Consumers Power Company

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May 17, 1983 82-07 #5

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: 22178

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
(3) Serial 19096, dated November 22, 1982
(4) Serial 20696, dated February 9, 1983

This letter, as were the referenced letters, 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 August 15, 1983.

James W. Cook

WRB/ljr

Attachment: MCAR-59, Interim Report 5, dated April 25, 1983

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

MAY 19 1983

OC0583-0001A-MP01

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SUBJECT: **MCAR 59 (issued May 28, 1982)**

INTERIM REPORT 5 5

DATE: **April 25, 1983**

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

Description of Deficiency

Review of Q-related structures of the plant has been completed and indicates that only portions of the auxiliary building and service water intake structure have safety-related devices that 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. 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. 5 5

Summary of Investigation and Historical Background

The initial review of project drawings identified a potential for 2,000 items of Q equipment in 101 areas of the auxiliary building that are cooled by non-Q HVAC systems. Subsequent detailed reviews have reduced this quantity to 1,571 items of Q equipment, of which 550 are non-Class 1E, Seismic Category I devices.

The detailed reviews have also identified an area in the service water pump structure with 23 items of Class 1E equipment cooled by non-Q HVAC systems. 5

This results in a total of 1,044 items of Class 1E equipment cooled by non-Q HVAC systems in 57 areas of the auxiliary and service water buildings.

Analysis of Safety Implication

The predicted steady-state maximum environmental room temperatures in the existing non-Q-cooled portions of the auxiliary building and service water intake structure, 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: | S

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 and service water intake structure non-Q HVAC system, as well as non-Q heat sources (except as noted above), are assumed to be inoperative, whereas four trains of the safeguards HVAC system are assumed to be available. (See Note, Page 3.) No credit is taken for the non-Q HVAC systems after the offsite power is restored. | S | S

Case 2 - A LOCA in both reactor units with offsite power available - A total loss of non-Q HVAC systems is assumed, whereas 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). No credit is taken for the operation of non-Q HVAC systems. | S

The following is a summary of the results of the peak temperature calculations for the two cases considered:

	Case 1	Case 2
Total number of non-Q-cooled areas analyzed	173(1)	173(1)
Total number of the 173 non-Q-cooled areas containing Class 1E devices	57	57
Total number of the 57 non-Q-cooled areas containing Class 1E devices with peak temperature ≥104F	41	48

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	Case 1	Case 2
Total number of the above non-Q-cooled areas containing Class 1E devices with peak temperature of ≥104F and to which Q cooling will be added	4	4
Remainder of non-Q-cooled areas containing Class 1E devices with peak temperature of ≥104F and not presently planned to be Q cooled	37(2)	44(3)

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Note: Although this is not a design basis for the plant, 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.

(1) This number increased from 167 to 173 because of the further division of one large area (cable and HVAC chases 444, 456, 457, 462A/B, 463A/B, and 464A/B) of auxiliary building and addition of one area (rooms 304 and 305) of service water intake structure.

(2) Of these 37 areas, the peak temperatures are broken down as follows:

a) 104F < 5 areas ≤ 110F

b) 110F < 17 areas ≤ 120F

c) 120F < 11 areas ≤ 130F

d) 130F < 3 areas ≤ 140

e) 140F < 1 area ≤ 170

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(3) Of these 44 areas, the peak temperatures are broken down as follows:

a) 104F < 4 areas ≤ 110F

b) 110F < 10 areas ≤ 120F

c) 120F < 8 areas ≤ 130F

d) 130F < 9 areas ≤ 140F

e) 140F < 4 areas ≤ 150F

f) 150F < 2 areas ≤ 160F

g) 160F < 3 areas ≤ 170F

h) Deleted

i) 180F < 3 areas ≤ 190F

j) 200F < 1 area < 210F

The heat loads generated by the auxiliary building and service water intake structure electrical cables are being evaluated. The steady-state (peak) temperature calculations will be revised, if necessary, after the evaluation is complete.

Probable Cause

The root cause of the discrepancies is as follows. Although documentation existed on project identifying areas served by the safety-grade ventilation system, the required interdiscipline coordination was not effective because the limiting conditions defining the maximum temperature that would be experienced by safety-related devices located in areas served by non-Q HVAC systems had not been established.

Therefore, design decisions as to suitable locations for intended service were made without adequate consideration of the impact of a loss of offsite power or post-DBA conditions. This resulted in a lack of consistency in:

1. Locating safety-grade equipment in an area served by a nonsafety-grade ventilation system

2. Specifying and ascertaining that adequate environmental qualification service conditions exist for the safety-grade equipment when located in an area served by nonsafety-grade ventilation systems

Corrective Action

1. Project engineering is still reviewing the safety function of Class 1E 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: 5

   a) Upgrade selected auxiliary building and service water intake structure HVAC systems to Q status to limit the effect of the peak room temperature within the current environmental qualification envelope of the equipment. 5

   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 that does not qualify for the predicted peak room temperature with one that qualifies. 5

   d) Demonstrate that the existing Class 1E device will function as required for temperatures greater than or equal to the calculated peak room environmental temperature. 5

   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 developing 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. 5

   A computer list of the affected safety-related devices in the auxiliary building and service water intake structure, 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, predicted peak temperature for Cases 1 and 2, and the proposed resolution for corrective action, if any. This list will be used as an attachment to a report documenting the results of equipment evaluation. 5

After accounting for 1) the four areas in which Q cooling will be added, and 2) devices that are located in non-Q-cooled areas but that have been determined to be potentially qualified for the environment in which they are located, approximately 104 devices remain to be evaluated for their non-Q-cooled environment. The basis for evaluating the acceptability of a safety-related devices' location with respect to its environmental qualification is being developed. The issues of harsh versus mild environment, operability period, failure mode, and active versus passive function are being evaluated and considered in developing the criteria. 5 5

2. Project Drawings 7220-M-560(Q), Sheets 1 through 9, Rev 0, were issued on July 26, 1982, to clarify the areas of the auxiliary building that are cooled by Q HVAC systems. Additional revisions to Drawings 7220-M-560(Q) will be made by June 30, 1983, to identify the calculated maximum peak temperatures that the non-Q-cooled auxiliary and service water building areas will experience. The use of these drawings should result in locating Q devices only in areas where a suitable environment exists. 5

3. Based on preliminary evaluation, safety-grade HVAC will be added to the following four areas:

Room	Area Name	Room Elevation	Unit Coolers
422, 506, 518	Corridor, chiller, and access areas	634'-6" and 646'	1VM-118A/B, 1VM-121A/B
423, 507, 519	Corridor, chiller, and access areas	634'-6" and 646'	2VM-118A/B, 2VM-121A/B
442A/B	Access control, change, and storage areas	634'-6"	1VM-120
443A/B	Access control, change, and storage areas	634'-6"	2VM-120

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It is anticipated that the safety-related devices in the remaining areas are qualified for the environment in which they are located. Efforts to document this statement are ongoing.

4. A purchase order has been issued to Carrier Corporation, the manufacturer of the safeguards water chillers, to replace the

centrifugal compressors' impeller and the low-side float valve in the economizer section to increase the capacity of the four existing safeguards water chillers from 180 to 200 tons.

5. Project engineering procedures, including PEP 4.25.1, will be revised by May 31, 1983, to explic tly require coordination with the mechanical discipline of all future procurement and location of heat-producing or heat-sensitive equipment. 5

6. Training will be conducted by May 31, 1983, to ensure that the appropriate individuals have received training in the use of project Drawing 7220-M-560(Q) (Recommended Corrective Action 2) and the requirements of the revised project engineering procedures (Recommended Corrective Action 5).

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.

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