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SUBJECT: Provides clarification re power shape used in large break loss of coolant accident analysis.

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September 26, 1995

AEP:NRC:1207A

Docket Nos. 50-315
50-316

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

Gentlemen:

DONALD C. COOK NUCLEAR PLANT UNITS 1 AND 2
LICENSE NOS. DPR-58 AND DPR-74
CLARIFICATION OF POWER SHAPE USED IN
LOCA ANALYSIS

This letter and its attachment provide clarification regarding the power shape used in the large break loss of coolant accident (LBLOCA) analysis provided as part of our submittal dated May 26, 1995 and identified as AEP:NRC:1207. Submittal AEP:NRC:1207 requested approval for technical specification changes associated with our effort to license operation of Unit 1 with up to 30% of the steam generator tubes plugged.

We recently received notification from the vendor performing the LBLOCA analysis, Westinghouse Electric Corporation, that the power shape methodology for LBLOCA analyses has been revised. We have submitted a 10CFR50.46 report describing the impact of the revised methodology on the analyses of record as submittal AEP:NRC:1118J.

We have also discussed with Westinghouse the potential impact of the revised power methodology on the LBLOCA analysis submitted with AEP:NRC:1207. It has been concluded that the revised power shape methodology does not have any effect on the limiting PCT for the LBLOCA analysis submitted in AEP:NRC:1207. This conclusion is included in the attachment to this letter. This is provided for your information only.

Sincerely,

W. J. Smith

for E. E. Fitzpatrick
Vice President

Attachment

A001

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

ATTACHMENT TO AEP:NRC:1207A

WESTINGHOUSE DOCUMENT
DESCRIBING POWER SHAPE
RELATIONSHIP FOR LBLOCA ANALYSIS
SUBMITTED IN AEP:NRC:1207

Attachment 4

Effect of LOCA Axial Power Shape Sensitivity Model on the Unit 1 Large Break LOCA analysis for 30% SGTP

Westinghouse has recently notified American Electric Power Service Corporation that the Power Shape Sensitivity Model (PSSM), which was applied to ensure that the cosine axial power distribution used in large break LOCA analyses remains limiting, is being withdrawn effective October 30, 1995. PSSM is being replaced by an alternate axial power shape methodology (ESHAPE) which is based on explicit analysis of a set of skewed axial power shapes. The purpose of this letter is to inform you of the effect of this change on the large break LOCA analysis which has been submitted to support the 30% Steam Generator Tube Plugging (SGTP) Program for D. C. Cook Unit 1.

The large break LOCA analysis for the 30% SGTP Program was performed using a cosine axial power distribution, with the intent of applying PSSM to ensure that the cosine distribution remained limiting during operation. Since PSSM is being withdrawn, an evaluation was performed to determine the impact on the analysis if the ESHAPE methodology is applied. This evaluation included a "compensatory benefit" which was developed by Westinghouse to reduce or eliminate the PCT penalty associated with the change from PSSM to ESHAPE. This compensatory benefit results from the incorporation of the hot leg nozzle gap into the BASH Methodology. The evaluation for the 30% SGTP analysis demonstrated that the PCT for skewed power shapes, in conjunction with the application of the hot leg nozzle gap model, would be less than the PCT for the existing analysis performed with a cosine axial power shape with the application of the hot leg nozzle gap model. Thus, the existing large break LOCA analysis with a cosine power shape remains limiting and there is no PCT penalty for skewed power shapes. It is noted that the hot leg nozzle gap is not required for the cosine shape analysis, and was only used to demonstrate that the cosine shape analysis remains limiting.

The reason that the large break LOCA analysis for 30% SGTP is not affected is that the impact of skewed power shapes is less pronounced for relatively early PCTs (less than approximately 100 seconds), and the benefit from the hot leg nozzle gap is also less significant for early PCTs. For the limiting large break LOCA analysis case for 30% SGTP, the calculated PCT with a cosine power shape is 2164°F at approximately 77 seconds, An analysis for this case with the limiting skewed power shape resulted in a delay in the PCT time to approximately 265 seconds with a PCT increase of 102°F. The application of the hot leg nozzle gap in conjunction with the skewed power shape then resulted in a benefit of 237°F, for a net PCT reduction of 135°F. The effect of the hot leg nozzle gap would not reduce the PCT significantly for the cosine power shape since the PCT occurs relatively early for that case. Thus, the PCT of 2164°F for the cosine power shape would remain limiting for the 30% SGTP analysis, and there is no PCT penalty for skewed power shapes. On this basis, it is concluded that the existing Unit 1 large break LOCA analysis for 30% SGTP with a cosine power shape is not affected by this issue.

In summary, the existing Unit 1 30% SGTP large break LOCA analysis with a cosine power shape is not affected by the change from PSSM to the ESHAPE methodology, and the analysis remains applicable as submitted.