



Consumers  
Power  
Company

DMB

James W Cook  
Vice President - Projects, Engineering  
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 4921 • (517) 788-0453

May 19, 1984

84-07 #1

Mr J G Keppier, 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  
PIPE WHIP RESTRAINTS - NSSS COLD LEG PIPING  
FILE: 0.4.9.94 SERIAL: 30284

On April 19, 1984, Consumers Power Company notified your staff of a potential 10CFR50.55(e) condition involving the design of pipe whip restraints for NSSS cold leg piping. This letter is a final report.

Because of the extensive evaluation required to determine whether the safety of plant operations would have been adversely affected, this condition is considered reportable under 10CFR50.55(e).

Attachments 1 and 2 provide descriptions of the investigation that took place, the probable causes and the planned corrective action.

*James W. Cook*

JWC/AHB/lr

Attachments 1: MCAR-84, Initial Issue, dated April 24, 1984  
2: MCAR 84, Final Report, dated May 16, 1984

CC: Document Control Desk, NRC  
Washington, DC

BBurgess, NRC Resident Inspector  
Midland Nuclear Plant

DHood, USNRC Office of NRR

INPO Records Center

8405300032 840519  
PDR ADOCK 05000329  
S PDR

OC0584-0036A-MP01

MAY 24 1984

IE27  
1/0

OM/OL SERVICE LIST

Mr Frank J Kelley  
Attorney General of the  
State of Michigan  
Ms Carole Steinberg  
Assistant Attorney General  
Environmental Protection Division  
720 Law Building  
Lansing, MI 48913

Mr Myron M Cherry, Esq  
Suite 3700  
Three First National Plaza  
Chicago, IL 60602

Mr Wendell H Marshall  
RFD 10  
Midland, MI 48640

Mr Charles Bechhoefer, Esq  
Atomic Safety & Licensing  
Board Panel  
U S Nuclear Regulatory Commission  
East-West Towers, Room E-413  
Bethesda, MD 20014

Dr Frederick P Cowan  
6152 N Verde Trail  
Apt 3-125  
Boca Raton, FL 33433

Mr Fred C Williams  
Isham, Lincoln & Beale  
1120 Connecticut Ave, NW, Suite 840  
Washington, DC 20036

Mr James E Brunner, Esq  
Consumers Power Company  
212 West Michigan Avenue  
Jackson, MI 49201

Atomic Safety & Licensing  
Appeal Board  
U S Nuclear Regulatory Commission  
Washington, DC 20555

Mr C R Stephens (3)  
Chief, Docketing & Services  
U S Nuclear Regulatory Commission  
Office of the Secretary  
Washington, DC 20555

Ms Mary Sinclair  
5711 Summerset Street  
Midland, MI 48640

Mr William D Paton, Esq  
Counsel for the NRC Staff  
U S Nuclear Regulatory Commission  
Washington, DC 20555

Atomic Safety & Licensing  
Board Panel  
U S Nuclear Regulatory Commission  
Washington, DC 20555

Ms Barbara Stamaris  
5795 North River Road  
Rt 3  
Freeland, MI 48623

Dr Jerry Harbour  
Atomic Safety & Licensing  
Board Panel  
U S Nuclear Regulatory Commission  
East-West Towers, Room E-454  
Bethesda, MD 20014

Mr M I Miller, Esq  
Isham, Lincoln & Beale  
Three First National Plaza  
52nd Floor  
Chicago, IL 60602

Mr D F Judd  
Babcock & Wilcox  
PO Box 1260  
Lynchburg, VA 24505

Mr Steve Gadler, Esq  
2120 Carter Avenue  
St Paul, MN 55108

Mr P Robert Brown  
Clark, Klein & Beaumont  
1600 First Federal Bldg  
Woodward Ave  
Detroit, MI 48226

Mr John DeMeester, Esq  
Dow Chemical Building  
Michigan Division  
Midland MI 48640

Ms Lynne Bernabei  
Government Accountability Project  
1901 Q Street, NW  
Washington, DC 20009

3/14/84

148811



QUALITY ASSURANCE PROGRAM  
MANAGEMENT CORRECTIVE ACTION REPORT

MCAR-1

REPORT NO. 84

JOB NO. 7220

Q NO.

DATE 4/23/84

I\* DESCRIPTION (Including references):

This report addresses a concern with the pipe whip restraint design on the NSSS lower cold leg piping, which was documented by Consumers Power Company in Safety Concern and Reportability Evaluation (SCRE) 81.

Continued on page 2

\* RECOMMENDED ACTION (Optional)

1. Provide appropriate design modifications to correct above conditions.
2. Investigate for related conditions and for similar conditions by other project groups.
3. Determine root cause and provide corrective action to preclude recurrence.
4. Issue first report by 5/11/84.

REFERRED TO  ENGINEERING  CONSTRUCTION  QA MANAGEMENT  \_\_\_\_\_  
 PROCUREMENT

ISSUED BY J.E. Crosby 4/27/84  
 for Project QA Engineer Date

\*\* This condition was reported to the NRC by CPCo as potentially reportable on 4/19/84.

II REPORTABLE DEFICIENCY

NOTIFIED CLIENT

NO

YES \*\*

Ray Bann 4/24/84  
 Project Manager Date

III CAUSE

CORRECTIVE ACTION TAKEN

AUTHORIZED BY \_\_\_\_\_  
 Date

STANDARD DISTRIBUTION

ADDITIONAL DISTRIBUTION - AS APPROPRIATE

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

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.

148811

DESCRIPTION (continued):

Pipe Whip Restraints 4 and 7 (typicals) on the NSSS lower cold leg piping were designed by Bechtel to be supported by the lower cold legs. There are a total of 8 subject restraints per unit, 2 on each steam generator cold leg. The Babcock & Wilcox (B&W) analysis of the NSSS did not account for the effects of the deadweight of these restraints on the NSSS during normal operation, safe shutdown earthquake (SSE), or loss-of-coolant accident (LOCA). This could have resulted in underestimated loadings on B&W components and Bechtel NSSS supports, and new system responses at the attachment points of Bechtel piping to the NSSS. In addition, B&W stated that the restraints could have induced potentially adverse vibrations on the NSSS during normal operation due to the eccentrically hung restraint mass.

Bechtel is currently redesigning these restraints to be completely supported by the basemat with no contact on the lower cold leg piping during normal operation. As a result, no reanalysis of the NSSS will be performed by B&W and no study will be conducted by B&W on the NSSS for potential vibration-induced problems.

Therefore, the evaluation of whether the subject restraints, if left attached to the NSSS piping, could have adversely affected the safety of operations of the Midland plant is indeterminate because no definitive statements can be made without the above reanalysis and study.

# Bechtel Associates Professional Corporation

151104

151164

SUBJECT: MCAR 84  
Pipe Whip Restraints on NSSS Lower Cold Leg Piping

## FINAL REPORT

DATE: May 16, 1984

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

### Introduction

This report addresses a concern with the pipe whip restraint design on the NSSS lower cold leg piping, which was documented by Consumers Power Company in Safety Concern and Reportability Evaluation (SCRE) 81.

### Description of Concern

Pipe Whip Restraints 4 and 7 on the NSSS lower cold leg piping were designed by Bechtel to be supported by the lower cold legs (Reference A). The B&W analysis of the NSSS did not account for the effects of the deadweight of these restraints on the NSSS during normal operation, safe shutdown earthquake (SSE), or loss-of-coolant accident (LOCA). This could have resulted in underestimated loading on B&W components and Bechtel NSSS supports, and new system responses at the attachment points of Bechtel piping to the NSSS. In addition, B&W stated that the restraints could have induced potentially adverse vibrations on the NSSS during normal operation due to the eccentrically hung restraint mass.

### Historical Background

Restraints 4 and 7 are located at the elbow of the lower cold leg piping near the outlet of the steam generators. These restraints were originally designed by Bechtel to limit the displacement of the piping after a LOCA at the steam generator outlet nozzle in order to prevent overpressurization of the steam generator skirt. The Bechtel design (Reference A) included straps around the cold leg piping to support the restraints. Bechtel was advised that the restraint design was not acceptable to B&W in January 1983 (Reference D).

### Summary of Investigation

Consumers Power Company issued SCRE 81 concerning this subject on April 4, 1983. Bechtel conducted its investigation and prepared a corresponding safety evaluation (Reference B) on September 2, 1983. No other Bechtel pipe whip restraints were found to be supported by vendor piping. For Bechtel pipe whip restraints supported by Bechtel piping, the additional deadweight is accommodated by the design of the piping and pipe supports.

# Bechtel Associates Professional Corporation

151104 151164

MCAR 84  
FINAL REPORT

Page 2

## Analysis of Safety Implication

The evaluation of whether the subject restraints, if left attached to the NSSS piping, could have adversely affected the safety of operations of the Midland plant is indeterminate without further analysis. The current redesign of the subject restraints conforms to the configuration analytically assumed by B&W. Further analysis is therefore unnecessary and will not be performed.

## Probable Cause

The exclusion of the deadweight of the subject restraints from the B&W NSSS analysis is attributable to two factors:

1. A misinterpretation of the Bechtel design drawing by B&W.
2. The deadweight of the restraints was not included in the initial issue of the Bechtel Input Document (BID).

## Corrective Action

- A. Reference C documents Consumers Power Company direction for Bechtel to redesign Restraints 4 and 7 to be completely supported by the basemat and to not contact the lower cold leg piping during normal operation. Bechtel is currently redesigning these restraints in accordance with that direction. The actions and schedule for issuing this redesign are as follows:

<u>Responsibility</u>	<u>Action</u>	<u>Date</u>
Bechtel (Civil)	1. Reissue Bechtel Sketch 7220-SKC-880, Rev A, (which shows the redesign) as Bechtel Drawing 7220-C-477-2(Q), Rev 0.	8/15/84F
Bechtel (Nuclear)	2. Revise the BID to include Bechtel Drawing 7220-C-477-2(Q), Rev 0 and to delete the deadweight values for the subject restraints.	8/29/84F

- B. This concern is judged by Bechtel to be an isolated incident. No additional corrective action to preclude recurrence is necessary because 1) adequate controls are currently in place through the BID

# Bechtel Associates Professional Corporation

151104 151164

MCAR 84  
FINAL REPORT

Page 3

and its procedure (PEP 4.25.6), and 2) communications channels between Bechtel and B&W for pipe whip restraints have been expanded to promote a mutual understanding of the restraint design and its effect on the B&W analysis. Even though this concern was not recognized in a time frame consistent with the completion of the B&W analysis, the concern was discovered during the B&W review of the governing Bechtel drawing contained in the BID.

## Reportability

This concern was verbally communicated to the NRC by Consumers Power Company on April 19, 1984. It was classified as potentially reportable under the criteria contained in 10 CFR 50.55(e).

## References

- A) Bechtel Drawing 7220-C-477(Q)
- B) Bechtel letter MAD-2537, 9/2/83
- C) CPCo Letter Serial 22684, 5/5/83 (Com 114680)
- D) Meeting Notes No. 1003, ELC-16160, 3/2/83 (Com. 106903)

Submitted by: *W. E. Poser*

*W. E. Poser*  
E. B. Poser  
Project Engineering Manager

Approved by: *K. C. Prasad*

*K. C. Prasad*  
for E. M. Hughes  
Chief Nuclear Engineer

Approved by: *E. H. Smith*

*E. H. Smith*  
for E. H. Smith  
Engineering Manager

Concurrence by: *M. A. Dietrich*

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