Consumers Power Company

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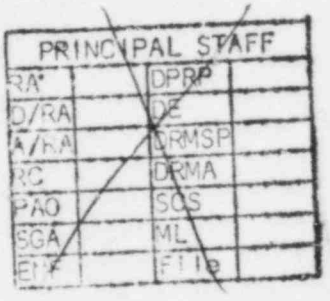
February 3, 1984

84-01 #1



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

MIDLAND ENERGY CENTER PROJECT
DOCKET NOS 50-329 AND 50-330
EXCESSIVE VOLTAGE DROP -
AUXILIARY FEEDWATER VALVE ACTUATORS
FILE: 0.4.9.88 SERIAL: 28001

On January 6, 1984 Consumers Power Company notified your staff of a potential 10CFR50.55(e) condition involving excessive voltage drop in power cables supplying auxiliary feedwater system DC valve actuators.

This letter is an interim 10CFR50.55(e) report. The attachments to this letter describe the concern and summarize the investigation and corrective action taking place.

Another report, either interim or final, will be sent on or before April 13, 1984

James W. Cook

JWC/cd

Attachments: (1) MCAR-1, Report 80, Revision 1, dated January 23, 1984
(2) MCAR-80, Interim Report 1, Revision 1, dated January 31, 1984

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

DSHood, USNRC
Office of NRR

INPO Records Center

OC0184-0066A-MP01

FEB 15 1984

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September 6, 1983
OC0184-0066A-MP01

140586

Attachment 1
Serial 28001

84-01 #1

QUALITY ASSURANCE PROGRAM

MANAGEMENT CORRECTIVE ACTION REPORT

MCAR-1 REPORT NO. 80 Rev. 1

JOB NO. 7220 Q NO. _____ DATE 1/23/84

I* DESCRIPTION (Including references):

The voltage drop in the power cables for the auxiliary feedwater system dc reversing motors for valves (see page 2) is actually greater than the value considered when sizing the cables for this application. The voltage drop has now been calculated [Calculation QPE-18(Q) approved December 21, 1983], and results indicate that voltage at the associated motor operated valves is below the allowable limits for proper operation.

(continued on page 2)

* RECOMMENDED ACTION (Optional)

1) Determine root cause of the design deficiency and provide corrective action to prevent recurrence.

2) Determine the extent of review necessary to identify similar voltage drop deficiencies for all Class 1E circuits. ⚠1

(continued on page 2)

REFERRED TO ☒ ENGINEERING ☐ CONSTRUCTION ☐ QA MANAGEMENT ☐ _____

☐ PROCUREMENT

ISSUED BY JE Crosby 1-23-84
Project QA Engineer Date

**This deficiency was reported to the NRC by the client as potentially reportable under 10CFR 50.55(e) on 1/6/84.

II REPORTABLE DEFICIENCY

NOTIFY CLIENT _____ Date

☐ NO * ☒ YES

Project Manager 1/24/84 Date

III CAUSE

CORRECTIVE ACTION TAKEN

AUTHORIZED BY _____
Date

STANDARD DISTRIBUTION

DIVISION QA MANAGER
MANAGER OF QA - BPC
GPD - QA MANAGER
LAPD QA MANAGER
SFPD QA MANAGER
PROJECT MANAGER
CLIENT

ADDITIONAL DISTRIBUTION - AS APPROPRIATE

ENGINEERING MANAGER
PROJECT ENGINEER
QE SUPERVISOR

CONSTRUCTION MANAGER
PROJ SUPT/PROJ CONSTR MANAGER
CHIEF CONSTR QC ENGINEER

DIVISION PROCURENT MGR
PROJ PROCUREMENT MGR
PROCUREMENT SUPPLIER QUALITY MGR AND DIV SUPPLIER QUALITY MGR

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.

AAPD-0161

140586

DESCRIPTION continued:

The Class 1E redundant safety dc valve actuator motors may fail to operate under anticipated plant conditions because of insufficient voltage. The net result could be loss of feedwater to the steam generators and the inability to safely cool down the reactor coolant system.

If this deficiency were to remain uncorrected, it could have adversely affected the safety of operations at the Midland plant.

Valve Number	Cable Number Dist Panel To Local Station	Local Control Station Number (Starter)	Cable Number Local Station To Actuator Motor
1M03177A	1BD2114 A	1NM03177A	1BFW081 R,S,T,U
1M03177B	1BD2115 A	1NM03177B	1BFW082 R,S,T,U
2M03277A	2BD2114 A	2NM03277A	2BFW081 R,S,T,U
2M03277B	2BD2115 A	2NM03277B	2BFW082 R,S,T,U
1M03865A	1AD1114 A	1NM03865A	1AFW082 AG,H
1M03865B	1BD2116 A	1NM03865B	1BFW083 AG,H
2M03965A	2AD1114 A	2NM03965A	2AFW082 AG,H
2M03965B	2BD2116 A	2NM03965B	2BFW083 AG,H
1M03831(ING05)	1BD2117 A	1C266	1BFW088 AC,AF
2M03931(2NG05)	2BD2117 A	2C266	2BFW088 AC,AF

NOTE: 1M03177A through 2M03965B (Dwg. E-158(Q)) are steam generator auxiliary feedwater isolation valves. 1M03831 and 2M03931 (Dwg. E-153(Q)) are auxiliary feedwater turbine 1/2G05 stop valves.

RECOMMENDED ACTION continued:

3) Perform a detailed review as determined from (2) above and document results.

4) Provide remedial corrective action for the discrepant cables listed herein and for any other deficiencies noted from investigative review; initiate NCRs and safety evaluations as required.

5) Issue first report, interim or final, by 1/20/84.

141453 141468 Bechtel Associates Professional Corporation

SUBJECT: MCAR 80, Rev 1 (issued January 24, 1984)
Auxiliary Feedwater DC Reversing Valve Actuator
Excessive Power Cable Voltage Drop

INTERIM REPORT 1

DATE: January 31, 1984

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

Introduction

This report provides the interim status and course of corrective action required pursuant to MCAR 80.

Description of Deficiency

The voltage drop in the power cables for the auxiliary feedwater system dc reversing valve actuator motors is greater than the value considered when the cables were sized. The voltage drop has now been calculated [Calculation QPE-18(Q), approved December 21, 1983], and the results indicate that voltage at the associated motor-operated valves is below the allowable limits for proper operation.

Probable Cause

Voltage drop resulting from the total circuit length between the starter and actuator motor was not considered in the design.

Summary of Investigation and Historical Background

The investigation into the adequacy of dc reversing valve actuator circuits was initiated as a result of TPO Problem Alert 82-02, Revision 0 (DC Power Circuit Starters and Sizes of Cables for Motors and Valve Actuator Motors). The problem alert identified a voltage deficiency in these types of circuits at the Susquehanna Steam Electric Station, Units 1 and 2. During the investigation, 10 dc reversing valve actuators in the auxiliary feedwater system have been identified that will have voltage below the allowable limits for proper operation (see the attachment). Nonconformance Report (NCR) D-00007 has been written on the Midland project as a result of this investigation to identify and track the corrective action.

Analysis of Safety Implications

The power cable voltage drop concerns associated with this MCAR have been analyzed for impact on the safety of operations at the Midland plant. If this deficiency were to remain uncorrected, it could have adversely affected the safety of operations at the Midland plant.

Corrective Action

The following corrective actions have been or will be initiated.

1. A design calculation has been issued to provide the criteria for sizing power cables for dc reversing motor-operated valves (MOVs). All future designs including rework will use these criteria for cable sizing. All design personnel in the electrical group have been instructed regarding this requirement.

2. A detailed review of Class 1E power and control circuits at the various plant voltage levels will be performed to confirm circuit adequacy with regard to voltage drop. The voltage levels to be reviewed are as follows:

   a. Medium Voltage

      1) 4.16 kV feeds

      2) 4.16 kV motors

   b. Low-Voltage Power

      1) 480 V load center feeds

      2) 460 V motor control center feeds

      3) Distribution panels feeds (120 V ac and 125 V dc)

      4) 120 V ac electrohydraulic valve actuators

   c. Low-Voltage Control

      1) 120 V ac from motor control transformers

      2) 125 V dc control

As a result of this review, additional NCRs will be initiated to identify and track any nonconformances found, and appropriate process corrective action will be implemented to preclude recurrence. The scope and schedule for the review will be provided in the next report.

All Class 1E dc valve actuators have been reviewed [reference Calculation QPE-18(Q)]. There are no additional dc valve actuators other than the 10 identified in the MCAR.

Bechtel Associates Professional Corporation

3. To correct the insufficient voltage condition for the dc valve actuators, the power cables will be replaced with larger cables, and/or the starter will be relocated closer to the motors. This will reduce the voltage drop within acceptable limits as defined in Calculation QPE-18(Q). The forecast date for issuance of the design is March 16, 1984.

Reportability

This deficiency was reported to the NRC by Consumers Power Company as potentially reportable on January 6, 1984.

Submitted by: E.B. Poser
Project Engineering Manager

Approved by: R.L. Castleberry
Electrical Chief Engineer

E.H. Smith
Engineering Manager

Concurrence by: M.A. Dietrich
Project Quality Assurance Engineer

Attachment: List of DC Valve Actuators with Excessive Voltage Drop

LIST OF DC VALVE ACTUATORS WITH EXCESSIVE VOLTAGE DROP

141453

41468

Valve Number	Cable Number Dist. Panel to Local Station	Local Control Station Number (Starter)	Cable Number Local Station To Actuator Motor
1M03177A	1BD2114A	1NM03177A	1BFW081 R, S, T, U
1M03177B	1BD2115A	1NM03177B	1BFW082 R, S, T, U
2M03277A	2BD2114A	2NM03277A	2BFW081 R, S, T, U
2M03277B	2BD2115A	2NM03277B	2BFW082 R, S, T, U
1M03865A	1AD1114A	1NM03865A	1AFW082 AG, H
1M03865B	1BD2116A	1NM03865B	1BFW083 AG, H
2M03965A	2AD1114A	2NM03965A	2AFW082 AG, H
2M03965B	2BD2116A	2NM03965B	2BFW083 AG, H
1M03831 (1NG05)	1BD2117A	1C266	1BFW088 AC, AF
2M03931 (2NG05)	2BD2117A	2C266	2BFW088 AC, AF

NOTES:

1. 1M03177A-2M03965B [E-158(Q)] are steam generator auxiliary feedwater isolation valves.

2. 1M03831-2M03931 [E-153(Q)] are auxiliary feedwater turbine 1/2G05 stop valves.