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SUBJECT: Application for amend to License DPR-74,changing Tech Specs  
 re Cycle 7.

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AEP:NRC:1071A  
10 CFR 50.90

Donald C. Cook Nuclear Plant Unit 2  
Docket No. 50-316  
License No. DPR-74  
TECHNICAL SPECIFICATIONS CHANGE FOR UNIT 2 CYCLE 7

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

Attn: T. E. Murley

October 14, 1988

Dear Dr. Murley:

This letter constitutes an application for amendment to the Technical Specifications (T/Ss) for the Donald C. Cook Nuclear Plant Unit 2. Specifically, due to a more accurate calculation by our Unit 2 fuel vendor, Advanced Nuclear Fuels Corp. (ANF), it is necessary to conservatively increase the Modes 4 and 5 shutdown margin requirements of Technical Specification (T/S) 3.1.1.2. The calculation was revisited in preparation for the Cycle 7 reload evaluation. ANF has determined that the required Cycle 6 shutdown margin was properly implemented, and therefore sufficient boron was available at all times during the previous cycle to protect against a boron dilution accident.

Unit 2 is currently in an outage for refueling and steam generator replacement. Mode 5 is currently expected to be reached as early as January 6, 1989. Therefore, we request that you respond to this proposal by December 30, 1988.

A description of the change and our analyses concerning significant hazards considerations are contained in Attachment 1 to this letter. The proposed revised T/S page is contained in Attachment 2. Attachment 3 contains a letter from ANF to Indiana Michigan Power Company detailing the nonconservatism in the reactivity evaluation and summarizing the revised evaluation that was performed.

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

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Dr. T. E. Murley

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AEP:NRC:1071A

These changes have been reviewed by the Plant Nuclear Safety Review Committee and will be reviewed by the Nuclear Safety and Design Review Committee at their next regularly scheduled meeting.

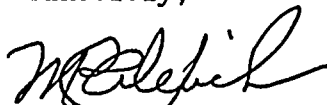
The T/S page affected by this submittal, 3/4 1-3b, has an additional change pending from a previous submittal, AEP:NRC:0916AB, dated August 15, 1988. Discussions with your staff have indicated that the AEP:NRC:0916AB change will likely be approved prior to Unit 2 restart. Therefore, we have included that change in the page contained in Attachment 2 to this letter.

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

Pursuant to the requirements of 10 CFR 170.12(c), we have enclosed an application fee of \$150.00 for the proposed amendments.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,



M. P. Alexich  
Vice President

Attachments

cc: D. H. Williams, Jr.  
W. G. Smith, Jr. - Bridgman  
G. Bruchmann  
R. C. Callen  
G. Charnoff  
NRC Resident Inspector - Bridgman  
A. B. Davis - Region III

ATTACHMENT 1 TO AEP:NRC:1071A

Reasons and 10 CFR 50.92 Significant Hazards Evaluation  
for Changes to the Donald C. Cook Nuclear Plant Unit 2  
Technical Specifications

Introduction

This letter requests modification of Technical Specification (T/S) 3.1.1.2 (Shutdown Margin-Shutdown). Specifically, we are proposing to increase the Mode 4 and 5 required shutdown margin defined by T/S Figure 3.1-3. The modification is necessary because of a more accurate reactivity evaluation by ANF for the next Unit 2 fuel cycle (Cycle 7). The analysis containing the previous reactivity evaluation is contained in Supplement 1 to the ANF document XN-NF-85-64(P) Rev. 2, entitled "Plant Transient Analysis for D.C. Cook Unit 2 with 10% Steam Generator Tube Plugging." This analysis was transmitted directly to the NRC by ANF via their letter RAC:025:86, dated March 21, 1986. The T/S change to Figure 3.1-3 that accompanied the ANF analysis was submitted in our letter AEP:NRC:0916P, dated March 27, 1986. The T/S change was approved by the NRC via Unit 2 T/S Amendment 82, dated May 21, 1986.

The portions of Figure 3.1-3 common to Modes 4 and 5 are based on an analysis of a boron dilution transient. The acceptance criteria for the analysis is that the operator must have at least 15 minutes to respond to the dilution accident before all shutdown margin is lost. The limiting case occurs when the reactor is being cooled via the residual heat removal system, since the flow rates through the core are lower, and complete mixing of the unborated water cannot be assured. The analysis performed by ANF employs a dilution front approach to evaluate criticality. A step boron concentration reduction occurs at the charging line inlet and migrates to the core. When one transit time has elapsed after the first dilution front reaches the core, the entire coolant volume is at the reduced boron concentration, and a second step reduction begins to transit the core. The calculation assumes the reactor coolant system (RCS) is drained down to a volume consistent with half-loop operation, since this provides the minimum RCS volume and thus maximizes the effect of the dilution front.

The more accurate method used by ANF involved determination of the change in reactivity between the initial and final boron concentrations. As detailed in Attachment 3, ANF assumed discrete values for the differential boron worth, rather than values based on the average boron concentration between the initial and final conditions. The use of discrete differential boron worth values results in a less accurate prediction of the time to reach criticality, relative to the use of an average differential boron worth.

ANF has revised Figure 3.1-3, based on a more accurate determination of shutdown boron using ANF's NRC-approved XTGPWR computer code, which is ANF's standard code for reload neutronics calculations. As with the present Figure 3.1-3, the shutdown margin requirements are based on the operator having 15 minutes to respond to a dilution accident before shutdown margin is lost. The replacement T/S Figure 3.1-3 is provided in Attachment 2 to this letter. The shutdown margin requirements at all boron concentrations are greater than or equal to the present requirements, and are thus conservative with respect to the present requirements.

As discussed in Attachment 3, the requirements of the present T/S Figure 3.1-3 were conservatively implemented for Cycle 6. Thus, sufficient boron was available at all boron concentrations to preclude criticality within 15 minutes during a potential boron dilution event.

#### 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 analyzed,
- (2) create the possibility of a new or different kind of accident from any accident previously analyzed or evaluated, or
- (3) involve a significant reduction in a margin of safety.

Our evaluation of the proposed change with respect to these criteria is provided below.

#### Criterion 1

The change will result in more conservative plant operation since it will require additional shutdown margin in Modes 4 and 5. As such, the change would be expected to increase safety. Therefore, the change is not expected to involve a significant increase in the probability or consequences of a previously analyzed accident, nor should it involve a significant reduction in a margin of safety.

#### Criterion 2

The change will not result in any new modes of plant operation.

Rather, it will impose additional restrictions on our present operational modes. Thus, it would not be expected to create the possibility of a new or different kind of accident from any accident previously analyzed or evaluated.

Criterion 3

See Criterion 1, above.

Lastly, we note that the commission has provided guidance concerning the determination of significant hazards by providing certain examples (48 FR 14870) of amendments considered not likely to involve significant hazards consideration. The second of these examples refers to changes that constitute an additional limitation, restriction, or control not presently included in the T/Ss. The revised shutdown margin requirements are in all cases equal to or conservative with respect to the present requirements. Therefore, we believe the example cited is relevant and the change should not involve significant hazards consideration.