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AUTH.NAME      AUTHOR AFFILIATION  
MCCOLLUM, W.R.      Duke Power Co.  
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SUBJECT: Forwards response to NRC request for addl info re root cause of indications & operability assessment of Oconee units.

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**Duke Power Company**

*A Duke Energy Company*

Oconee Nuclear Site

P.O. Box 1439

Seneca, SC 29679

**W. R. McCollum, Jr.**  
*Vice President*

(864) 885-3107 OFFICE

(864) 885-3564 FAX

November 6, 1997

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

Subject: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287  
Request for Technical Specification Amendment  
Steam Generator Tubing Surveillance  
Request for Additional Information

In a letter dated October 20, 1997, Duke Energy Corporation (Duke) requested an amendment to the Technical Specifications for Oconee Nuclear Station Units 1, 2, and 3. The amendment consisted of proposed changes to the Steam Generator Tubing Surveillance requirements. In a letter dated October 30, 1997, the NRC requested additional information about the Technical Specification amendment request and associated topical report.

Duke provided a response to the NRC's request for additional information (RAI) as part of a supplement to the Technical Specification amendment request in a letter dated November 3, 1997. In the response to the NRC's RAI, Duke indicated that additional information would be provided at a later date concerning the root cause of the indications and an operability assessment of the Oconee units. The response to the questions about the root cause of the indications and operability of the Oconee units is provided in Attachment 1.

Since the reroll process is not contained in the current Oconee Technical Specifications as an approved repair method, NRC approval of the Technical Specification submittal must be obtained prior to exceeding 250°F in the Reactor Coolant System on Oconee Unit 1. Currently, restart of Oconee Unit 1 is expected to occur the last week of November 1997. However, the heatup above 250°F in the Reactor Coolant System on Oconee Unit 1 is expected to occur around November 21, 1997. Therefore, Duke requests that the Technical Specification submittal be reviewed and approved

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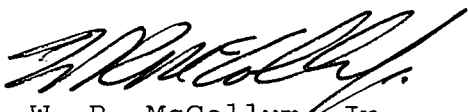
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on an expedited basis to support the restart of Oconee Unit  
1.

If there are any questions regarding this submittal, please  
contact Michael Bailey at (864) 885-4390.

Very truly yours,



W. R. McCollum, Jr.  
Site Vice President  
Oconee Nuclear Station

cc: L. A. Reyes, Regional Administrator  
Region II

M. A. Scott, Senior Resident Inspector  
Oconee Nuclear Site

D. E. LaBarge, Project Manager  
NRR

## RESPONSE TO NRC QUESTIONS

**Questions C1 and C2**

The rerolling repair process is proposed to return to service a number of tubes with degradation initiating from the inside diameter (ID) of the tubes. With the one unusual exception, no other licensees with OTSGs have identified such degradation in their OTSG tubing. Given the significant number of degraded tubes that were identified in the current refueling outage and the potential implications for the leakage integrity of the tubes, the staff requests the following information:

1. Discuss the root cause for the development of ID-initiated degradation in the "B" OTSG tubes.
2. Provide details of an operational assessment that considers this mode of steam generator tube degradation.

**Response to Question C1**

The inside diameter (ID) initiated degradation observed at Oconee can be divided into two types: pure water stress corrosion (PWSCC) and intergranular attack (IGA) at the roll transition. Pulled tubes from Oconee Unit 3 and other once through steam generators (OTSGs) indicate that the OTSGs are susceptible to PWSCC at the roll transition.

The root cause evaluation of the second mode of degradation which is ID IGA is in progress. Since previous tube exams have shown that it is extremely difficult to trace degradation back to a single root cause, Oconee expects that a single root cause will not be identified. Based on previous inspection and pulled tube results from Oconee Unit 3 during the last refueling outage, Oconee does not believe this degradation is significantly active on all Oconee units. The current results appear to indicate a cause that would be limited largely to steam generator B on Oconee Unit 1. Operating experience from Three Mile Island Unit 1 suggests that the ID IGA has a single event initiation. It is suspected that the IGA initiated many years ago from some contamination and is not directly associated with plant operation.

## RESPONSE TO NRC QUESTIONS

**Response to Question C2**

The current inspection results on Oconee Unit 1 do not indicate a concern for the safe operation of the OTSGs. The degradation which has been identified does not represent a concern for tube burst or significant leakage rates. Any similar degradation on the other Oconee units will be identified during planned inspections and repaired appropriately.

ID IGA has been observed in the Oconee Unit 1B steam generator within the upper tubesheet. The tubesheet is 24 inches deep and the observed indications are at the roll transition within two and a half inches of the tube end. Because these indications are captured in the tubesheet, the indications will not burst and do not present a structural concern. Destructive analysis indicates that the observed depth is thirty five percent through wall with a maximum possible depth of forty-six percent through wall. In addition, the destructive analysis data indicates that the indications are detectable by eddy current testing and do not represent a leakage concern

Helium leak tests have been performed on the five pulled tubes and no leakage was identified. In situ pressure tests were also performed on twelve tubes representing the deepest degradation and no leakage was identified. Therefore, no leakage is expected at accident conditions.

The growth rate of the ID IGA appears to be low as inferred by the inspection results. Approximately 1900 indications have been observed by rotating coil technology. The bobbin inspection has not identified a large population of these indications in this outage or previous outages. Even if the growth occurred in the last cycle, a population of these indications would have been expected to reach the bobbin detection threshold. IGA that has been observed on the ID and OD has been shown to have little growth during operation. The projected growth rates are still bounded for the next cycle.

Therefore, ID IGA should not present an operability concern for the next cycle on Oconee Unit 1 or for the operating Oconee units.