

AUGUST 14 1992

Docket Nos. 50-413  
and 50-414

Distribution  
See next page

Mr. M. S. Tuckman  
Vice President, Catawba Site  
Duke Power Company  
4800 Concord Road  
York, South Carolina 29745

Dear Mr. Tuckman:

SUBJECT: ISSUANCE OF AMENDMENTS - CATAWBA NUCLEAR STATION, UNITS 1 AND 2  
(TAC NOS. M83148 AND M83149)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 99 to Facility Operating License NPF-35 and Amendment No. 93 to Facility Operating License NPF-52 for the Catawba Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated May 19, 1992, as supplemented June 15, 1992.

The amendments revise the TSs to allow the use of the B&W sleeving process as described in BAW-2045P, Revision 1, "Recirculating Steam Generator Kinetic Sleeve Qualification for 3/4 Inch OD Tubes." This revision allows sleeving to be used in the tube support plate region, as well as in the tube sheet region, which is currently allowed in TS 4.4.5.4.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

**ORIGINAL SIGNED BY:**

Robert E. Martin, Senior Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

**Enclosures:**

1. Amendment No. 99 to NPF-35
2. Amendment No. 93 to NPF-52
3. Safety Evaluation

cc w/enclosures:  
See next page

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Mr. M. S. Tuckman  
Duke Power Company

Catawba Nuclear Station

cc:

Mr. R. C. Futrell  
Regulatory Compliance Manager  
Duke Power Company  
4800 Concord Road  
York, South Carolina 29745

Mr. Alan R. Herdt, Chief  
Project Branch #3  
U. S. Nuclear Regulatory Commission  
101 Marietta Street, NW. Suite 2900  
Atlanta, Georgia 30323

Mr. A. V. Carr, Esquire  
Duke Power Company  
422 South Church Street  
Charlotte, North Carolina 28242-0001

North Carolina Electric Membership  
Corporation  
P. O. Box 27306  
Raleigh, North Carolina 27611

J. Michael McGarry, III, Esquire  
Winston and Strawn  
1400 L Street, NW  
Washington, DC 20005

Senior Resident Inspector  
Route 2, Box 179 N  
York, South Carolina 29745

North Carolina MPA-1  
Suite 600  
P. O. Box 29513  
Raleigh, North Carolina 27626-0513

Regional Administrator, Region II  
U. S. Nuclear Regulatory Commission  
101 Marietta Street, NW. Suite 2900  
Atlanta, Georgia 30323

Mr. Frank Modrak  
Project Manager, Mid-South Area  
ESSD Projects  
Westinghouse Electric Corporation  
MNC West Tower - Bay 241  
P. O. Box 355  
Pittsburgh, Pennsylvania 15230

Mr. Heyward G. Shealy, Chief  
Bureau of Radiological Health  
South Carolina Department of  
Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 27602

County Manager of York County  
York County Courthouse  
York, South Carolina 29745

Mr. R. L. Gill, Jr.  
Licensing  
Duke Power Company  
P. O. Box 1007  
Charlotte, North Carolina 28201-1007

Richard P. Wilson, Esquire  
Assistant Attorney General  
South Carolina Attorney General's  
Office  
P. O. Box 11549  
Columbia, South Carolina 29211

Saluda River Electric  
P. O. Box 929  
Laurens, South Carolina 29360

Piedmont Municipal Power Agency  
121 Village Drive  
Greer, South Carolina 29651

Ms. Karen E. Long  
Assistant Attorney General  
North Carolina Department of Justice  
P. O. Box 629  
Raleigh, North Carolina 27602

DATED: AUGUST 14, 1992

AMENDMENT NO. 99 TO FACILITY OPERATING LICENSE NPF-35 - Catawba Nuclear Station, Unit 1

AMENDMENT NO. 93 TO FACILITY OPERATING LICENSE NPF-52 - Catawba Nuclear Station, Unit 2

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R. Martin	14-H-25
OGC-WF	15-B-18
D. Hagan	MNBB 4702
G. Hill (8)	P1-37
W. Jones	MNBB 7103
C. Grimes	11-F-23
ACRS (10)	P-135
OPA	2-G-5
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

DUKE POWER COMPANY

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

SALUDA RIVER ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 99  
License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-35 filed by the Duke Power Company, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees) dated May 19, 1992, as supplemented June 15, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

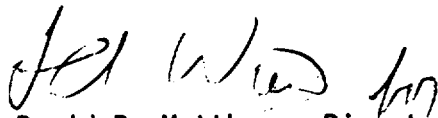
2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-35 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 99, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: August 14, 1992



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

DUKE POWER COMPANY

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 93  
License No. NPF-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the Catawba Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-52 filed by the Duke Power Company, acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency (licensees) dated May 19, 1992, as supplemented June 15, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

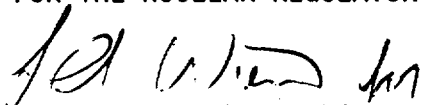
2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-52 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 93 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: August 14, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 99

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND

TO LICENSE AMENDMENT NO. 93

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove Pages

3/4 4-15

B 3/4 4-3

Insert Pages

3/4 4-15

B 3/4 4-3



SURVEILLANCE 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 or sleeve from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube or sleeve 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 or sleeve;
- 3) Degraded Tube means a tube or sleeve containing imperfections greater than or equal to 20% of the nominal tube or sleeve wall thickness caused by degradation;
- 4) % Degradation means the percentage of the tube or sleeve wall thickness affected or removed by degradation;
- 5) Defect means an imperfection of such severity that it exceeds the repair limit. A tube or sleeve containing a defect is defective;
- 6) Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by sleeving. It also means the imperfection depth at or beyond which a sleeved tube shall be plugged. The repair limit is equal to 40% of the nominal tube or sleeve wall thickness. For Unit 1, this definition does not apply to the region of the tube subject to the alternate tube plugging criteria.

If a tube is sleeved due to degradation in the F\* distance, then any defects found in the tube below the sleeve will not necessitate plugging.

The Babcock & Wilcox process described in Topical Report BAW-2045(P)-A, Rev. 1 will be used for sleeving.

- 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 4.4.5.3c., 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;

## REACTOR COOLANT SYSTEM

### BASES

#### RELIEF VALVES (Continued)

reactor coolant system pressure except for limited periods where the PORV has been isolated due to excessive seat leakage and except for limited periods where the PORV and/or block valve is closed because of testing and is fully capable of being returned to its normal alignment at any time, provided that this evolution is covered by an approved procedure. This is a function that reduces challenges to the code safety valves for overpressurization events. 5) Manual control of a block valve to isolate a stuck-open PORV. Testing of the PORVs includes the emergency N<sub>2</sub> supply from the Cold Leg Accumulators. This test demonstrates that the valves in the supply line operate satisfactorily and that the nonsafety portion of the instrument air system is not necessary for proper PORV operation.

#### 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 Reactor Coolant System 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 B&W process (or method equivalent) to the inspection method described in Topical Report BAW-2045(P)-A, Rev. 1, will be used. Inservice inspection of steam generator sleeves is also required to ensure RCS integrity. Because the sleeves introduce changes in the wall thickness and diameter, they reduce the sensitivity of eddy current testing, therefore, special inspection methods must be used. A method is described in Topical Report BAW-2045(P)-A, Rev. 1 with supporting validation data that demonstrates the inspectability of the sleeve and underlying tube. As required by NRC for licensees authorized to use this repair process, Catawba commits to validate the adequacy of any system that is used for periodic inservice inspections of the sleeves, and will evaluate and, as deemed appropriate by Duke Power Company, implement testing methods as better methods are developed and validated for commercial use.

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 Reactor Coolant System and the Secondary Coolant System (reactor-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a reactor-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 reactor-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 repaired.



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.

Principal Contributor: H. Conrad, EMEB/NRR

Date: August 14, 1992