February 3, 1997

Mr. J. W. Hampton
Vice President, Oconee Site
Duke Power Company
P. O. Box 1439
Seneca, SC 29679

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 TENDON SURVEILLANCE TECHNICAL SPECIFICATION CHANGE (TAC NOS. M97125, M97126, M97127)

Dear Mr. Hampton:

By letter dated October 30, 1996, you submitted a proposed amendment to the Oconee Nuclear Station Units 1, 2, and 3 Technical Specification requirements to implement a containment tendon surveillance program based on Regulatory Guide 1.35. The NRC staff has reviewed the information supplied with your application and determined that additional information, as requested in the enclosure, is necessary before we can complete our review.

Sincerely,
Original signed by:

David E. LaBarge, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270 and 50-287

Enclosure: Request For Additional Information

cc w/encl: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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REQUEST FOR ADDITIONAL INFORMATION

OCONEE NUCLEAR STATION UNITS 1, 2, AND 3

1. The discussion on the concept of prestressed concrete containment as contained in Insert B to the BASES section of the revised technical specification is uncalled-for. It contains misleading statements and should be revised so that it will be succinct and to the point.

2. In your procedure for inspection and tendon surveillance of the Reactor Building, you adopt the prescribed lower limit (PLL) required by Regulatory Guide 1.35, Revision 3, as the acceptance criterion for surveillance. Provide a graph for each group of tendons that shows the PLL, 90 percent PLL, and 95 percent PLL as well as the minimum required tendon force. In establishing the PLL, refer to Regulatory Guide 1.35.1 for guidance. Since you are not using the relaxed surveillance intervals for a multiple-unit plant, it appears that either separate graphs for each unit or, if justified, combined graphs for the three units may serve the purpose.

3. Your previous tendon surveillances were based on repeated use of the same preselected tendons and the results of the lift-off forces indicated larger prestress losses than predicted. This can be attributed to the effect of detensioning and retensioning the same tendons through a number of cycles. Since the forthcoming tendon surveillance for Unit 1 is based on Regulatory Guide 1.35, Rev. 3, which requires the use of randomly selected tendons, indicate how the data of previous surveillances can be used in the linear regression analysis to establish the trend of tendon forces. With only the forthcoming data it may not be possible to perform a trend analysis. This information should be provided in the Bases section.

4. For Section 4.4.2.1, change "Surveillance Intervals" to "Inspection Intervals" because "inspection" is more inclusive than "surveillance," which is used here exclusively for inspection of tendons. Also, change the first sentence to read "The inspection intervals to demonstrate the structural integrity of the reactor building shall be as follows:" Since this is an amendment, there is no need to mention the required inspection intervals that have passed. For all the units, the inspection is at 5-year intervals. For each unit, as a data base, just mention the date of the first inspection performed and the intervals of inspection thereafter and the date of the last inspection conducted. The staff believes that this information is more meaningful than what you have presented. Further, to be realistic, it would be improbable even though not impossible to perform the inspection exactly at 5-year intervals and therefore some provision should be made for potential deviation in the inspection intervals. Such deviation is allowed in ASME Section XI, Subsection IWL. This can avoid the future need for requesting relief

Enclosure

because of any deviation. The terms "reactor building," "reactor building structure," and "containment" have been used interchangeably. To be consistent and to avoid any confusion use "reactor building" throughout since it has been extensively used.

5. Under a. in Section 4.4.2.2, the first sentence states to the effect that predicted limits have been established for each tendon. Since the surveillance is to be based on randomly selected tendons, and there are hundreds of tendons, it would be a major task to do so, but realistically this is not necessary. It should be remembered that you are using a sample tendon to represent the behavior of a sampled population. Therefore, what is required is the predicted limit for each group of tendons as indicated in item 2 above. Change "each tendon" to "each tendon group." The predicted limits should be based on initial seating forces of the tendons in the group normalized for the effects of elastic deformation.

6. Under b. in Section 4.4.2.2, the first sentence mentions "a previously stressed tendon." What this means is not clear, since all the tendons are stressed. A change of this statement appears to be in order.

7. Under c. in Section 4.4.2.2, in the middle of the paragraph it states "...between zero and the tendon seating force." In order to establish the useful linear relationship between force and elongation, the following information should be obtained: (a) the pretensioned force (PTF), which is the force necessary to bring the tendon into a slightly stressed condition to remove slack and seat the buttonheads and is the base for elongation measurement, (b) lock off force (LOF) is the force at which the tendon load transferred to the shim stack from the ram and is representative of the force at which the tendon lift occurred during the monitoring of the tendon force, and (c) the overstress force (OSF) is that force at which the maximum elongation is determined. The three approximately equally spaced levels of force and elongation as required by Regulatory Guide 1.35 are to be between PTF and LOF, i.e., two additional readings should be made between PTF and LOF. In view of the above considerations, a revision of the statement is required. Instead of the statement, the following table may serve the purpose.

Actual Observed Force and Elongation Measurement
For Retensioned Tendons

| | Force (Kips) | Pressure (psi) | Elongation (in) |
|---|---|---|---|
| PTF | | | |
| Step 1 | | | |
| Step 2 | | | |
| LOF | | | |
| OSF | | | |

Total Elongation (actual) = (LOF - PTF) Elongation

List the definitions of the terms as indicated above.

On the basis of the information in the table, a graph to show the force-elongation relationship should be provided in the surveillance report for each retensioned tendon. From this graph, we can see how well the measurements were made and the tendon surveillance was performed.

8. On the basis of comments 3. and 4. above, the statement in the BASES should be revised. For instance, the first sentence mentions "Reactor Building prestressed concrete containment." This is confusing, because it can be interpreted that within the reactor building there is a prestressed concrete containment.

9. Section 4.4.2.3 indicates that only bottom grease caps of vertical tendons are to be inspected. At Farley, a lower anchor head failure was found as a result of the discovery of grease and deformed the grease cap at the top of the vertical tendon. The failure of the vertical tendon lower anchor head was attributed to the presence of water in the lower grease cap, leading to the hydrogen stress cracking of the anchor head material. The large force, thus released, deformed the top grease cap resulting in the leakage of the grease. In view of this, both top and bottom grease caps of vertical tendons should be visually inspected, unless it can be justified.