

U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Report of Construction Inspection

RO Inspection Report No. 050-329/74-02
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Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Midland Plant, Units 1 and 2
Midland, Michigan

License No. CPPR-81
License No. CPPR-82
Category: A

Type of Licensee: PWR (B&W) - Unit 1, 650 Mwe
Unit 2, 818 Mwe

Type of Inspection: Unannounced, Special

Date of Inspection: January 29, 1974

Dates of Previous Inspection: December 6-8, 1973 (Construction)

Principal Inspector: *C. C. Williams*
C. C. Williams

Feb 14, 1974
(Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: *W. E. Vetter*
W. E. Vetter, Chief
Reactor Construction Branch

2-14-74
(Date)

8006200701

SUMMARY OF FINDINGS

Enforcement Action

A. Violations

No violations were identified during the inspection.

B. Safety Matters

No safety matters were identified during the inspection.

Licensee Action on Previously Identified Enforcement Matters

No previously identified enforcement matters were reviewed. (Special Inspection)

Design Changes

Not applicable; special inspection.

Unusual Occurrences

No unusual occurrences were identified during the inspection.

Other Significant Findings

A. Current Findings

Computation Errors in Cadweld Void Calculation (RO Inspection Reports No. 050-320/73-10, No. 050-329/73-11, No. 050-329/74-01, No. 050-330/73-10, No. 050-330/73-11, and No. 050-330/74-01)

The inspection report covers a special inspection to determine the scope of the problem and adequacy of corrective action relative to the detection of small computation errors in previously accumulated data used to requalify existing site Cadwelds.

Detection by the licensee, of these small errors during data manipulation to determine the feasibility of a simplified void measuring technique, led to the issuance of Consumers Power Company (CP) Nonconformance Report (NCR) No. QF-6 to Bechtel

Corporation (Bechtel). The NCR requires that all Cadweld reinspection data, relative to calculations to establish the degree of Cadweld voids be recomputed by at least two, independent individuals, and to provide assurance that all future inspection data be mathematically accurate. Although concrete placement activities are not scheduled in the subject areas for at least a month, CP has taken the additional precaution of issuing a "Stop Work" order to Bechtel (No. FSW-2) covering all concrete structures containing Cadwelds, until such time as the subject CP NCR QF-6 is resolved. Bechtel final recomputation will show recomputation of this data by two, independent QA engineers at the site, plus an additional check by another QC engineer. Further, the site data is to be verified against data generated independently by Bechtel's San Francisco Headquarters QA Department. At the time of this inspection, only site computation data was available. Although considered incomplete until compared to Bechtel San Francisco recomputation data, the site records show that void calculations covering 936 Cadweld void areas were in error on 39 occasions, involving 33 of 468 Cadwelds. Correction of these mostly small (about .1 square inch) and random errors apparently will not change the original reinspection acceptance status of any of the subject (936 splice ends reinspected) Cadwelds in Units 1 and 2. None of the comparatively significant computation errors (nine errors greater than 0.1 square inch) resulted in a corrected void, exceeding 1/3 of the allowable three square inches.

B. Unresolved Items

No unresolved items identified.

C. Status of previously Reported Unresolved Matters

Not applicable; special inspection.

Management Interview

- A. The following persons attended the management interview at the conclusion of the inspection.

Consumers Power Company (CP)

H. W. Slager, Quality Assurance Supervisor
T. W. Bowes, Quality Assurance Engineer
J. L. Corley, Field Quality Assurance Engineer
R. E. Whitaker, Quality Assurance Engineer
B. H. Peck, Field Supervisor

- B. Matters discussed and comments, on the part of the licensee, were as follows.

The inspector stated that discussion with the licensee representative and review of the associated NCR's, Bechtel Cadweld reinspection and interim recomputation records, and CP audits of the original Cadweld inspection reports showed that:

- a. The identified errors in void calculations are, in all but three cases, insignificantly small and appear not to have compromised the quality status (accept or reject) of any of the subject 468 Cadwelds in Units 1 and 2. In the remaining three cases, although the error is comparatively large (as much as 0.88 square inches) acceptance status was likewise unaffected.
- b. Recomputation and verification of the void areas of the subject Cadwelds will not be considered complete until the Bechtel site organization has received and compared their results with recomputation performed by the Bechtel San Francisco QA Department.
- c. It appears that a contributing source of the identified error is the fact that the original computations were carried, in most cases, to three significant numbers when, in fact, it appears that the required and adequate measuring techniques are, at best, accurately relatable to actual voids to a limit of one significant number.
- d. Although Bechtel has taken, and nearly completed, significant corrective action even beyond the scope of the CP recommended corrective action, (independent checking of data by Bechtel, San Francisco, personnel) documents prescribing the details of this activity were unavailable for review. The Bechtel representative stated that this consideration will be detailed in their final report to CP.
- e. The inspector noted that CP requested that Bechtel provide measures to assure that all future Cadweld void measurements will be mathematically accurate. However, this documentation is not available as yet. The Bechtel representative indicated that they are considering a revision to the appropriate inspection procedure to require that all calculations be checked by at least two independent QC inspectors, and verified by the project field quality control engineer.

The licensee acknowledged these remarks and stated that they will start an audit of the interim Bechtel recomputation activity this afternoon. Further, the CP NCR and the associated "Stop Work" order will remain in force until Bechtel completes all elements of its corrective action to resolve the immediate problem and has taken steps to assure that future problems of a like nature will not occur.

REPORT DETAILS

Persons Contacted

The following people, in addition to individuals listed under the Management Interview Section of this report, were contacted during the inspection.

Bechtel Corporation (Bechtel)

Z. G. Tucker, Quality Control Supervisor
J. P. Connolly, Field Quality Control Engineer
J. I. Dotson, Project Quality Assurance Engineer
L. R. Albert, Quality Control Engineer

Results of Inspection

Review of CP NCR No. QF-6 dated January 23, 1974, for Midland Units 1 and 2, which identified several Cadweld void area computation errors, showed that it required Bechtel to: (a) "recompute all Cadweld void areas, based upon reinspection data," and (b) "provide assurance that all future QC computations will be mathematically accurate." Further, CP issued "Stop Work" Order No. FSW-2 which states: "This work covers all concrete containing Cadwelds until such time as CP NCR QF-6 is closed."

CP discovered these small errors while manipulating previously accumulated data (during the process of reinspection and requalification of all existing site Cadwelds during November 1973) to determine if a "simplified" Cadweld void area measurement technique was feasible. The Bechtel corrective action relative to recomputation, as reported by the Bechtel project field quality control engineer, is to have the data for each Cadweld recomputed by two independent QC engineers, then checked by another, and finally compare the site data to the results obtained by the Bechtel San Francisco office. The preliminary data also shows that the acceptance status of the 468 Cadwelds in Units 1 and 2, will not be affected by correction of these errors; that is, the recomputed void areas will not exceed the original acceptance criteria. In fact, correction of about half of the areas will result in reduced void area computations. The numerical results of this review are as follows:

1. Recalculation of Rebar Cadwelds (Review of Preliminary Bechtel Records)

- a. Thirty-nine computation errors involving 33 out of a total of 468 Units 1 and 2 Cadwelds (936 Cadweld end void areas) have been identified by the Bechtel site organization.
- b. The 39 errors were corrected, resulting in reduced void areas in 21 cases and increased void areas in 18 cases. None of the Cadwelds experienced a change in acceptance status.
- c. Nine of the 39 corrected computations exceeded a change greater than (.1) one-tenth of a square inch; (5) five of the 9 increased; and (4) four were reduced. The average change for these nine Cadwelds is approximately .492 square inches.
- d. Thirty of the subject 39 corrected computations did not exceed a change greater than (.1) one-tenth square inch; (12) twelve increased void area; and (18) eighteen had reduced void area. The average change in computed void area for these 30 Cadwelds is approximately .040 square inches.
- e. The largest error, which increased computed void, is .882 square inches; the largest error, which reduced computed void, is .730 square inches. The smallest (all 39) error was .01 square inches, and the largest (all 39) was .882 square inches.

2. Post Inspection Information

Subsequent to the inspection, the licensee's site representative informed RO:III, via telecon on February 1, 1974, that Bechtel has submitted a final report on this matter. This final report shows that 35 errors have been confirmed involving 29 splices. No change in acceptance status was experienced. This final report will be reviewed during the next inspection. It is expected that the data will be in substantial agreement with the preliminary data results identified in 1., above.