Bechtel Associates Professional Corporation

SUBJECT: MCAR 37 (Issued 12/28/79)

Broken Reactor Vessel Anchor Stud in Unit 1

INTERIM REPORT 2

DATE: April 11, 1980

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

Discrepancy

The discrepancies discussed in this report are the failed reactor vessel anchor studs in Unit 1.

Background

The anchor studs in question are 2-1/2 inches in diameter and 7 feet 4 inches long, embedded in the reinforced concrete reactor vessel pedestal. The anchor studs were purchased from Mississippi Valley Structural Steel (MVSS) of St. Louis, Missouri, fabricated by Southern Bolt and Fastener (SB&F) of Shreveport, Louisiana, and heat-treated by J.W. Rex of Lansdale, Pennsylvania. These studs were received on site by Bechtel in early 1976, embedded in concrete by Bechtel in April 1977, and tensioned by Babcock & Wilcox Construction Company in late July 1979. The failure of the first stud was discovered on September 14, 1979. Failures of the second and third studs were reported on December 20, 1979, and February 5, 1980, respectively. The third stud was removed during the week of March 31, 1980 and showed that the failure occurred in the stud approximately 1/2 inch below the top of the bottom heavy hex nut.

Investigative Action

Teledyne Engineering Services (TES) of Waltham, Massachusetts is preparing a report based on its investigation of the failed studs. This report will provide acceptability for service criteria of the reactor vessel anchor studs.

The quality verification document packages for high strength, low alloy, quenched and tempered anchor bolts with a diameter greater than 1 inch used on the Midland project are being reviewed.

An NRC investigative team has visited the Midland jobsite, the Ann Arbor office, and vendor locations. To date, the team's concerns have been focused on the history of the stud procurement, fabrication, testing, and quality documentation.

Preventive Action

The detensioning of the anchor studs is presently underway. The Unit 1 studs will be entirely detensioned while the tension in the Unit 2 studs will be lowered to the intended value of 75 ksi on the effective tensile stress area of 4.0 square inches (a more detailed discussion was presented in Interim Report 1). The actual tension in the studs will be determined by the lift-off force during detensioning.

Corrective Action

Two options are being considered as potential solutions for Unit 1. These options are:

1) Shim the existing shield plug support brackets tight to the reactor vessel to provide additional support.

2) Replacement of the studs

At present, these options are being reviewed and Bechtel met with Babcock & Wilcox on April 9, 1980, in Ann Arbor to discuss technical details regarding these potential solutions.

Safety Implications

This deficiency, if uncorrected, could adversely affect the safety of the operations of the Midland plant at any time throughout the expected life of the plant.

Reportability

This condition was reported by Consume. Power Company under 10 CFR 50.55(e) on September 14, 1979.

Submitted by: Craig Boyak

Approved by: BY DT M-Eley FOR L.H. CURTIS

Concurrence by: K. J. Bailey

BD/CB/ht