

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Reactor Construction Inspection

RO Inspection Report No. 050-329/73-08  
RO Inspection Report No. 050-330/73-08

Licensee: Consumers Power Company  
1945 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: Special Audit of Architect Engineer  
Quality Assurance Program

Dates of Inspection: September 10, 11, and 27, 1973

Dates of Previous Inspection: September 5-7, 1973

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

10-16-73  
(Date)

Accompanying Inspectors: *M. W. Dickerson*  
M. W. Dickerson

10-19-73  
(Date)

*R. C. Knop*  
R. C. Knop (September 27, 1973)

10-19-73  
(Date)

*R. A. Rohrbacher*  
R. A. Rohrbacher (September 27, 1973)

10-19-73  
(Date)

Other Accompanying Personnel: *W. E. Vetter*  
W. E. Vetter (September 27, 1973)

10-21-73  
(Date)

Reviewed By: *D. W. Hayes*  
D. W. Hayes, Senior Reactor Inspector  
Reactor Construction Branch

10/19/73  
(Date)

8007070434

## SUMMARY OF FINDINGS

### Enforcement Action

#### A. Violations

Certain of the activities at the Bechtel Power Corporation appear to be in violation of AEC regulations and in nonconformance with the Bechtel Corporation Nuclear Quality Assurance Manual or the Bechtel Corporation Procedures Manual for Midland Units No. 1 and No. 2, as identified below, and are considered to be of Category II severity.

1. 10 CFR Part 50, Appendix B, Criterion II, states, in part, that:  
" . . . . This program shall be documented by written policies, procedures, and instructions . . . ." Criterion XVII of 10 CFR Part 50, Appendix B, states, in part, that: "Consistent with applicable regulatory requirements, the applicant shall establish requirements concerning record retention, such as duration, location, and assigned responsibility."

Contrary to the above, the Bechtel Corporation Nuclear Quality Assurance Manual does not include a requirement for retention of records common to activities affecting quality. Furthermore, other quality assurance program documentation dealing with record retention requirements was unavailable during the course of the inspection. (Paragraph 1.b.)

2. 10 CFR Part 50, Appendix B, Criterion V, states, in part, that: "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

The Bechtel Power Corporation Internal Procedures Manual for Midland Units No. 1 and No. 2, Section 7.5, titled, "Drawing Control and Stick Files" requires that the current revision of each drawing be maintained in the stick files.

Contrary to the above, current revisions of certain drawings were missing from the stick files. (Paragraph 2.c.)

3. 10 CFR Part 50, Appendix B, Criterion V, states, in part, that: "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances . . . ."

Contrary to the above:

- a. Procedures to prescribe control of interface activities between design groups were not available for review by the inspector at the time of the inspection. (Paragraph 2.b.)
  - b. Procedures to prescribe control, issuance, and changes to the Bechtel Corporation Internal Procedures Manual for Midland Units No. 1 and No. 2, were not available for review by the inspector during the inspection. (Paragraph 2.c.)
4. 10 CFR Part 50, Appendix B, Criterion V, states, in part, that: "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings." The Bechtel Corporation Nuclear Quality Assurance Manual, Section III, Procedure No. 4, specifies the use of Exhibits 3.6A.1, 3.6A.2, and 3.6A.3 for vendor control.

Contrary to the above, quality assurance specifications No. 7220 G-20, No. 7220 G-21, and No. 7220 G-22 were being used to accomplish this activity in the absence of an approved change to the manual authorizing the use of these Specifications. (Paragraph 2.d.)

B. Safety Matters

No safety matters were identified.

Licensee Action on Previously Identified Enforcement Matters

No previously identified enforcement matters were involved.

Design Changes

No design changes were identified.

Unusual Occurrences

No unusual occurrences were identified.

Other Significant Findings

A. Current Findings

An inspection of the Bechtel Power Corporation (Bechtel) was performed to evaluate the Architect-Engineers' (A-E) compliance to applicable criteria of 10 CFR Part 50, Appendix B, for design and procurement

activities relative to the Midland facilities. Except for the apparent violations identified above, the QA program manual and implementation of the manual requirements were considered to be consistent with the requirements of 10 CFR Part 50, Appendix B.

B. Unresolved Matters

No unresolved matters.

C. Status of Previously Reported Unresolved Items

No previously reported unresolved items were involved.

Management Interview

- A. A management interview was not conducted at the conclusion of the inspection due to licensee scheduling problems which precluded attendance by appropriate licensee management personnel. A management interview was conducted later, on September 27, 1973, at the Consumers Power Company (CP) corporate offices located in Jackson, Michigan. The following persons attended.

Consumers Power Company (CP)

S. H. Howell, Vice President  
G. S. Keeley, Director of Electric Plant Projects, Quality Assurance  
W. E. Kessler, Project Manager  
C. Q. Hills, Quality Assurance Administrator  
H. W. Slager, General Engineer, Quality Assurance

Bechtel Power Corporation (Bechtel)

M. M. Krout, Project Manager  
P. A. Martinez, Project Engineer  
J. I. Dotson, Project Quality Assurance Engineer  
C. M. Shortt, Project Quality Engineer

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

The inspectors discussed the apparent violations identified during the inspection of the Bechtel Quality Assurance Program and the program implementation relative to design and procurement activities for the Midland project.  
(Paragraphs 1.b., 2.b., 2.c., and 2.d.)

The licensee representatives indicated that they understood the matters discussed and that appropriate, corrective action would be undertaken.

## REPORT DETAILS

### Persons Contacted

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

#### Bechtel Power Corporation (Bechtel)

W. E. Ferriss, Quality Assurance Supervisor  
D. A. Popham, Quality Engineer Supervisor  
R. C. Sommerfeld, Supervisor - M&F Quality Control Services  
M. G. Larkin, Project Administration  
K. W. Hartwell, Assistant Project Administration  
P. (NMI) Karpa, Manager of Engineering  
E. A. Clark, Quality Engineer Specialist  
J. L. Hurley, Mechanical Design Group Supervisor  
J. R. Koupal, Assistant Project Engineer  
J. C. Hink, Civil Engineer - Group Supervisor  
A. G. Horner, Jr., Project Procurement Manager  
J. L. Dial, Purchasing Agent  
S. J. Barker, Office Inspector  
R. L. Rirford, Civil Discipline Quality Engineer  
A. (NMI) Bruzzo, Plant Design Supervisor  
M. E. Velastequi, Supervisor - Engineering Electrical Group

### Results of Inspection

Each criterion of 10 CFR Part 50, Appendix B, applicable to an A-E, was utilized as a basis and comparison standard for the review of the Bechtel QA program and an audit of the program implementation relative to the Midland project.

The results of the review and audit are as follows:

#### 1. Nuclear Quality Assurance Manual (NQAM)

The Bechtel NQAM was provided to the RO:III office for review prior to the inspection and was represented as the manual describing the Bechtel QA program presently in effect for the Midland project. The preinspection review of the NQAM resulted in questions to be discussed during the audit concerning Criteria I, II, III, IV, V, VII, and XVII. Information, which was provided during the discussions, satisfactorily resolved questionable areas (outlined below) except for one area of activity which was identified as an apparent violation of the requirements of Criteria II and XVII.

a. Criterion I - Organization

The Bechtel NQAM included a procedure in Section I, which provides for project organization charts. The Midland project charts were not included in the manual but, upon request, were provided to the RO inspector. Four separate charts, identified as Midland Units No. 1 and No. 2, were provided. One chart covered the organization for project engineering, one covered the organization showing the QA relationship to the project, and the other two charts showed the QA activities relative to the project. In addition to project activities, the QA engineers perform management audits and have an independent reporting path to the Bechtel Power Division Vice President.

b. Criterion II - QA Program

The manual (program) was determined to be nonresponsive to the requirements of Criteria II and XVII. The second sentence of Criterion II states that: "The applicant shall establish . . . a quality assurance program . . . documented by written policy, procedures, or instructions . . .". The last sentence of Criterion XVII states that: "Consistent with applicable regulatory requirements, the applicant shall establish requirements concerning record retention, such as duration, location, and assigned responsibility."

Discussion with Bechtel representatives, regarding the requirements for record retention for those activities affecting quality, established that no single procedure was available that described the program for record retention such as the location, duration of retention, or assigned responsibilities. Some sections of the Bechtel Internal Procedures Manual, Midland Units No. 1 and No. 2, approved June 15, 1973, do provide for filing instructions and control of various documents, but these cannot be construed as satisfying the 10 CFR Part 50, Appendix B, requirements regarding quality assurance records. This matter was discussed with representatives of Bechtel and the licensee, who were informed that this appeared to be in violation of AEC requirements.

c. Criterion III - Design Control

The preaudit review of the QA program manual raised questions concerning: (1) material suitability review, (2) design interface control, and (3) test programs utilization. Discussions with the Bechtel representatives resolved questionable aspects of design control provisions except for design interface. This problem area is discussed in Paragraph 2.b, below.

d. Criterion IV - Procurement Document Controls

Section III of the NQAM contained procedures (Nos. 4 through 9 dealing with vendor control) that were found to be confusing. The Bechtel representatives agreed to the existence of confusion and that confusion was caused by: (1) incorrect references to exhibits which were not in the manual, (2) inclusion in the manual of QA specifications which were not relatable to the governing procedures, and (3) usage of titles which could not be clearly related to the manual. Implementation of procurement document control, discussed in Paragraph 2.d below, was found to be inconsistent with the program described in the QA manual.

e. Criterion V - Instructions, Procedures, and Drawings

A short discussion was held concerning other manuals and documents utilized in the Bechtel QA program. The Bechtel representatives outlined the program related manuals identified in Figure 3.1A of Section II of the NQAM. Implementation review, discussed in Paragraphs 2.b, c and d below, identifies practices which appear to be in violation of this criteria.

f. Criterion VII - Control of Purchased Material, Equipment, and Services

The Bechtel QA program for vendor documentation control requirements, and the NQAM system for control and review of documentation and for control of inspections (including receiving inspection) were discussed. The RO inspectors were informed that vendor document requirements would be controlled by Form G-321D, titled, "Engineering and Quality Documents Requirements." (The manual had previously been revised to include this form.) In addition, the Bechtel Field Inspection Manual (FIM) is being revised to add a new procedure similar to the old procedure, No. G-5, which provides for receiving inspection control. A special project provision notice, Provision Notice No. 1, is to be utilized until the new procedure is available.

g. Criterion XVII - Quality Assurance Records

The Bechtel NQAM was found to be deficient, relative to records control, as described in Paragraph 1.b, above.

2. Quality Assurance Program Implementation

a. Design Control

Design control (provided for by Section II of the Bechtel NQAM)



is implemented through the use of Engineering Department procedures, the Internal Procedures Manual for Midland Units No. 1 and No. 2, and Division Engineering Standards. In general, the implementation appears to be acceptable, based on selective review of several design documents related to materials or components on the Q-list dated June 1, 1973, as follows:

(1) Specification No. C-230 - "Technical Specification for Operating Onsite Batch Plant and Finishing Concrete for the Consumers Power Company Midland Plant, Midland, Michigan"

Review of this specification file indicated that the initial Revision 0 specification had been disapproved by a Design Review Notice (DRN) dated June 13, 1973, and later approved as Revision 1 by a DRN dated August 24, 1973. The DRN contained a notation, initialed by the chief engineer, requesting resolution of comments in a review meeting. An additional note had been added by the chief engineer, which indicated that all comments had been resolved in the review meeting. No formal documentation of this meeting was made, since Bechtel procedures do not require a formal design review meeting or documentation of meetings held to discuss design problems. Form G-321-D (Engineering and Quality Document Requirements) dated July 18, 1973, was attached to the specification and required verification of certified material test reports, material certification of compliance, and performance test procedures and verification reports. Also attached to the specification were the design mix calculation sheets.

(2) Specification No. C-231 - "Technical Specification for Forming, Placing, Finishing, and Curing of Concrete for the Consumers Power Company Midland Plant, Midland, Michigan"

Review of this specification file indicated that a DRN dated August 27, 1973, approved Revision 1 of the specification, with minor comments. Two minor problems were associated with the specification in that comments on the DRN were not initialed to identify the originator, and the specification cover sheet approval block was blank and the approval signature had apparently been misplaced into the project engineer's signature box. These were brought to the attention of the Bechtel Quality Engineer representative.

(3) Reactor Building Spray System P&ID (Drawing No. 7220-M-413, Revision A)

The reactor building spray system for Unit No. 2 is identified on the Q-list as No. 413. The piping and instrument Drawing (P&ID) for this system had been approved, with comments, by the chief engineer on a DRN dated June 7, 1973, which included a notation stating that comments had been resolved in a design review meeting. The P&ID was then sent to CP for their review and returned with comments. The comments are presently being reviewed for incorporation, or justification, as to why they should not be included. (When comments are received from the client, a formal acceptance, or rejection, of these comments is contained in correspondence between Bechtel and CP.)

(4) Specification No. M-51 - Component Cooling Water Heat Exchanger

Specification No. M-51 was in the process of review and approval by CP and has not received final review or approval by Bechtel engineering. The preliminary calculations for the component cooling water heat exchanger were reviewed by the inspector and were determined to have been properly checked by an individual other than the one who performed the initial calculations. These calculations, at the time of the inspection, had not been checked or approved by engineering supervision.

b. Interface Control

To determine the adequacy of interface control, the inspector asked for the interface control procedures. At that time, the Bechtel representative informed the inspector that no procedure was available and that an audit by Bechtel Ann Arbor, Michigan, QA, on September 6, 1973, had previously revealed this deficiency. Bechtel QA described corrective action, in regard to this matter, as the development and implementation of procedures to provide a means to assure that interface activities affecting quality have been satisfactorily accomplished. This corrective action is to be accomplished by October 10, 1973. Failure to develop these procedures prior to start of design efforts is considered to be a violation of the requirements of 10 CFR Part 50, Appendix B, Criterion V.

c. Design Document Control

Design document control (provided by the NQAM in Section II, Quality Assurance Procedure No. 7) is implemented by the Internal

Procedures Manual for Midland Units No. 1 and No. 2.

During the inspection, it was determined that the Internal Procedures Manual for Midland Units No. 1 and No. 2, was not being controlled, i.e.: There is no assigned serial number, no provision for identifying revisions, no formal control list for assignments of the manual, and no control system to assure that the applicable revision is in use. An audit by Bechtel, San Francisco, California, management QA had also established this deficiency in an audit performed on August 27 and 28, 1973. Corrective action, in regard to this matter is due to be completed by September 21, 1973. This matter is considered to be a violation of the requirements of 10 CFR Part 50, Appendix B, Criterion V.

The drawing and specification control provisions in the manual appeared to be generally adequate. However, to determine the adequacy of implementation, drawing control was selected for review, and the implementation was found to be deficient. The Internal Procedures Manual for Midland Units No. 1 and No. 2, Section 7.5, "Drawing Control and Stick Files," requires that each discipline group issue a monthly drawing control form indicating the status of each drawing (for their discipline). The project administration, utilizing these drawing control forms, issues (also monthly) a complete package according to a master distribution list. The procedure also requires that the current revision of each drawing be maintained in the individual group stick files and in a master stick file maintained by the mechanical and plant design group. The master stick file was audited against information on the current month's drawing control forms (for the electrical and the mechanical and plant design groups) with the following results:

- (1) Drawing No. M-10, Reactor and Auxiliary Building, Sections "CC" and "DD", Revision 1, dated July 31, 1973. The control form and stick file were in agreement.
- (2) Drawing No. M-20, Turbine Building, Sections A-A, B-B, and C-C, Revision 0, dated June 29, 1973. The control form and stick file were in agreement.
- (3) Drawing No. M-178-Q, Embedded Piping, Reactor Building Unit No. 2, Revision 3, dated July 17, 1973. The control form and stick file were in agreement.

- (4) Drawing M-201, Auxiliary and Containment Building Drainage Below Elevation 568'-0", Revision 5. The control form indicated that Revision 5 had been issued for construction but, when the drawing was located (on a drafting table) it was apparently in the process of being revised. In addition, it was stamped "for information only" contrary to the procedures. The drawing in the stick file was Revision 3, dated July 9, 1970.
- (5) Drawing No. E-534, Reactor and Auxiliary Building Elevation 568'-0", Revision 2, dated July 25, 1973. The control form and stick file were in agreement.
- (6) Drawing No. E-547, Turbine Building Unit No. 2, Elevation 614'-0", Revision 2, dated September 10, 1973. Contrary to procedures, both Revision 1, dated June 8, 1973, and Revision 0, dated June 10, 1970, were found in separate parts of the stick file. Revision 2, issued the day prior to the inspection, was located under the control of the mechanical and plant design group, but had not yet been placed in the stick file.

When these findings were discussed with a Bechtel representative, he informed the inspector that Bechtel Ann Arbor QA had also detected this discrepancy on August 30, 1973. Corrective action, as a result of the Bechtel August 30, 1973, findings, requires preparation of a specific procedure for drawing control which will establish the responsibility for maintaining the stick file. The corrective action is to be completed by September 28, 1973. This matter is considered to be a violation of the requirements of 10 CFR Part 50, Appendix B, Criterion V, and in nonconformance with Section 7.5 of the Bechtel Internal Procedures Manual for Midland Units No. 1 and No. 2.

d. Procurement Control

Procurement control is provided by Section III of the NQAM and has implementing procedures located in the Internal Procedures Manual and the Procurement Department Inspection Manual. The manual provisions and the implementing procedures appeared to be adequate, with the exception of specifications included in the manual which establish the QA requirements for vendors. Presently, the NQAM procedure No. 4 specifies, in Paragraphs 3.a, 3.b, 3.c, and 3.d, that the requirements of Exhibits 3.6A-1, 3.6A-2, or 3.6A-3 be applied for vendor QA program requirements. In response to questioning, the Bechtel representatives stated

that although the exhibits are called for, they are no longer in the NQAM and that in their place, QA specifications, Nos. 5, 6, and 7, are provided in the manual. However, he added that the QA specifications in the manual are no longer being used, but that other specifications, Nos. 7220 G-20, G-21, and G-22, have been developed and are presently in use. He also added, that the manual has not been revised to reflect this change.

A QA Engineering audit report, No. 005, dated May 16, 1973, identified this conflict with the approved program and directed that corrective action be accomplished. On July 6, 1973, a letter was issued to the QA manager, San Francisco, requesting that the manual be revised to incorporate the new specifications and delete the old specifications, numbered 5, 6, and 7. This matter is considered to be a violation of the requirements of 10 CFR Part 50, Appendix B, Criterion V.

e. Special Process Control

A branch of the Materials and Fabrication QC Services is being established at Ann Arbor. This group is to provide: (1) construction QA monitoring, auditing, and surveillance, and (2) construction, engineering, and procurement technical direction and support for all projects in the Ann Arbor office. The group reports administratively to the Scientific and Development Branch of the Bechtel Corporation in San Francisco and provides the services outlined above on a request basis. Services provided include:

- (1) Qualification of welding and NDE procedures.
- (2) Qualification of NDE personnel.
- (3) Special processes review of procedures and other documents received from vendors and contractors.
- (4) Maintenance of a document review history file.
- (5) Maintenance of the ASME Certificate (N-319 for NA and N-320 for NPT).

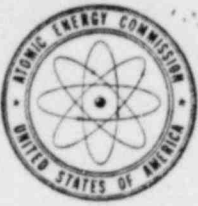
f. Audits

The Bechtel project Quality Assurance Engineer has developed a project auditing master schedule through 1978. He stated that

this provides the overall plan for planned and periodic audits, but that additional and more detailed information is to be generated as it is required.

An audit report was reviewed of an audit conducted on September 5, 1973. The report identified 18 items for which a quality audit finding was issued. Each finding related to a specific problem area or deficiency, identified an individual responsible for correction, and established a completion time. In addition, follow-up reaudit and signoff by the auditor is required. Distribution of the report to management, including the licensee management, was provided.

The activities reviewed were determined to be in compliance with the procedures outlined in the NQAM.



UNITED STATES  
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A. RO Inspection Report No. 050-329/73-08 and No. 050-330/73-08

Transmittal Date : October 24, 1973

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B. RO Inquiry Report No. \_\_\_\_\_

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C. Incident Notification From: \_\_\_\_\_  
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