



**Consumers  
Power  
Company**

**James W Cook**  
Vice President - Projects, Engineering  
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0457

82-02 #3

June 9, 1982

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

MIDLAND PROJECT -  
DOCKET NOS 50-329 AND 50-330  
RODENT DAMAGE TO ELECTRICAL PENETRATION  
WIRING AND CABLES  
FILE: 0.4.9.58 SERIAL: 17514

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

- 1) Serial 16107, dated February 19, 1982
- 2) Serial 16160, dated April 8, 1982

The referenced letters were interim 50.55(e) reports concerning rodent damage to electrical penetration wiring and cables. This letter is the final report on this subject. The attachment to this letter provides a final status of the course and schedule of corrective action to be taken to resolve this issue.

*James W. Cook*

WRB/lr

Attachment: MCAR 56, Final Report, "Damage to Electrical Penetration Assemblies," dated May 26, 1982

CC: RJCook, NRC Resident Inspector  
Midland Nuclear Plant

Document Control Desk, NRC  
Washington, DC

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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

SUBJECT: MCAR 56 (Revised)  
Damage to Electrical Penetration Assemblies

FINAL REPORT

DATE: May 26, 1982

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

REFERENCES: A) CPCo letter Serial CSC-5830, 12/3/81  
B) CPCo NCR M01-9-1-165, 12/28/81  
C) SCRE 39, 1/15/82

Introduction

This report provides the final status and course of corrective action required pursuant to MCAR 56, revised March 1, 1982. In addition to the deficiency covered by the original issue of this MCAR, several other deficiencies have been noted during the ongoing inspection of the Class 1E assemblies.

Description of Deficiencies

1. During post-construction surveillance inspection of the Class 1E electrical penetration assemblies (EPAs), assembly 2Z135 revealed rodent damage to the outboard side module wiring. The damage consisted of chewed insulation resulting in exposed and/or severed conductors. Subsequent inspection of additional Class 1E assemblies revealed similar damage.
2. Conductor insulation cracking at the conductor-module interface resulted in some exposure of the module conductors.
3. Inadequately crimped in-line butt splices occurred, which could result in discontinuity or potential localized overheating in circuits terminated in the EPAs.
4. A crack in the sealing surface of a module, resulting in a pressure leak which degraded the EPAs ability to provide a constant pressure boundary. (Note: Leaking modules/header plates are noted during routine inspection and are repaired as required.)

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Corrective Action

A. Construction has initiated a reemphasis on rodent control including:

1. Removal of all nesting and debris from the EPA sleeves and surrounding areas
2. Additional rodent baiting with revised location of the bait
3. An increase in the frequency of surveillance by the rodent control subcontractor
4. A program of rodent control consisting of disseminating rodent control information to all craft onsite through tool box safety meetings, education of personnel on the identification and significance of the types of bait and traps being used, the importance of not moving or altering them, and the need to report evidence, sightings, or dead animals to the appropriate individuals
5. Instructing construction to seal all EPAs to prevent the reentry of rodents

(Note: All corrective action in A above have been completed)

B. Construction has completed its inspection of all EPAs used for Class 1E circuits to determine the extent of rodent damage. With the decision to replace all #2 AWG through #20 AWG modules the need to inspect for other deficiencies is not required.

C. Engineering has identified a generic deficiency (Deficiency 2) in #2 AWG through #20 AWG penetration modules.

1. Engineering has procured qualified replacement modules for all EPAs (#2 AWG through #20 AWG), to correct deficiencies 2 and 3.
2. Engineering has obtained and accepted repair/replacement procedures from the EPA manufacturer (2/0 AWG through 350 MCM and coaxial type modules), for deficiency 1.
3. Construction is repairing rodent damaged module wires (2/0 AWG through 350 MCM and coaxial type modules) in accordance with the accepted procedures.
4. The cracked module (Module G of EPA 12110) will be replaced.
5. Construction is replacing all modules, #2 AWG through #20 AWG, with qualified replacement modules.

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D. Root Causes

1. The deficiency is a result of rodents entering/nesting in the EPAs and chewing on module wiring. Access into the EPAs was via the cable feedthrough nipples.
2. The root cause of the insulation cracking has not been positively identified to date. It is our belief that the cause of the insulation cracking is overaging of the insulation during the module molding process. It is believed that the curing of epoxy molding material resulted in an internal temperature which degraded the insulation and provided the foundation for insulation cracking. The exact materials used in the molding process are considered by the module manufacturer (Bunker Ramo) to be proprietary in nature and therefore the exact effect on the insulation materials cannot be readily determined.
3. The root cause of the inadequately crimped butt splice has been determined to be a breakdown in the fabrication/design of the module assemblies.
4. The crack is considered an isolated case; therefore, no evaluation for a root cause was performed.

Safety Implications

1. The rodent damage consisted of chewed insulation resulting in exposed and/or severed conductors. Exposed conductors could result in circuit shorts and severed conductors could result in circuit discontinuities; therefore, equipment necessary to safely operate the plant may have failed.
2. The cracked insulation resulted in some exposure of the module conductors. Exposed conductors could result in circuit shorts; therefore, equipment necessary to safely operate the plant may have failed.
3. The inadequately crimped butt splice could result in circuit discontinuities or potential localized overheating. Therefore, equipment necessary to safely operate the plant may have failed.
4. There is no generic safety implication associated with the single cracked module.

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Forecast Date for Corrective Action

1. Construction is proceeding to replace #2 AWG through #20 AWG modules with qualified replacement modules. The modules in the first EPA were replaced on May 11, 1982, with the last EPA scheduled for completion by December 31, 1982.
2. The cracked module is scheduled to be replaced by August 17, 1982.
3. All rodent damage is scheduled to be repaired by December 31, 1982.

Submitted by:

*CS*  
*ME*  
*AK*  
*for*  
J.G. Kovach  
Electrical Group  
Supervisor

Approved by:

*EMH*  
E.M. Hughes  
Ann Arbor  
Project Engineer

Concurrence by:

*ES*  
E.H. Smith  
Engineering Manager

Concurrence by:

*for*  
M.A. Dietrich  
Project Quality Assurance  
Engineer

JGK/CS/se(E)  
5/13/5