

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Construction Inspection

IE Inspection Report No. 050-329/75-03
IE Inspection Report No. 050-330/75-03

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 No. 1, 650 MWe
Unit No. 2, 818 MWe

Type of Inspection: Routine, Announced

Dates of Inspection: April 8 and 9, 1975

Date of Previous Inspection: February 27, 1975 (Construction)

Principal Inspector: *T. E. Vandell*
T. E. Vandell

5-1-75
(Date)

Accompanying Inspectors: D. W. Hayes

I. T. Yin
I. T. Yin

(Date)
5/1/75
(Date)

Other Accompanying Personnel: None.

Reviewed By: *D. W. Hayes*
for D. W. Hayes
Senior Reactor Inspector
Construction Projects

5/1/75
(Date)

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SUMMARY OF FINDINGS

Enforcement Action

Noncompliance Items

No noncompliance of NRC requirements were identified.

Licensee Action on Previously Identified Enforcement Action

No previously identified enforcement matters remain unresolved.

Design Changes: None.

Unusual Occurrences: None identified.

Other Significant Findings

A. Current Project Status

1. Facility Completion

Engineering - 45%

Construction - 9.4%

2. Concrete Placed

Unit 1 - 6,305 cubic yards

Unit 2 - 18,144 cubic yards

Auxiliary Building and common facility - 12,693 cubic yards

B. Unresolved Matters

Work Interface Between Design and Construction Engineering Groups

The inspector commented on the procedures being developed to correct deficiencies in the work interface between Bechtel Associates Professional Corporation (BAPC) and Bechtel Power Corporation (Bechtel). The deficiencies include control of design comments of field drawings and sketches as well as identifying what field drawings and sketches should be submitted for review. This matter is considered to be subject to further review of the final procedures and the corrective action reports. (Report Details, Section II, Paragraph 3)

C. Status of Previously Reported Unresolved Matters

1. Unit 2 NSSS Equipment Onsite Storage (IE Inspection Reports No. 050-329/75-01 and No. 050-330/75-01 and RO Inspection Reports No. 050-329/74-11 and No. 050-330/74-11)

- a. Removal of the Spraylat coating from the vessel coated areas and covering vessels with tarpaulins had been approved by Babcock and Wilcox Construction Company (B&W).
- b. Inspection of NSSS internal "as received" conditions had not been implemented. Inspection and safety procedures appeared to be adequate.

The above items are considered unresolved pending completion of and evaluation of results. Extended long-term NSSS onsite storage for up to a three year period, using the existing surveillance procedures and program, had been approved by B&W. (Report Details, Section II, Paragraph 4)

2. Unit 2 Containment Rebar Spacing

(IE Inspection Reports No. 050-329/75-02, No. 050-330/75-02, No. 050-329/75-01, and No. 050-330/75-01)

The revised evaluation report on possible safety implications of the rebar spacing discrepancies, identified by the licensee in the containment building was reviewed. The report was considered responsive to the licensee's commitments and the requirements of 10 CFR Part 50, Paragraph 50.55(e). This matter is considered resolved. (Report Details, Section II, Paragraph 1)

3. Discrepancy Between PSAR and Specification 7220-C-230 (IE Inspection Reports No. 050-329/75-02 and No. 050-330/75-02)

The apparent discrepancy of the slump criterion, stated in the PSAR and Specification 7220-C-230, was discussed. No resolution was established. (Report Details, Section I, Paragraph 2)

D. Deviations: None identified.

E. Status of Previously Reported Deviations

No deviations reported previously.

Management Interview

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

Consumers Power Company (CP)

T. C. Cook, Project Superintendent
B. H. Peck, Field Supervisor
H. W. Slager, Project Quality Assurance Administrator
J. L. Corley, Project Quality Assurance Superintendent

Bechtel Power Corporation (Bechtel)

P. A. Martinez, Project Manager
J. P. Connolly, Project Field Quality Control Engineer
G. L. Richardson, Lead Quality Assurance Engineer
J. F. Newgen, Field Superintendent

Bechtel Associates Professional Corporation (BAPC)

J. L. Hurley, Midland Assistant Project Engineer

Babcock and Wilcox Construction Company (B&W)

V. N. Asgaonkar, Site Representative

- B. Matters discussed and comments, on the part of management personnel, were as follows:

1. The inspector commented that the Unit 2 containment rebar spacing resolution information appeared to be adequate and that he had no further questions at this time. He added that further review of the information would be performed at the regional office after the inspection. The licensee representatives commented that they would be glad to answer any further questions that might arise.
2. The inspector requested that the information made available to the inspector for review, relative to the auxiliary building concrete beam design deviation, be allowed to be reviewed in detail at the regional office after the inspection. He added that the information would be returned to the site at the completion of review. The licensee representative indicated that this would be acceptable and also indicated that, should questions arise, the inspector should feel free to contact the licensee.

3. The inspector discussed the proposed revision of the field interface procedure, No. FPC-3. The inspector's understanding was that the procedure is to be modified to identify field sketches as being subject to review in the same fashion as vendor drawings. In addition, the field procedures manual, and the engineering procedures manual would have a general statement placed in the front (of each manual) clarifying the existence of both Bechtel and BAPC. Bechtel representatives commented that they were not in complete agreement, since not all field generated sketches require review. However, they indicated that the question would be reviewed and should be resolved by the next inspection.
4. The inspector stated that he had reviewed the long-term and extended long-term NSSS onsite storage procedures and surveillance records and had no further questions. However, the NSSS equipment stored onsite will continue to be the subject of inspection by the IE:III inspector.
5. The inspector stated that he had reviewed the QC System for handling and storage of safety related components. The inspector added that he had examined the receipt, storage and surveillance records as well as the actual storage conditions for the decay heat removal pump motors in making this review and that no deficiencies had been identified.

REPORT DETAILS

Section I

Prepared By: T. E. Vandell

Persons Contacted

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

Consumers Power Company (CP)

W. E. Kessler, Project Manager
C. A. Hunt, Executive Engineer
R. W. Rogness, Senior Engineer
R. M. Wheeler, Project Field Engineer
G. L. Slagel, Project Field Engineer
R. E. Whitaker, Field Quality Assurance Coordinator
D. R. Keating, Field Quality Assurance Coordinator, Mechanical
D. E. Horn, Field Quality Assurance Coordinator, Civil

Bechtel Power Corporation (Bechtel)

L. R. Albert, Lead Quality Control Engineer, Civil
W. E. Ferriss, Quality Assurance Supervisor
W. F. Holub, Project Quality Assurance Engineer
D. Grote, Field Engineer, Civil

Bechtel Associates Professional Corporation (BAPC)

T. R. Thiruvengadam, Senior Engineer
G. A. Tuveson, Engineering Group Leader
J. Hink, Civil Design Group Supervisor
J. Arora, Engineering Group Leader

Results of Inspection

1. Construction Schedule and Site Staffing

In response to questioning, information was provided to the inspectors regarding the planned construction schedule and the necessary manpower levels to be maintained for the remainder of 1975. It is planned that

the present crafts manpower level will be expanded by approximately one-third during the summer months, with a late fall reduction to a point less than the present level. The representative said that the Bechtel QA/QC staff at the site (consisting of one QA engineer and seven QC engineers) will probably be maintained near its present level. In addition, the inspector was informed that CP does not plan any changes in their site QA engineering staff.

The inspector acknowledged that the QA/QC staff appeared to be compatible with the current level of construction activity.

2. Review of Bechtel Specification No. 7220-C-230

Bechtel Specification No. 7220-C-230, Revision 5, dated November 22, 1974, entitled "Technical Specification for Subcontract for Operating Onsite Batch Plant and Furnishing Concrete for the Consumers Power Company Midland Plant" was discussed with the licensee representatives. They informed the inspectors that the PSAR information (Page 5-6, Paragraph 5.1.1.3.1) had not been intended to be written in such detail to include the inadvertency margin allowed in the specification. They added that, although the PSAR stated slump of two or three inches was intended to be maintained, the inadvertency margin allowed by the specification was necessary for: (1) drying of concrete in delivery, and (2) consistency with concrete practice as provided by ACI Code No. 349. The inspectors were informed that further controls are provided that institute corrective action once a slump has been identified in excess of 3 inches and that require rejection of further batches remaining uncorrected. The licensee representative concluded that the subject is under consideration at the present time and that no decision had been reached regarding any modifications to the PSAR.

REPORT DETAILS

Section II

Prepared By: I. T. Yin

Persons Contacted

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

Consumers Power Company (CP)

W. E. Kessler, Project Manager
C. A. Hunt, Executive Engineer
R. W. Rogness, Senior Engineer
R. M. Wheeler, Project Field Engineer
G. L. Slagel, Project Field Engineer
R. E. Whitaker, Field Quality Assurance Coordinator
D. J. Vokal, Field Engineer

Bechtel Power Corporation (Bechtel)

L. R. Albert, Lead Quality Control Engineer, Civil
W. E. Ferriss, Quality Assurance Supervisor
W. F. Holub, Project Quality Assurance Engineer
D. Grote, Field Engineer, Civil
R. L. Bowren, Assistant Project Field Quality Control Engineer

Bechtel Associates Professional Corporation (BAPC)

T. R. Thiruvengadam, Senior Engineer
G. A. Tuveson, Engineering Group Leader
J. Hink, Civil Design Group Supervisor
J. Arora, Engineering Group Leader

Results of Inspection

1. Unit 2 Containment Rebar Spacing Nonconformance

A review was performed of a BAPC report, Investigation of Reported Reinforcing Steel Spacing for Midland Containment Wall, Revision 1, dated March 21, 1975. The report included: (1) a statement of the

problem, (2) design bases computations per PSAR Section 5 requirements, including Code applications and loading condition evaluations, (3) material identifications, (4) description of the structure, analytical methods and computer program used, (5) cabulation of stress levels and safety factors for various loading combinations, (6) justification of the acceptability of the as-built condition, and (7) design/verification summary in accordance with Bechtel Engineering Department Procedures (EDP's) 4.34 and 4.37. The IE:III inspection considered that the engineering justification and methology applied was logical and that the documentation and verification of the evaluation and computation was adequate. This matter is considered resolved.

2. Auxiliary Building Rebar Deviation

The IE:III inspector was informed, by the licensee on March 5 and 10, 1975, that deficiencies were found in auxiliary building concrete rebar placements. The deficiency areas included: (1) 50% of the initially specified No. 6 tie-bars (56 in number) were not placed in a horizontal concrete beam; (2) four No. 6 bars had not been placed in the building wall near an opening; and (3) two No. 6 rebars were placed into the floor slab where three No. 8 rebars are required.

Extensive efforts have been made on behalf of the licensee and his A-E, BAPC, to evaluate the significant effects on structural rigidity and safety requirements. The results of the studies, together with IE:III comments, are listed as follows:

a. Missing No. 6 Tie-Bars in Concrete Beam

BAPC reviewed their original calculation of the horizontal beam (along column line A, between column lines 6.9 and 7.4, and at elevation 599') and found excessive conservatism exists, based on a widely applied design approach. The reevaluation, using deep beam formulas provided by ACI Code 318-71, equation 11 - 22, indicated that the nominal shear stress carried by the concrete shall not exceed $6\sqrt{f'_c}$, as compared to $2\sqrt{f'_c}$ used previously. To be able to allow higher stress values, certain requirements in regard to loading condition, physical dimension ratio, moment and shear ratio at critical areas must be met. The IE:III inspector determined that the above requirements had been met in accordance with the code formulas. In addition, the inspector determined that the beam formula loading condition assumption is appropriate, and that the f'_c value of 4,000 psi is conservative.

b. Other Rebar Deficiencies

The deficiencies of rebar placement at floor slab and opening were also investigated by the licensee and BAPC in detail. The original design was based heavily on educated engineering judgement which is commonly accepted throughout the industry. The reevaluation of the problem, with added mathematical analysis, indicated previous judgement consists of excessive conservatism and that rebar deficiencies found will not affect the structural integrity. The IE:III inspector reviewed the computation and the reasoning and had no further questions.

3. BAPC and Bechtel Engineering Work Interface

Insufficient procedures and control of BAPC design and Bechtel field engineering work interface had been identified as a result of the auxiliary building rebar placement nonconformance. To resolve this problem, Bechtel issued Nonconformance Report (NCR) No. 205 and Management Corrective Action Report (MCAR) No. 10. These documents had not been closed at the time of the IE:III inspection. Furthermore, the Bechtel Procedure for Review of Vendor Drawings for Midland Units 1 and 2 (FPC-3, Revision 3) was revised to include Bechtel field engineering comments and sketches which are to be reviewed by BAPC design engineers with the proper signoffs. The IE:III inspector reviewed the procedure and commented that: (1) there is a lack of description of responsibilities of both BAPC and Bechtel organizations, (2) the procedure title does not sufficiently identify the added contents, and (3) rework of the procedure seems necessary to improve continuity and understanding. Followup during a future inspection is planned.

4. Unit 2 NSSS Onsite Long-Term Storage

The Unit 2 NSSS vessels and pipes arriving onsite since the latter part of 1974, have been inspected by the IE:III inspector during the previous two (2) site inspections. Areas of concern included:

- a. NSSS items may be in storage over two years before installation. Detailed conservation procedures and a surveillance program are needed.

- b. The Spraylat coating was damaged during shipping and has not been corrected.
- c. Vessel interiors have not been inspected. The "as received" conditions and necessary fixes, if any, have not been determined.

Discussions on the subject matter are documented in IE:III Inspection Report No. 75-01 and RO Inspection Report No. 74-11. To summarize it and to indicate future licensee actions, the following is provided:

- a. The original plan of having different procedures for long-term (defined as less than one year period) and extended long-term (more than one year period) NSSS onsite storage has been cancelled. The licensee's request to use the existing long-term storage procedures during the extended time period was approved by the NSSS vendor, B&W. The B&W letter to the licensee, Extended Storage of B&W Supplied Components, dated February 25, 1975, was reviewed by the inspector. This letter, together with previous procedure reviews indicate that the existing programs are adequate for up to three years as permitted by B&W.
- b. In regard to the Spraylat coating damage, B&W stated in their letter to BPC, dated March 19, 1975, that B&W would agree to removal of the Spraylat coating from the defectively coated area of the No. 2 steam generator and the use of tarps for protection from the elements. Environmental conditions were also discussed in the letter. According to the licensee and Bechtel, tarps will be provided for the reactor pressure vessel, two steam generators, and the pressurizer. Whether tarps will also be made for the reactor closure head and the primary piping will be determined during continued hardware surveillance and examination.
- c. Field Procedures and Instructions reviewed included:
 - (1) Bechtel Field Procedure Mechanical, FPM-3, Revision 0, issued on February 2, 1975, Procedure for Interior Inspection of Major NSSS Components Prior to Long-Term Storage.
 - (2) Bechtel Field Instruction Safety, FIS-1, Revision 0, dated January 20, 1975, through Bechtel Interoffice Memo.

These documents were made to ensure proper handling and personnel safety during the inspection of vessel interiors for possible

hardware damage and contamination from shipping and onsite outdoor storage. The procedures included: (1) component clean air purge, (2) personnel training and instruction, (3) clean clothing and enclosed work area, (4) desiccant removal and handling, and (5) Senior Safety Representative signoffs. The inspector considers these procedures adequate and will plan follow-up inspections.

During this inspection, the nitrogen supply to steam generator 2E-51A was lost with no pressure and no gas flow. This was promptly corrected, and NRC No. 305 was written on the same day, April 9, 1975. The inspector audited the surveillance logs and applicable procedures for 2E-51A and had no further questions.

5. Safety System Component Handling and Storage

a. Quality Control System Review

(1) The inspector reviewed the procedures for receipt inspection and handling to determine:

- (a) If approved procedures had been provided
- (b) Adequacy of the procedures
- (c) Sufficient record keeping

The inspector reviewed the Bechtel Quality Control Notice Manual, Project Special Provision Notice SF/PSP No. 14, Revision 0, 7220, dated November 14, 1974, and considered it satisfactory.

(2) The inspector reviewed the special handling and storage procedures in the areas of:

- (a) Purchase order review
- (b) Verification of the requirement
- (c) Adequate record keeping

The following Bechtel procedures were considered adequate:

Notice SF/PSP No. 3, Revision 4, 7220, dated March 19, 1975, Supplementary Requirements to Field Inspection Manual Procedure G-1.

Field Inspection Procedure G-5, Material Receiving
and Storage Control, dated December 20, 1973.

- (3) The nonconformance quarantine requirements were reviewed by inspector regarding:
- (a) Procedures to inspect quarantine areas periodically.
 - (b) Tagging or marking.
 - (c) Generation and distribution of nonconformance reports.
 - (d) Access limitation.
 - (e) Reasons and status of nonconforming components.

The inspector reviewed Field Inspection Procedure G-3, Processing of Nonconforming Items, and considered it sufficient.

b. Quality Control Record Review

The inspector audited the records on four (4) General Electric Company (GE) decay heat pump motors. Three of these motors were in the warehouse, and one had been shipped to B&W for testing. Motor identification numbers are IP-60A, IP-60B, 2P-60A, and 2P-60B. These GE Custom 8000, 400 HP, 4.16 KV, horizontal industrial motors (drip-proof, splash-proof, and weather-protected) were purchased per B&W Purchase Orders No. 0265061R and No. 0265071R. Storage surveillance, and maintenance service requirements are specified in: (1) GE Instruction No. 326-32605-6, (2) ANSI C50.22-1972, (3) ANSI N45.2.2-1972, (4) B&W FS-II-1-12 and 13, Revision 0, (5) B&W FS-III-13-12 and 13, Revision 0, and (6) BPC FPG-3, Revision 2. The inspector reviewed the service record file Nos. F-1-36 through 38 and no deficiencies were identified.

c. Inspection of the Warehouse, Including the Nonconformance Quarantine Area

The warehouse was inspected by the IE:III inspector. The three GE decay heat pump motors in the warehouse were found in

proper maintenance condition, with all identifications intact. The service personnel were knowledgeable about the requirements and service history. Physical barriers and access control were observed in the nonconformance quarantine area.

6. IE:III Inspection Report No. 050-329/75-02 and No. 050-330/75-02
Corrections

The inspector acknowledges the licensee's comments on the subject reports and is making corrections as follows:

Management Interview

Bechtel Associates Professional Corporation (BAPC)

E. Rumbaugh, Engineering Manager
P. A. Martinez, Midland Project Manager
M. G. O'Mara, Midland Project Quality Engineer

REPORT DETAILS

Persons Contacted

Bechtel Associates Professional Corporation (BAPC)

J. R. McBride, Midland Quality Engineer