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ACCESSION NBR:8807130169 DOC.DATE: 88/07/08 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 05000315
50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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RECIP.NAME RECIPIENT AFFILIATION
MURLEY,T.E. Document Control Branch (Document Control Desk)

SUBJECT: Forwards reponse to NRC Bulletin 88-4, "potential Safety Related Pump Loss."

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AEP:NRC:1065

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
RESPONSE TO NRC BULLETIN 88-04
POTENTIAL SAFETY RELATED PUMP LOSS

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

Attn: T. E. Murley

July 8, 1988

Dear Dr. Murley:

The purpose of this letter is to provide our response to NRC Bulletin 88-04, "Potential Safety Related Pump Loss." The bulletin addresses two problems associated with the miniflow lines of safety-related pumps. The first concern involves the potential for dead-heading one or more pumps in safety-related systems that have a miniflow line common to two or more pumps or other piping configurations that do not preclude pump-to-pump interaction during miniflow operation. We have investigated this concern and determined that it applies only to our residual heat removal (RHR) pumps. A detailed description of the concern as it relates to our RHR pumps, our proposed short-term and long-term actions, our schedule for implementing these actions, and our justification for continued operation are provided in the attachment to this letter. The second concern addressed by the bulletin involves whether or not the installed miniflow capacity is adequate for even a single pump in operation. Our investigation of this concern determined that current miniflow capacities for all safety-related pumps are adequate. The details of our response to this concern are also discussed in the attachment.

Sincerely,

M. P. Alexich
Vice President

MPA/eh

Attachment

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

ATTACHMENT TO AEP:NRC:1065

DESCRIPTION OF PROBLEM, PROPOSED ACTIONS,

AND JUSTIFICATION FOR CONTINUED OPERATION

The following is the Indiana and Michigan Power Company's response to the NRC IE Bulletin 88-04 as applicable to the Donald C. Cook Nuclear Plant.

A. Response to First Bulletin Concern

With regard to the first concern identified by the bulletin involving pump-to-pump interaction concerns, we have determined that the concern applies only for our RHR pumps. In accordance with the requirements of the bulletin we are providing a written response which summarizes the problems and the systems affected, identifies the short-term and long-term modifications implemented to ensure safe operation, proposes a schedule for long-term resolution of problems identified, and provides justification for continued operation. Our response to these requirements is provided below.

1. Summary of Problems and Systems Affected

We conducted a review of all safety-related systems at the Cook Nuclear Plant to determine if any existing pump and piping system configuration allows pump-to-pump interaction during miniflow operation. This review determined that no condition allowing pump-to-pump interaction exists for the auxiliary feedwater system, the component cooling water system, the containment spray system, or the essential service water system. Review of the emergency core cooling system (ECCS) determined that all ECCS pumps have miniflow paths that share some portion of the line; however, only the residual heat removal (RHR) pumps were identified as a potential problem with regard to dead-heading. Each pump in the high pressure injection systems (centrifugal charging system and safety injection system) has a flow restricting miniflow orifice in its circuit upstream of the common portion of the miniflow line which precludes pump-to-pump interaction.

In our RHR system design, each RHR pump has its own miniflow line; however, the cross-tie joining the RHR discharge lines upstream of the miniflow circuits cause the miniflow circuits to act in parallel rather than independently and therefore the potential exists for dead-heading the weaker pump when the RHR cross-tie is open.

2. Short-Term and Long-Term Modifications

We do not believe any short-term modifications are necessary to ensure safe operation. This conclusion is based on the results of our analyses performed to determine the difference in shutoff head required to dead-head the weaker RHR pump. These analyses showed that dead-heading would occur if the pump shutoff heads differ by greater than 2.6 percent. A review of the monthly surveillance data for the two year period beginning January 1986 found that the average performance difference between the two pumps on each unit is less than 1 percent. A review of the operating history determined that the performance of the four RHR pumps has shown very little degradation in the 13 years of operation on Unit 1 and the 10 years of operation on Unit 2. Therefore, we believe there is no short term potential for dead-heading to occur with these particular pump sets.

The proposed long-term corrective action is to operate with the cross-tie valves closed to make the miniflow circuits independent, thereby removing the potential for dead-heading the weaker pump. Operation in this manner requires approval of our analysis for two loop injection. Our current analysis assumes 4 loop injection and failure of one of the RHR pumps; therefore, we are currently required to keep the cross-tie open to ensure 4 loop injection. Once our analysis to allow 2 loop injection is approved, we will normally operate with the RHR cross-tie closed thereby removing any potential for dead-heading a weaker pump.

3. Schedule for Long-Term Resolution of Identified Problems

The majority of our analyses for two-loop safety injection has been submitted with our final submittal scheduled for September 1, 1988. NRC approval of our analyses is expected by January 31, 1989. After NRC approval of our analysis, we will be permitted to operate with the RHR cross-tie closed. Within 30 days of implementing this long-term action, we will submit a written response describing the actions taken.

4. Justification for Continued Operation

As discussed under our short-term actions, we believe there is no potential for dead-heading to occur with our particular pump sets since the differences between the pumps within each set is much less than the 2.6 percent difference required to cause dead-heading to occur. We therefore believe that continued operation is justified.

B. Response to Second Bulletin Concern

The second concern identified in the bulletin involved the adequacy of miniflow for single pump operation. We have evaluated this issue for the safety related pumps operation with miniflow. The current flow capacities being used were originally recommended by the NSSS supplier or pump supplier. The pumps that require miniflow circuits in the performance of their safety function are tested monthly while aligned to operate on their miniflow circuits. In over 13 years on Unit 1 and over 10 years on Unit 2, no damage has been observed which could be directly altributed to the operation in the minimum flow mode. Based on this satisfactory operational experience, we believe it is not necesary to obtain verification of adequacy of miniflow capacities from the manufacturer.

STATE OF OHIO)
COUNTY OF FRANKLIN)

Milton P. Alexich, being duly sworn, deposes and says that he is the Vice President of licensee Indiana Michigan Power Company, that he has read the foregoing response to NRC Bulletin No. 88-04, "Potential Safety-Related Pump Loss" and knows the contents thereof; and that said contents are true to the best of his knowledge and belief.

Subscribed and sworn to before me this 8th day of July, 1988.

Barbara Ann Winkler
NOTARY PUBLIC

BARBARA ANN WINKLER
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES MARCH 12, 1991