ATTACHMENT

TO

1CAN079301

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT ONE

DOCKET NO. 50-313

DESCRIPTION OF PROPOSED CHANGES

The proposed change revises the Arkansas Nuclear One, Unit 1 (ANO-1) reactor building (RB) internal volume specified in Technical Specification (TS) 5.2.1 from a value of 1.91×10^6 cu. ft. to a value of 1.81×10^6 cu. ft. This change is proposed to reflect the result of a more accurate calculation of the RB internal volume. Also, the wording of the specification has been changed to clarify that the volume specified is the RB net free volume.

BACKGROUND

The value for the ANO-1 RB internal volume specified in TS 5.2.1 (1.91×10^6 cu. ft.) is an approximate value. Loss of coolant accident (LOCA) RB peak pressure analyses use smaller assumed values, which are more conservative in that they result in higher peak RB pressures. The original ANO-1 Safety Analysis Report (SAR) LOCA analysis predicted a maximum internal reactor building pressure of 53.1 psig and a temperature of 280°F.

The RB internal volume given in the ANO-1 Safety Evaluation Report (SER) is "approximately 1.8×10^6 cu. ft." The SER acceptance criteria for the ANO-1 reactor building pressure limit is the reactor building design pressure of 59 psig.

A similar TS change request was approved for the Oconee Nuclear Station, Units 1, 2, and 3 on August 21, 1991.

DISCUSSION OF CHANGE

For the original SAR peak RB pressure analysis which required a more accurate value for the RB internal volume, a value of 1.8656×10^6 cu. ft. (RB net free volume) was used. This value is supported by an approved calculation. During a penetration design review, a non conservative error was identified in this calculation. This error was the omission of a term in the toroidal sector calculation used to determine the RB dome volume. Several other errors were found during the resolution of this omission error, resulting in the recalculation of the entire RB net free volume. The resolution of these errors resulted in a decrease in the calculated RB net free volume from 1.8656×10^6 cu. ft. to 1.81×10^6 cu. ft.

RB net free volume is used as an input in the following analyses and testing: RB Design Basis Accident (DBA), post-LOCA hydrogen generation, Maximum Hypothetical Accident (MHA), LOCA, and RB leak rate testing. The following discussion reviews the impact of the proposed change in net free volume on each of these issues.

RB DBA Analysis

The post accident analysis most affected by this reduction in calculated RB volume is the ANO-1 RB DBA analysis. A reanalysis was performed using the COPATTA computer code. The results of this analysis indicated a new peak RB pressure of 54.0 psig and a temperature of 284°F. These values exceed the original SAR values of 53.1 psig and 280°F but are still below the licensing basis design pressure and temperature of 59 psig and 286°F, respectively. Part of the temperature increase is a result of the higher initial RB temperature assumed in the new COPATTA analysis as documented by letters dated April 4, 1990, (1CAN049003) and August 8, 1990 (1CAN089002). The new temperature profile was verified not to impact the Environmental Qualification Program.

The margin between the original SAR analysis pressure of 53.1 psig and the RB design pressure is 11.1%. As a result of the decrease in calculated RB net free internal volume, this margin has been slightly reduced. Due to recent studies (NUREG/CR-5121 and NUREG/CR-4209) which indicate that large dry prestressed concrete containments with steel liners do not start leaking until greater than twice the design pressure is reached, and require even higher pressure for rupture, this slight decrease in margin is not considered significant. Also, since these increased analysis values are below the RB design values of 59 psig and 286°F, no significant reduction in the margin of safety results.

Post-LOCA Hydrogen Generation

The small reduction in the calculated RB net free volume results in slightly less than a 3% increase in post-LOCA hydrogen generation (the hydrogen concentration generated is proportional to the RB volume). A specific analysis to address only the reduction in net free volume was not performed. However, a recent analysis performed to address plant design changes used the smaller net free volume. This recent hydrogen generation analysis was performed using COGAP (NUREG/CR-2847). Results from this analysis have already been incorporated into the ANO-1 SAR Amendment No. 11 under 10 CFR 50.59 criteria.

MHA Dose Calculation

In the MHA dose calculation the reduction in calculated RB net free volume results in a reduction in the sprayed region volume. The dose calculations are based upon the RB leakage rate expressed as a percentage per day. This change in calculated RB internal net free volume has very little effect on the offsite doses calculated, due to the use of the percentage leakage rate per day. A sensitivity analysis was performed with TACT5 (NUREG/CR-5106) to verify a negligible impact on the MHA doses. This analysis showed a decrease in the Exclusion Area Boundary (EAB) whole body dose of approximately 0.46%; approximately no change in the EAB thyroid dose; a decrease in the Low Population Zone (LPZ) whole body dose of approximately 0.44%; and a slight increase in the LPZ thyroid dose of approximately 0.056%.

LOCA Analysis

The LOCA analysis assumes initial RB conditions which result in the lowest peak building pressure following a LOCA. Therefore, a conservative overestimate of the RB net free volume is assumed for the LOCA analysis. By maximizing the net free volume assumption in the LOCA evaluation a minimum RB pressure is calculated. The change in calculated net free volume is in the conservative direction with respect to the LOCA analysis; therefore, no additional evaluations were required.

<u>RB Leak Rate Testing</u>

The RB net free volume is also used as an input for the Integrated Leak Rate Test (ILRT) calculations for RB integrity as required by TS 4.4.1 -- "Reactor Building Leakage Tests" and 10CFR50 Appendix J. The leakage is calculated as a percentage of the mass change of the air contained in the RB net free volume during a timed test period, as required by Appendix J. Since the RB net free volume is constant throughout the test, this volume appears in the calculation of the mass of the air contained in the RB net free volume and the change in mass terms of the calculation. When the percentage change in mass is calculated, the RB net free volume is canceled out of the equation and has essentially no impact on the final results of Appendix J Type A tests. For Appendix J Type B and C tests, the leak rate test acceptance criterion is based upon a percentage per day leakage calculated from the value for the RB net free volume. This proposed reduction in calculated RB net free volume value conservatively results in calculating a more restrictive leak rate test criterion to which all test results are compared. In addition, a review of past Type B and C test acceptance criteria indicates that the acceptance criteria based on the proposed RB net free volume value has no effect on the past test results which remain valid. Therefore, the impact of the proposed change in the calculated RB net free volume value is not significant for Appendix J Type A, B, or C test criteria.

<u>DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION</u>

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the standards in 10CFR50.92(c). A discussion of these standards as they relate to this amendment request follows:

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

Reactor Building internal volume is not an event initiator of any accident analyzed in the ANO-1 SAR. The proposed changes do not provide any relief from the requirements of the TS, or change the intended operation or administrative requirements of the plant or its design basis.

The reduction in the calculated value for the RB net free volume has been reevaluated for its impact on the consequences of the RB DBA analysis. Only a 0.9 psig increase from the original SAR analysis peak RB pressure results from this smaller calculated RB volume. This new peak RB pressure is still less than the RB design pressure of 59 psig. The peak RB temperature increase results in a value that is still below the RB design temperature of 286°F. The new temperature profile was verified not to impact the Environmental Qualification Program.

The reduction in the calculated value for the RB net free volume has been verified to have a slight impact on the post-LOCA hydrogen generation calculation and negligible impact on the MHA dose calculation. The reduction in the calculated value is in the conservative direction with respect to the LOCA analysis.

For 10CFR50 Appendix J Type A ILRT calculations, the leak rate is calculated based upon percentage mass ratio. This eliminates the RB net free volume from the calculations. Therefore, the calculated value for RB net free volume has essentially no impact on the final results of Appendix J Type A ILRTs. For Appendix J Type B and C leak rate tests, the proposed reduction in the calculated value for RB net free volume results in the calculation of more restrictive leak rate test criteria to which the test results are compared.

The wording change clarifies that the internal volume specified for the RB is the internal net free volume and is considered to be a purely administrative change.

Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated.

The proposed changes do not involve any design changes, plant modifications, or changes in plant operation; rather, they reflect a more accurate description of the design features of the ANO-1 reactor building.

Therefore, this change does not create the possibility of a new or different kind of accident from any previously evaluated.

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

The increased RB DBA peak pressure and temperature values do not exceed the RB design pressure and temperature values of 59 psig and 286°F, respectively. The slight decrease in margin is not considered significant given that recent studies have shown that large dry prestressed concrete containments with steel liners do not leak until greater than twice the design pressure is reached, and that higher pressures are required for rupture to occur. The new temperature profile was verified not to impact the Environmental Qualification Program.

The reduction in the calculated value for the RB net free volume has been verified to have a slight impact on the post-LOCA hydrogen generation calculation which is not considered significant, and negligible impact on the MHA dose calculation. The reduction in the calculated value is in the conservative direction with respect to the LOCA analysis.

The calculated value for RB net free volume has essentially no impact on the final results of Appendix J Type A ILRTs. For Appendix J Type B and C leak rate tests, the proposed reduction in the calculated value for RB net free volume results in the calculation of more restrictive leak rate test criteria to which the test results are compared.

The wording change clarifies that the internal volume specified for the RB is the internal net free volume and is considered to be a purely administrative change.

Therefore, this change does not involve a significant reduction in the margin of safety.

The Commission has provided guidance in 51 FR 7750 dated March 6, 1986, concerning the application of these 10CFR50.92 standards by providing examples of amendments which are likely to involve no significant hazards considerations. The proposed amendment most closely matches example (vi): "A change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan, e.g., a change resulting from the application of a small refinement of a previously used calculational model or design model."

The effects of the proposed change in the calculated value of the RB net free volume on the peak RB pressure and temperature, the effect on accident analysis and equipment qualification, and ILRT calculations as applicable to leak rate test criteria have been evaluated. The evaluations show that all parameters and test results remain acceptable.

Therefore, based upon the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

MARKUP OF CURRENT ANO-1 TECHNICAL SPECIFICATIONS

5.2 REACTOR BUILDING

Applicability

Applies to those design features of the reactor building relating to operational and public safety.

Objective

To define the significant design features of the reactor building structure, reactor building isolation system, and penetration room ventilation system.

Specification

5.2.1 Reactor Building Structure

The reactor building completely encloses the reactor and the associated reactor coolant system. It is a fully continuous reinforced concrete structure in the shape of a cylinder with a shallow domed roof and a 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 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 net free volume of the reactor building is approximately ~~1.91~~ 1.81 x 10^6 cu. ft. The approximate inside dimensions are: diameter--116'; height--207'. The approximate thickness of the concrete forming the buildings are: cylindrical wall--3-3/4'; dome--3-1/4'; and the foundation slab--9'.

The concrete reactor building structure provides adequate shielding or 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 corresponds to a margin of 0.5 psi above the differential pressure that could be developed if the building is sealed with an internal temperature of 110 F and it is subsequently cooled to an internal temperature of less than 50 F. Since the building is designed for this pressure differential, vacuum breakers are not required.

The principal design basis for the structure is that it be capable of withstanding the internal pressure resulting from a loss of coolant accident, as defined in FSAR Section 14 with no loss of integrity. In this event the total energy contained in the water of the reactor coolant system is

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The internal net free volume of the reactor building is approximately 1.81×10^6 cu. ft. The approximate inside dimensions are: diameter--116'; height--207'. The approximate thickness of the concrete forming the buildings are: cylindrical wall--3-3/4'; dome--3-1/4'; and the foundation slab--9'.

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The principal design basis for the structure is that it be capable of withstanding the internal pressure resulting from a loss of coolant accident, as defined in FSAR Section 14 with no loss of integrity. In this event the total energy contained in the water of the reactor coolant system is