# U. S. ATOMIC ENERGY COMMISSION DIRECTORATE OF REGULATORY OPERATIONS

#### REGION III

# Report of Construction Inspection

RO Inspection Report No. 050-329/74-04 RO Inspection Report No. 050-330/74-04

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. CPPk-82 Category: A

Type of Licensee:

PWR (B&W) Unit 1, 650 Mwe Unit 2, 818 Mwe

Type of Inspection: Routine, Announced

Dates of Inspection: March 6 and 7, 1974

Dates of Previous Inspection: February 6 and 7, 1974 (Construction)

Principal Inspector: R. A. Rohrbacher

4-12-74 (Date)

Accompanying Inspector: M. W. Dickerson

4-12-74 (Date)

Reviewed By: W. E. Vetter, Chief W. C. William Reactor Construction

- 12-74 (Date)

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### SUMMARY OF FINDINGS

# Enforcement Action

## A. Violations

Contrary to 10 CFR Part 50, Appendix B, Criterion V, and the Consumers Power Company Quality Assurance Manual, Section 5, the weld method used by a site contractor welder was not part of the applicable weld procedure. The welder used an additional rod as a manually fed filler rod, which was fed into the arc created by the normally used electrode. This violation is considered to be of Category II severity.

Since it was determined during the current inspection that both Consumers Power Company and Bechtel Corporation had taken appropriate, corrective action relative to this violation and had established measures to assure that similar violations would not occur, the licensee will not be required to respond to a "Notice of Violation" to be issued in connection with this matter. (Paragraph 1, Report Details)

### B. Safety Matters

No safety matters were identified during the inspection.

# Licensee Action on Previously Identified Enforcement Matters

Insufficient Frequency of Aggregate Testing (RO Inspection Reports No. 050-329/70-06 and No. 050-330/70-06; No. 050-329/71-01 and No. 050-330/71-01; No. 050-329/73-07 and No. 050-330/73-07)

During the referenced September 1970 inspection, it was determined that the site testing laboratory was not taking concrete aggregate gradation and organic tests of sand at frequencies stated in the Midland Plant PSAR. Consumers Power Company (CP) was informed that this matter would remain on a follow-up status until construction work was resumed, so that further inspections could be made.

From a review of procedures and records, and from discussions with site personnel during the referenced September 1973 inspection and the current inspection, it was determined that the required frequency of the subject testing was procedurally established and maintained. This matter is considered to be resolved. However, periodic inspections of concrete activities, including the above testing, are to be made during subsequent inspections.



# Design Changes: None identified.

Unusual Occurrences: None identified.

#### Other Significant Findings

A. Current Findings

The licensee estimated current project status to be as follows:

- 1. Engineering 38% complete.
- 2. Construction 4% complete.
- B. Unresolved Matters

No new unresolved matters were identified during the current inspection.

- C. Status of Previously Reported Unresolved Matters
  - 1. <u>Bechtel Corporation (Bechtel) Audit of Erico Products,</u> <u>Incorporated (Erico) - (RO Inspection Reports No. 050-329'74-03</u> and No. 050-330/74-03)

During a routine audit (on January 31, 1974) of Erico, the Cadweld components supplier, three audit findings were identified by Bechtel. This matter remains open pending a review of the report of a resudit of Erico by Bechtel and an engineering evaluation of the possible safety implications involved. (Paragraph 4, Reports Details)

2. Containment Building Tendon Trumplates (RO Inspection Reports No. 050-329/74-01 and No. 050-330/74-01; No. 050-329/74-03 and No. 050-330/74-03)

Corrective action has been initiated. This matter remains open pending satisfactory completion. (Paragraph 6, Report Details)

 Additional Work and Inspection Procedures (RO Inspection Reports No. 050-329/74-01 and No. 05050-330/74-01; No. 050-329/74-03 and No. 050-330/74-03)

Implementation is in progress. Work and inspection procedures are being developed and/or revised by Bechtel. This matter remains open pending review of this effort during subsequent inspections. (raragraph 7, Report Details)



 Babcock and Wilcox Company (B&W) QA Program for the Midland Plant (BO Inspection Reports No. 050-329/73-06 and No. 050-330/74-06)

Subsequent to the reactivation of construction and fabrication activities for this facility, CP and B&W personnel have been discussing quality assurance requirements common to components furnished by B&W for the Midland Plant. During the current inspection, it was determined that the revised B&W QA documents (QA plans) covering Class I components to be supplied for the Midland Plant appeared to be complete, properly approved by B&W, and no deficiencies were identified during a preliminary review of these B&W QA documents. A more detailed review of the B&W QA program for the Midland Plant will be made during a subsequent inspection. (Paragraph 3, Report Details)

5. Consumers Power Company Quality Assurance Manual (RO Inspection Reports No. 050-329/73-06 and No. 050-330/73-06)

During the referenced inspection, it was determined that the CP Quality Assurance Manual (QAM) for the Midland Plant lacked, or was inconsistent with, certain detailed requirements of 10 CFR Part 50, Appendix B. At the time, CP indicated that appropriate changes to the QAM would be made.

These changes were completed by CP in November 1973. During an initial review of these changes, made prior to this inspection, no significant deficiencies were identified, and there were no further questions at this time.

6. <u>Site Contamination Sampling Program (RO Inspection Reports No.</u> 050-329/73-07 and No. 050-330/73-07; No. 050-329/73-10 and No. 050-330/73-10)

This program was reinitiated by CP during July 1973 in conjunction with the restart of construction activities at the site. The results of the analysis of samples taken under this sampling program indicated that site atmospheric contamination has not adversely affected stored materials and components to an extent greater than atmospheric environments elsewhere, i.e., only normal, expected surface deterioration had occurred. This sampling program has been discontinued. A new site sampling (monitoring) program has been developed by Bechtel and is being reviewed by CP.

 Site Requalification Activities (RO Inspection Reports No. 050-329/73-05 and No. 050-330/73-05)

Carbon steel construction materials and components, stored outside

at the site (during construction shutdown) have rusted to varying degrees. The licensee arranged for specialists from Bechtel to inspect these components and evaluate the results relative to restoration and requalification to meet specification requirements. Bechtel started this activity in May 1973, and this work is continuing. This matter will be reviewed again during subsequent inspections. (Paragraph 10, Report Details)

 Contacts With Firms Having QA Expertise (RO Inspection Reports No. 050-329/74-01 and No. 050-330/74-01; No. 050-329/74-03 and No. 050-330/74-03)

As stated in the referenced reports, CP has met with personnel from NUS Corporation (NUS) and three other firms having QA expertise. The NUS team assigned to review the Midland Plant QA program have dicussed their findings with CP personnel, and CP expects to review the final NUS report early in March 1974. This NUS report will be reviewed by the inspector during a subsequent inspection.

## Management Interview

Two management interviews were held at the conclusion of the inspection; one with CP personnel only, and one with both CP and Bechtel personnel present. Matters discussed in both meetings are included below.

A. The following persons attended one or both of the management interviews at the conclusion of the inspection:

Consumers Power Company

- G. S. Keeley, Director of Quality Assurance Services
- T. C. Cooke, Project Superintendent
- H. W. Slager, Project Quality Assurance Supervisor
- J. L. Corley, Field Quality Assurance Engineer
- B. H. Pack, Field Supervisor

## Bechtel Corporation

- E. E. Felton, Project Superintendent
- Z. G. Tucker, Quality Control Supervisor
- J. P. Connolly, Project Field Quality Control Engineer
- W. F. Holub, Project Quality Assurance Engineer
- A. J. Boos, Senior Field Engineer
- B. Matters discussed and comments, on the part of management personnel, were as follows:
  - 1. The apparent violation relative to containment liner plate "leak chase" channel welding and the subsequent corrective action taken

by CP and Bechtel were discussed. The inspector stated that he had reviewed this matter with CP and Bechtel personnel at the site and that the corrective action measures appeared to be adequate. Licensee personnel acknowledged this information. (Paragraph 1, Report Details)

- 2. The status of corrective action measures, taken by Erico and Bechtel relative to the Bechtel audit findings associated with the recent Erico audit, were discussed. A representative of Bechtel stated that a reaudit of Erico was made on March 5, 1974, and that some corrective action is yet to be completed by Erico. In regard to the safety implications of the audit findings, Bechtel stated that a review of Cadweld splice tensile data indicated that no safety problem was involved. The inspector stated that he woul. review the Bechtel audit reports and engineering evaluation during a subsequent inspection when this information is available at the site.
- 3. A representative of the licensee stated that CP reviews of Bechtel inspection plans, and discussions with Bechtel relative to these reviews, were continuing. He further stated that about 20 Bechtel inspection plans have been reviewed by CP QA personnel and returned to Bechtel with comments during February 1974.
- Current inspection findings, relative to certain unresolved matters and other matters reported elsewhere in this report, were reviewed briefly.

#### REPORT DETAILS

#### Persons Contacted

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

#### Consumers Power Company

R. E. Whitaker, Field Quality Assurance Coordinator
D. R. Keating, Field Quality Assurance Coordinator
D. E. Horn, Field Quality Assurance Coordinator
G. L. Slagel, Associate Engineer - Civil

## Bechtel Corporation

L. R. Albert, Lead Civil Quality Control Engineer
P. T. Carpenter, Quality Control Laboratory Supervisor
R. A. Moray, Quality Control Receiving Inspection
M. P. Hendrick, Welding - NDE Quality Control Engineer
J. T. Stocks, Welding Engineer
T. E. Jennings, Assistant Welding Engineer

United States Testing Company, Incorporated (U.S. Testing)

K. R. Rademacher, Field Laboratory Chief

Babcock and Wilcox Company (B&W) - Lynchburg

S. H. Klein, Manager - Quality Assurance Engineering

- J. R. Agee, Quality Assurance Engineer
- D. K. Frerichs, Associate Project Manager

## Results of Inspection

# 1. Containment Liner Plate Welding

Prior to the current inspection, the licensee identified a situation wherein Class I work (welding of containment liner plate "leak chase" channels) was determined to be in progress. using a weld method not included in the applicable welding procedure (Bechtel Welding Procedure P1-A-C-Lh).

A "leak chase" channel was being welded on liner plate S1-1-U2. The welder used an additional rod as a manually fed filler rod, which was fed into the arc created by the electrode in the electrode holder. This method is not part of the applicable weld procedure. During the current inspection, the details of the apparent violation and the corrective action taken by CP and Bechtel were reviewed. It was established that: (1) CP issued a nonconformance report (QF-4) to Bechtel relative to this matter, (2) apparently, only one weld and one welder were involved, (3) Bechtel had stopped the improper welding activity and had the subject weld removed and repaired, and (4) corrective action had been taken by both CP and Bechtel relative to this matter to preclude recurrence. Bechtel has reinstructed welders as to the application of proper welder techniques required for this work and is providing increased surveillance of containment liner plate field fabrication. CP has provided a method to verify, by their site QA personnel, that this increased surveillance is being conducted and that it is adequate.

# 2. Concrete - Class I Structures and Supports

#### a. Implementation of QA Program - U.S. Testing

A review of the CP, Bechtel, and U. S. Testing line and QA organization and functional relationships indicated that applicable quality requirements (10 CFR Part 50, Appendix B, ANSI 45.2 and Bechtel Test Specification No. 7220-G-22) were being met relative to the testing and inspection requirements for concrete and reinforcing steel.

Satisfactory implementation was established by review of the following documents:

- Bechtel Quality Assurance Manual, with amendments, dated December 26, 1973.
- (2) Bechtel Master Inspection Plan No. C-208-1, Material Testing Services (Daily Batch Plant Inspection and Testing, Revision 5, dated February 8, 1974).
- (3) Bechtel Technical Specification for Materials Testing Services for the Consumers Power Company, Midland Plant, No. 7220-C-208, Revision 2, dated September 20, 1973.
- (4) U. S. Testing QA Manual for Material Testing Services, Consumers Power Company, Midland Plant, Units 1 and 2, No. 7220-C-208, Revision 2, dated January 31, 1974, and approved by Bechtel on March 6, 1974 (TWX No. 3499).
- (5) Bechtel Project Special Provision No. 3, Revision 2, 7220, dated November 13, 1973.
- (6) Master Inspection Plan No. C-208-1, Material Testing Services (Daily Batch Plant Inspection and Testing) Revision 5, dated February 8, 1974.

(7) Bechtel Specification No. 7220-G-22, General Requirement for Subcontractor QA Program, Revision 1, dated June 22, 1973.

The present U. S. Testing organization at the site is composed of a concrete batch plant inspector, an assistant batch plant inspector, a clerk, and four laboratory technicians, who all report to a laboratory chief, The latter, in turn is required by the U. S. Testing QA manual, Bechtel Specification No. 7220-G-22, and Project Special Provision Notice SF/PSP No. 3 for Midland to report to Bechtel as a division of the Bechtel construction site organization. As construction activity at the site increases, the U. S. Testing staff is to be increased to a total of approximately 16 people. (The Bechtel project field QC engineer at the Midland site has assigned a field QC engineer to provide functional technical direction over the work performed by U. S. Testing.)

A selective sampling of records, including those at the test laboratory and the concrete batch plant and observations at both facilities, indicated that required tests and records were being maintained in accordance with requirements specified in the referenced documents.

#### b. Heview of QC System

The Bechtel QC system for Class I concrete structures was determined to be acceptable relative to robar tests and users' verification tests, concrete tests being performed at the proper location, proper use of curing procedures, and placement control (location preparation, proper mix specified, proper mix delivered, and adequate placement crew). Acceptability was determined by selective examination of the following Bechtel documents:

- Nuclear Quality Assurance Manual, with amendments, dated December 26, 1973.
- (2) Quality Control Notice Manual, revised December 11, 1973.
- (3) Field Inspection Procedure, Material Receiving and Storage Control, Revision 00, dated December 20, 1973.
- (4) Master Inspection Plan No. C-39-R, Revision 4, dated February 8, 1974.
- (5) Field Inspection Plan No. C-39-9, Receiving Reinforcing Steel at Job Site Prior to Off Loading, Revision 3, dated January 24, 1974.

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- (6) MasterInspection Plan No. C-C-3, Sampling and Testing Plastic Concrete, Revision 0, dated August 27, 1973.
- Master Inspection Plan No. C-208-1, Material Testing Services (Daily Batch Plant Inspection and Testing) Revision 5, dated February 8, 1974. (Replaces above MIP)
- (8) Master Inspection Plan No. C-C-4, Forming, Placing, and Curing of Concrete (Preplacement) Revision 0, dated August 27, 1973.
- (9) Master Inspection Plan No. C-231-2, Forming, Placing, Finding, and Curing of Concrete (Preplacement) Revision 5, dated February 8, 1974. (Replaces above MIP)
- (10) Master Inspection Plan No. C-C-5, Forming, Placing, Finishing, and Curing of Concrete (Placement) Revision 0, dated August 27, 1973.
- (11) Master Inspection Plan No. C-231-3, Forming, Placing, Finishing, and Curing of Concrete (Concrete Placement) Revision 3, dated December 28, 1973. (Replaces above MIP)
- Master Inspection Plan No. C-C-6, Forming, Placing, Finishing, and Curing of Concrete (Post Placement) Revision 0, dated August 27, 1973.
- (13) Master Inspection Plan No. C-231-4 (a, b and c) Forming, Placing, Finishing and Curing of Concrete (Finishing, Curing, Repair) Revision 5, dated February 25, 1974. (Replaces above MIP)
- (14) Technical Specification for Forming, Placing, Finishing, and Curing of Concrete for the Consumers Power Company Midland Plant, Midland, Michigan, No. 7220-C-231Q, Revision 4, dated November 14, 1973.
- (15) Technical Specification for Materials Testing Services for the Consumers Power Company Midland Plant, Midland, Michigan, No. 722-C-208, Revision 2, dated September 20, 1973.
- (16) Bechtel Form QC-C6 Rebar Test Report
- (17) Bechtel Rebar Log
- (18) Bechtel letter to Inland-Ryerson Construction Products Company, dated January 29, 1974.

## c. Embedded Reinforcing Bar

Bechtel documents relative to the inspection and acceptance of embedded reinforcing bar were reviewed by the inspector and were considered acceptable. However, the actual calculations (filed at Bechtel, Ann Arbor) referenced in the attachment, interoffice memo, Martinez to Hondorp (dated Spetember 26, 1973) to NCR No. C-2, dated September 7, 1973, were not reviewed by the inspector.

The initial document reviewed (Bechtel's final report - Inspection of Embedded Reinforcing Bar, dated August 29, 1973) provided the basis for measurement of the in-place rebar diameter, in lieu of weight/foot, as a means for acceptance or rejection of the rebar when compared to the theoretical diameter. (Da =  $\sqrt{0.94}$  Dl, where Da is the acceptable diameter, and Dl is the theoretical diameter). The results of these measurements established that rebar sizes 8, 9 and 11 were adequate, while those for No. 7 rebar (containment building, Units 1 and 2) were below the theoretical acceptable diameter. The report recommended issuance of an NCR and that project engineering evaluate this matter to determine if the "undersize" rebar could fulfill its designated function.

NCR No. C-2 was issued on September 7, 1973, and was subsequently closed out on October 4, 1973, based on the interoffice memo referenced above. The interoffice memo indicates that a stress calculation, based on the smallest diameter bar measured, established that the reduced size area is adequate for the design load.

## 3. B&W QA Program for the Midland Plant

During this inspection, the current B&W QA program for the Midland project was reviewed and discussed with CP and B&W personnel. A B&W QA plan (BAW-1346) for the Midland project was recently revised (Revision 1, dated March 1, 1974) and approved by the B&W manager of QA and the senior project manager, Nuclear Power Generation Division (Lynchburg) This revised document is a result of several months effort to upgrade the B&W QA program for the Midland project, subsequent to the reactivation of the project in 1973. It is to be applicable to all current and future work done by B&W for the Midland project and replaces BAW-1346 (dated November 1970). CP has received a copy of BAW-1346, Revision 1, for their review. No deficiencies were identified by the inspector during a preliminary review of this B&W QA document.

In regard to the B&W QA program for B&W suppliers and vendors, B&W issued an approved Specification No. 1212, Revision O, on August 20,

1973, which replaces Specification No. 1152. The formant of Specification No. 1212 is arranged to include 18 sections related to the 18 criteria of 10 CFR Part 50, Appendix B. It contains the nuclear quality program requirements that B&W imposes on their suppliers and vendors, i.e., the required QA/QC plans and procedures that the supplier must have to do nuclear work for B&W. A representative of B&W stated that it is a general policy of B&W to withhold "release to manufacture" until the QA program of the supplier is approved by B&W. The inspector did not identify any deficiencies in specification No. 1212 during a preliminary review.

## 4. Bechtel Audit of Erico

During the current inspection, the status of corrective action was determined relative to the audit findings identified during a January 31, 1974, Bechtel audit of Erico. A representative of Bechtel stated that a reaudit of Erico was made by Bechtel on March 5, 1974, to determine the corrective action measures taken by Erico. Preliminary information provided by Bechtel indicated that some corrective action is yet to be completed by Erico.

In regard to the safety implications of the audit findings, Bechtel stated that a review of Cadweld splice tensile data indicated that no safety problem was involved. CP has reviewed the Bechtel tensile data and is currently discussing this matter with Bechtel. The inspector will review the Bechtel audit reports and engineering evaluation during a subsequent inspection, when this information is available for review at the site.

## 5. Bullock Creek Diversion

During the summer of 1973, CP and Bechtel developed plans to reroute the lower end of Bullock Creek (a drainage stream) near the Midland Plant to provide a construction laydown area readily accessible to the construction work. Both the new and the "old" creek alignments are on land fully controlled by the Dow Chemical Company and CP. Details of alternatives considered, previous use of the area, channel construction, environmental considerations, and a monitoring program are included in a Bechtel report, titled "Environmental Aspects of Bullock Creek Rerouting", dated August 10, 1973.

During a November 1973 inspection, and during the current inspection, the inspector reviewed the creek diversion plans and specifications, the actual channel relocation work, and the planned monitoring program. It was determined that the rerouting was accomplished according to Bechtel Drawing No. 7220-C-132, Revision 3, and the applicable specifications. The licensee stated that water sampling

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of Bullock Creek, prior to and following creek diversion, has been and is continuing as required by the monitoring program. A review of water sampling records indicated that three sets of water samples were taken prior to diversion but, due to no-flow conditions, post diversion sampling was deferred until after a rain on October 27, 1973. Sampling after diversion was started on October 30, 1973. Analysis of the water samples was performed by CP at their Karn Plant Laboratory. These test results were available at the site for samples taken from August 20, 1973, through December 28, 1973. It was determined that the monitoring program, relative to the Bullock Creek rerouting, is being conducted as stated in the Bechtel report mentioned above.

# 6. Containment Building Tendon Trumplates

Prior to this inspection, CP had requested Bechtel to complete the resolution of certain unresolved matters relative to tendon trumplates. This work is in progress. CP stated that: (1) the tendon trumplate welds had been cleaned and inspected prior to the current inspection, (2) approximately 20 pinholes (about 1/16 inch in diameter) were found in the Unit 1 tendon trumplate welds and about the same number of weld pinholes in the Unit 2 trumplates, and (3) Bechtel initiated a nonconformance report relative to this matter about March 5, 1974. This matter remains open.

# 7. Additional Work and Inspection Procedures

Development and review of additional work and inspection procedures are continuing. The licensee stated that CP and Bechtel personnel are currently discussing these procedures to resolve questions. In addition to the approximately 20 inspection plans recently developed by Becthel for CP review. Bechtel has developed procedures for work planning (FPG-2), for initiating and processing field procedures (FPG-1), and a procedure relative to special processes and special process procedures (SPPG-1).

# 8. CP QA Training Program

A review of CP QA training records, and discussions with CP personnel, indicated that the training program for CP site QA personnel and its implementation are considered to be adequate. Another training session, to be held on March 14 and 15, 1974, is scheduled for all QA site personnel.

# 9. CP Management Involvement in QA Activities

A CP quarterly management meeting was held at the Midland Plant site on February 4, 1974. CP attendance at this meeting included Messrs. Youngdahl, Howell, Keeley, Kessler, Cooke, Slager, and Corley. The following matters were discussed: (1) Bechtel senior management uvolvement in site QA/QC activities, (2) the NUS preliminary report, '3) a procedure for site visits by Quality Assurance Services management (4) CP QA field audit matrix, (5) CP review of Bechtel inspection plans, (6) Bechtel Nuclear Quality Assurance Manual, (7) B&W QA Program, (8) CP nonconformance reports, and (9) timeliness of Bechtel corrective action.

From a review of records, it was determined that the director of QA Services and the project QA supervisor made planned, periodic site visits to review and discuss matters related to the quality aspects of the Midland Plant construction.

## 10. Site Requalification Activities

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Work is continuing at the site to determine the affects of the environment on stored materials, components, and structures. Various inspections have been made by Bechtel specialists and by site personnel relative to this matter. A review of these reports, during pervious inspections and during the current inspection, indicated that about ten inspections relative to this matter have been conducted and documented. It appears that this activity is continuing in an adequate manner and in accordance with the program developed by CP pursuant to Condition 1 of ALAB-106.



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RO Inspection Report No. 050-329/74-04 A. RO Inspection Report No. 050-330/74-04

Transmittal Date

: April 15, 1974

Distribution: RO Chief, FS&EB RO:HQ (5) DR Central Files Regulatory Standards (3) Licensing (13) RO Files

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B. RO Inquiry Report No.

Transmittal Date : \_\_\_\_\_

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C. Incident Notification From:

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