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SUBJECT: Forwards low pre-pressure fuel rod program burnup extension
 loca analysis. Rept withheld (ref 10CFR2.790).

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January 22, 1988

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LOCA-Limited Maximum Allowable Linear Heat Rate

Gentlemen:

Pursuant to 10CFR 50, §50.90, please find attached (Attachment 1) a proposed amendment to the Oconee Nuclear Station (ONS) Facility Operating Licenses and revisions to the ONS Technical Specifications. The proposed revision will update the LOCA - Limited Maximum Allowable Linear Heat Rate (Figure 3.5.2-16) to reflect B&W Owners Group Topical Report BAW2001P, Low Pre-Pressure Fuel Rod Program (Attachment 3).

By letter dated June 1, 1987 Duke provided a proposed revision to update Figure 3.5.2-16 to reflect NUREG-0630, Cladding Swelling and Rupture Models for LOCA Analysis and BAW-1915P, Bounding Analytical Assessment of NUREG-0630 Models of LOCA kW/ft Limits with use of FLECSSET. Subsequently, the NRC Safety Evaluation Report (SER) for BAW-1915P was issued. Duke then requested by letter dated November 24, 1987 that the NRC review and approve the June 1, 1987 amendment request. The attached proposed amendment is provided as a supplement to the June 1, 1987 amendment request. The Technical Justification and No Significant Hazards Consideration provided with the June 1, 1987 amendment request will not be affected by application of BAW-2001P.

BAW-2001P presents the results of a series of analyses concerning low pre-pressure fuel rods. These fuel rods are the standard Mark-B designs in which the pre-pressure (fill gas pressure) has been reduced. The purpose of this reduction is to provide for extended burnup capabilities, and for improved LOCA margins. The results verify that these goals were achieved. The overall burnup limit was extended by 4000 MWd/mtU. Use of low pre-pressure fuel was implemented in Oconee 2 Cycle 8, Oconee 3 Cycle 9, and Oconee 1 Cycle 10. NRC reviewed and approved these reloads by Safety Evaluation Reports (SER) dated April 18, 1985, September 19, 1985, and April 25, 1986 respectively. LOCA margins were improved enough that the 2 foot core elevation peak power limit can be raised from 14 to 14.5 kW/ft for the generic lowered loop configuration plant. BAW-2001P is provided in support of the proposed Technical Specification amendment.

In accordance with the requirements of 10CFR 2.790, Duke is enclosing with this submittal an application for withholding from public disclosure an affidavit (Attachment 4). The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission.

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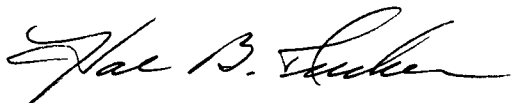
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Duke requests that the NRC review and approve this amendment by May 2, 1988 such that the results of the BAW-2001P analyses can be utilized in the reload design effort for Unit 3 Cycle 11.

Duke has determined the attached proposed amendment as having no Significant Hazards Considerations. Attachment 2 provides the No Significant Hazards Consideration Evaluation. Duke is forwarding a copy of this application to the South Carolina Department of Health and Environmental Control for review and, as appropriate, subsequent consultation with the Staff.

This amendment request is considered to supplement a previous submittal. As such, no license fees are provided.

Very truly yours,



Hal B. Tucker

PJN/274/jgc

Attachments

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OCONEE NUCLEAR STATION

ATTACHMENT 1

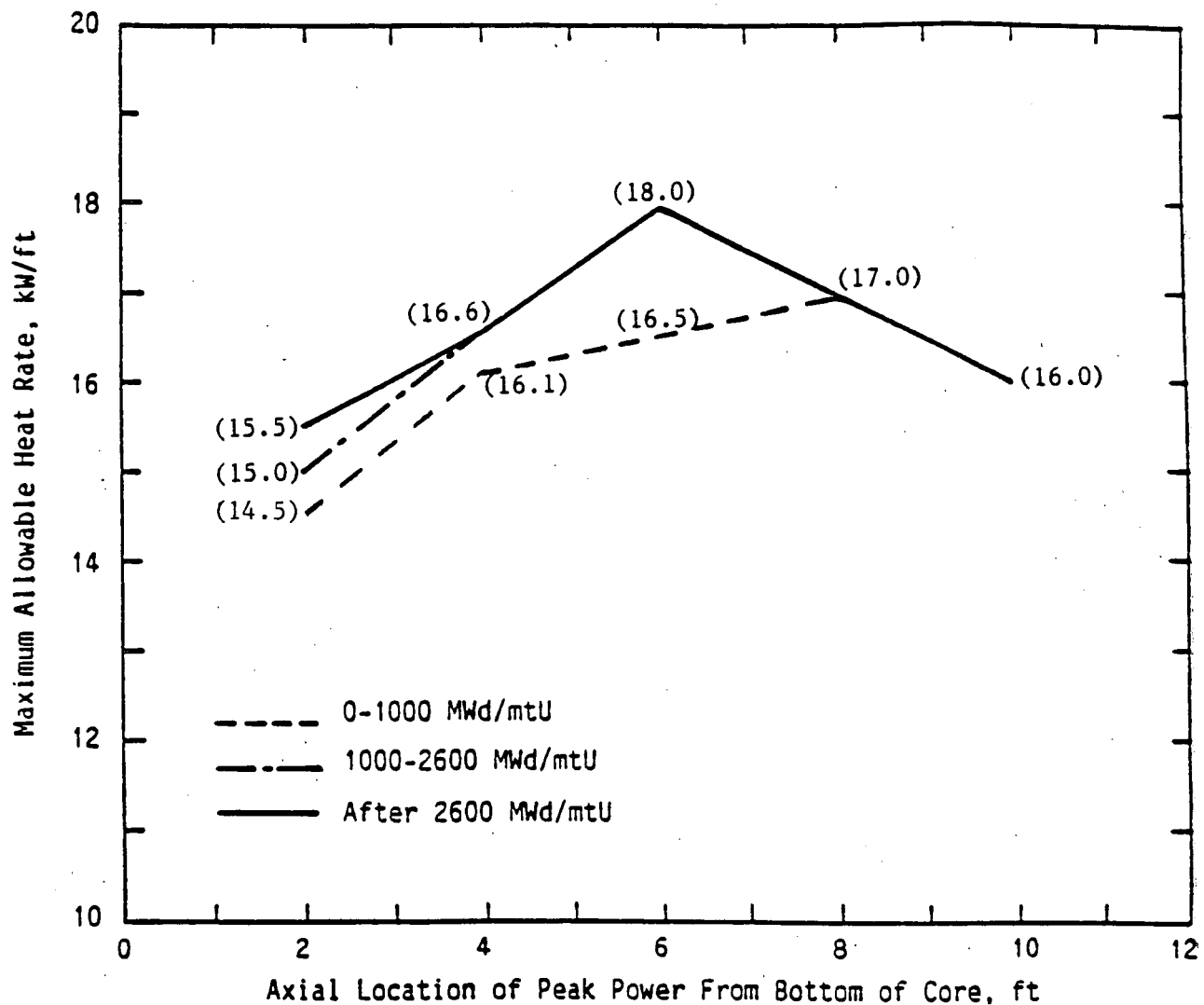
PROPOSED TECHNICAL SPECIFICATION REVISION

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LOCA-Limited Maximum Allowable
Linear Heat

Oconee Nuclear Station
Figure 3.5.2-16

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OCONEE NUCLEAR STATION

ATTACHMENT 2

NO SIGNIFICANT HAZARDS CONSIDERATION

No Significant Hazards Consideration Evaluation

Duke has determined that the proposed amendment request poses no significant hazards as defined by NRC regulations in 10CFR 50.92. 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; or
- 2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- 3) Involve a significant reduction in a margin of safety.

This proposed revision will update the LOCA-Limited Maximum Allowable Linear Heat Rate (Figure 3.5.2-16) to reflect BAW-2001P, Low Pre-Pressure Fuel Rod Program. As such, the previously analyzed accident that is applicable to this change would be a large break loss of coolant accident. Acceptance criteria for this event is identified in 10CFR 50.46 and 10CFR 50, Appendix K. BAW-2001P has been provided in Attachment 3 and provides the Technical Justification for the proposed amendment.

The Low Pre-pressure Fuel Rod Program was proposed as a fuel design change to provide for extended burnup limits and improved LOCA margins. This design change was a reduction in the fuel rod pre-pressure of the Mark-B fuel rod designs. Use of low pre-pressure fuel was implemented in Oconee 2 Cycle 8, Oconee 3 Cycle 9, and Oconee 1 Cycle 10. NRC reviewed and approved these reloads by Safety Evaluation Reports (SER) dated April 18, 1985, September 19, 1985, and April 25, 1986 respectively. These and subsequent fuel cycles were longer due to the extension of the fuel rod overall burnup limit. In addition, by application of BAW-2001P, LOCA linear heat rates may be increased, thus providing increased operational flexibility.

The increased burnup limits were obtained by trading off margin between the creep collapse and the pin pressure burnup limits. Reducing the pre-pressure caused the pin pressure burnup limit to increase, and the creep collapse limit to decrease. The amount of pre-pressure reduction was chosen so that both resulting burnup limits were nearly equivalent. This resulted in an increase in the overall fuel rod burnup limit. This analysis effort is described in BAW-2001P.

Changes in LOCA margin were evaluated by analyzing the most restrictive LOCA case. This is the peak power at the 2 ft level of core elevation at beginning-of-life (BOL) conditions. This analysis, performed generically for the lowered loop configuration B&W NSSS plant had resulted in an allowable LHR of 14.0 KW/ft for the standard Mark-B design. When redone for the reduced pre-pressure design this analysis verified that an allowable limit of 14.5 KW/ft was achievable. BAW-2001P provides detailed analyses for burnup extension and LOCA.

The following evaluation measures aspects of this amendment request against the 50.92(c) requirements to demonstrate that all three standards are satisfied.

First Standard

(Amendment would not) involve a significant increase in the probability or consequences of an accident previously evaluated.

Each accident analysis addressed in the Oconee Final Safety Analysis report (FSAR) has been examined with respect to changes to the LOCA - Limited Maximum Allowable Linear Heat Rate (Figure 3.5.2-16) resulting from use of BAW-2001P analyses. The limiting FSAR accident due to this change is a large break LOCA. The NRC acceptance criteria for Emergency Core Cooling Systems (ECCS) given postulated loss of coolant accidents is identified in 10CFR 50.46 and 10CFR 50, Appendix K. 10CFR 50.46(b)(1) states that the maximum fuel element cladding temperature shall not exceed 2200 degrees-F. LOCA analysis results provided in BAW-2001P demonstrate a peak cladding temperature of 2028 degrees-F. The revised Figure 3.5.2-16 included in this amendment request is therefore consistent with all NRC acceptance criteria and requirements. As a result, this change will not involve an increase in the consequences of previously analyzed accidents.

The LOCA-Limited Maximum Allowable Linear Heat Rate is not considered to be an initiator to any previously analyzed accident. As such, changes to the LOCA-Limited Maximum Allowable Linear Heat Rate will not involve an increase in the probability of previously analyzed accidents.

Second Standard

(Amendment would not) create the possibility of a new or different kind of accident from any accident previously evaluated.

Changes provided within this amendment request are within all NRC acceptance criteria. Specifically, the acceptance criteria identified in 10CFR 50.46 and 10CFR 50, Appendix K for ECCS given postulated loss of coolant accidents. As such, the possibility of a new or different kind of accident from any accident previously evaluated is not created.

Third Standard

(Amendment would not) involve a significant reduction in a margin of safety.

The margin of safety applicable to changes in the LOCA-Limited Maximum Allowable Linear Heat Rate is the ECCS acceptance criterion of peak cladding temperature. 10CFR 50.46(b)(1) states that the maximum fuel element cladding temperature shall not exceed 2200 degrees-F. LOCA analysis results provided in BAW-2001P demonstrate a peak cladding temperature of 2028 degrees-F. As such, changes in the LOCA-Limited Maximum Allowable Linear Heat Rate as a result of application of BAW-2001P analyses are within the margins of safety identified in 10CFR 50.46 and 10CFR 50, Appendix K. This change is within all NRC acceptance criteria and will not involve a reduction in any margin of safety.

The above evaluation with its accompanying references show that the three Part 50.92(c) standards are satisfied. Duke has determined and submits that the proposed changes do not represent any significant hazards.

DUKE POWER COMPANY
OCONEE NUCLEAR STATION

ATTACHMENT 3

BAW-2001P

Low Pre-Pressure Fuel Rod Program

Burnup Extension

LOCA Analysis

PROPRIETARY INFORMATION

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