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TO: Mr. Edson G. Case		FROM: Duke Power Company Charlotte, North Carolina William O. Parker, Jr.	DATE OF DOCUMENT 6/21/77
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ACKNOWLEDGED

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ENCLOSURE

Consists of proposed Technical Specification ...notorized 6/21/77....incorporating provisions of the model specifications excluding steam generator tube sample size and frequency.....

(7-P)

PLANT NAME: Oconee Units 1-2-3 (4-P)

RJL 6/30/77

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DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

June 21, 1977

TELEPHONE: AREA 704
373-4083

Regulatory

FILE 67

Mr. Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555



Re: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

In response to a July 18, 1974 letter from Mr. Karl R. Goller, a submittal dated August 30, 1974 was made which requested a revision to the Oconee Nuclear Station Technical Specifications to make provisions for surveillance of steam generator tubing. This proposal was consistent with Regulatory Guide 1.83. At the time of this submittal, no inservice inspections of the "once-through" design of steam generators had been performed. In a February 27, 1975 letter, the preliminary results of the first inservice inspection of Oconee 1 steam generator tubing were provided which indicated that the generators were exceptionally clean and free of detectable defects. Also, it was pointed out that the design of the once-through steam generators was significantly different than that of the recirculation type because:

1. The use of full flow condensate polishing with volatile chemical additions reduced the susceptibility of the steam side to corrosion attack.
2. Solids such as sodium phosphate are not added.
3. The straight tube, straight shell configuration and broached tube support plate design minimize possible locations of stagnation.
4. The once-through mode of operation eliminates bulk concentrations of impurities.
5. Testing has been performed to assure freedom from vibration damage.

Additionally, it was stated that Duke Power Company was re-evaluating its program for steam generator tubing surveillance to properly reflect the design and operating features of the once-through steam generator and to incorporate experience gained during the Oconee 1 steam generator inspection.

In a March 27, 1975 letter, a detailed description of the first eddy-current inspection results was provided. This inspection was performed in accordance with the methods described in Regulatory Guide 1.83.

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In a September 3, 1975 letter, it was stated that the criteria for steam generator surveillance were being developed for inclusion in Section XI of the ASME Boiler and Pressure Vessel Code. It was intended that this criteria would be issued in the Winter 1975 Addenda to Section XI. Submittal of a specification covering this surveillance was to be provided after the Section XI code was revised to cover this matter.

In a September 21, 1976 letter, Mr. A. Schwencer provided a model technical specification covering steam generator surveillance and requested that we propose a license amendment to incorporate the requirements concerning the operability and inservice inspection of the steam generators. This was accomplished in our submittal of November 30, 1976 in which a Technical Specification modeled on the ASME Section XI Winter 1975 Addenda was provided.

Over the past three years since the original submittal of a Technical Specification covering steam generator operation and surveillance, considerable experience has been gained on the six Oconee once-through steam generators. Regularly scheduled inservice inspections have been performed four times (two for Oconee 1 and one each for Oconee 2 and 3), and have examined approximately 4000 tubes. As a result of steam generator tube leaks which have occurred since July, 1976, nine additional inspections have been performed which have examined approximately 700 additional tubes (the examinations performed during the first several tube leak outages were limited in scope). Additionally, inservice inspections have been performed at two other nuclear stations which utilize the B&W designed once-through steam generators.

It has been our experience that the once-through steam generators are not subject to widespread general tube wall thinning due to corrosive attack. Indeed rarely, if ever, has a tube been observed to have wall thinning in the classical sense. Examinations performed during the tube leak outages have revealed that the leaks are the result of the propagation of a local defect by high-cycle fatigue from vibration. There has been no evidence of intergranular stress corrosion or evidence of the wasting or tube denting problems associated with some of the recirculating steam generators. Eddy current testing has been shown effective in locating a defect in a failed tube, but has been unable to predict a pending failure in a tube. For instance, tubes examined by eddy current testing and shown to be acceptable for continued service have failed within a matter of weeks. In short, eddy current testing has not proven itself to be entirely useful as a diagnostic aid in ascertaining the condition of the steam generator.

Currently, there are at least three recognized inservice inspection programs for steam generator tubes. These are Regulatory Guide (RG) 1.83, the NRC Model Technical Specifications and the Winter 1975 Addenda to ASME Section XI. Based upon our experience, it is our belief that these programs are devised to discover the general degradation which has been identified in certain recirculating water steam generators. The following is a list of comments which Duke Power Company considers pertinent with regards to these standards.

1. All three standards require additional unscheduled inservice inspections during the shutdown subsequent to a primary-to-secondary tube leak in excess of the Technical Specification limits (1 gpm). In the type leaks which have occurred at Oconee (circumferential cracks), the majority of leaks will progress to the technical specification limit. This is due to the necessity of assuring a leakage rate of sufficient magnitude to be identified after shutdown before the shutdown is initiated, and the rapid progression of the leakage rate during shutdown. Since in all instances only one tube has been involved, it is unnecessarily restrictive to require the inspection of 450 to 900 steam generator tubes during every tube leak outage. Indeed, there is no rationale for requiring an inspection based upon leakage rates when the type of leaks encountered have been cracks and not wall thinning.
2. Regulatory Guide 1.83 requires a supplemental inspection of the second steam generator if any tube indicates a previously undetected imperfections of 20% of greater depth. Several eddy current indications have been observed on Oconee tubes in the tube support sheet or tube sheet areas where interpretation of results is difficult. In selected instances, these tubes have been plugged as a precaution. Eddy current testing can accurately tell the wall thickness of defects for wastage and not for cracks. Therefore, it is likely that additional steam generators would be required to be inspected unnecessarily.
3. The model Technical Specification requires excessively large eddy current samples. For instance, if one tube defect is determined during a tube leak outage, a minimum of approximately 2700 tubes must be inspected. This is unreasonably restrictive in restoring the unit to service particularly considering the dubious value of the inspection for once-through steam generators.

In summary, while it is considered that eddy current examination techniques are valid for detecting general steam generator tube wastage (thinning), and hence pending failures, it is not particularly effective for the type of steam generator tube defects which have occurred on the Oconee units. Eddy current examination should be continued, therefore, on such a frequency as would be conducive to detecting and identifying any potential general tube wastage situation. It is not meaningful or beneficial, however, to apply eddy current examination extensively in all cases of tube defects in once-through steam generators. In this regard, it is also noted that the matter of the tube defects which have occurred at Oconee is the subject of separate discussions with the staff.

Accordingly, pursuant to the provisions of 10CFR50.90, the attached proposed Technical Specification is provided for your review and approval. This specification incorporates provisions of the model specifications excluding steam generator tube sample size and frequency. The sample size and frequencies proposed are in accordance with the requirements of ASME Section XI Winter 1975 Addenda. As described above, the requirement to perform an unscheduled inspection in the event a tube leaks in excess of the Technical

Mr. Edson G. Case, Acting Director

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Specification limits have been deleted, and it is considered that the sample sizes and acceptance criteria are appropriate for the once-through steam generators.

The Oconee steam generators are, and will continue to be inspected in accordance with the proposed Technical Specifications.

Very truly yours,

s/William O. Parker, Jr.

William O. Parker, Jr.

MST:ge

WILLIAM O. PARKER, JR., being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this request for amendment of the Oconee Nuclear Station Facility Operating Licenses DPR-38, DPR-47, and DPR-55; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

s/William O. Parker, Jr.

William O. Parker, Jr., Vice President

Subscribed and sworn to before me this 21st day of June, 1977.

s/Vivian B. Robbins

Notary Public
(Notarial Seal)

My Commission Expires:

February 15, 1982