

February 2, 2006

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Subject: Duke Energy Corporation  
Catawba Nuclear Station, Unit 2  
Docket Number 50-414  
Proposed Change to Technical Specification (TS) 5.5.9,  
Steam Generator (SG) Program

Reference: Letter from Duke Energy Corporation to NRC, same  
subject, dated December 19, 2005

The reference letter submitted a proposed revision to the subject TS requirements. The amendment application proposed a revision to TS 5.5.9 to incorporate changes in the SG tube repair criteria during the Unit 2 End of Cycle 14 Refueling Outage and subsequent outages.

On January 26, 2006, a telephone discussion was held between Duke Energy Corporation and the NRC. As a result of this discussion, Duke Energy Corporation is amending the reference submittal to request the TS change on a one-time basis. The revised request provides for a SG tube depth within the tubesheet of 17 inches. The request, as it is being revised via this letter, is therefore similar to requests made by other utilities and approved by the NRC.

Attachment 1 provides a re-marked copy of the affected TS pages for Catawba, showing the proposed changes. Attachment 2 is a revised No Significant Hazards Consideration Determination in support of the revised request. The information being revised via this supplement is indicated by revision bars in the margin of the text.

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In addition, to support this request, Catawba is proposing that the Unit 2 Facility Operating License be conditioned to require a reduction in the allowable normal operating primary-to-secondary leakage rate from 150 gallons per day to 75 gallons per day through any one SG and from 600 gallons per day to 300 gallons per day through all SGs. The proposed license condition will be applicable for the duration of Unit 2 Cycle 15 operation. The marked-up Facility Operating License pages are contained in Attachment 3. Applicable procedures will be modified as necessary to implement the license condition.

Duke Energy Corporation anticipates submitting a topical report supporting this revised request by February 28, 2006. Duke Energy Corporation requests the proposed amendment be approved by March 18, 2006 to support the SG tube examination during the Unit 2 End of Cycle 14 Refueling Outage.

Pursuant to 10 CFR 50.91, a copy of this proposed amendment supplement is being sent to the appropriate State of South Carolina official.

Should you have any questions concerning this information, please call L.J. Rudy at (803) 831-3084.

Very truly yours,

A handwritten signature in black ink, appearing to read 'D.M. Jamil', with a large, stylized flourish at the end.

D.M. Jamil

Attachments

LJR/s

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D.M. Jamil affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.



D.M. Jamil, Site Vice President

Subscribed and sworn to me:

2-2-06

Date

Michy Staudridge  
Notary Public

My commission expires:

7-10-2012

Date



SEAL

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**ATTACHMENT 1**

**MARKED-UP TS PAGES FOR CATAWBA**

5.5 Programs and Manuals

**5.5.9 Steam Generator (SG) Program (continued)**

condition of the tubing during a SG inspection outage, as determined from the Inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged to confirm that the performance criteria are being met.

- b. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.
  - 1. Structural integrity performance criterion: All Inservice SG tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown, and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.
  - 2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 150 gallons per day through each SG for a total of 600 gallons per day through all SGs.
  - 3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."
- c. Provisions for SG tube repair criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

**INSERT** →

(continued)

INSERT for TS 5.5.9c.

The following alternate tube repair criteria may be applied as an alternative to the 40% depth based criteria:

1. For the Unit 2 End of Cycle 14 Refueling Outage and Cycle 15 operation only, the 40% depth based criterion does not apply to degradation identified in the portion of the tube below 17 inches from the top of the tubesheet. Degradation found in the portion of the tube below 17 inches from the top of the tubesheet does not require plugging. Degradation identified in the portion of the tube from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service.

**ATTACHMENT 2**

**REVISED NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION**

### No Significant Hazards Consideration Determination

The following discussion is a summary of the evaluation of the changes contained in this proposed amendment against the 10 CFR 50.92(c) requirements to demonstrate that all three standards are satisfied. A no significant hazards consideration is indicated if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated, or
2. Create the possibility of a new or different kind of accident from any accident previously evaluated, or
3. Involve a significant reduction in a margin of safety.

### First Standard

*Does operation of the facility in accordance with the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated? No.*

The previously analyzed accidents are initiated by the failure of plant structures, systems, or components. The proposed change that alters the SG tube repair criteria does not have a detrimental impact on the integrity of any plant structure, system, or component that initiates an analyzed event. The proposed change will not alter the operation of, or otherwise increase the failure probability of any plant equipment that initiates an analyzed accident.

Of the applicable accidents previously evaluated, the limiting transients with consideration to the proposed change to the SG tube repair criteria, are the SG tube rupture event and the steam line break event.

During the SG tube rupture event, the required structural integrity margins of the SG tubes will be maintained by the presence of the SG tubesheet. SG tubes are hydraulically expanded in the tubesheet area. Tube rupture in tubes with cracks in the tubesheet region of the tube is precluded by the constraint provided by the tubesheet. This constraint results from the hydraulic expansion process, thermal expansion mismatch between the tube and tubesheet, and the differential pressure between the primary and secondary side. Based on this design, the structural margins against burst, discussed in the TS are maintained for both normal and postulated accident conditions.

The proposed change does not affect other systems, structures, components, or operational features. Therefore, the proposed changes result in no significant increase in the probability of the occurrence of a SG tube rupture event.

At normal operating pressures, leakage from stress corrosion cracking below the proposed limited tube repair depth is limited by both the tube-to-tubesheet crevice and the limited crack opening permitted by the tubesheet constraint. Consequently, negligible normal operating leakage is expected from cracks within the tubesheet region. The consequences of a SG tube rupture event are affected by the primary-to-secondary leakage flow during the event. Primary-to-secondary leakage flow through a postulated broken tube is not affected by the proposed change since the tubesheet enhances the tube integrity in the region of the hydraulic expansion by precluding tube deformation beyond its initial hydraulically expanded outside diameter.

The probability of a steam line break event is unaffected by the potential failure of a SG tube, as this failure is not an initiator for a steam line break event.

The consequences of a steam line break event are also not significantly affected by the proposed change. During a steam line break event, the reduction in pressure above the tubesheet on the shell side of the SG creates an axially uniformly distributed load on the tubesheet due to the reactor coolant system pressure on the underside of the tubesheet. The resulting bending action constrains the tubes in the tubesheet, thereby restricting primary-to-secondary leakage below the midplane.

Primary-to-secondary leakage from tube degradation in the tubesheet area during the limiting accident (i.e., a steam line break event) is limited by flow restrictions resulting from the crack and tube-to-tubesheet contact pressures that provide a restricted leakage path above the indications and also limit the degree of potential crack face opening as compared to free span indications. The primary-to-secondary leak rate from tube degradation in the tubesheet region during postulated steam line break event conditions will be no more than twice that allowed during normal operating conditions when the pressure boundary is relocated to the 17-inch depth. Since normal operating leakage is limited to 75 gallons per day through any one SG per the proposed license condition, the associated accident condition leak rate, assuming all leakage to be from lower tubesheet indications, would be limited to 150 gallons per day per SG. This is the value that is assumed in the steam line break dose analysis.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

### Second Standard

*Does operation of the facility in accordance with the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated? No.*

The proposed change does not introduce any new equipment, create new failure modes for existing equipment, or create any new limiting single failures. Plant operation will not be altered, and all safety functions will continue to be performed as previously assumed in accident analyses. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

### Third Standard

*Does operation of the facility in accordance with the proposed amendment involve a significant reduction in the margin of safety? No.*

The proposed change maintains the required structural margins of the SG tubes for both normal and accident conditions. NEI 97-06 and the Catawba TS are used as the bases in the development of the limited tubesheet tube repair depth methodology for determining that SG tube integrity considerations are maintained within acceptable limits. Regulatory Guide 1.121 describes a method acceptable to the NRC for meeting General Design Criterion (GDC) 14, "Reactor coolant pressure boundary," GDC 15, "Reactor coolant system design," GDC 31, "Fracture prevention of reactor coolant pressure boundary," and GDC 32, "Inspection of reactor coolant pressure boundary," by reducing the probability and consequences of a SG tube rupture event. By determining the limiting safe conditions for tube wall degradation, the probability and consequences of a SG tube rupture event are reduced. Safety factors are used for loads for tube burst that are consistent with the requirements of Section III of the American Society of Mechanical Engineers (ASME) Code.

For axially oriented cracking located within the tubesheet, tube burst is precluded due to the presence of the tubesheet. For circumferentially oriented cracking, the analysis provided in support of this proposed amendment defines a length of degradation free expanded tubing that provides the necessary resistance to tube pullout due to the pressure induced forces, with applicable safety factors applied. Application of the

| limited tubesheet tube repair depth criterion (17 inches) will preclude unacceptable primary-to-secondary leakage during all plant conditions.

Therefore, the proposed change does not involve a significant reduction in any margin of safety.

Based upon the preceding discussion, Duke Energy Corporation has concluded that the proposed amendment does not involve a significant hazards consideration.

**ATTACHMENT 3**

**MARKED-UP FACILITY OPERATING LICENSE PAGES FOR CATAWBA**

(6) Additional Conditions

The Additional Conditions contained in Appendix B, as revised through Amendment No. 172 are hereby incorporated into this renewed license. Duke Energy Corporation shall operate the facility in accordance with the Additional Conditions.

- D. The facility requires exemptions from certain requirements of Appendix J to 10 CFR Part 50, as delineated below, and pursuant to evaluations contained in the referenced SER and SSER. These include: (a) partial exemption from the requirement of paragraph III.D.2(b)(ii) of Appendix J, the testing of containment airlocks at times when the containment integrity is not required (Section 6.2.6 of SSER #5), (b) exemption from the requirement of paragraph III.A.1(d) of Appendix J, insofar as it requires the venting and draining of lines for type A tests (Section 6.2.6 of SSER #5), and (c) partial exemption from the requirements of paragraph III.B of Appendix J, as it relates to bellows testing (Section 6.2.6 of the SER and SSER #5). These exemptions are authorized by law, will not present an undue risk to the public health and safety, are consistent with the common defense and security, and are consistent with certain special circumstances, as discussed in the referenced SER and SSER. These exemptions are, therefore, hereby granted pursuant to 10 CFR 50.12. With the granting of these exemptions, the facility will operate, to the extent authorized herein, in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission.

E. Physical Protection

Duke Energy Corporation shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains safeguards information protected under 10 CFR 73.21, is entitled: "Duke Energy Physical Security Plan" submitted by letter dated September 8, 2004, and supplemented on September 30, 2004, October 15, 2004, October 21, 2004 and October 27, 2004.

F. Reporting to the Commission

Except for Item 2.C.(2), Duke Energy Corporation shall report any violations of the requirements contained in Section 2.C of this renewed license in the following manner: initial notification shall be made within twenty-four (24) hours to the NRC Operations Center via the Emergency Notification System with written follow-up within 30 days in accordance with the procedures described in 10 CFR 50.73 (b), (c), and (e).

- G. The licensees shall have and maintain financial protection of such type and in such amounts as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims.

Renewed License No. NPF-52  
Revised by letter dated October 29/2004

<u>Amendment Number</u>	<u>Additional Condition</u>	<u>Implementation Date</u>
165	<p>The schedule for the performance of new and revised surveillance requirements shall be as follows:</p> <p>For surveillance requirements (SRs) that are new in Amendment No. 165 the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment No. 165. For SRs that existing prior to Amendment No. 165, including SRs with modified acceptance criteria and SRs who intervals of performance are being extended, the first performance is due at the end of the first surveillance interval that begins on the date the surveillance was last performed prior to implementation of amendment No. 165. For SRs that existed prior to Amendment No. 165, whose intervals of performance are being reduced, the first reduced surveillance interval begins upon completion of the first surveillance performed after implementation of Amendment No. 165</p>	By January 31, 1999
172	The maximum rod average burnup for any rod shall be limited to 60 GWd/mtU until the completion of an NRC environmental assessment supporting an increased limit.	Within 30 days of date of amendment.

INSERT 

INSERT for Unit 2 Facility Operating License, Appendix B

Amendment Number	Additional Condition	Implementation Date
To be inserted by NRC	This amendment requires the licensee to use administrative controls, as described in the licensee's letter of February 2, 2006, and evaluated in the Staff's Safety Evaluation dated (to be inserted by NRC), to restrict the primary to secondary leakage through any one steam generator to 75 gallons per day and through all steam generators to 300 gallons per day (in lieu of the limits in TS Sections 3.4.13d. and 5.5.9b.3.), for Cycle 15 operation.	Prior to any entry into Mode 4 during Cycle 15 operation