



Consumers  
Power  
Company

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August 12, 1983

82-16 #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  
POTENTIAL 50.55(e) REPORT CONCERNING  
PROCURED ELECTRICAL EQUIPMENT  
FILE: 0.4.9.72 SERIAL: 23769

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

- (1) Serial 19130, dated December 30, 1982
- (2) Serial 20716, dated February 25, 1983
- (3) Serial 22197, dated May 13, 1983
- (4) Serial 22241, dated June 29, 1983

This letter, as were the referenced letters, is an interim report on a potential 50.55(e) condition concerning delivered, safety-related electrical equipment not meeting project requirements. Attachment A provides a description of the problem and the overall corrective actions to resolve this issue. Another letter, either interim or final, will be sent on or before September 30, 1983.

*James W. Cook*

JWC/WRB/cd

Attachment A: MCAR-66, Interim Report 5, dated June 14, 1983

CC: Document Control Desk, NRC  
Washington, DC

RJCook, NRC Resident Inspector  
Midland Nuclear Plant

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## 118673 Bechtel Associates Professional Corporation

SUBJECT: MCAR 66 (issued December 30, 1982)  
Deficiencies Associated with Workmanship Conditions on  
Electrical Control Panels and Cabinets Supplied by Various  
Vendors

## INTERIM REPORT 4

DATE: June 14, 1983

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

Introduction

This report provides interim status and the course of corrective action required pursuant to MCAR 66.

Description of Deficiency

Unacceptable workmanship conditions, such as insufficient solder, broken wire strands, damaged wire insulation, leads pulling from lugs, loose identification tags and markers, use of improper wire lugs, and improper crimping have been identified on electrical control panels and cabinets supplied by various vendors.

Probable Cause

The cause for the deficiencies is being investigated and the results will be included in a future report. Preliminary results have been reviewed and no significant problems have been identified.

Summary of Investigation and Historical Background

To date, 37 discrepancy reports [nonconformance reports (NCRs) and quality action requests (QARs)] have been written on electrical equipment as a result of MPQAD overinspections using Consumers Power Company Project Inspection Plan 01-E-7B. See Attachment 3 for a list and description of the NCRs/QARs associated with this MCAR. Several discrepancy reports do not concern workmanship and are not addressed in the scope of this MCAR.

Analysis of Safety Implications

To date, 31 NCRs/QARs have been evaluated for possible impact on safety. For the cases analyzed, it is concluded that if the workmanship deficiencies had remained uncorrected, there would be no impact on the safety of operations at Midland. Two NCRs (Attachment 3, Items 34 to 35) are under evaluation by Bechtel. The responsible equipment vendors for Items 34 and 35 have been notified and were requested to perform an evaluation of whether the equipment can be expected to perform the intended functions under the specified conditions. These vendors will be requested to visit the jobsite to investigate and evaluate the deficiencies. Based on

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vendor responses, Bechtel will perform a safety evaluation. Items 3, 28, and 32 will be evaluated by Consumers Power Company.

## Corrective Action

A task force has been established to investigate and resolve MCAR 66. See Attachment 1 for the task force charter. As of the date of this interim report, several corrective actions have been initiated or completed.

### a. Safety Evaluation of Identified Conditions

An investigation to summarize the deficiencies as noted on each of the NCRs/QARs has been completed and is included in this report as Attachment 2. Safety evaluation of identified conditions is included in Attachment 3 and the Analysis of Safety Implications section above.

### b. Evaluation of Requirements and Vendor Programs

1. The task force is reviewing each Bechtel purchase order for definition of workmanship requirements or criteria affected by this MCAR, and the results will be included in a future report.
2. The task force is reviewing supplier submittals to determine if workmanship was addressed in their programs. The results of this review will be included in a future report.
3. The task force is reviewing the project records for evidence of suppliers' implementation of their workmanship programs. The results of this review and corrective actions will be included in a future report.

### c. Evaluation of Bechtel Programs

1. MPQAD has reviewed the receipt inspection program and believes that for the equipment in question, the control of vendor workmanship is best controlled by source inspection. The receiving program, as recently revised for Midland, is adequate and no further action is required.
2. On near-term equipment deliveries where fabrication is complete or nearly complete, a comprehensive plan of shop inspection, coupled with a parallel MPQAD in-shop overinspection (Plan 01-E-7B) to detect and correct workmanship problems before shipment, is being implemented. Results of this plan are being evaluated.

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The supplier quality department has developed several inspection criteria guidelines and training sessions, e.g., a guide for compression type connectors, electrical testing, electrical codes and standards, and electrical commodities. In addition, the supplier quality representatives are placed in vendor shops according to their training, background experience, and complexity of the procured equipment.

## d. Final Inspection

Bechtel has observed a recent increase in the quantity of loose terminations on vendor equipment and believes that this was partly due to the overinspection criteria, which required a firm pull on the termination. MPQAD will continue to investigate termination inspection criteria.

Reportability

This condition was reported to the NRC by Consumers Power Company as potentially reportable on December 3, 1982.

Submitted by:

AJG

J.G. Kovach

Cognizant Group Supervisor

Approved by:

E.M. Hughes

E.M. Hughes  
Project Engineer

Concurrence by:

for

R.L. Castleberry

R.L. Castleberry  
Cognizant Discipline Chief

Concurrence by:

E.H. Smith

E.H. Smith  
Engineering Manager

Concurrence by:

for M.A. Dietrich

M.A. Dietrich  
Project Quality Assurance  
Engineer

- Attachments: 1. MCAR 66 Task Force Charter  
2. Summary of Deficiencies for MCAR 66  
3. Summary of NCRs/QARs for MCAR 66



TASK FORCE CHARTER

1. Review the findings from MPQAD's (Plan 01-E-7B) overinspections of electrical control panels and cabinets, and develop recommended plans of action for the Midland project and other divisional departments to avoid recurrence on future Midland plant purchase orders (Reference: MCAR Recommended Action Items B.2, B.3, C.1, and C.2).
2. Review and provide concurrence with project engineering dispositions so that there is a consistent approach used to correct problems on existing hardware and to prevent problems on future work. Based on that review, the task force will produce a checklist to summarize the deficiencies for each purchase order. Project engineering, in support of the task force, will review each NCR and QAR and summarize the deficiencies noted on individual checklists for each purchase order. (Reference: MCAR Recommended Action Items A.1 and A.2).
3. Develop a list of considerations to be used in evaluating the individual purchase orders. The task force will then review each purchase order affected by this MCAR against the evaluation checklist (Step 2) and summarize the strengths and weaknesses of each purchase order (Reference: MCAR Recommended Action Items B.1 and B.2).
4. Identify the root causes of the workmanship deficiencies and develop plans for corrective action. (Reference: MCAR Recommended Action Items B.2, B.3, C.1, and C.2).
5. Prepare a summary of corrective actions for individual purchase orders under Plan 01-E-7B where there will be future releases or where there is time in the fabrication process on existing items to implement changes. The Midland project will review, concur with/resolve, and implement the corrective actions (Reference: MCAR Recommended Action Items B.2, B.3, and C.2).
6. Develop a list of generic actions for purchase orders based on attributes other than those covered by Plan 01-E-7B. This list will be developed principally from the purchase order checklist and problem summary. The Midland project will implement the generic actions (Reference: MCAR Recommended Action Item C.2).

SUMMARY OF DEFICIENCIES FOR MCAR 66<sup>(1)</sup>

Deficiency	NCR/QAR Affected	Type of Deficiency <sup>(2)</sup>
a. Cut, nicked, broken strands	3, 9, 10, 11, 12, 15, 28, 29, 34, 37	W
b. Strands outside lug barrel	11, 12, 15, 36	W
c. Undersize/incorrect type wiring	5, 8, 31	W/E
d. Unidentified wiring	8, 31	E
e. Minimum bend radius violation	9, 25	W/E
f. Conductor not terminated	2	W
g. Conductor pulled out of termination	2, 4, 7, 15, 19, 34, 36	W
h. Conductor outside wireway/support problem	5, 7, 23, 31	W/E
i. Conductor insulation inside lug barrel	15	W
j. Conductor insulation damaged	17, 24, 33	W
k. Conductor not visible past lug barrel	19	W
l. Loose terminations	11, 12, 13, 15, 17, 18, 19, 25, 27, 34, 35, 36, 37	W
m. More than two lugs on a terminal	5, 10, 22	E
n. Class IE and non-Class IE apparently on same terminal	5	E
o. Color code violations	5, 7, 8, 16, 31, 33	E
p. 6-inch separation violations	1, 5, 15, 35	E
q. Lugs applied without proper tools	9, 13	W
r. Incorrect size lugs/incorrect type lugs or terminations	5, 8, 10, 11, 13, 14, 21, 23, 28, 29, 31, 35	W/E
s. Excessive/inadequate solder in lugs	15, 35	W
t. Terminal block ID missing/incorrect	5, 7, 8, 31, 34	W/E
u. Terminal block barrier missing/broken	28, 29, 32, 34	W
v. Missing/inadequate inspection criteria	6, 7	E
w. Appearance/workmanship	5, 7, 9, 16, 17, 25, 33	W

(1) Only workmanship deficiencies are included in the scope of MCAR 66.

(2) W = workmanship  
E = engineering

## ATTACHMENT 3

MCAR 66, INTERIM REPORT 4

## SUMMARY OF MCR'S/QAR'S

MCR/QAR Number	Responsible Discipline/ Company	Purchase Order (7220-)	Purchase Order Vendor	Workmanship Discrepancy Index Number (see Attachment 2)	Safety Impact	10 CFR 50.55(e) Reportability	Remarks
1) M01-9-1-097	Control Systems	J-201(Q)	Magnetics	None	NA	NA	Not a workmanship deficiency - separation removed from MCAR 66 scope
2) M01-9-1-114	Electrical	E-51B(Q)	Solid State Controls, Inc.	F, G	No	No - See CPCo NCR Block 17	The workmanship discrepancy was required and satisfactorily reinspected.
3) M01-9-1-095	B&W			A			To be evaluated by CPCo
4) M01-9-0-075	Control Systems	J-201(Q)	Magnetics	G	No	No - See CPCo NCR Block 17	Vendor followed proper procedures; equipment was 100% satisfactorily inspected before shipment; disposition is to retighten and use as is.
5) M01-9-1-075	Mechanical	M-18(Q)	Delaval	H, W	No	No - See CPCo NCR Block 17	Not all of the NCR pertains to MCAR 66. Some items were given a disposition of "use as is." FMP issued to correct discrepancies.
6) M01-9-0-064	Mechanical	M-118A(Q)	EBV	None	NA	NA	Not a workmanship deficiency - removed from MCAR 66 scope (seismic analysis report required); reference Com 078995
7) M01-9-0-066	Mechanical	M-118A(Q)	EBV	G, H, W	No	No - See CPCo NCR Block 17	Not all of the NCR pertains to MCAR 66; some discrepancies were design related; reference Com 108181
8) M01-9-0-068	Mechanical	M-169(Q)	Westinghouse	C, R	No	No - See CPCo NCR Block 17	Reference Com 022547
9) M01-9-1-008	Electrical	E-51B(Q)	Solid State Controls, Inc.	A, E, Q, W	No	No - See CPCo NCR Block 17	Reference Com 022114
10) M01-9-0-063	Electrical	E-11(Q) E-19(Q) E-51B(Q)	Solid State Controls, Inc	A, R	No	No - See CPCo NCR Block 17	Disposition is to "use as is"; reference Com 040595
11) M01-9-0-071	Electrical	E-205(Q)	ITE	A, B, L, R	No	No - See CPCo NCR Block 17	Reference Com 044815
12) QAR F-010	Electrical	E-205(Q)	ITE	A, B, L	No	No	Same as NCR M01-9-0-071
13) M01-9-1-024	Mechanical	M-150(Q)	Mine Safety	L, Q, R	No	No - See CPCo NCR Block 17	Reference Com 048488

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## SUMMARY OF MCR'S/QAR's (Continued)

<u>MCR/QAR Number</u>	<u>Responsible Discipline/ Company</u>	<u>Purchase Order (7220-)</u>	<u>Purchase Order Vendor</u>	<u>Workmanship Discrepancy Index Number (see Attachment 2)</u>	<u>Safety Impact</u>	<u>10 CFR 50.55(e) Reportability</u>	<u>Remarks</u>
14) QAR SD-332	Control Systems	J-207(Q) J-275(Q) J-281(Q) J-284(Q)	Several	R	No	No	Not a workmanship discrepancy (control systems), but an inspection problem (mechanical) (reference Com 102704); vendors used insulated lugs
	Electrical	E-6(Q) E-7(Q)					
	Mechanical	M-18(Q) M-150(Q) M-169(Q)					
15) M01-9-1-128	Control Systems	J-201(Q)	Magnetics	A, B, G, I, L, S	No	No - See CPCo NCR Block 17	Reference Com 089839; same problem as M01-9-0-075
16) M01-9-1-136	Mechanical	M-18(Q)	Delaval	W	No	No - See CPCo NCR Block 17	Original purchase order did not require the listed as discrepancies (reference Com 095715); DCP issued to repair discrepancies
17) M01-9-1-129	Control Systems	J-201(Q)	Magnetics	J, L, W	No	No - See CPCo NCR Block 17	Field to rework field damage and retighten loose vendor terminations
18) M01-9-1-140	Electrical	E-7(Q)	ITE	L	No	No - See CPCo NCR Block 17	Reference Com 049432
19) M01-9-1-142	Electrical	E-7(Q)	ITE	G, K, L	No	No - See CPCo NCR Block 17	Reference Com 049431
20) QAR SD-382	NA	NA	NA	NA	NA	NA	Voided
21) QAR F-007	Electrical	E-7(Q)	ITE	None	NA	NA	Disposition is to "use as is"; removed from MCR 66 scope
22) M01-9-0-067	Mechanical	M-150(Q)	Mine Safety	None	NA	NA	Reference Com 088397; removed from MCR 66 scope
23) QAR F-070	Electrical	E-518(Q)	Solid State Controls, Inc.	None	NA	NA	Disposition is to "use as is"; removed from MCR 66 scope; Reference Com 042026
24) M01-6-1-043	Electrical	E-7(Q)	ITE	None	NA	NA	Design consideration not included in the scope of MCR 66
25) QAR F-114	Electrical	E-19(Q)	Solid State Controls, Inc.	E, L, W	No	No	Reference Com 044010; discrepancies were repaired
26) M01-9-1-120	NA	NA	NA	NA	NA	NA	Voided

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SUMMARY OF MCR'S/QAR's (Continued)

MCR/QAR Number	Responsible Discipline/ Company	Purchase Order (7220-)	Purchase Order Vendor	Workmanship Discrepancy Index Number (see Attachment 2)	Safety Impact	10 CFR 50.55(e) Reportability	Remarks
27) M01-9-1-139	Electrical	E-7(Q)	ITE	L	No	No - See CPCo NCR Block 17	Reference Com 048642
28) M01-9-1-150	B&W			A, R, U			To be evaluated by CPCo
29) QAR F-133	NA	NA	NA	NA	NA	NA	Voided
30) M01-9-1-137	NA	NA	NA	NA	NA	NA	Voided
31) M01-9-1-151	Mechanical	M-169(Q)	Westinghouse	C, D, H, O, R, T	No	No - See CPCo NCR Block 17	Reference Com 096341
32) M01-9-2-082	B&W			U			To be evaluated by CPCo
33) M01-9-2-150	Control Systems	J-275(Q)	Vitro	J, O, W	No	No	Reference SCRE 66; reference Com 102311
34) M01-9-2-139	Mechanical	M-18	Devalal	A, L, G, U			Open (reference SCRE 64); vendor notified via Com 111741; vendor evaluation is required.
35) M01-9-2-173	Mechanical	M-14	Terry Turbine/ Bingham - Willamette	L, R, S		No - See CPCo NCR Block 24	Open (reference SCRE 68 and Com 100170); vendor notified via Com 111926; vendor evaluation is required.
36) M01-9-3-089	Control Systems	J-284(Q)	Comsip	L, B, G	No	No - See CPCo NCR Block 24	Open; added to MCAR 66 in accordance with CPCo Serial 20749 (3/30/83); vendor will repair discrepancies.
37) M01-9-3-098	Control Systems	J-202(Q)	Harlo	A, L	No	No - See CPCo NCR Block 24	Open; added to MCAR 66 in accordance with CPCo Serial 20749 (3/30/83); vendor will repair discrepancies.

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