

February 11, 2002

Mr. G. R. Peterson  
Site Vice President  
Catawba Nuclear Station  
Duke Energy Corporation  
4800 Concord Road  
York, South Carolina 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2 RE: ISSUANCE OF  
AMENDMENTS (TAC NOS. MB1570 AND MB1571)

Dear Mr. Peterson:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 195 to Facility Operating License NPF-35 and Amendment No. 188 to Facility Operating License NPF-52 for the Catawba Nuclear Station (CNS), Units 1 and 2. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated March 22, 2001, as supplemented by letter dated October 11, 2001.

The amendments revise the current CNS TS surveillance requirement (SR) for the methodology and frequency for the chemical analyses of the ice condenser ice bed. Also, these amendments add a new TS SR to address sampling requirements for ice additions to the ice bed. In addition, the amendments revise the current CNS TS surveillance requirement acceptance criteria and surveillance frequency for the inspection of ice condenser ice basket flow channel areas.

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,

**/RA/**

Chandu P. Patel, Project Manager, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosures:

1. Amendment No. 195 to NPF-35
2. Amendment No. 188 to NPF-52
3. Safety Evaluation

cc w/encls: See next page

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DUKE ENERGY CORPORATION  
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. 195  
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 Energy Corporation, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees), dated March 22, 2001, as supplemented by letter dated October 11, 2001, 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:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 195 , which are attached hereto, are hereby incorporated into this license. Duke Energy Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Richard J. Laufer, Acting Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: February 11, 2002

DUKE ENERGY CORPORATION  
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. 188  
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 Energy Corporation, acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency (licensees), dated March 22, 2001, as supplemented by letter dated October 11, 2001, 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:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 188 , which are attached hereto, are hereby incorporated into this license. Duke Energy Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Richard J. Laufer, Acting Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: February 11, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 195

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND LICENSE AMENDMENT NO. 188

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

Replace the following pages of the Appendix A Technical Specifications and associated Bases with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

<u>Remove</u>	<u>Insert</u>
3.6.12-2	3.6.12-2
3.6.12-3	3.6.12-3
B3.6.12-1	B3.6.12-1
B3.6.12-2	B3.6.12-2
B3.6.12-3	B3.6.12-3
B3.6.12-4	B3.6.12-4
B3.6.12-5	B3.6.12-5
B3.6.12-6	B3.6.12-6
B3.6.12-7	B3.6.12-7
B3.6.12-8	B3.6.12-8
B3.6.12-9	B3.6.12-9
B3.6.12-10	B3.6.12-10

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 195 TO FACILITY OPERATING LICENSE NPF-35  
AND AMENDMENT NO. 188 TO FACILITY OPERATING LICENSE NPF-52  
DUKE ENERGY CORPORATION, ET AL.  
CATAWBA NUCLEAR STATION, UNITS 1 AND 2  
DOCKET NOS. 50-413 AND 50-414

## 1.0 INTRODUCTION

By letter dated March 22, 2001, as supplemented by letter dated October 11, 2001, Duke Energy Corporation, et al. (DEC, the licensee), submitted a request for changes to the Catawba Nuclear Station (CNS), Units 1 and 2, Technical Specifications (TS). The requested changes are divided into two parts. Part I affects the current CNS TS surveillance requirement (SR) for the methodology and frequency for the chemical analyses of the ice condenser ice bed (stored ice). Also, these amendments add a new TS SR to address sampling requirements for ice additions to the ice bed. Part II affects the current CNS TS surveillance requirement acceptance criteria and surveillance frequency for the inspection of ice condenser ice basket flow channel areas. The proposed changes also result in renumbering the SRs. Associated changes to the TS Bases were made by the licensee pursuant to 10 CFR 50.59.

The October 11, 2001, letter provided additional information that did not expand the scope of the original Federal Register notice or the initial proposed no significant hazard consideration determination.

## 2.0 DISCUSSION AND EVALUATION

### 2.1 Changes to Ice Bed Chemical Analyses and Sampling

These proposed amendments modify the current CNS TS SR 3.6.12.3. The changes involve the methodology and frequency for the chemical analyses of the stored ice. Also, these proposed amendments add a new TS SR to address sampling requirements for ice additions to the ice bed.

Specifically, the current CNS SR 3.6.12.3 requires that every 18 months, ice in the ice bed be verified to have a boron concentration of greater than or equal to 1800 ppm and a pH between 9.0 and 9.5. The proposed amendments include the following changes to SR 3.6.12.3 for sampling of the ice in the ice bed:

- The number of samples is increased from 9 to 24 by requiring one sample from each of the 24 ice condenser bays.
- The interval for the surveillance is increased from once per 18 months to once per 54 months.



- A note is added to the effect that the results of the SR will be based on the average of the 24 individual samples.
- A boron concentration upper limit of 2330 ppm is added to reflect the value required for the post loss-of-coolant hot leg switch-over timing calculation.
- The current SR 3.6.12.3 will be renumbered to SR 3.6.12.7.

In addition a new SR 3.6.12.2 is added with the following changes applicable to each addition of ice:

- For each ice addition, the ice must meet the boron concentration and pH requirements of SR 3.6.12.7, and
- The chemical analysis of the boron concentration and pH may be performed on either the liquid solution or the resulting ice.

The licensee stated that the industry experience has shown that there are no normal operating mechanisms that decrease the boron concentration of the stored ice, and pH remains within a 9.0 to 9.5 range when boron concentrations are above approximately 1100-1200 ppm. The licensee also stated that the review of past history of sampling analysis results at CNS concluded that, consistently, the boron and pH of the ice beds have been well within limits. The proposed surveillance frequency of 54 months is expected to be the length of three fuel cycles, and it is consistent with the improved Standard Technical Specifications for Westinghouse plants with ice condensers. Based on the above considerations, and further assurance provided by the addition of the new CNS SR 3.6.12.2 for the ice that may be added to the ice bed, the staff concludes that changing the performance frequency from 18 to 54 months is acceptable.

The addition of the Note in SR 3.6.12.7 indicating that the SR is satisfied based on the averages of the boron concentration and pH provides clarification that, as the licensee states, the average analysis results of the individual samples should be "consistent with the accident analysis assumption that the bulk containment sump pH and boron concentration will not be altered from their accident analysis assumed values following complete ice melt." The staff agrees with licensee's evaluation regarding the use of average concentrations.

The provision of the additional SR 3.6.12.2 provides further assurance that the boron concentration and pH of ice that may be added to the ice bed as often as each refueling outage will be controlled within the limit values.

The licensee has proposed to add an upper limit of 2330 ppm to the TS surveillance limit on required boron concentration. The licensee stated that the CNS's Updated Final Safety Analysis Report (UFSAR) documents the input parameters for the boron precipitation analysis, and these input parameters establish a maximum boron concentration of 2330 ppm for CNS's ice beds. The licensee further stated that the boron precipitation analysis shows that the maximum boron concentration in the reactor vessel following a hypothetical loss of coolant accident is below the NRC staff accepted maximum limit. The licensee indicated that CNS has procedural

controls that have maintained the borax ice making solution within the TS lower limit of 1800 ppm and the UFSAR documented upper limit of 2330 ppm. The addition of the TS upper limit requirement on boron concentration does not require any changes to existing maintenance practices for targeting boron concentration.

The staff has determined that the licensee's proposed changes, as discussed above, should ensure a clearer and more consistent interpretation and implementation of the TS related to boron concentration and pH. In addition, the proposed changes are consistent with the improved Standard Technical Specifications for Westinghouse plants with ice condensers. The staff has approved similar changes at other Westinghouse plants with ice condensers. On these bases, the staff finds these changes to be acceptable.

## 2.2 Changes To Ice Bed Flow Area Verification

The amendments alter the acceptance criterion and surveillance frequency in the current CNS TS SR 3.6.12.2. Also, due to the addition of the new SR described in the above discussion, the changes result in renumbering the current SR 3.6.12.2 to SR 3.6.12.3.

Specifically, the current CNS SR 3.6.12.2 require a visual inspection of the air/steam flow area within the ice condensers. These proposed amendments replace the current visual inspection requirement that uses a 0.38 inch ice/frost buildup criteria with a visual surveillance program that provides a 95 percent confidence level that flow blockage does not exceed the 15 percent assumed in the accident analysis. Whereas, the 0.38 inch program required inspection of as few as two flow channels per ice condenser bay, the new program will require at least 33 percent of the flow area per bay to be inspected. Also, the proposed changes revise the frequency interval from 9 months to 18 months for flow area inspection of the ice condenser. The surveillance is intended to be performed following outage maintenance as an "as-left" surveillance.

The amendments also revise the applicability from "flow channels through the ice condenser" to "flow channels through the ice bed." An associated revision to the TS Bases clarifies which structures are to be inspected. The revision limits the structures to be inspected to only include "between ice baskets" and "past lattice frames and wall panels." This change also deletes "frost" from the SR. The Westinghouse definitions for frost and ice have been added to the TS Bases to explain why frost is not an impediment to air/steam flow through the ice condenser.

The purpose of the change is to revise the TS such that it is based on the design basis analysis for the plant. The licensee indicated that Westinghouse analysis has shown that over-pressurization of the lower compartment will not occur provided the overall blockage is less than the 15 percent of each safety analysis section that is assumed in the transient mass distribution (TMD) analysis. The TMD analysis lumps the ice condenser bays into six sections of 2.75, 3.25, 6.50, 4.50, 3.50 and 3.50 bays. The analysis concluded that 15 percent effective flow blockage was acceptable. The analysis methodology supports that there can be individual bays with blockage of greater than 15 percent, or even individual channels blocked, provided the highest calculated percent blockage in each of the TMD lumped sections is less than or equal to 15 percent. The 15 percent blockage inspection criterion applies to each of the six analysis sections. The staff concludes that the proposed changes provide a better criterion to assure that the design basis analysis limitations for the plant are not exceeded. The revised inspection requirement will change from requiring inspection of as few as two flow passages per each of

the 24 ice condenser bays, to at least 54 passages (33 percent) per bay to be inspected. The staff agrees with the licensee's conclusion that this increased sampling would provide an increased confidence level in the results of the inspection. On these bases, the staff finds the changes to be acceptable.

The scope for a visual inspection of the flow channels in the Bases for the new SR 3.6.12.3 has been changed to include the flow channel area between the ice baskets and past lattice frames and wall panels. This area is the limiting area for flow through the ice bed. The principal effect of this change is to remove the much larger flow areas in the regions of the upper deck grating and the lower inlet plenum and turning vanes from the flow channel area definition. The licensee stated that the plant and the industry experience have shown that removal of ice from these larger structures during the refueling outages is sufficient to ensure their operability. Accordingly the licensee indicated that plant procedures will now require a 100 percent inspection and evaluation for any gross ice buildup on the excluded structures, and the removal of significant ice accumulations.

The NRC staff review of this subject has determined that inspection, during an operating cycle, of the larger components such as the lower inlet plenum and associated components, such as the turning vanes, is not necessary to meet the intent of the SR. The staff recognizes that the lower inlet plenum and associated components (such as the turning vanes) represent a relatively large free volume, such that the available flow area is not significantly affected by any localized frost/ice buildup within the volume. Specifically, the available flow area in the lower inlet plenum is typically 10 to 100 times the flow area within the ice basket matrix. Hence, the literal application of the subject SR to the lower inlet plenum region has no significant physical basis. The staff finds the licensee's proposed changes to the SR to be consistent with the NRC staff's latest guidance in the improved Standard Technical Specifications for Westinghouse plants. On these bases, as discussed above, the staff finds these changes to be acceptable.

The previous SR 3.6.12.2 required that the accumulation of ice or frost would be inspected and compared to the acceptance criterion. The proposed change deletes frost from the SR and adds a definition of frost to the Bases to explain why frost is not an impediment to air/steam flow through the ice condenser. The frost is defined as ice which is loosely adherent, and can be easily brushed or knocked off by hand. The licensee stated that Westinghouse concurs that loose ice is judged to either melt or be blown out very quickly during design basis accident. Thus, excluding frost from the flow blockage determination does not impact the safety analyses. The staff agrees with licensee's conclusion. Therefore, the exclusion of frost from flow blockage determination is acceptable.

Also, the licensee has proposed to revise the frequency interval from 9 months to 18 months for the flow area inspection of the ice condensers. The licensee stated that management of ice condenser maintenance activities has successfully limited activities with the potential for significant flow channel degradation to the refueling outage. By verifying an ice bed condition of less than or equal to 15 percent flow channel blockage following completion of these maintenance activities, the surveillance assures that the ice bed is in acceptable condition for the duration of the operating cycle. During the operating cycle, an expected amount of ice sublimates and reforms as frost on the colder surfaces in the Ice Condenser. However, frost does not degrade flow channel flow area according to the Westinghouse definition of frost. Thus, the licensee states that, the surveillance will effectively demonstrate operability for an allowed 18-month cycle. In addition, the proposed frequency is consistent with the improved

Standard Technical Specifications for Westinghouse plants. On these bases, the staff finds the changes to be acceptable.

### 3.0 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.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. 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 (66 FR 36339). 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: C. Patel

Date: February 11, 2002

Catawba Nuclear Station

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