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SUBJECT: Application for amend to License DPR-74,adding Rept XN-NF-87-31(P),entitled "Steam Line Break Analysis for Unit 2." Fee paid.

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June 15, 1987
AEP:NRC:0916D

Donald C. Cook Nuclear Plant Unit No. 2
Docket No. 50-316
License No. DPR-74
SUBMITTAL OF STEAM LINE BREAK ANALYSIS
FOR D. C. COOK UNIT 2

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

Attn: T. E. Murley

References:
1. Letter, G. N. Ward (Advanced Nuclear Fuels Corp.) to U.S. Nuclear Regulatory Commission, dated May 29, 1987 (Identifier GNW:047:87).
2. Advanced Nuclear Fuels Corp. Report XN-NF-87-31 (P), "Steam Line Break Analysis for D. C. Cook Unit 2."
3. Letter, M. P. Alexich (I&MECo) to H. R. Denton (U.S. NRC), dated May 21, 1985 (Identifier AEP:NRC:0916A).
4. Letter, D. L. Wigginton (U.S. NRC) to John E. Dolan (I&MECo) dated May 21, 1986 (Transmittal letter for Unit 2 Technical Specifications Amendment 82).
5. XN-NF-84-93(P), "Steam Line Break Methodology for PWRs," Exxon Nuclear Co., Richland, WA, November 1984.

Dear Dr. Murley:

The purpose of this letter is to advise you that Advanced Nuclear Fuels Corporation (ANF, formerly Exxon Nuclear Co.) has transmitted to you their Report XN-NF-87-31(P), entitled "Steam Line Break Analysis for D. C. Cook Unit 2." This report was submitted by ANF via their letter GNW:047:87, dated May 29, 1987. Via this letter, we request that the report be placed on our D. C. Cook Unit 2 docket, No. 50-316.

In Reference 3, we committed to having a steam line break analysis performed by the midpoint of the current Unit 2 fuel cycle, Cycle 6. This commitment was made a condition of the NRC's safety evaluation report for

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Cycle 6 (Reference 4). The submittal of XN-NF-87-31(P) is intended to fulfill this commitment.

The analyses presented in XN-NF-87-31(P) demonstrate the acceptability of operation of D. C. Cook Unit 2 under conditions of a steam line break. These analyses, which are based on the methodology outlined in Reference 5, simulate four transient scenarios. The scenarios considered initiation of the transient from two operating conditions, Hot Zero Power (HZP) and Hot Full Power (HFP). The main differences between the two initial conditions are the presence of the delayed neutrons and the higher stored energy in the HFP case. From both these initial conditions, the transient was then assumed to occur both with and without offsite power. Here, the main differences result from the coastdown of the primary coolant pumps and the effect the resulting flow coastdown has on the timing of the events occurring during the transient.

The HZP scenario with loss of offsite power was determined to be the most limiting from a minimum departure from nucleate boiling ratio (MDNBR) standpoint. This case resulted in an MDNBR of 1.26, which is above the 1.135 MDNBR safety limit for the correlation utilized. The HFP and HZP scenarios, with offsite power maintained for operation of the primary coolant pumps, resulted in a return to higher power levels than the scenarios where offsite power is lost. However, these scenarios provide substantially greater margin to the MDNBR limit because of the higher coolant flow rate. In no scenario evaluated, however, was fuel failure calculated to occur as a result of penetration of the MDNBR safety limit.

The HZP scenario with offsite power available was determined to be the most limiting from the standpoint of fuel centerline melt. This scenario results in the highest calculated linear heat generation rate, 19.7 kW/ft. This value is within the limit of 21 kW/ft discussed in XN-NF-87-31(P). Thus, no fuel failures would be expected due to fuel melt. As discussed above, the HFP and HZP scenarios with offsite power maintained for operation of the primary coolant pumps returned to higher power levels than the scenarios where offsite power is lost. Although these scenarios have substantially greater margin to the MDNBR limit because of a higher coolant flow rate, the higher power levels, in combination with the highly skewed power distribution due to the assumption of a stuck rod cluster, resulted in them being limiting in regard to the fuel centerline melt criteria.

We are currently evaluating T/S changes that may be necessary as a result of the XN-NF-87-31(P) analyses. Changes that are found to be necessary will be transmitted after we receive preliminary notification that the analyses contained in XN-NF-87-31(P) are acceptable.

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 insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

M. P. Alexich
Vice President

cm

Enclosure

cc: John E. Dolan
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Bruchmann
G. Charnoff
NRC Resident Inspector - Bridgman
A. B. Davis - Region III