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SUBJECT: Application for amends to Licenses DPR-58 & DPR-74, modifying TS 5.6.2 to increase current limit on nominal fuel assembly enrichment for new, Westinghouse - fabricated fuel stored in new fuel storage racks. C  
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February 26, 1996

AEP:NRC:1071U

Docket Nos.: 50-315  
50-316

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

Gentlemen:

Donald C. Cook Nuclear Plant Units 1 and 2  
TECHNICAL SPECIFICATION 5.6.2  
INCREASE IN MAXIMUM NOMINAL FUEL ASSEMBLY  
ENRICHMENT LIMIT, TAKING CREDIT FOR  
USE OF INTEGRAL FUEL BURNABLE ABSORBER MATERIAL

This letter and its attachments constitute an application for amendment of the technical specifications (T/Ss) for Donald C. Cook Nuclear Plant Units 1 and 2. Specifically, we propose to modify T/S 5.6.2 to increase the current limit on nominal fuel assembly enrichment for new Westinghouse - fabricated fuel stored in the new fuel storage racks. The current nominal limit for Westinghouse fuel is 4.55 weight percent (w/o) uranium-235 isotope (U-235). The proposed nominal limit is 4.95 w/o U-235, provided that the fuel assembly contains sufficient zirconium diboride integral fuel burnable absorber (IFBA) material to maintain the maximum reference fuel assembly  $K_{\infty}$  less than or equal to 1.4857 at 68°F. Also, T/S 5.6.2 is modified to present it in a format similar to that used in the Standard T/Ss (NUREG 1431, Rev. 1).

Attachment 1 provides a detailed description of the proposed changes, justification for the changes, and our determination of no significant hazards consideration performed pursuant to 10 CFR 50.92. Attachment 2 contains the existing T/S pages marked to reflect the proposed changes. Attachment 3 contains the proposed revised T/S pages.

Attachment 4 contains a report prepared by Westinghouse Electric Corporation entitled "Criticality Analysis of the Donald C. Cook Nuclear Plant New Fuel Storage Vault with Credit for Integral Fuel Burnable Absorbers," dated November 1995. This report assists in the justification for the changes which is provided in Attachment 1. This report is not proprietary to Westinghouse.

We believe that the proposed changes will not result in (1) a significant change in the types of any effluent that may be released offsite, (2) a significant increase in individual or cumulative occupational radiation exposure, or (3) a significant reduction in a margin of safety.

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ADD 1

The proposed changes have been reviewed by the Plant Nuclear Safety Review Committee and the Nuclear Safety and Design Review Committee.

In compliance with the requirements of 10 CFR 50.91(b)(1), copies of this letter and its attachments have been transmitted to the Michigan Public Service Commission and to the Michigan Department of Public Health.

Sincerely,

*for W. E. Fitzpatrick*  
E. E. Fitzpatrick  
Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 26<sup>th</sup> DAY OF February 1996  
*Reverend W. E. Fitzpatrick*  
Notary Public

My Commission Expires: 6-28-99

plt

Attachments

cc: A. A. Blind  
G. Charnoff  
H. J. Miller  
NFEM Section Chief  
NRC Resident Inspector - Bridgman  
J. R. Padgett



ATTACHMENT 1 TO AEP:NRC:1071U  
JUSTIFICATION AND 10 CFR 50.92  
ANALYSIS FOR CHANGES TO THE  
DONALD C. COOK NUCLEAR PLANT  
UNITS 1 AND 2 TECHNICAL SPECIFICATIONS

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DESCRIPTION OF CHANGES

## Units 1 and 2, Technical Specification (T/S) 5.6.2:

1. Administrative changes are proposed to incorporate the information presently found in T/S 5.6.2.1 and 5.6.2.2 into a format similar to the format used in the NUREG 1431, Rev. 1 T/Ss. This revised format includes reference to applicable FSAR sections. All current T/S requirements are retained, as follows:

- new fuel storage rack pitch 21 inch center-to-center distance (moved from T/S 5.6.2.1 to 5.6.2.d);
- $K_{eff}$  will not exceed 0.98 when fuel assemblies are placed in the new fuel storage vault and aqueous foam moderation is assumed (moved from T/S 5.6.2.1 to 5.6.2.c);
- the maximum nominal fuel assembly enrichment limits (moved from T/S 5.6.2.2 to 5.6.2.a and Table 5.6-1).

Due to the individual enrichment limits for the various fuel types, Table 5.6-1 is added for clarification to 5.6.2.a. Proposed T/S 5.6.2.b requires  $K_{eff}$  less than or equal to 0.95 with the new fuel vault flooded with unborated water. This is a new T/S requirement. It is consistent with the analyses provided in Attachment 4, and with NUREG 1431, Rev. 1 format.

The FSAR analysis referenced by proposed T/S 5.6.2.c is not presently in FSAR Section 9.7, but will be added during the next annual FSAR update. This condition is not limiting with regard to  $K_{eff}$ ; the condition in proposed T/S 5.6.2.b is limiting.

2. An asterisked footnote is added to the enrichment limits for the Westinghouse fuel types described in Items 1 and 3 in Table 5.6-1. The footnote contains the following text:

A maximum nominal enrichment of 4.95 weight percent U-235 for Westinghouse fuel types is acceptable provided that sufficient integral fuel burnable absorber is present in each fuel assembly stored in the new fuel storage racks such that the maximum reference fuel assembly  $K_u$  is less than or equal to 1.4857 at 68°F.

3. A number of administrative changes are made for T/S clarity, usability, and consistency between units, as follows:
  - a. Unit 1 pages 5-4 and 5-5: move portions of section 5.4 on page 5-4 to page 5-5;
  - b. Unit 1 pages 5-5, 5-6, 5-8 and Unit 2 page 5-6: font change;
  - c. Unit 1 page 5-5: remove "1." from 5.6.1.1.c, which is not required;
  - d. Unit 1 pages 5-6 and 5-8: move section 5.6.1.2 from page 5-8 to page 5-6;
  - e. For both units T/Ss, sections 5.6.1.2 and 5.6.2: in the table heading, change "Wt. % <sup>235</sup>U" to "Wt. % U-235".

REASON AND JUSTIFICATION FOR CHANGES

In general, nuclear power plant economics dictate longer operating cycles. With regard to nuclear fuel, this means either higher fuel enrichments or a larger number of new fuel assemblies each reload. In today's market, higher enrichment is less expensive than the purchase of additional fuel assemblies, from the various standpoints of cost per fuel assembly, efficient use of uranium, and long-term spent fuel storage costs.

Specifically with regard to Cook Nuclear Plant, although the facility is licensed for fuel enrichments up to 5.0 weight percent (w/o) uranium-235 isotope (U-235), the enrichment limit for the new fuel storage racks per T/S 5.6.2.2 is 4.55 w/o U-235 for Westinghouse fuel types. This limit is established due to the fact that, for the unborated water density flooding condition,  $K_{eff}$  is 0.9495 at 4.55 w/o U-235, just below the 0.95 limit. For the optimum moderation (aqueous foam) flooding condition,  $K_{eff}$  is 0.8974 at 4.55 w/o U-235, well below the 0.98 limit.

Using a method called "reactivity equivalencing," the increase in the maximum nominal fuel assembly enrichment limit to 4.95 w/o U-235 is justified, provided that enough integral fuel burnable absorber (IFBA) material is present in each fuel assembly to be stored in the new fuel storage racks.

Attachment 4 contains a report by Westinghouse Electric Corporation entitled "Criticality Analysis of the Donald C. Cook Nuclear Plant New Fuel Storage Vault with Credit for Integral Fuel Burnable Absorbers." In this report, Westinghouse analyzed the various Westinghouse fuel types used at Cook Nuclear Plant to determine which type was bounding. Then, they analyzed the bounding fuel type for various IFBA loadings, in milligrams of boron-10 isotope per inch of fuel rod length. Westinghouse determined (see Table 4 of Attachment 4) that for a small number of IFBA coated rods, up to 32, (the number is a variable controlled by the core designer and can differ for each fuel assembly) fuel enriched to 5.0 w/o U-235 can be safely stored in the new fuel storage racks and continue to meet the  $K_{eff}$  limits. Therefore, using reactivity equivalencing, any fuel assembly placed in the new fuel storage racks will not have greater reactivity than a fuel assembly at the current T/S limit.

Table 4 of Attachment 4 provides an administrative guide to ensure that each fuel assembly intended for storage in the new fuel storage racks will meet the proposed T/S limit prior to placement of the fuel assembly in the racks.

The wording for the footnote was chosen because it is similar to the wording in previously approved Technical Specifications changes for the Farley, V. C. Summer, and Braidwood nuclear power stations. (For the reviewer's reference: Farley Unit 2 T/S Amendment No. 101, V. C. Summer Unit 1 T/S Amendment No. 116, and Braidwood Units 1 & 2 Amendment No. 58.) The value for the maximum reference fuel assembly  $K_{eff}$  (less than or equal to 1.4857 at 68°F) was calculated in Attachment 4.

Although the Westinghouse report provides for an increase in the new fuel storage rack limit for Westinghouse fuel up to 5.0 w/o U-235, due to the normal manufacturing enrichment variability of  $\pm 0.05$  w/o U-235, a limit of only 4.95 w/o U-235 is requested.

Also, since the Westinghouse report only analyzed for Westinghouse fuel types, no change is requested for the non-Westinghouse fuel types listed in the proposed Table 5.6-1.

NUREG 1431, Rev. 1 format is used for these proposed changes to facilitate use and approval.

#### 10 CFR 50.92 EVALUATION

Per 10 CFR 50.92, a proposed amendment will not involve a significant hazards consideration if the proposed amendment does 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.

#### Criterion 1

The proposed changes will not involve a significant increase in the probability of an accident previously evaluated because similar administrative controls to those presently used to identify new fuel storage rack inventory and compliance with T/S limits will be used. There are no physical changes to the plant associated with this T/S change. The consequences of an accident previously evaluated will not be increased because the reactivity of the fuel stored in the new fuel storage racks under the proposed T/S limits will be no greater than the reactivity of fuel stored in the new fuel storage racks presently allowable under the current T/S limits.

#### CRITERION 2

The proposed changes will not create the possibility of a new or different kind of accident from any accident previously evaluated because the changes will involve no physical changes to the plant nor any changes in plant operations. Furthermore, the reactivity of the fuel stored in the new fuel storage racks under the proposed T/S limits will be no greater than the reactivity of fuel stored in the new fuel storage racks presently allowable under the current T/S limits.

#### CRITERION 3

The proposed amendment will not involve a significant reduction in a margin of safety because the reactivity of the fuel stored in the new fuel storage racks under the proposed T/S limits will be no greater than the reactivity of fuel stored in the new fuel storage racks presently allowable under the current T/S limits.



ATTACHMENT 2 TO AEP:NRC:1071U

EXISTING TECHNICAL SPECIFICATION  
PAGES MARKED TO REFLECT PROPOSED CHANGES