

# INDIANA & MICHIGAN ELECTRIC COMPANY

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NEW YORK, N. Y. 10004

June 7, 1982  
AEP:NRC:0701

Donald C. Cook Nuclear Plant Unit No. 1  
Docket No. 50-315  
License No. DPR-58  
REQUEST FOR RELIEF FROM TECHNICAL SPECIFICATION 3.5.2

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Mr. Steven A. Varga

Dear Mr. Denton:

This letter documents the discussions held with members of your Staff concerning our request for a license amendment granting relief from the requirements of Technical Specification 3.5.2.

Unit No. 1's 1E Centrifugal Charging Pump was registering a high vibration. It was decided to take the pump out of service and in so doing, we entered the action statement of Technical Specification 3.5.2. The action statement requires, in particular, that the Centrifugal Charging Pump be restored to operable status within 72-hours or that the Unit be in hot shutdown within the next 12-hours. Upon further inspection of the 1E Centrifugal Charging Pump, we discovered erosion on both the discharge and suction sides. Repairing the erosion is considerably more involved than resolving the vibration problem and as such, we would like to request a one time license amendment to Unit No. 1's Technical Specification 3.5.2 which would allow us an additional 72-hours to restore the Centrifugal Charging Pump to operable status. The Technical Specification would then require us to restore the Centrifugal Charging Pump to operable status within 144-hours or be in hot shutdown within the next 12-hours.

Each Unit of the Cook Nuclear Plant has two high head Centrifugal Charging Pumps and one Reciprocating Charging Pump. The second Centrifugal Charging Pump of Unit 1 (the 1W pump) as well as its Reciprocating Charging Pump are operable. We have reviewed the surveillance history of the operable 1W Centrifugal Charging Pump and found that its last surveillance was performed on May 16, 1982 and that it passed its surveillance requirements including suction pressure, discharge pressure and vibration. We believe that the operable 1W Centrifugal Charging Pump will continue to be operable during the extension period requested by this Technical Specification change.

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Attachment 1 to this letter contains the Westinghouse evaluation concerning small break considerations. It is their conclusion that even if we were to lose the operable 1W Centrifugal Charging Pump sufficient margin would still exist to the limits specified in 10 CFR 50.46. We concur with that conclusion.

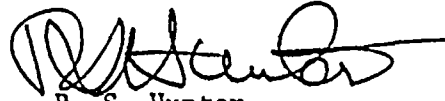
We would appreciate the expeditious handling of this request by your Staff.

AEPSC interprets 10.CFR.170.22 as requiring that a Class III Amendment Fee be paid for the change. A check in the amount of \$4,000 will be transmitted to you in a future letter.

This Technical Specification relief request has not been reviewed by the Cook Plant PNSRC or by the AEPSC NSDRC. Both Committees will review this request at their next meeting.

Due to this letter being written on short notice, it has not been prepared following our standard Corporate Procedures for such letters. We shall, however, review the letter according to our Corporate Procedures and will inform you if any modification is required.

Very truly yours,

  
R. S. Hunter  
Vice President

RSH:mm  
Attachment

cc: John E. Dolan - Columbus  
R. W. Jurgensen  
W. G. Smith, Jr. - Bridgman  
R. C. Callen  
G. Charnoff  
Joe Williams, Jr.  
NRC Resident Inspector at Cook Plant - Bridgman



### LOCA Evaluation for D. C. Cook Unit 1 with One Charging Pump Out of Service

The purpose of this evaluation is to assess the effect of one charging pump out of service for the Cook Unit 1 Nuclear Plant on Loss of Coolant Accident (LOCA) consequences. Presently, the plant is fueled by Exxon Nuclear Company. However, the evaluation provided below is judged to be applicable to the non Westinghouse fuel, since there are no known major design differences that would have a significant impact on the LOCA behavior important for this evaluation.

#### Large Break LOCA

Charging pump flow provides an insignificant proportion of the total SI flow during a large break accident, where RCS pressure rapidly drops to near atmospheric. Accumulator and low head safety injection (RHR) flow are important for this accident. Therefore, the loss of a charging pump has a negligible effect on large LOCA calculated peak clad temperature.

#### Small Break LOCA

The plant's protection against small LOCAs comes from a two train system including a total of two intermediate head SI pumps and two charging pumps. Small LOCA FSAR licensing analyses assume the worst single failure to be loss of a train, leaving one intermediate head SI pump and one charging pump. The small LOCA analysis yields clad temperatures well below 10 CFR 50.46 limits. This analysis assumption bounds the present plant configuration with one charging pump out of service and no single failure.

If the worst single failure assumption is considered in addition to the loss of the charging pump, and further, the train lost is assumed to have the operational charging pump, SI flow is delivered from only the intermediate head SI pump. The following paragraphs evaluate this scenario.

One differentiation in the SI flow characteristics with no charging pump is the absence of SI flow at pressures greater than the shutoff head of the intermediate head pump, or approximately 1500 psia. The Westinghouse Topical Report, WCAP-9600, "Report on Small Break LOCAs in W NSSS Systems", demonstrated that the RCS depressurizes to a pressure where SI flow equilibrates to the break flow for design basis small LOCAs with auxiliary feedwater available. Therefore, for small break sizes that relied only on charging flow for inventory makeup, additional depressurization will naturally occur resulting in makeup from the intermediate head pump. SI flow above 1500 psia is not required for core cooling of design basis LOCAs.

Reduction of SI flow in the range of 600 to 1200 psia has an adverse effect on calculated clad temperature for a range of small LOCA break sizes. The loss of a charging pump has the effect of reducing delivered SI flow in that important pressure range. Total SI flow will be degraded by approximately 44% averaged over this pressure interval. Established sensitivity studies have indicated that such a degradation results in as much as a 450°F small LOCA PCT increase.

The small break analysis for AEP does not use the latest NRC approved W small LOCA Evaluation Model. The current small break LOCA EM would calculate a PCT of approximately 1200°F, reduced from 1493°F, predicted by the analysis in the FSAR. This new PCT is established from analysis of a substantially equivalent plant (3250 MW, 4 Loop, same SIS design) analyzed in WCAP-8970-P-A, "Westinghouse Emergency CORE Cooling System Small Break October, 1975 Model", and applies to Cook.

Additionally, credit for conservative assumptions in the small LOCA FSAR analysis can mitigate the PCT penalty. Following is a summary of those assumptions, and estimates of their impact on PCT.

- 1.) ANS Decay Heat + 20% - A best estimate decay heat function would reduce PCT by 200°F.
- 2.) Analysis assumed a peaking factor of 2.32 - Large break limited FQT of 2.04 would reduce small break PCT by 100°F.
- 3.) Analysis assumed loss of steam dump - steam dump availability would reduce PCT by 100°F or more.
- 4.) Degraded SI pump performance - best estimate performance would reduce PCT by 50°F.

In conclusion, operation of Cook 1 with a charging pump out of service for a brief period of time reduces the small LOCA PCT margin in the unlikely event of a LOCA coincident with the worst single failure. However, when consideration of newer approved LOCA Evaluation Models and better estimate assumptions in the FSAR analysis are included, the PCT penalty is mitigated. In addition, the fact that the present analysis has significant margin to 10 CFR 50.46 PCT limits indicates that continued operation of the plant for a short period of time is not a safety concern.

