



Consumers
Power
Company

James W Cook

Vice President - Projects, Engineering
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

80-09 #5

April 2, 1982

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

MIDLAND PROJECT - UNITS 1 AND 2
DOCKET NOS 50-329 AND 50-330
LOW ALLOY QUENCHED AND TEMPERED BOLTING 1½ INCHES
AND GREATER IN SUPPORT OF SAFETY RELATED SYSTEMS
FILE: 0.4.9.46 SERIAL: 16149



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

- (1) Serial 10996, dated January 9, 1981
- (2) Serial 11526, dated March 31, 1981
- (3) Serial 13690, dated September 29, 1981
- (4) Serial 14666, dated January 15, 1982

This letter, as were the referenced letters, is an interim 50.55(e) report concerning the status of the subject bolting. Enclosure 1 provides a description of the corrective actions in progress to resolve the problem.

Another report, either interim or final, will be sent on or before July 9, 1982.

James W. Cook

WRB/lr

Enclosure 1: MCAR 45A and B, Interim Report 5, dated March 22, 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
SHFresman, Esq, Asst Attorney General
WHMarshall
GJMerritt, Esq, TNK&J

Bechtel Associates Professional Corporation

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SUBJECT: MCAR 45A and 45B (issued 12/18/80)

INTERIM REPORT 5

DATE: March 22, 1982

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

Introduction

The discrepancies discussed in this report concern the hardness values of the anchor and connecting studs for the reactor coolant pump (RCP) snubbers.

Background

MCAR 45A

The RCP snubber anchor studs are 2-1/4, 2-1/2, 3, and 3-1/2 inches in diameter and vary in length from 3'-6" to 7'-1". They are embedded in the secondary shield wall and the refueling canal wall. Also included are 2-inch and 2-1/4-inch diameter connecting studs approximately 1'-10" long that connect the snubbers to a structural steel transition piece. The anchor studs are partially embedded in the concrete and the connecting studs are in place. The snubbers restrain the RCPs during seismic and/or loss-of-coolant accident (LOCA) events.

The studs were purchased from various vendors during 1977 and 1978 by Bechtel construction in accordance with either ASTM A 354, Grade BD, or ASTM A 540, Grade B23, Class 3. They were intended to be tensioned to a preload up to 96 ksi to maintain the specified snubber spring rates under all loading conditions. Prior to tensioning, to ascertain that the studs could withstand long-term loads of this magnitude without becoming susceptible to stress corrosion cracking, Consumers Power Company requested Teledyne Engineering Services (TES) to conduct hardness tests on the exposed end of the embedded and connecting studs. TES conducted these hardness tests from November 21 through November 23, 1980. The test results showed that 207 studs of 384 tested are outside the range of hardness specified by the ASTM specifications.

MCAR 45B

On November 26, 1980, Consumers Power Company expanded the 10 CFR 50.55(e) report to include, as potentially reportable, all low-alloy quenched and tempered bolting materials 1-1/2 inches in diameter and larger used in support of safety-related systems.

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Investigative Action

MCAR 45A

Aptech Engineering Services of Palo Alto, California, was retained by Consumers Power Company to review the hardness data taken by TES, and to evaluate the effect of the measured hardnesses on the ability of the studs to withstand preload, operating, and accident loadings. Based on preliminary Aptech evaluations, it has been decided to lower the stud preload (to a maximum of 12 ksi) to preclude failure because of stress corrosion cracking. Aptech has confirmed that a maximum preload of 12 ksi is low enough to preclude stress corrosion cracking for the hardness ranges under consideration. Instructions have been issued to construction to preload the studs to 9 ksi, a value lower than the maximum permissible. A tolerance of ± 3 ksi is allowed.

This preload value, when reduced by temperature and relaxation losses, exceeds 3 ksi, a value in excess of the minimum preload of 1.5 ksi required by Babcock & Wilcox during operation. New spring rates have been submitted by Bechtel to B&W. B&W is proceeding with the new seismic and LOCA analysis of the reactor coolant system. ITT Grinnell, supplier of the snubbers, has also been informed of the change in the preload. Grinnell stated that there is no effect on the snubbers or on the spring rate of the snubbers themselves.

Aptech has submitted a draft report on the assessment of the reactor coolant pump snubber anchor bolts. Based on this report, the preload of 12 ksi maximum is acceptable and the preliminary allowable stress limits for operation and short duration loading are greater than the calculated bolt stresses based upon the capacity of the snubbers.

Procurement documentation packages for these studs have been reviewed to determine whether any additional action is required. A report on this review is being expedited and will be included in the next interim report.

MCAR 45B

Consumers Power Company is leading the investigation required by this MCAR. Commonwealth Associates, Incorporated (CAI) of Jackson, Michigan, has been retained by Consumers Power Company to review safety-related

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purchase orders and identify those purchase orders including low-alloy quenched and tempered steel (LAQTS) bolting and/or component material. The initial effort has been completed; however, additional purchase orders and LAQTS materials have been identified. CAI is currently onsite gathering data that will be used in evaluating the LAQTS materials. This activity is currently scheduled to be completed by June 11, 1982.

Most of the review being conducted on the LAQTS bolting and component support materials consists of field hardness testing. This testing is being performed by Consumers Power Company and CAI. This activity began in December 1981 and is estimated to be completed by September 1982.

Science Applications Incorporated (SAI) of Palo Alto, California, has been retained and has developed a sampling plan to determine the quantity of items to be tested. SAI is also providing statistical services in preparing the hardness data for evaluation.

Aptech Engineering Services of Palo Alto, California, has been retained to assist in evaluating the LAQTS materials purchased by identifying which materials are LAQTS and require testing. Aptech is also assisting in the analysis of the hardness test results.

Corrective Action

MCAR 45A

Construction has been instructed to preload the snubber studs to 9 +3 ksi. A procedure was developed by B&W construction to ensure that the studs are tensioned as required. This work has been completed for Unit 2, and is presently in progress for Unit 1. Engineering has made a preliminary comparison of the calculated anchor bolt stresses with the Aptech allowable stresses. These stresses, based on the capacity of the snubber, are within the preliminary Aptech allowable limits. A final check of stresses will be made upon receipt of B&W Specification 1235, Reactor Coolant System Foundation and Nozzle Loadings, scheduled for issue December 1982. At that time, the need for further corrective action will be determined.

MCAR 45B

Quality control receipt inspection will include hardness testing of LAQTS bolting component support materials and is being established to preclude utilization of defective materials.

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Safety Implications

MCAR 45A

If the subject studs were tensioned according to the original design requirements, there may have been a safety deficiency in that some of the studs could have failed due to stress corrosion cracking. If uncorrected, this deficiency could adversely affect the safety of Midland plant operations during the expected life of the plant.

MCAR 45B

Presently, the existence of adverse safety implications relative to other safety-related bolting is undetermined.

Reportability

This condition relative to the reactor coolant pump snubber studs was identified as "potentially reportable" by Consumers Power Company to the NRC under 10 CFR 50.55(e) on November 25, 1980.

MCAR 45A

Submitted by:

P.V. Brown
for S.L. Sobkowski
Civil Group Supervisor

Approved by:

L.H. Curtis
for L.H. Curtis
Project Engineering Manager

Concurrence by:

E.H. Smith
E.H. Smith
Engineering Manager

Concurrence by:

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

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MCAR 45B

Submitted by:

VADrusbach

L.A. Dreisbach

Approved by:

M. Elgandy
FR L.H. Curtis

Project Engineering Manager

Concurrence by:

E.H. Smith

E.H. Smith
Engineering Manager

Concurrence by:

M.A. Dietrich
CS for

M.A. Dietrich
Project Quality Assurance
Engineer