5.2 CONTAINMENT

Specification

The containment for this unit consists of three systems which are the reactor building, reactor building isolation system, and penetration room ventilation system.

5.2.1 Reactor Building

The reactor building completely encloses the reactor and its associated reactor coolant system. It is a fully continuous reinforced concrete structure in the shape of a cylinder with a shallow domed roof and flat foundation slab. The cylindrical portion is prestressed by a post tensioning system consisting of horizontal and vertical tendons. The dome has a three-way post tensioning system. The structure can withstand the loss of 3 horizontal and 3 vertical tendons in the cylinder wall or adjacent tendons in the dome without loss of function. The foundation slab is conventionally reinforced with high strength reinforcing steel. The entire structure is lined with 1/4" welded steel plate to provide vapor tightness.

The internal volume of the reactor building is approximately 1.836×10^6 cu. ft. The approximate inside dimensions are: diameter--116'; height--208 1/2'. The approximate thickness of the concrete forming the building are: cylindrical wall--3 3/4'; dome--3 1/4'; and the foundation slab--8 1/2'.

The concrete containment structure provides adequate biological shielding for both normal operation and accident situations. Design pressure and temperature are 59 psig and 286°F, respectively.

The reactor building is designed for an external atmospheric pressure of 3.0 psi greater than the internal pressure. This is greater than the differential pressure of 2.5 psig that could be developed if the building is sealed with an internal temperature of 120°F with a barometric pressure of 29.0 inches of Hg and the building is subsequently cooled to an internal temperature of 80°F with a concurrent rise in barometric pressure to 31.0 inches of Hg. Since the building is designed for this pressure differential, vacuum breakers are not required.

Penetration assemblies are seal welded to the reactor building liner. Access openings, electrical penetrations, and fuel transfer tube covers are equipped with double seals. Reactor building purge penetrations and reactor building atmosphere sampling penetrations are equipped with double valves having resilient seating surfaces. (1)

Duke Power Company

Oconee Nuclear Station

Attachment 2

No Significant Hazards Consideration Evaluation

No Significant Hazards Consideration Evaluation

Duke Power Company (Duke) has made the determination, based on the evaluation presented in Attachment 3, that this amendment request involves a no significant hazards consideration by applying the standards established by NRC regulations in 10CFR50.92. This ensures that operation of the facility in accordance with the proposed amendment would not:

1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

Each accident analysis addressed within the Oconee FSAR has been examined with respect to changes proposed within this amendment request. The change in CFV is not considered to be an initiator of any event discussed within Chapter 15 of the FSAR. Accordingly, the probability of an accident previously evaluated occurring is not impacted. As discussed in Attachment 3, the proposed change which would revise the value for the CFV based on the as-built drawings would result in a slight increase in the reactor building pressure for the worst postulated LOCA analyzed in the Oconee FSAR. However, this would not significantly affect the probability or consequences of any accident previously evaluated since the building design pressure is still not reached for the worst LOCA analysis.

2) Create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

The CFV value is not considered to be an initiator for accidents or other types of events. Thus, operation of Oconee in accordance with this proposed Technical Specification will not create any failure modes not bounded by previously evaluated accidents. As such, this change will not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

3) Involve a significant reduction in a margin of safety.

As discussed in Attachment 3, the proposed amendment to revise the current value for the CFV in Technical Specification 5.2.1 to a more accurate value based on the as-built drawings does not reduced any margin of safety. The design limits for peak pressure and temperature are not challenged by this change. No other margin of safety is affected by this change and all safety functions required to mitigate the consequences of the worst analyzed LOCA case are unaffected.

Duke has concluded based on the above discussion and technical justification provided in Attachment 3 that there are no significant hazards consideration involved in this amendment request.

Duke Power Company

Oconee Nuclear Station

Attachment 3

Technical Justification

Technical Justification

Purpose

The proposed amendment would revise the value for the containment free volume (CFV) in Technical Specification 5.2.1 to reflect the documented as-built CFV. The purpose of this evaluation is to provide technical justification to support a No Significant Hazards Consideration evaluation.

Description of Change

Technical Specification 5.2.1 specifies the design features of the Oconee Nuclear Station reactor buildings. The current value for the internal volume of the reactor building, otherwise known as CFV, is specified in Technical Specification 5.2.1 as approximately 1.91×10^6 cubic feet. This value is believed to be based on a preliminary estimate made prior to completion of the Oconee Nuclear Station final construction and does not reflect the as-built CFV. To resolve this discrepancy, the proposed amendment would revise Technical Specification 5.2.1 to specify the CFV as 1.836×10^6 cubic feet which is the as-built internal volume of the reactor building. The new CFV value is also reflected in Section 3.8.1.1 and Table 15.16.6 of the Oconee FSAR, updated in December of 1989.

Although this amendment is an administrative change in nature, in that it corrects discrepancy between as-built CFV value and the value given in Technical Specifications, the proposed amendment was evaluated to determine the impact of the change in the CFV value. As discussed in the following paragraphs, the proposed amendment would not significantly affect the integrity of the reactor building or the results of the design basis accidents reported in the Oconee FSAR.

Evaluation

The current Technical Specification 5.2.1 specifies the containment free volume (CFV) as approximately 1.91×10^6 cubic feet. This value is an estimate made prior to the Oconee Nuclear Station construction completion and is difficult to trace. The value for the CFV based on the as-built drawings for the Oconee containment is 1.836×10^6 cubic feet. The more accurate and documented value of 1.836×10^6 cubic feet is considered the correct value for future applications.

The CFV value is used as input for leak rate test (ILRT) calculations for containment integrity as required by Technical Specification 4.4.1 and 10CFR50, Appendix J and the Oconee FSAR Chapter 15 Loss of Coolant Accident (LOCA) analyses. For accident scenarios causing pressurization of the containment a smaller CFV will result in higher containment pressures. As far as the ILRT calculations are concerned, the leakage is calculated as a percentage of weight of the original containment air at leakage rate test pressure (greater than or equal to the design pressure of 59 psig) that escaped to the outside atmosphere during a 24 hour test period, as required by Appendix J. Therefore, by calculating a leak rate based on percent weight ratio, the CFV is eliminated from the calculations and has no impact on the final results of Type A Tests. For Types B and C tests, the proposed smaller CFV value conservatively results in calculating a more restrictive leak rate test criteria to which all the test results are compared. In addition, a review of the past Type B and C test acceptance criteria indicates that the acceptance criteria based on the proposed CFV value has no effect on the past test results and they remain valid. Therefore, the impact of the proposed change is not significant for ILRT calculations or Type A, B, or C Test criteria. However, since the proposed smaller CFV will result in a higher containment peak pressure during a worst LOCA, the effect of the CFV revision on the LOCA analyses were examined further.

According to Section 15.14.5 of the Oconee FSAR, the highest building pressure occurs for a 14.1 square feet hot leg break. This worst case LOCA analysis assumed no reactor building spray and no reactor building coolers operating. The case was reanalyzed to examine the effects of changing the reactor building free volume from 1.91×10^6 cubic feet to 1.836×10^6 cubic feet. This change resulted in an increase in the peak containment pressure of approximately 2 psi. However this worst case maximum pressure is still well below the design building pressure of 59 psig. Likewise, the peak containment temperature increased slightly, however, the margin between the peak temperature and limiting EQ profile, as specified by IEEE-323 (1974), is maintained. Therefore, there will be no reduction in any margin of safety due to this change. No other design or safety parameters are significantly affected by the proposed value for the CFV.

In summary, the effect of the proposed change on ILRT calculations, as required by 10CFR50 Appendix J, is not significant. As for the impact on the FSAR analyses, the effect of the proposed change on peak containment pressure and temperature was examined, and the change meets the no significant hazards requirements established in 10CFR50.92. The change increases both peaks slightly but does not lessen any margin of safety.