



Consumers
Power
Company

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December 3, 1982

82-12 #1

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
SHEAR LUG DESIGN FOR EMBEDS
FILE: 0.4.9.68 SERIAL: 19106

This letter is an interim 50.55(e) report regarding the design of steel embedments in concrete that use shear lugs located in tension zones. This concern was reported to Mr D Hunter of your staff on November 5, 1982. The attachments to this letter provide a description of the investigation and corrective actions being taken with regard to this subject.

Another report, either interim or final, will be sent on or before March 1, 1983.

JWC/WRB/lr

- Attachments: (1) Management Corrective Action Report MCAR-1, Report No 63, dated 11/10/82
- (2) MCAR-63, Interim Report 1, dated November 29, 1982

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

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PDR ADOCK 05000329
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CC CBechhoefer, ASLB Panel
RSDecker, ASLB Panel
FPCowan, ASLB Panel
JHarbour, ASLB Panel
AS&L Appeal Panel
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CRStephens, USNRC
WDPaton, Esq, USNRC
FJKelley, Esq, Attorney General
SHFreeman, Esq, Asst Attorney General
WHMarshall
CJMerritt, Esq, TNK&J
Great Lakes QA Managers

Attachment 2
Serial 19106
82-12 #1

Bechtel Associates Professional Corporation

SUBJECT: MCAR 63 (ISSUED 11/10/82)
 Design of Steel Embedments That Use Shear Lugs Located
 in Tension Zones

INTERIM REPORT 1

DATE: November 29, 1982

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

Introduction

This report addresses a concern with the design of steel embedments in concrete that use shear lugs located in tension zones.

Background

The ACI 349 Code, Appendix B, issued August 1979, specifies that shear lugs in embedment designs shall be considered effective only in compression zones. Some Midland embedment designs, which were completed and installed before this date, considered that shear lugs accommodate all shear loads and that tension bars accommodate all tension loads. Other than ACI 349, Appendix B, no known design code or industry standard issued before ACI 349, Appendix B, restricts the design of embedments using shear lugs.

For embedments within the scope of this MCAR, the Midland Final Safety Analysis Report, Section 3.8, is committed to design reinforced concrete according to ACI 318-63 and 318-71, and structural steel according to the AISC 1969 edition; however, these codes do not directly address embedment design.

Investigative Action

Presently, all embedments within the scope of this MCAR are being identified and located.

A review criterion is being developed that will address the concerns regarding shear lugs located in tension zones.

Bechtel Associates Professional Corporation

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An investigation is under way to determine if the embedments used in the Midland plant are satisfactory as designed by means of additional analyses, and if required, testing.

If an existing embedment design is found to be unsatisfactory, the embedment will be identified by location and necessary corrective measures will be taken.

Probable Cause

The potential deficiency was identified following the issuance of ACI 349, Appendix B. The root cause is that, before the issuance of ACI 349, Appendix B, this possible failure mode was not recognized by codes or industry standards.

Corrective Action

No corrective action has been established at this time. The results of the investigation will determine any required corrective actions.

Analysis of Safety Implications

The concern is that shear lugs located in tension zones may not be effective and that this may result in a nonconservative design. The design may be nonconservative to the extent that it may not be capable of performing its required safety function.

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Reportability

This concern is considered potentially reportable in accordance with Title 10 of the Code of Federal Regulations, Part 50.55(e).

Submitted by:

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