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Neil S. "Buzz" Carns
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July 9, 1992

2CAN079201

SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Proposed ANO-2 Technical Specifications to Revise
Containment Parameter Limits and Reduce Peak Linear Heat Rate
Limit

Gentlemen:

Attached for your review and approval are proposed Technical Specification (TS) changes for Arkansas Nuclear One, Unit 2 (ANO-2). These changes will revise the containment internal pressure, average air temperature, and relative humidity limits, (TS Figure 3.6-1 and Bases) and reduce the linear heat rate limit (TS Figure 3.2-1) for ANO-2.

In accordance with 10CFR50.91(a)(1), and using the criteria in 10CFR50.92(c), Entergy Operations has determined that these changes involve no significant hazards consideration. The bases for these determinations are included in the enclosed submittal.

Although the circumstances of this request are neither emergency or exigent, prompt review and approval of this proposed amendment is requested prior to heatup from our next refueling outage which is currently scheduled for completion on October 12, 1992. We request the effective date of this change be upon issuance of the amendment.

Very truly yours,

Neil S. Carns

NSC/jt

Attachments

140117

A001
1/1

cc: Mr. James L. Milhoan
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STATE OF ARKANSAS)
) SS
COUNTY OF LOGAN)

Affidavit

I, J. W. Yelverton, being duly sworn, subscribe to and say that I am General Manager, Plant Operations ANO for Entergy Operations, that I have full authority to execute this affidavit; that I have read the document numbered 2CAN079201 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.

J. W. Yelverton

J. W. Yelverton

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 9th day of July, 1992.

Sandy Siebenmorgen
Notary Public

My Commission Expires:

May 11, 2000

ATTACHMENT

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT TWO

DOCKET NO. 50-368

PROPOSED CHANGES

The proposed changes revise:

- Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) 3.6.1.4 by revising Figure 3.6-1 to incorporate values consistent with the Emergency Core Cooling System (ECCS) analysis assumptions and increase the allowable upper limits based on recent containment Design Basis Accident (DBA) analysis. The Bases for TS 3.6.1.4 is also revised to clarify that operation in accordance with TS Figure 3.6-1 ensures the ECCS analysis assumptions are maintained and that containment peak pressure will not exceed the design pressure of 54 psig during design basis conditions.

- ANO-2 TS 3.2.1 by reducing the allowable peak linear heat rate (PLHR) limit of Figure 3.2-1 to maintain a large break loss of coolant accident (LBLOCA) peak clad temperature (PCT) within the 10CFR50.46 limit of 2200°F.

BACKGROUND

In February of 1991 the ANO-2 LBLOCA analysis input decks were reviewed in preparation for a reevaluation of this event. During this review, a discrepancy was identified between the containment pressure and temperature conditions allowed by the TS and the assumptions used for these parameters in the current ANO-2 ECCS analysis. A review of the bases for TS 3.6.1.4 indicates that the limits for the initial containment pressure are to ensure: 1) the containment structure is prevented from exceeding its design negative pressure differential of 5 psig with respect to the outside atmosphere, and 2) the containment peak pressure does not exceed the containment structure design pressure of 54 psig during LOCA conditions. The ANO-2 TS do not contain requirements to ensure the ECCS analysis assumptions for containment pressure and temperature are maintained.

The ANO-2 LBLOCA analysis assumes initial containment conditions which result in the lowest peak building pressure following a LOCA. This ensures conservative assumptions when calculating PCTs because reduced initial pressure conditions leads to greater blowdown of the reactor coolant system (RCS) and subsequently, delayed reflood rates. Therefore, higher PCTs are expected as a result of a decrease in the initial containment pressure. Initial conditions of containment temperature and humidity do not have a significant impact on PCTs.

The ANO-2 Cycle 1 ECCS analysis of record used initial containment conditions of 90° F, 14.7 psia and 100% humidity. TS 3.6.1.4 allows for a range of initial containment conditions from 11.7 psia to 16.1 psia, 50° F to 140° F, and 0% to 100% humidity. Lower containment temperatures and pressures coupled with high containment humidities result in a lower ECCS analysis containment pressure following a DBA.

Based on this information, it was determined that the current ANO-2 ECCS analysis only bounded the plant operation with containment temperatures and pressures above 90° F and 14.7 psia at any humidity.

An evaluation was initiated to determine the effects of varying containment initial conditions upon the ECCS analysis. This evaluation assumed that, in order to maintain operating flexibility and to account for potential errors associated with instrumentation used to monitor containment parameters, allowance for initial containment conditions of 12.8 psia and 60°F would be needed. The results of the analysis indicated that operation with these initial containment conditions produced a calculated PCT of 2170° F. This was 92° F greater than the current analysis of record of 2078° F for ANO-2. These results are documented and available for review.

Subsequently, further analyses were performed to determine that, if the allowable PLHR was decreased from 13.5 kW/ft to 12.8 kW/ft, the original PCT of 2078° F would remain bounding. After discussions with the NRC staff, it was determined that the PLHR limit would be administratively controlled to 12.8 kW/ft for the remainder of the current operating cycle (Cycle 9) while further evaluations of containment instrumentation would be performed. These evaluations and corrective actions were discussed in an ANO letter to the NRC dated May 10, 1991 (2CAN059106).

The ANO-2 Cycle 10 core design has been developed since the last communications with the staff on this subject. Due to the desired longer cycle length for the upcoming Cycle 10, the reload batch size is significantly increased, resulting in better power sharing among assemblies throughout the cycle length and a flatter overall power distribution (i.e. a smaller pin to box ratio). While this is advantageous for the departure from nucleate boiling ratio (DNBR) operating limit, it has a negative impact on the PLHR power operating limit. This effect was offset in the Cycle 10 core design by further PLHR reductions. The amount of proposed PLHR limit reduction, 0.7 kW/ft was determined to be appropriate while not overly reducing our margin to the PLHR operating limits but is insufficient to completely offset the combined effects of the core design and containment initial conditions. As a result, a slight increase in PCT to 2086° F is calculated for Cycle 10 with a PLHR of 12.1 kW/ft.

In addition to the effort undertaken to define the ECCS analysis limits on the containment initial conditions, all limits allowed by Figure 3.6-1 were reviewed. From this review it was determined that changes have occurred in the containment DBA analysis since the bases for Figure 3.6-1 was developed. The three major changes which affect the peak pressure are 1) a reduction in the air cooler performance, 2) an increase in the gap conductance between the containment liner and concrete, and 3) a later version of Bechtel's containment analysis code (COPATTA) is now used. Additionally, the current analysis indicates that the main steam line break (MSLB) as opposed to a LOCA is the most limiting with respect to peak containment pressure. The net effect of these changes has been evaluated and indicate that at least a 0.1 psi margin exists in the allowable initial containment pressure. A set of six data points (prescribed below) has been generated to support the new

upper limits of Technical Specification figure 3.6-1. COPATTA analysis utilizing these six sets of input data projected peak containment pressure in each case to be below the Technical Specification basis value of 54 psig.

Case	Initial Containment Pressure (psia)	Initial Containment Temperature (°F)	Initial Containment Humidity (%)
1	15.9	100	0
2	14.116	140	0
3	16.05	100	50
4	14.46	140	50
5	16.19	100	100
6	14.80	140	100

DISCUSSION

These changes: 1) revise the Region Of Acceptable Operation of ANO-2 TS Figure 3.6-1, and 2) revise the PLHR limit of ANO-2 TS 3.2.1.

Proposed ANO-2 TS Figure 3.6-1 has been revised to include a lower pressure bound of 12.8 psia and a lower temperature bound of 60° F. These are the values utilized in the LBLOCA reanalysis performed by ABB-CE discussed above. The upper limits of the curve have been increased to incorporate current changes to the containment DBA analysis as discussed above. The lower right hand portion of the curve is derived from the analysis of an inadvertent spray actuation. This portion of the curve is considered conservatively bounding and as a result, remains unchanged. Figure 3.6-1 represents analysis limits and does not account for instrument error.

PLHR is a limit that has never impacted the operation of ANO-2 (DNBR is typically limiting) so the proposed limit was chosen to make the PLHR power operating limit approximately equal to, but still greater than, the DNBR power operating limit. The proposed change would impose a 12.1 kW/ft PLHR limit and should remain bounding for future cycles. This limit, when used in the present ECCS evaluation model to determine the acceptability for the Cycle 10 core design, yields a PCT value of 2086° F. This is a slight increase in the PCT of record of 2078° F but remains well below the 10CFR50.46 limit of 2200° F.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

An evaluation of the proposed changes has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards consideration using the standards in 10CFR50.92(c). A discussion of those 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.

Containment internal pressure, average air temperature, humidity or PLHR are not event initiators of any accidents analyzed in the ANO-2 Safety Analysis Report (SAR) and do not effect the probability of occurrence of any event previously analyzed. Therefore, this change does not increase the probability of any accident previously evaluated.

The proposed change in the Region of Acceptable Operation of ANO-2 TS Figure 3.6-1 revises the limits on containment internal pressure and average air temperature to those now assumed in the SAR LBLOCA ECCS analysis. These limits, along with the PLHR limit proposed, result in a limiting PCT of 2086° F which is slightly greater than the present ANO-2 SAR value of 2078° F; but well within the 10CFR50.46 limit of 2200° F.

The proposed changes to the upper region of TS Figure 3.6-1 still ensure that the peak containment pressure following the containment DBA is less than the 54 psig design pressure of the containment.

The proposed change to the PLHR limit of ANO-2 TS 3.2.1 Figure 3.2-1 decreases the limit from 13.5 kW/ft to 12.1 kW/ft. When the hot rod calculation is performed using the proposed limit, the resulting PCT is 2086° F, which is well within the 10CFR50.46 limit of 2200°F. Hence, there is no significant increase in the consequences of a previously evaluated accident.

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, or plant modifications. The proposed changes in the Region of Acceptable Operation of ANO-2 TS Figure 3.6-1 and the PLHR limit of ANO-2 TS 3.2.1 Figure 3.2-1 have been evaluated and shown to result in peak containment pressures within the design pressure and a PCT which is bounded by 10CFR50.46 requirements.

Additionally, both the proposed PLHR limit and the new lower limit for containment temperature and pressure represent more restrictive limitations imposed by the present Technical Specifications and constitute a conservative change in plant operation.

Therefore, these changes do 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 a Margin of Safety.

The proposed change in the PLHR limit of ANO-2 TS 3.2.1 Figure 3.2-1 and the Region of Acceptable Operation of ANO-2 TS Figure 3.6-1 have been evaluated and shown to result in a peak clad temperature which is well within the guidance provided by 10CFR50.46. A small increase in the Cycle 1 PCT of 2078° F to 2086° F has been calculated with the proposed changes. This value is still below the 2200° F limit and the 8° F increase in PCT is less than the 50° F significant change criteria given in 10CFR50.46. Additionally, the Region of Acceptable Operation of ANO-2 TS 3.6.1.4 has been evaluated and shown to result in peak containment pressures within the design pressure as was the case with the original analyses.

Therefore, these changes do not involve a significant reduction in the margin of safety.

The Commission has provided guidance, in 51 FR 7750 - 3/6/86, 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 the following two examples: B.(ii) "A change that constitutes an additional limitation, restriction, or control not presently included in the technical specifications, e.g., a more stringent surveillance requirement," and B.(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 method.

Therefore, based on 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.