



Consumers
Power
Company

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March 10, 1983

82-14 #2

Mr J G Keppler, Regional Administrator
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT -
DOCKET NOS 50-329 AND 50-330
AUXILIARY FEEDWATER SUCTION PIPING
FILE: 0.4.9.70 SERIAL: 20727

Reference: J W Cook letter to J G Keppler, Same Subject, Serial 19114, dated
December 14, 1982

This letter, as was the referenced letter, is an interim 50.55(e) report on a
potential deficiency in the design of the auxiliary feedwater suction piping.
The attachment to this letter provides a description of the deficiency and the
corrective actions being taken to resolve this problem.

Another report, either interim or final, will be sent on or before May 20,
1983.

JWC/WRB/lr

Attachment: MCAR-65, Interim Report 2, dated February 18, 1983

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

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Attachment to
Serial 20727
82-14 #2

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Management Corrective Action Report (MCAR)

Subject: MCAR 65 (Issued 11/16/82)
Concerns for Auxiliary Feedwater (AFW) Suction
Piping Overpressurization

Interim Report 2

Date:

Project: Consumers Power Company
Midland Plant Units 1 and 2
Bechtel Job 7220

Description of Design Concern

Project engineering has become aware of an occurrence on McGuire 1 Plant which resulted in AFW suction overpressurization (INPO/SOER 82-3). The Midland design was reviewed using the hypothesis of check valve leakage and a potential design concern was identified. The design concern is that for the assumption of significant check valve leakage there is inadequate overpressurization protection for the ASME III Class 3, 150# ANSI rated AFW suction piping and pump components. Although the 1971 ASME III Code, which was in effect at the time of AFW piping design, allows an overstress of 20% in pressure during 1% of the operating period (Article NC-3612.3), the hypothesized backleakage through the check valves on the piping discharge combined with a closed recirculation valve could subject the AFW suction piping and pump components to the normal steam generator pressure, which is greater than their design pressure rating. Therefore, absence of overpressure protection for the AFW suction piping does not meet ASME Section III Code, Article ND-7110 which states, ". . . pump suction lines shall have relief valves of suitable size unless the lines are designed for the maximum pressure to which they may be subjected."

Summary of Investigation and Historical Background

In Interim Report 1, it was stated that overpressurization of the Midland AFW suction piping could occur as a result of backflow and/or leakage through the check valves on the discharge piping and that this overpressurization could result in damage to essential instrumentation in the suction line causing failure of the interlocks designed to support system design basis one and four (FSAR section 10.4.9.1.1).

However, further information received on a similar problem which occurred at McGuire 1 Plant revealed that overpressurization of the AFW suction piping was caused by backleakage only rather than backflow and/or leakage through the check valves in the discharge piping. In addition, reinvestigation of the instrumentation of the Midland AFW suction piping showed that the instrumentation is designed to withstand the maximum pressure of the steam generator.

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Summary of Investigation and Historical Background (cont'd)

The Midland AFW recirculation valve logic could be revised to open the valve while the pump is not running, thus allowing the leakage from the discharge check valves to be relieved through the recirculation line. However, such a design is unreliable because the fail close solenoid valve on the recirculation line relies on electrically actuated devices to open. In addition, the valve could still inadvertently be closed manually from the control room and result in overpressurization of the suction piping.

Analysis of Safety Implication

When the AFW pump is tripped, backleakage could occur through the discharge check valves. Because the suction piping check valve in conjunction with a closed recirculation valve maintains the pressure boundary, overpressurization in the AFW suction piping could result. It is expected that such an overpressurization will not damage the physical integrity of the suction piping, valves, and flanged connections to the point that the safety function of the AFW system will be adversely affected. However, overpressurization could cause water to leak from the tubes of the AFW turbine lube oil coolers into the lube oil system, causing the AFW pump turbine to fail. If the motor-driven AFW pump fails under a single failure incident, then the AFW supply to the steam generators will be lost. Therefore, if this condition remains uncorrected, the safety operation of the Midland Plant could be adversely affected.

Probable Cause

The design of the Midland auxiliary feedwater system utilizes check valves on both the pump suction and the discharge. On systems of such a design, the potential for discharge check valve leakage with subsequent suction piping overpressurization has not been generally recognized.

Corrective Action

The following actions are being evaluated:

1. Install a pressure relief valve on the AFW suction line between the pump and the check valve.
2. Conduct an investigation to determine if similar situations exist in any other system in the Midland plant. Any new findings will be addressed in future reports.

Reportability

Based on the safety analysis, this item was considered potentially reportable under the criteria contained in 10 CFR 50.55(e).

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