10CFR50.36

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September 29, 1988

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

Attention: Mr. J. J. Hayes, Jr.

SUBJECT: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
"Containment Structural Integrity"
Surveillance Requirements

Reference: September 16, 1986 SCE&G to Mr. H. R. Denton letter and September 14, 1988 NRC meeting with Mr. J. J. Hayes, Jr., Mr. C. P. Tan, and Mr. H. Ashar

Gentlemen:

South Carolina Electric & Gas Company (SCE&G) agrees to the request made by Mr. C. P. Tan as a condition for the approval of our September 16, 1986 request for change to "Containment Structural Integrity" Technical Specifications (3.6.1.6). SCE&G will revise the Technical Specifications Bases (3/4.6.1.6) to include the reference to Surveillance Test Procedure STP-160.001, "Containment Tendon Test," Attachment I, for the purpose of specifying the tendons to be inspected and establishing the base values and normalizing factors for those tendons, see Enclosure.

If you should have any additional questions, please advise.

Very truly yours,

O. S. Bradham

WRH/OSB:lcd
Enclosure

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CONTAINMENT SYSTEMS

BASES

3/4.6.1.4 INTERNAL PRESSURE

The limitations on reactor building internal pressure ensure that 1) the reactor building structure is prevented from exceeding its design negative pressure differential with respect to the outside atmosphere of 3.5 psig and 2) the reactor building peak pressure does not exceed the design pressure of 57 psig during steam line break conditions.

The maximum peak pressure expected to be obtained from a steam line break event is 47.1 psig. The limit of 1.5 psig for initial positive containment pressure will limit the total pressure to 47.1 psig which is less than design pressure and is consistent with the accident analyses.

3/4.6.1.5 AIR TEMPERATURE

The limitations on reactor building average air temperature ensure that the overall containment average air temperature does not exceed the initial temperature condition assumed in the accident analysis for a steam line break accident.

3/4.6.1.6 REACTOR BUILDING STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the containment will withstand the maximum pressure of 47.1 psig in the event of a steam line break accident. The measurement of containment tendon lift off force, the tensile tests of the tendon wires, the visual examination of tendons, anchorages and exposed interior and exterior surfaces of the containment, and the Type A leakage test are sufficient to demonstrate this capability.

The tendon lift off forces are evaluated to ensure that 1) the rate of tendon force loss is within predicted limits, and 2) a minimum required prestress level exists in the containment. In order to assess the rate of force loss, the lift off force for a tendon is compared with the force predicted for the tendon times a reduction factor of 0.95. This resulting force is referred to as the 95% Base Value. The predicted tendon force is equal to the original stressing force minus losses due to elastic shortening of the tendon, stress relaxation of the tendon wires, and creep and shrinkage of the concrete. The 5% reduction on the predicted force is intended to compensate for both uncertainties in the prediction techniques for the losses and for inaccuracies in the lift-off force measurements.

REACTOR BUILDING STRUCTURAL INTEGRITY (Continued)

In order for the tendon lift off force to be indicative of the level of prestress force in the containment, each measured force must be adjusted for the known differences which exist among the tendons due to original stressing force and elastic shortening loss. This adjustment is accomplished through the use of a Normalizing Factor ($NF_i(t)$). This factor is added to the lift off force, which results in the Normalized Lift Off Force. The Normalizing Factor is given by:

$$NF_i(t) = \{F_{ave}(o) - F_i(o)\} \{1 - \frac{SR(t)}{100}\} + \Delta F_{es}^{T} \{\frac{N - 2n + 1}{2N}\}$$

$\{F_{ave}(o) - F_i(o)\}$ is the group average lock-off force at original stressing, minus the original stressing force for the specific tendon.

SR(t) is stress relaxation (percent) which occurs at time t after original stressing.

ΔF_{es}^{T} is the total elastic shortening tendon force loss.

n is the stressing sequence comprising the specific tendon.

N is the total number of stressing sequences for the group of tendons which comprise the specific tendons.

i refes to the specific tendon.

t refers to the time after original stressing of the current inspection period.

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The surveillance requirements for demonstrating the containment's structural integrity are in compliance with the recommendations of Proposed Revision 3 to Regulatory Guide 1.35, "Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments," April 1979, except that in place of the Lower Limit and 90% Lower Limit defined by these Regulatory Guides, the 95% Base Value and 90% Base Value, respectively, are used.

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The Base Values and Normalizing Factors of tendons selected for surveillances 4 through 10 are listed in Enclosure 8 of Attachment I to the Virgil C. Summer Nuclear Station Surveillance Test Procedure STP-160.001, "Containment Tendon Test," Revision 2. Based on experience from the first three tendon surveillances, STP-160.001 may have to be revised to add Base Values and Normalizing Factors for additional or alternate tendons not previously listed, but are required for a particular surveillance. The revision level of STP-160.001, as listed above, need not be updated in this Technical Specification where a change to Enclosure 8 of Attachment I only adds Base Values and Normalizing Factors for tendons not previously listed, but were used as additional or alternates for a particular surveillance. Base Values and Normalizing Factors listed in Enclosure 8 of Attachment I of STP-160.001 will not be revised prior to NRC approval.