Consumers Power Company

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November 7, 1980

Mr J G Keppler, Regional Director
Office of Inspection & Enforcement
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND NUCLEAR PLANT
UNITS 1 AND 2, DOCKET NOS 50-329, 50-330
COMPONENT COOLING WATER DESIGN
FILE: 0.4.9.43 UFI: 73*10*01, 10111(S) SERIAL: 10053

This letter confirms the 50.55(e) item concerning the effect of failure of the nonessential portion of the component cooling water (CCW) on the essential (safety-related) portion of the CCW. This condition was reported by telephone call to R Knop and R Sutphin, USNRC Region III, Glen Ellyn, IL, on October 8, 1980.

The attachments to this letter describe the conditions and actions being taken concerning this item.

Another report, either interim or final, will be sent on or before January 30, 1981.

James W. Cook

WRB/lr

Attachments: 1) Management Corrective Action Report (MCAR-1), Report No 43, dated October 10, 1980

2) MCAR-43, Interim Report 1, Component Cooling Water System Susceptibility to Loss of Coolant Accident Induced Failures, dated October 31, 1980

CC: Director of Office of Inspection & Enforcement
Att Mr Victor Stello, USNRC (15)

Director, Office of Management
Information & Program Control, USNRC (1)

RCook, USNRC Resident Inspector
Midland Nuclear Plant (1)

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CC: CBechhoefer, ASLB Panel
GALinenberger, ASLB Panel
FPCowan, ASLB Panel
AS&L Appeal Panel
MMCherry, Esq
MSinclair
CRStephens, USNRC
WDPaton, Esq, USNRC
FJKelly, Esq, Attorney General
SHFreeman, Esq, Asst Attorney General
GTTaylor, Esq, Asst Attorney General
WHMarshall
GJMerritt, Esq, TNK&J
Great Lakes QA Managers

QUALITY ASSURANCE PROGRAM
Serial 10053

MANAGEMENT CORRECTIVE ACTION REPORT

MCAR-1

REPORT NO.: 43

JOB NO.: 7220 01377 SO NO.: _____ DATE: October 10, 1980

I DESCRIPTION* (Including References):

Contrary to the safety design bases in FSAR Subsection 9.2.2, the component cooling water (CCW) system may be susceptible to LOCA-induced failures that, in conjunction with a loss of offsite power and a single active failure, could result in complete loss of the system's safety function. Non safety-related CCW lines located inside the containment are not designed for or specifically protected against the effects of a

RECOMMENDED ACTION* (Optional):

1. Develop and submit a written report to the AAO PQAE staff containing all available information on or before October 27, 1980 for coordination with the Consumers Power Company.

REFERRED TO: ☒ Engineering ☐ Construction ☐ QA Management ☐ _____
☐ Procurement

ISSUED BY for Archie E. Bice
L.A. Dreisbach 10/10/80
Project QA Engineer Date

II REPORTABLE DEFICIENCY:

☐ NO

Potentially Reportable
X YES

Telcon J.A. Rutgers to J.W. Cook
NOTIFIED CLIENT: 10/08/80 9:00 a.m.
Date

J Bacon for J A. Rutgers 10/10/80
Project Manager Date

III CAUSE:

CORRECTIVE ACTION TAKEN:

AUTHORIZED BY: _____
Date

AAPD DISTRIBUTION	PROJ DISTRIBUTION	OTHER DISTRIBUTION
MGR OF CONSTRUCTION	CHIEF CONSTR QC ENGR	MGR OF QA - TPO
MGR OF ENGINEERING	CLIENT	GPD - QA MGR
MGR OF PROCUREMENT	PFOCE	LAPD - QA MGR
MGR OF PROJ OPERATIONS	PROJECT CONSTR MGR	SFPD - QA MGR
MGR OF QUALITY ASSURANCE	PROJECT ENGINEER	
CONSTRUCTION MGR	PROJECT MGR	
ENGINEERING MGR	PROJ PROCUREMENT MGR	
SUPPLIER QUALITY MGR	SITE MGR	
QE SUPERVISOR		

FORMAL REPORT TO CLIENT (If Section II Applies) _____ Date

CORRECTIVE ACTION IMPLEMENTED

VERIFIED BY _____
Project QA Engineer Date

*Describe in space provided and attach reference document

I DESCRIPTION - Cont. 013775

LOCA (e.g., [illegible] impingement).

The isolation valves have closure times of 60 to 75 seconds, exclusive of signal delay times or diesel generator startup time. These closure times are inadequate to isolate a gross failure in the nonsafety-related portions of the system before the CCW surge tank empties.

If a single active failure is postulated to concurrently disable the opposite CCW safety train, the unit will lose CCW heat transfer capability. Following a LOCA, CCW capability is required to transfer heat from the DHR heat exchangers within approximately 22 minutes, and from the DHR, high-pressure injection, and reactor building spray pump coolers within approximately 30 minutes. The engineered safety features pumps have not been evaluated to determine their capability to operate without cooling water.

The CCW system, as presently designed, would accommodate minor leaks in the nonsafety-related portion of the system prior to closure of isolation valves and still allow the safety-related portion of the CCW system to perform its functions but the system is not designed to withstand a full break of the non-seismic CCW piping. Therefore, for completeness, further evaluation of seismic induced stresses and their probable effects is necessary to establish the adequacy of design for the design basis seismic event (SSE).

II RECOMMENDED ACTION - Cont.

2. Perform related high energy line break analysis (HELBA) and seismic analysis to establish the impact on the portion of CCW piping in question.

3. Make a final determination on the reportability of this item as soon as sufficient data is available.

4. Investigate and identify the root cause and provide corrective action to preclude recurrence.

5. Determine if other similar/associated problems exist.

6. Determine the necessary system changes to bring the CCW design in conformance to the applicable design criteria.

Bechtel Associates Professional Corporation

015296

SUBJECT: MCAR 43 (issued 10/10/80)

Component Cooling Water System Susceptibility to Loss-of-Coolant Accident-Induced Failures

INTERIM REPORT 1

DATE: October 31, 1980

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

Introduction

This report describes the interim status of project activities concerning component cooling water (CCW) system susceptibility to loss-of-coolant accident (LOCA)-induced failures.

Description of Deficiency

The Midland Units 1 and 2 CCW system is a dual-purpose system serving both safety and nonsafety-related equipment. For each unit, redundant CCW pump trains supply cooling water to the associated high-pressure injection (HPI) makeup pump lube oil coolers, reactor building spray pump, decay heat removal (DHR) pump seal coolers, and DHR heat exchangers following a LOCA; and to nonsafety-related heat exchangers during normal power operation. The nonsafety-related loads are supplied by either CCW train during normal power operation while the redundant CCW pump train is on standby. The 16- and 18-inch motor-operated butterfly valves isolating nonsafety-related loads from the CCW pump trains have a valve closing time of 60 to 75 seconds, exclusive of delay in the control signal to activate them. Each CCW pump train has a CCW surge tank with a total capacity of 1,000 gallons and a nominal minimum operating level of 300 gallons, with a nonseismic makeup from the demineralized water storage and transfer system.

Nonseismic CCW piping to the reactor coolant pump motor coolers, letdown coolers, and control rod drive mechanism in the reactor building may not be adequately protected from LOCA-induced failures such as jet impingement or pipe whip; other CCW piping to the radwaste evaporator condenser in the auxiliary building is not designed as Seismic Category I. Therefore, the piping may not retain its integrity under LOCA-induced failures or during a seismic event.

If a pipe break were to occur in CCW piping because of LOCA-induced failures or a seismic event where the line is not specifically designed to withstand such an event and its consequences, the CCW surge tank level would drop. For Unit 1, CCW train A, the CCW surge (1T-73A) low-low level signal will trip its associated CCW pump (1P-73A) and initiate closure of its associated motor-operated safety-related loop isolation valves (1M-1610A and 1MO-1623A) isolating all nonessential components from the CCW system. This scenario is analogous for each CCW train in both units. If an emergency core cooling actuation signal (ECCAS) occurs, the CCW surge tank low-low level trip signal to the CCW pump will be bypassed, the CCW pump will start, and the safety-related loop isolation valves will close.

With a pipe break in a line not specifically designed to withstand the postulated seismic event, the operating CCW surge tank level could drop to the low-low level setpoint and the closure of the safety-related loop isolation valves will then be initiated. However, because of the slow (60-75 seconds) closure time of the isolation valves, enough water could be lost from the CCW system before the valves completely close that the net positi e suction head (npsh) available to the CCW pump would be inadequate. An ECCAS signal would restart the tripped CCW pump, which could result in loss of CCW flow and pump cavitation because of low npsh availability. The standby CCW train is postulated to be unavailable because of a concurrent single active component failure. Thus, the unit would have lost CCW heat transfer capability.

Potential Safety Implications

The design deficiency has no effect on the normal safe operation of the plant. However, following a LOCA, CCW capability is required to transfer heat from the DHR heat exchangers within approximately 22 minutes, and from the DHR pump seal coolers, reactor building spray pump seal coolers, and HPI makeup pump lube oil coolers within approximately 30 minutes. It cannot be ensured that these requirements allow sufficient time following a LOCA to restore the level to the surge tank and restore flow to required components. The capability of the engineered safety features pumps to operate without cooling water has not been evaluated. The capability of the containment air coolers to remove heat is not affected by this scenario.

Because the current design is a significant deficiency in final design as approved and released for construction such that the deisgn does not conform to the criteria and bases stated in the safety analysis report and could have an adverse impact on plant safety throughout the expected life of the plant, the design deficiency is reportable under 10 CFR 50.55(e).

Corrective Action

Corrective action will be taken to ensure that the CCW surge tank level is maintained to ensure adequate npsh for safe operation of CCW pumps and that the design conforms to the design basis stated in the final safety analysis report (FSAR). Therefore further high-energy line break analysis and seismic analysis of the CCW piping under question will not be pursued. It has been determined, after reviewing other systems, that similar associated problems would not occur in other systems because the CCW system is the only closed-loop, dual-purpose system in the plant. Design for the corrective action is proceeding. The cause of the deficiency and design details for corrective actions are being reviewed and will be discussed in the next report, which will be provided by January 16, 1981.

Prepared by: C. C. Liaw

Approved by: E. Hughes for L. H. Evans

Concurrence by: K. P. Bailey