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SUBJECT: Application for amend to License NPF-63, revising limit for
 max fuel enrichment.

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CP&L

Carolina Power & Light Company

P.O. Box 1551 • Raleigh, N.C. 27602

APR 11 1989

A. B. CUTTER
Vice President
Nuclear Services Department

SERIAL: NLS-89-074
10CFR50.90

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
FUEL ENRICHMENT INCREASE

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company (CP&L) hereby requests a revision to the Technical Specifications for the Shearon Harris Nuclear Power Plant, Unit 1.

The proposed Technical Specification changes will revise the limit for maximum fuel enrichment. Specifically, the proposed changes will:

- o change Technical Specification 5.3.1, which currently requires that reload fuel have a maximum enrichment of 4.20 weight percent U-235, to allow a maximum enrichment of 5.0 weight percent U-235.
- o add to Technical Specification 5.6.1, concerning design requirements of the Spent Fuel Storage Racks, an additional requirement to require that a maximum core geometry K_{∞} for PWR fuel assemblies be less than or equal to 1.470 at 68°F.
- o revise the numbering sequence of Section 5.6.1, Criticality, to eliminate duplicate specification numbers.

Enclosure 1 provides a detailed description of the proposed changes and the basis for the changes.

Enclosure 2 details the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration.

Enclosure 3 is an environmental evaluation which demonstrates that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment.

Enclosure 4 provides the proposed Technical Specification pages.

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THE
UNITED STATES
DEPARTMENT OF
THE ARMY
WASHINGTON, D. C.

OFFICE OF THE
CHIEF OF STAFF

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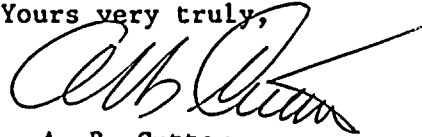
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Enclosure 5 is the Westinghouse report in support of this amendment entitled, "Criticality Analysis of Shearon Harris Spent Fuel Racks with IFBA Fuel, November, 1988."

Carolina Power and Light Company requests approval of the proposed amendment by September 1, 1989 in order to support fuel receipt for the upcoming SHNPP refueling outage currently scheduled to begin in November, 1989. Please refer any questions regarding this submittal to Mr. John Eads at (919) 546-4165.

Yours very truly,



A. B. Cutter

JHE/che

Enclosures:

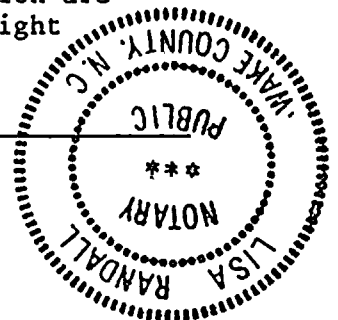
1. Basis for Change Request
2. 10CFR50.92 Evaluation
3. Environmental Evaluation
4. Technical Specification Pages
5. Westinghouse Report in Support of Amendment

cc: Mr. R. A. Becker
Mr. W. H. Bradford
Mr. Dayne H. Brown
Mr. S. D. Ebnetter

A. B. Cutter, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.


Notary (Seal)

My commission expires: 6-7-93





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ENCLOSURE 1

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
FUEL ENRICHMENT INCREASE

BASIS FOR CHANGE REQUEST

Proposed Change

The proposed Technical Specification changes will revise the limit of maximum fuel enrichment. Specifically, the proposed changes will:

- o change Technical Specification 5.3.1, which currently requires that reload fuel have a maximum enrichment of 4.20 weight percent U-235, to allow a maximum enrichment of 5.0 weight percent U-235.
- o add to Technical Specification 5.6.1, concerning design requirements of the Spent Fuel Storage Racks, an additional requirement to require that a maximum core geometry K_{∞} for PWR fuel assemblies be less than or equal to 1.470 at 68°F.
- o revise the numbering sequence of Section 5.6.1, Criticality, to eliminate duplicate specification numbers.

Basis

In order to achieve the target Harris Cycle 3 cycle length, there is a need to utilize fresh assemblies with enrichments greater than the current value of 4.20 w/o specified in T.S. 5.3.1. Changes to the allowed enrichment must address both the receipt and storage of this fuel as well as the impact of operation with the fuel assemblies.

The question of receipt and storage was addressed by performing a new fuel rack criticality analysis (Enclosure 5) which addressed the various fuel handling accidents and question of maintaining $K_{eff} \leq 0.95$ in the racks. The results of the analysis indicates that K_{eff} will be maintained less than 0.95 as long as the maximum core geometry K_{∞} is less than or equal to 1.470 at 68°F. For those PWR fuel assemblies which contain an integral burnable absorber, such as the Vantage V Boron-coated pellets, credit is taken for the reduction in reactivity due to the integral absorber since they are inseparable from the fuel.

Another aspect of storage reviewed was the potential change in heat load due to the eventual storage of the higher enriched fuel which could achieve peak rod burnups up to 60,000 MWD/MTU (corresponds to a batch average exposure of about 50,000 MWD/MTU). The maximum normal and abnormal heat load cases were evaluated for the increased enrichment and burnup and found to be bounded by the current analysis presented in FSAR Section 9.1.3.3.

The impact of operation with higher enriched fuel focuses on the impact higher enrichment (and therefore exposure) would have on the assumed fission product inventory in the fuel gap and the currently assumed radiological consequences. An evaluation of the maximum potential increase in fission product activity and radiological dose resulting from operating with fuel enrichments up to 5.0 w/o with peak rod burnups up to 60,000 MWD/MTU was conducted. Based on this analysis, the impact of the changes on accident doses can be bounded by assuming that the radiological consequences of the accidents, as reported in the FSAR, increase by four percent. If one considers that the current FSAR accident analyses are evaluated using source terms based on the stretch power level of 2900 MWt rather than the licensed power rating of 2775 MWt, there is no increase in the radiological consequences.

In addition, an administrative change to the numbering sequence of Section 5.6.1, Criticality, has been made. The existing section has two specifications numbered 5.6.1; these have been revised to 5.6.1.a and 5.6.1.b and the subitems for 5.6.1.a have been changed from alphabetic to numeric.

ENCLOSURE 2

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
FUEL ENRICHMENT INCREASE

10CFR50.92 EVALUATION

The Commission has provided standards in 10CFR50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if 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, (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. Carolina Power and Light Company has reviewed this proposed license amendment request and determined that its adoption would not involve a significant hazards consideration. The bases for this determination are as follows:

Proposed Change

The proposed Technical Specification changes will revise the limit of maximum fuel enrichment. Specifically, the proposed changes will:

- o change Technical Specification 5.3.1, which currently requires that reload fuel have a maximum enrichment of 4.20 weight percent U-235, to allow a maximum enrichment of 5.0 weight percent U-235.
- o add to Technical Specification 5.6.1, concerning design requirements of the Spent Fuel Storage Racks, an additional requirement to require that a maximum core geometry K_{∞} for PWR fuel assemblies be less than or equal to 1.470 at 68°F.
- o revise the numbering sequence of Section 5.6.1, Criticality, to eliminate duplicate specification numbers.

Basis

1. The proposed changes relate only to the consequences of an accident as they do not in any way impact the manner in which any systems or components involved in the initiation of an accident function. To evaluate the impact on consequences, three distinct areas were covered: 1) maintaining the fuel rack $K_{eff} \leq 0.95$; 2) maximum heat load generated by the fuel in the fuel pools; and 3) impact on radiological dose.

The proposed change specifies a new Technical Specification requirement on the maximum reactivity an assembly may have at any time in its life. Credit can be taken for burnable poison integral to the fuel in determining an assembly's reactivity. This new requirement assures that K_{eff} will remain below 0.95 in the fuel racks; therefore, the consequences of storage of higher enriched fuel remains unchanged.

An evaluation has been performed to determine the impact of higher enriched fuel on the pool heat load analysis presented in the FSAR.

An evaluation assuming batch average discharge exposures up to 50,000 MWD/MTU (lead rod exposures of 60,000 MWD/MTU) has shown that the current heat loads assumed in the FSAR remain bounding.

Westinghouse has performed an evaluation to determine the potential impact of higher enrichment (and burnup) on the radiological consequences of the accidents presented in the FSAR. They have concluded that the impact of enrichments up to 5.0 w/o and lead rod burnups up to 60,000 MWD/MTU can be bounded by assuming a 4 percent increase in radiological dose. The potential increase in consequences is not significant based on the large margins to the 10CFR100 limits present in the existing analyses. Furthermore, it is concluded that if one takes into consideration that the current FSAR analyses are based on a power level of 2900 MWT (for determining fission product inventory in the gap) instead of 2775 MWT, the current FSAR radiological dose consequences are bounding.

The changes to the numbering sequence of Section 5.6.1 are administrative in nature and, therefore, cannot involve an increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create any new scenarios for system or equipment malfunctions. The changes are integral to the fuel and do not create any new or special handling, storage, or operating concerns.

The changes to the numbering sequence of Section 5.6.1 are administrative in nature and, therefore, cannot create the possibility of a new or different kind of accident.

3. The proposed changes do not result in a significant reduction in the margin of safety. Evaluations have been performed that show the Keff in the racks can be maintained less than 0.95, that the change will not result in any spent fuel pool heat loads greater than those previously analyzed and that radiological dose consequences remain well within the 10CFR100 guidelines, and are not significantly different than those currently reported.

The changes to the numbering sequence of Section 5.6.1 are administrative in nature and, therefore, cannot involve a reduction in a margin of safety.

ENCLOSURE 3

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
FUEL ENRICHMENT INCREASE

ENVIRONMENTAL CONSIDERATION

10CFR51.22(c)(9) provides criterion for and identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating licence for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amount of any effluents that may be released offsite; and (3) result in an increase in individual or cumulative occupational radiation exposure. Carolina Power and Light Company has reviewed this request and determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need to be prepared in connection with the issuance of the amendment. The basis for this determination follows:

Proposed Change

The proposed Technical Specification changes will revise the limit of maximum fuel enrichment. Specifically, the proposed changes will:

- o change Technical Specification 5.3.1, which currently requires that reload fuel have a maximum enrichment of 4.20 weight percent U-235, to allow a maximum enrichment of 5.0 weight percent U-235.
- o add to Technical Specification 5.6.1, concerning design requirements of the Spent Fuel Storage Racks, an additional requirement to require that a maximum core geometry K_{∞} for PWR fuel assemblies be less than or equal to 1.470 at 68°F.
- o revise the numbering sequence of Section 5.6.1, Criticality, to eliminate duplicate specification numbers.

Basis

The change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) for the following reasons:

1. As demonstrated in Enclosure 2, the proposed amendment does not involve a significant hazards consideration.
2. The proposed amendment does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The proposed amendment allows an increase in fuel enrichment from 4.2 weight percent U-235 to 5.0 weight percent which will allow an increase in the batch-average burnup level to 50,000 MWD/MTU (60,000 MWD/MTU peak rod burnup). Based on

extensive studies conducted for the NRC by Pacific Northwest Laboratories (NUREG/CR-5009, "Assessment of the USC of Extended Burnup Fuels in Light Water Power Reactors"), the NRC has concluded that there are no significant adverse radiological or non-radiological impacts associated with the use of extended burnup up to 60,000 MWD/MTU and fuel enrichments up to 5.0 weight percent U-235. This conclusion was documented by the NRC in a public notice, "Extended Burnup Fuel Use in Commercial LWRs; Environmental Assessment and Findings of No Significant Impact," dated February 23, 1988.

Based on the above, the proposed amendment does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

3. The proposed amendment does not result in a significant increase in individual or cumulative occupational radiation exposure. This conclusion is supported by the NRC as documented in a public notice, "Extended Burnup Fuel Use in Commercial LWRs; Environmental Assessment and Finding of No Significant Impact," dated February 23, 1988.

ENCLOSURE 4

SHEARON HARRIS NUCLEAR POWER PLANT
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TECHNICAL SPECIFICATION PAGES