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August 23, 1996

2CAN089605

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Technical Specification Change Request
Concerning Fuel Enrichment Increase

Gentlemen:

Attached for your review and approval are technical specification changes allowing fuel enrichments for Arkansas Nuclear One, Unit-2 (ANO-2) of up to 5.0 weight percent Uranium-235. Increasing cycle lengths and improved plant capability factors have created a need for higher fuel assembly enrichments of Uranium-235 to meet future cycle energy demands.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c), and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal.

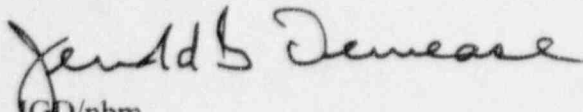
Entergy Operations requests that the effective date for this change be within 30 days of issuance. Although this request is neither exigent nor emergency, your prompt review is requested prior to the next ANO-2 cycle 13 new fuel receipt which is currently scheduled for February 1997.

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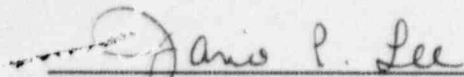
Very truly yours,



IGD/nbm
Attachments

To the best of my knowledge and belief, the statements contained in this submittal are true.

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for Hinds
County and the State of Mississippi, this 26th day of August, 1996.



Notary Public

My Commission Expires

NOTARY PUBLIC STATE OF MISSISSIPPI AT LARGE
MY COMMISSION EXPIRES: August 10, 1997
~~BONDED THRU HEIDENMARCHETTI, INC.~~

cc: Mr. Leonard J. Callan
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U. S. Nuclear Regulatory Commission
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Acting Director, Division of Radiation
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4815 West Markham Street
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ATTACHMENT

TO

2CAN089605

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

DESCRIPTION OF PROPOSED CHANGES

The proposed changes to the ANO-2 Technical Specifications include the following:

- Specification 3/4.9.12.a including the associated bases is being revised to allow fuel assemblies containing enrichments of up to 5.0 weight percent Uranium-235 to be stored in the spent fuel pool.
- Specification 3/4.9.12.b and Figure 3.9.2 including the associated bases are being revised to provide alternate storage configurations in the spent fuel pool in order to accommodate the higher enrichment fuel. A new cross-hatch fuel assembly storage configuration is being utilized.
- Specification 5.6.1.2 is being revised to allow fuel assemblies containing a maximum fuel enrichment of up to 5.0 weight percent Uranium-235 to be stored in the new fuel storage racks.

BACKGROUND

With increasing fuel cycle lengths and improved plant capability factors, higher fuel assembly enrichments of Uranium-235 are needed to meet future cycle energy demands. The current ANO-2 spent fuel storage racks were originally analyzed for the storage of fuel containing up to 4.1 weight percent Uranium-235. Unrestricted fuel assembly storage in the spent fuel pool is allowed in Region 1 of the storage racks which contains a fixed poison called Boraflex. Non-restricted and checkerboard storage configurations are currently allowed in Region 2 of the storage racks in the spent fuel pool depending upon a burnup credit given by technical specification Figure 3.9.2. Region 2 of the storage racks does not contain Boraflex. In order to support the next reload for ANO-2 cycle 13, fuel assembly enrichments of greater than 4.1 weight percent Uranium-235 will be necessary.

DISCUSSION OF CHANGE

The attached report, NEAD-SR-95/125.R1, describes the criticality safety analyses for fuel assembly enrichments up to 5.0 weight percent Uranium-235. These analyses were performed for the spent fuel pool, the new fuel storage racks, fuel transfer upender, and the containment temporary storage rack.

For Region 1 of the spent fuel pool, the analysis contains conservatisms which consider the reactivity increase due to Boraflex shrinkage and contains sufficient margin to compensate for potential long-term effects of surface erosion degradation. Soluble boron or burnable poisons were not credited in the analysis. Unrestricted storage of 5.0 weight percent enriched Uranium-235 in Region 1 of the spent fuel pool storage racks will now only be allowed if the burnup criteria of the revised Figure 3.9.2 is met; otherwise, Region 1 storage will be

restricted to a cross-hatch storage configuration in which each fuel assembly must be adjacent to two opposite water holes or located diagonally from four water holes. Also, the Region 1 storage cells adjacent to the Region 2 interface are further restricted to fuel assemblies that meet the limits of curve A of technical specification Figure 3.9.2.

For Region 2 of the spent fuel pool, the analysis allows storage of fuel assemblies with enrichments up to 5.0 weight percent Uranium-235 and credit for fuel assembly burnup in three storage configurations. Soluble boron or burnable poisons were not credited in the analysis. The most restrictive Region 2 fuel assembly storage configuration specified in technical specification Figure 3.9.2 is the checkerboard storage configuration in which each fuel assembly must be adjacent to four water holes. Another Region 2 storage configuration specified in technical specification Figure 3.9.2 is the cross-hatch storage configuration which was previously described for Region 1. Finally, non-restricted storage in Region 2 is allowed for fuel assemblies meeting the burnup criteria of technical specification Figure 3.9.2. Also, in order to accommodate a mixture of fuel designs in the spent fuel pool, technical specification Figure 3.9.2 was developed based on initial assembly average Uranium-235 loading instead of initial assembly average enrichment. An initial assembly average enrichment of 5.0 weight percent Uranium-235 is equivalent to 0.614108 grams per inch of Uranium-235 for the base fuel assembly described in the attached report.

The criticality analysis for the new fuel storage racks, fuel transfer upender, and the containment temporary storage rack shows that fuel assemblies with enrichments up to 5.0 weight percent Uranium-235 may be safely stored in all of these locations. Also, the nominal new fuel storage rack center-to-center distance between new fuel assemblies was revised from 25 inches to 26 inches in the analysis. This was confirmed from design drawings as the nominal spacing between assemblies. The effects of the lateral fuel assembly position within the rack were considered as an uncertainty in the analysis.

Several fuel handling accidents were evaluated in the criticality analysis. A dropped fuel assembly and/or the misplacement of a fuel assembly for each storage configuration has been analyzed. Fuel handling accidents in the new fuel storage racks were confirmed to meet the 0.95 k-effective acceptance criteria. By crediting 1000 ppm boron for the other storage racks, the 95/95 k-effective is well below 0.95 for all situations. In order to maintain conservatism, the boron requirement of technical specification 3/4.9.12.c will remain 1600 ppm and is not being revised.

The proposed fuel assembly enrichment increase will not result in an increase in burnup beyond the currently approved 60 GWD/MTU limit for ANO-2. The other aspects of implementing a higher enrichment fuel management core design will be evaluated using approved reload analysis methods and evaluated under the provisions of 10CFR50.59.

Paragraph b of 10CFR51.52 requires licensees using fuel enrichments greater than 4.0 weight percent Uranium-235 or with fuel irradiation in excess of 33 GWD/MTU to provide a full description and detailed analysis of the environmental effects of transportation of fuel and wastes to and from the reactor. The NRC has performed a generic evaluation for fuel

enrichments up to 5.0 weight percent Uranium-235 and irradiation up to 60 GWD/MTU in the "NRC Assessment of the Environmental Effects of Transportation Resulting from Extended Fuel Enrichment and Burnup," dated August 3, 1988. This evaluation concludes that the environmental impact of extended irradiation and increased burnup are bounded by those reported in Table S-4 of 10CFR Part 51. Since the ANO-2 enrichment and irradiation levels are bounded by those assumed in the NRC evaluation, the conclusions of that evaluation are considered applicable to ANO-2.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

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.

The calculated k-effective including uncertainties, demonstrates substantial margin to criticality in the fuel assembly storage locations for both normal and accident conditions; therefore, the probability of a previously evaluated accident is not significantly increased. Since a criticality accident is demonstrated to not be feasible under the specified conditions, the consequences of a previously evaluated accident are not significantly increased. Administrative controls are utilized in order to assure that a fuel assembly is not placed in an unanalyzed configuration. 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 increase in fuel enrichment could be considered a change in plant equipment; however, it would only affect reactivity. The reactivity increase has been analyzed and shown that no new or different kinds of accidents from any previously evaluated exist. The proposed change does not involve the addition of any plant equipment, nor does it modify the method of operation of any plant equipment. Also, the proposed change would not alter the design or configuration of the plant beyond the standard functional capabilities of the equipment. 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 proposed change has been analyzed to maintain a k-effective of less than the criticality acceptance criteria of 0.95 including uncertainties at the 95/95 probability/confidence level for all storage configurations. Additionally, the optimum moderation condition for the new fuel

storage racks has been analyzed and determined to meet the acceptance criteria of maintaining k-effective of 0.98. The use of physical restraints for blocking the storage locations where fuel is prohibited to be stored in the spent fuel pools prevents misloading of fuel into these locations. A dropped assembly and/or the misplacement of a fuel assembly for each storage configuration has been analyzed. By crediting 1000 ppm boron (ANO-2 Technical Specifications require 1600 ppm), the 95/95 k-effective is well below 0.95. Therefore, this change does not involve a significant reduction in the margin of safety.

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