

TECHNICAL SPECIFICATIONS

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#### 4.4.2 Reactor Building Structural Integrity

##### Applicability

Applies to structural integrity of the Reactor Building, specifically, the prestressed concrete cylinder and dome portions of the reactor building.

##### Objective

To define the inservice surveillance program for the Reactor Building post-tensioning system and concrete cylinder and dome.

##### Specification

#### 4.4.2.1 Inspection Intervals

The inspection intervals to demonstrate the structural integrity of the reactor building shall be as follows:

- a. For Unit 1, the inspection interval, as measured from 1/1/93, shall be every five years thereafter.
- b. For Unit 2, the inspection interval, as measured from 11/1/94, shall be every five years thereafter.
- c. For Unit 3, the inspection interval, as measured from 6/1/95, shall be every five years thereafter.
- d. Tendon surveillance may be conducted during reactor operation provided design conditions regarding loss of adjacent tendons are satisfied at all times.
- e. Inspection intervals in Specification 4.4.2.1 (a), (b), and (c) may be modified in accordance with the requirements of ASME Section XI, Subsection IWL.

#### 4.4.2.2 Tendons

Adequacy of prestressing forces in tendons shall be demonstrated by performing the following activities:

- a. Determine that a random, but representative, sample of at least eleven tendons (five hoop, three vertical, three dome) each have an observed lift-off force within the predicted limits established for each tendon group. For each subsequent inspection, one tendon from each group shall be kept unchanged to develop a history and to

correlate the observed data. The procedure of inspection and the tendon acceptance criteria shall be as follows:

1. If the measured prestressing force of the selected tendon in a group lies above the prescribed lower limit, the lift-off test is considered to be a positive indication of the sample tendon's acceptability.
2. If the measured prestressing force of the selected tendon in a group lies between 95% of the prescribed lower limit and 90% of the prescribed lower limit, two tendons, one on each side of this tendon, shall be checked for their prestressing forces. If the prestressing forces of these two tendons are above 95% of the prescribed lower limits for the tendons, all three tendons shall be restored to the required level of integrity, and the tendon group shall be considered acceptable. If the measured prestressing forces of any two adjoining tendons fall below 95% of the prescribed lower limits of the tendons, additional lift-off testing shall be done to detect the cause and extent of such occurrence. The conditions shall be considered as an indication of abnormal degradation of the reactor building(s). In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.2.
3. If the measured prestressing force of any tendon lies below 90% of the prescribed lower limit, the defective tendon shall be fully investigated and additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the reactor building. In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.2.
4. If the average of all measured prestressing forces for any group (corrected for average condition) is found to be less than the minimum required prestress level at anchorage location for that group, the condition shall be considered as abnormal degradation of the reactor building. In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.1.

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ATTACHMENT 2

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Applies to structural integrity of the Reactor Building, specifically, the prestressed concrete cylinder and dome portions of the reactor building.

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4.4.2.1 Inspection Intervals

The inspection intervals to demonstrate the structural integrity of the reactor building shall be as follows:

- a. For Unit 1, the inspection interval, as measured from 1/1/93 ~~7/1/91~~, shall be every five years thereafter.
- b. For Unit 2, the inspection interval, as measured from 11/1/94, shall be every five years thereafter.
- c. For Unit 3, the inspection interval, as measured from 6/1/95, shall be every five years thereafter.
- d. Tendon surveillance may be conducted during reactor operation provided design conditions regarding loss of adjacent tendons are satisfied at all times.
- e. Inspection intervals in Specification 4.4.2.1 (a), (b), and (c) may be modified in accordance with the requirements of ASME Section XI, Subsection IWL.

4.4.2.2 Tendons

Adequacy of prestressing forces in tendons shall be demonstrated by performing the following activities:

- a. Determine that a random, but representative, sample of at least eleven tendons (five hoop, three vertical, three dome) each have an observed lift-off force within the predicted limits established for each tendon group. For each subsequent inspection, one tendon from each group shall be kept unchanged to develop a history and to

correlate the observed data. The procedure of inspection and the tendon acceptance criteria shall be as follows:

1. If the measured prestressing force of the selected tendon in a group lies above the prescribed lower limit, the lift-off test is considered to be a positive indication of the sample tendon's acceptability.
2. If the measured prestressing force of the selected tendon in a group lies between the prescribed lower limit and 90% of the prescribed lower limit, two tendons, one on each side of this tendon, shall be checked for their prestressing forces. If the prestressing forces of these two tendons are above 95% of the prescribed lower limits for the tendons, all three tendons shall be restored to the required level of integrity, and the tendon group shall be considered acceptable. If the measured prestressing forces of any two adjoining tendons fall below 95% of the prescribed lower limits of the tendons, additional lift-off testing shall be done to detect the cause and extent of such occurrence. The conditions shall be considered as an indication of abnormal degradation of the reactor building(s). In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.2.
3. If the measured prestressing force of any tendon lies below 90% of the prescribed lower limit, the defective tendon shall be fully investigated and additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the reactor building. In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.2.
4. If the average of all measured prestressing forces for any group (corrected for average condition) is found to be less than the minimum required prestress level at anchorage location for that group, the condition shall be considered as abnormal degradation of the reactor building. In the event of an indication of abnormal degradation, refer to Technical Specification 3.6.7.1.
5. If the measured prestressing forces from consecutive surveillances for the same tendon, or tendons in a group, indicate a trend of prestress loss larger than expected and the resulting prestressing forces are

## ATTACHMENT 3

### TECHNICAL JUSTIFICATION

#### Revision to 4.4.2.1:

This minor revision changes the date from which the reactor building tendon surveillance interval is measured for Unit 1. In a response to the staff dated April 22, 1997, Question #4, Duke provided the interval start dates for each unit. For Unit 1, Duke provided an overly conservative date of July 1, 1991. This date was based on the start of the Unit 1 Sixth Tendon Surveillance. The Unit 1 Sixth Tendon Surveillance was not completed until January 1, 1993, due to portions of the surveillance which were carried over to the next refueling outage. Therefore, January 1, 1993 should be the date specified in proposed Specification 4.4.2.1. Accordingly, this will require that the Unit 1 Seventh Tendon Surveillance be completed no later than January 1, 1999 (five years plus 12 month grace period).

According to Regulatory Guide 1.35, Revision 3, and ASME Section XI, the surveillance intervals are at 1, 3, and 5 years and then every 5 years thereafter, as measured after the initial Structural Integrity Test (SIT). The Unit 1 SIT was completed on August 2, 1971. If the Seventh Tendon Surveillance was conducted under this sequence, then the resulting due date, without the allowed relaxations, would be August 2, 2000. Therefore, completion of the Unit 1 Seventh Tendon Surveillance by January 1, 1999, is conservative with respect to these requirements.

#### Revisions to 4.4.2.2.a.2:

Regulatory Guide (RG) 1.35, Revision 3, constitutes the basis for Oconee's proposed technical specification changes for Reactor Building Structural Integrity. During development of procedures as part of the pre-implementation effort for this new proposed technical specification, a review of Specification 4.4.2.2.a.2 revealed that this item was not consistent with RG 1.35, Revision 3, methodology. Specifically, the item

required that two additional adjacent tendons be checked for their prestressing forces if the measured prestressing force for the first-examined tendon is between the prescribed lower limit (PLL) and 90% of the PLL. RG 1.35, Revision 3, Section 7.1.2, requires that two additional adjacent tendons be checked for their prestressing forces if the measured prestressing force for the first-examined tendon is between 95% of the PLL and 90% of the PLL. Specifically, as Specification 4.4.2.2.a.2 is currently worded, adjacent tendons to the first-examined tendon would have to be unnecessarily examined if the first-examined tendon exhibited a prestressing force between 100% of the PLL and 95% of the PLL. Therefore, the methodology proposed in the current specification is overly conservative and could potentially result in the examination of additional tendons beyond the requirements of RG 1.35, Revision 3.

In addition, the word "adjoining" is added in Specification 4.4.2.2.a.2 to provide clarification that additional lift-off testing needs to be done only if two adjoining tendons' prestressing force falls below 95% of the PLL. As the proposed specification is currently worded, this could be misinterpreted to imply any two tendons, regardless of whether they are adjacent. This proposed wording change is also consistent with RG 1.35, Revision 3, Section 7.1.2.