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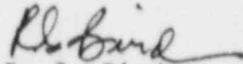
Ralph G. Bird
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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

BECO 88- 110
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Docket 50-293

RESPONSE TO NRC BULLETIN 88-04,
"POTENTIAL SAFETY-RELATED PUMP LOSS"

Boston Edison's response to NRC Bulletin 88-04 is provided in the attachment. We are endorsing the BWROG response and providing additional plant specific information regarding our investigation and actions taken to date.


R. G. Bird

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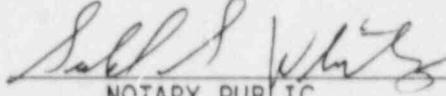
Attachment: Response to NRC Bulletin 88-04

Commonwealth of Massachusetts)
County of Suffolk)

Then personally appeared before me, Ralph G. Bird, who being duly sworn, did state that he is Senior Vice President - Nuclear of Boston Edison Company and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements in said submittal are true to the best of his knowledge and belief.

My commission expires:

APR 03 1992
DATE


NOTARY PUBLIC

Gerald G. Whitney
Notary Public

My Commission Expires April 3, 1992

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Response to NRC Bulletin 88-04

Boston Edison endorses the BWROG position on this bulletin, as discussed in BWROG-8836 dated June 29, 1988. The following information, specific to Pilgrim Nuclear Power Station (PNPS), supplements the BWROG response. (Each numbered item below corresponds to the same numbered section in BWROG-8836).

I. Summary of Problem and Affected Systems

A. Summary of Problem

The BWROG summary description is comprehensive and adequately addresses the PNPS situation.

B. Affected Systems

Four systems at PNPS fall within the scope of the bulletin; Residual Heat Removal (RHR), Core Spray (CS), High Pressure Coolant Injection (HPCI), and Reactor Core Isolation Cooling (RCIC).

C. Potential for Dead-Heading

• Residual Heat Removal (RHR)

RHR is a dual loop, 4 pump system with the two pumps in each loop each having a two inch minimum flow line which ties into a common three inch line. Each three inch line connects into the twelve inch RHR full flow test line for the respective loop.

All four two inch lines are orificed prior to the junction with the common three inch line. As part of an RHR pump inspection project, performed between June 1986 and January 1987, the adequacy of the orifice sizes was reviewed. As a result, the orifices were modified in order to increase the minimum flow rate. We have performed a pipe resistance calculation and verified that the resistance of the common three inch line is small compared to the overall resistance, therefore dual pump operation presents negligible adverse pump-to-pump interaction. In addition, the pump shut-off head of all four pumps are similar based on inservice testing data and pump performance tests performed after the 1986-1987 repair (i.e., mismatch is insignificant).

• Core Spray (CS)

The CS system has two pumps. Each pump is equipped with an individual, orificed, three inch minimum flow line. Each three inch line connects to the respective pump's six inch full flow test line, which connects to the twelve inch RHR full flow test lines. As discussed in the BWROG response, this piping configuration, with orificed lines prior to a significantly larger common line, is considered adequate to prevent any pump-to-pump interaction or possible pump dead-heading.

- High Pressure Coolant Injection (HPCI)

The HPCI system is a single pump high pressure system with a four inch, orificed, minimum flow line which connects to the twelve inch RHR full flow test line. This piping configuration design is considered adequate to prevent any pump-to-pump interaction due to the orificed line prior to the common line, the size of the common line, and the fact that it operates in minimum flow for a short period of time.

- Reactor Core Isolation Cooling (RCIC)

The RCIC system is a single pump high pressure system with a two inch, orificed, minimum flow line which connects to the twelve inch RHR full flow test line. This piping configuration design is considered adequate to prevent any pump to pump interaction due to the orificed line prior to the common line, the size of the common line, and the fact that it operates in minimum flow for a short period of time.

D. Adequacy of Pump Minimum Flow

- RHR

In 1986 all four RHR pumps were disassembled to replace IGSCC susceptible wear rings and inspected in the presence of the pump manufacturer's representative. The inspection indicated that the minimum flow configuration has not degraded the pump. This determination was supported by continued successful pump operation with no, or negligible, pump performance degradation. While all pumps were operable and had met Technical Specification requirements, the D pump impeller did show signs of overheating which could have been caused by inadequate flows. It should be noted that pumps B, C and D all had approximately the same minimum flows.

As a result of the 1986 inspection all RHR pump orifices were modified to increase minimum flows. The minimum flows of all the pumps, including D, were increased by approximately 60%. As an added precaution RHR operating procedures were revised to ensure pump operation in the minimum flow mode is minimized.

It should also be noted that the 'C' RHR pump was operated dead headed (suction valve closed) for approximately five hours in 1981 (Reference LER No. 81-064/03L-0 dated December 23, 1981). Test and evaluations at the time of the incident demonstrated that the pump was still operable. The 1986 inspections revealed no damage attributable to this incident. We estimate that, to date, the 'A' and 'C' pumps have spent a total of two hours in the minimum flow mode; the 'B' and 'D' pumps a total of one hour and ten minutes.

- Core Spray

As part of the RHR inspection project in 1986-1987 each Core Spray pump impeller was also inspected in the presence of the pump manufacturer representative. This inspection indicated that the minimum flow configuration has not degraded either pump. This determination was supported by continued successful pump operation with no, or negligible, pump performance degradation. Inservice

testing, in conjunction with scheduled surveillances, confirms this. We have estimated that, to date, each pump has operated for approximately one and one half hours in the minimum flow mode.

- High Pressure Coolant Injection

The HPCI system receives only an injection signal (i.e., no initiation and then stand-by operation) therefore, the minimum flow path only operates during pump start until the injection (or full flow test) valves open. We have estimated that, to date, HPCI has operated for less than one hour total in the minimum flow mode during periodic surveillances. The HPCI pump and turbine performance were verified (at full capacity) with auxiliary steam in December 1987. Inservice testing, in conjunction with scheduled surveillances has identified no pump performance degradation attributable to inadequate minimum flow. Based on this, the HPCI pump minimum flow is considered adequate.

- Reactor Core Isolation Cooling

Similar to HPCI, RCIC receives only an injection signal. We have estimated that, to date, RCIC has operated for less than one hour in the minimum flow mode during periodic surveillance tests. The RCIC pump and turbine performance were verified (at full capacity) with auxiliary steam in December 1987. Inservice testing, in conjunction with scheduled surveillances has identified no pump performance degradation attributable to inadequate minimum flow. Based on this, the RCIC pump minimum flow is considered adequate.

II Short-Term and Long Term Modifications

Based on past operating history, current operating practices, the recent RHR and CS pump inspections, and the justification for continued operation discussed below, no short or long term modifications are planned.

III Schedule

Based on Section II, no schedule is required

IV Justification for Continued Operation

The BWROG Justification for Continued Operation, Items A through F, provide adequate assurance that, for the applicable four systems at PNPS (RHR, CS, HPCI and RCIC), minimum flow concerns will not degrade system operability. Additionally, the results of our recent RHR and CS pump inspections and tests demonstrate that, the pumps will operate adequately and no significant degradation has occurred due to inadequate minimum flow.

Therefore, justification for continued operation is provided by; the results of Technical Specification and ASME Section XI tests, the recent inspection of the internals of all the RHR and Core Spray pumps, the improvements recently made to the RHR minimum flow lines and the procedural changes implemented to limit pump operating time in the minimum flow mode.