



Consumers
Power
Company

James W Cook
Vice President - Projects, Engineering
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

November 22, 1982

82-07 #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
Q-RELATED EQUIPMENT COOLED BY NON-Q HVAC SYSTEM
FILE: 0.4.9.63 SERIAL: 19096

References: J W Cook letters to J G Keppler, same subject:

- (1) Serial 17529, dated June 25, 1982
- (2) Serial 17578, dated August 17, 1982

This letter, ~~as~~ was the referenced letter, is an interim 50.55(e) report on Q-related equipment cooled by non-Q HVAC systems.

Another report, either interim or final, will be sent on or before February 14, 1983.

James W. Cook

WRB/ljr

Attachment: MCAR-59, Interim Report 3, dated November 8, 1982

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

8212020313 821122
PDR ADOCK 05000329
S PDR

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CC: CBechhoefer, ASLB Panel
RSDecker, ASLB Panel
FPCowan, ASLB Panel
JHarbour, ASLB Panel
AS&L Appeal Panel
MMCherry, Esq
MSinclair
BStamiris
CRStephens, USNRC
WDPaton, Esq, USNRC
FJKelley, Esq, Attorney General
SHFreeman, Esq, Asst Attorney General
WHMarshall
GJMerritt, Esq, TNK&J

BCC JLBacon, M-1085A
RCBauman, P14-312B
WRBird, P14-418A
NRC Corres File, P24-517
LHCurtis, Bechtel Ann Arbor
LEDavis, Bechtel-Midland
MADietrich, Bechtel-Midland
GREagle, CPCo Ann Arbor
DNReia, Bechtel Ann Arbor
WDGreenwell, Bechtel Ann Arbor
GSKeeley, P14-113B
HPLeonard, Midland
BWMarguglio, Midland
DBMiller, Midland (3)
JAMooney, P14-115A
MGO'Mara, Bechtel Ann Arbor
JARutgers, Bechtel Ann Arbor
MJSchaeffer, Midland
TJSullivan, P24-624A
MLCurland, Midland
DMTurnbull, Midland
KAWells, P14-113A
REWhitaker, Midland
MEGibbs, IL&B
FDField, Union Electric
FCWilliams, IL&B Washington
PSteptoe, IL&B-Chicago

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SUBJECT: MCAR 59 (issued May 28, 1982)

INTERIM REPORT 3

DATE: November 8, 1982

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

Description of Deficiency

Safety-related devices are located in portions of the auxiliary building and are cooled by non-Q heating, ventilating, and air-conditioning (HVAC) systems. Loss of these non-Q HVAC systems following various design basis accidents (DBAs) could result in room environmental temperatures that could exceed the specified design temperature of 104F because the rooms are serviced by non-Q HVAC systems. Under these conditions, the safety-related equipment in these rooms may not operate reliably, and both trains of redundant Q-listed equipment are affected by loss of the non-Q HVAC system in many instances.

Summary of Investigation and Historical Background

The results of the review of the project design drawings to date have identified 101 areas containing approximately 2,000 items of Class 1E electrical equipment, devices, and instruments in the auxiliary building that are cooled by non-Q HVAC systems.

Analysis of Safety Implication

The predicted steady-state maximum environmental room temperatures in the existing non-Q-cooled portions of the auxiliary building, assuming a DBA simultaneous with an extended loss of the non-Q HVAC systems, has been determined. The resulting temperatures are based on two accident conditions as follows:

Case 1 - A loss-of-coolant accident (LOCA) in both reactor units concurrent with a loss of offsite power - All safety-related equipment has been assumed to be operating and generating heat as well as any dc or diesel-backed ac nonsafety-related equipment. The auxiliary building non-Q HVAC system, as well as all non-Q heat sources, are assumed to be inoperative, whereas all four trains of the safeguards HVAC system are assumed to be available. (See NOTE, page 2.)

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MCAR 59
Interim Report 3
November 8, 1982

Case 2 - A LOCA in both reactor units with offsite power available - A total loss of non-Q HVAC systems is assumed, whereas all four trains of the safeguards HVAC system are assumed to be available. Because offsite power is available, nonessential equipment could be available and generating heat as well as any dc or diesel-backed ac equipment. (See NOTE.)

The following is a summary of the results of the peak temperature calculations for the two accident situations:

	<u>Case 1</u>	<u>Case 2</u>
Total number of non-Q-cooled areas analyzed	167	167
Total number of the 167 non-Q-cooled areas containing Class 1E devices	101	101
Total number of the 101 non-Q-cooled areas containing Class 1E devices with peak temperature $\geq 104F$	74	86
Total number of the above non-Q-cooled areas containing Class 1E devices with peak temperature of $\geq 104F$ and to which Q cooling will be added (tentative).	20	20
Remainder of non-Q-cooled areas containing Class 1E devices with peak temperature of $\geq 104F$ and not presently planned to be Q cooled.	54(1)	66(2)

NOTE: Both units were assumed to be affected by a LOCA to simplify the analysis. This assumption is conservative. Assuming one unit in LOCA and one unit in hot shutdown, the major difference would be the pipeways, where heat loads would be lower during hot shutdown because fewer engineered safety features (ESF) piping systems would be operating.



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093496

MCAR 59
Interim Report 3
November 8, 1982

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- (1) Of these 54 areas, the peak temperatures are broken down as follows:
- a) $104F < 11 \text{ areas} \leq 110F$
 - b) $110F < 23 \text{ areas} \leq 120F$
 - c) $120F < 20 \text{ areas} \leq 130.2F$
- (2) Of these 66 areas, the peak temperatures are broken down as follows:
- a) $104F < 6 \text{ areas} \leq 110F$
 - b) $110F < 12 \text{ areas} \leq 120F$
 - c) $120F < 20 \text{ areas} \leq 130F$
 - d) $130F < 14 \text{ areas} \leq 140F$
 - e) $140F < 5 \text{ areas} \leq 150F$
 - f) $150F < 2 \text{ areas} \leq 160F$
 - g) $160F < 3 \text{ areas} \leq 170F$
 - h) $170F < 1 \text{ area} \leq 180F$
 - i) $180F < 1 \text{ area} \leq 190F$
 - j) $200F < 2 \text{ areas} < 210F$

Probable Cause

The root cause of these discrepancies is still under investigation. Preliminary indications are that recent equipment additions provided to conform to NRC recommendations resulting from the lessons learned at Three Mile Island Unit 2 and the normal design evolution,



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093496

MCAR 59

Interim Report 3

November 8, 1982

development, and physical implementation process has necessitated certain system changes, equipment additions, and physical relocations. While on-project requirements and documentation existed identifying the areas served by the safety-grade ventilation systems, proper correlation of environmental qualification requirements of the new or relocated equipment in the design coordination process did not always occur, allowing the subject condition to develop.

Corrective Action

1. Project engineering is still reviewing the safety function of the Q devices in the areas already identified to evaluate the safety-related implications of the equipment failure following the DBAs. Should the evaluation indicate that failure of the equipment could adversely affect the capability of the plant systems to mitigate the consequences of the accident or to achieve and maintain a safe shutdown, corrective action would be implemented on a case-by-case basis. These actions could include the following:
 - a) Upgrade selected auxiliary building HVAC systems to Q status to limit the effect of the peak room temperature within the current environmental qualification envelope of the equipment.
 - b) Relocate the Class 1E device to another area where the predicted peak environmental temperature is within the environmental qualification envelope of the equipment.
 - c) Replace the Class 1E device, which does not qualify for the predicted peak room temperature, with one that qualifies.
 - d) Qualify the existing Class 1E device for temperatures greater than or equal to the calculated peak room environmental temperature.

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MCAR 59

Interim Report 3

November 8, 1982

093496

Specific area-by-area resolutions will be addressed in future interim reports. Case 1 results will be used as the basis for determining the need for corrective action. Bechtel will develop information for Consumers Power Company's use in development of emergency operating guidance to ensure that nonessential heat-producing equipment will be deenergized as needed after a DBA to preclude the possibility of Case 2 occurring and to limit the peak temperatures to acceptable levels.

A computer list of the affected safety-related devices in the auxiliary building, derived from the licensing equipment qualification data base, has been developed. The list is categorized by room number and contains information on the required operability period of the safety-related device, its functional status before and after the accident, its failure mode, power consumption, qualification test data, predicted peak temperature for Cases 1 and 2, the estimated peak temperature to which the device can be qualified based on Arrhenius techniques or reanalysis by the equipment manufacturer, and the proposed resolution for corrective action, if any. After accounting for 1) the 20 areas in which Q cooling will be tentatively added, and 2) devices which are located in non-Q-cooled areas but have been determined to be potentially qualified for the environment in which they are located; approximately 700 devices remain to be evaluated for their non-Q-cooled environment.

2. Project Drawings 7220-M-560(Q), Sheets 1 through 9, Rev 0, were issued on July 26, 1982, and clarify the areas of the auxiliary building that are cooled by Q HVAC systems. The use of these drawings should result in locating Q devices only in areas where a suitable environment exists.
3. An assessment has been made of the 101 affected areas. Engineering and procurement activities are presently under way to add safety-grade HVAC to 20 areas of the auxiliary building that have, in general, the highest predicted peak temperatures of all affected areas, the greatest concentration of safety-related devices, and areas containing safety-related devices with post-accident operability period requirements of 30 days or more.

Bechtel Associates Professional Corporation

MCAR 59
Interim Report 3
November 8, 1982

093496


093765

4. The manufacturer of the safeguards water chillers, Carrier Corporation, has evaluated the feasibility of increasing the capacity of the existing safeguards water chillers to serve the addition of Q cooling in certain areas of the auxiliary building as required. Carrier Corporation has concluded that the capacity of the four chillers can be increased from 180 to 200 tons by replacing the centrifugal compressors' impeller and the low-side float valve in the economizer section.

Reportability

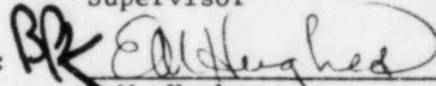
This deficiency was reported to the NRC on May 26, 1982, as potentially reportable under 10 CFR 50.55(e) by Consumers Power Company.

Submitted by:



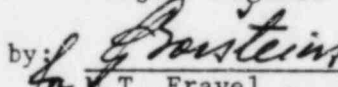
T.C. Ballweg
Mechanical Group
Supervisor

Approved by:



E.M. Hughes
Project Engineer

Concurrence by:



W.T. Fravel
Chief Mechanical
Engineer

Concurrence by:



E.H. Smith
Engineering Manager

Concurrence by:



M.A. Dietrich
Project Quality
Assurance Engineer

NOTE:



Denotes information that has been revised or that is new since the last interim report.