



Consumers
Power
Company

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May 20, 1983

82-14 #3

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: 22190

Reference: J W Cook letters to J G Keppler, Same Subject,

- (1) Serial 19114, dated December 14, 1982
- (2) Serial 20727, dated March 10, 1983

This letter, as were the referenced letters, is an interim 50.55(e) report on a potential deficiency in the design of the auxiliary feedwater suction piping. This letter is our final report on this subject.

The enclosure to this letter provides an analysis of the deficiency and the corrective actions that were taken with regard to this matter.

James W. Cook

JWC/WRB/lr

Attachment: MCAR-65, Final Report, dated April 27, 1983

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

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Management Corrective Action Report (MCAR)

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

Final Report April 27, 1983

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 Section III, Class 3, 150-pound ANSI rated AFW suction piping and pump components. Although the 1971 ASME Section 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 overpressurization 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 lines 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,

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MCAR 65 (Issued 11/16/82) i3522
Final Report
Page 2

Summary of Investigation and Historical Background (cont'd)

information concerning the instrumentation of the Midland AFW suction piping showed that the instrumentation is designed to withstand the maximum pressure of the steam generator.

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 main and auxiliary feedwater system utilizes check valves on both the suction and the discharge. The potential for discharge check valve leakage with subsequent suction piping overpressurization was not recognized.

Corrective Action

The following actions are being implemented:

1. A design change approval request (DCAR 687) has been issued to install a pressure relief valve on each of the four AFW pump suction

Bechtel Associates Professional Corporation

113204

MCAR 65 (Issued 11/16/82) 113522

Final Report

Page 3

lines between the pump and the first isolation valve. The affected piping and instrument diagrams [7220-M438, Sheet 3B(Q) and 7220-M439, Sheet 3B(Q)] will be revised to show the added four pressure relief valves.

2. An investigation was conducted to determine if similar situations existed in any other safety-related systems in the Midland plant. The investigation revealed that the suction piping of the makeup pumps could be subjected to overpressurization. A design change approval request (DCAR 706) has been initiated to install a pressure relief valve on each of the six makeup pump suction lines between the pump and the first isolation valve. The affected piping and instrument diagrams [7220-M403, Sheet 2A(Q) and 7220-M404, Sheet 2A(Q)] will be revised to show the added six pressure relief valves.
3. The material requisition and specification [7220-M140(Q)] will be revised to add the ten required pressure relief valves.
4. Based on Corrective Actions 1 and 2 above, it is concluded that these deficiencies are limited to the two systems identified. Therefore, no additional corrective actions are required.

All actions above will be completed by June 30, 1983.

Reportability

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

Bechtel Associates Professional Corporation

113204

MCAR 65 (Issued 11/16/82) 3522
Final Report
Page 4

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