

DRAFT WRITEUP

Testimony on Facility Construction - Quality Assurance Programs

Midland Plant, Units 1 and 2

By

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I. INTRODUCTION

I am presently employed as a reactor inspector in the Reactor Construction Branch of Region III, Regulatory Operations, U. S. AEC. I am responsible for the reactor plant inspection program activities assigned to me. In regard to the Midland Plant, I have been actively involved in the RO:III inspection program since being assigned principal inspector for this facility in late 1972.

From February 1973 through early March 1974, I conducted and/or participated in eight inspections at the Midland Plant construction site and three inspections at the corporate offices of the Consumers Power Company. (Additional follow-up inspections and meetings with Consumers Power Company management personnel are included as part of some of the above inspections.)

A basic philosophy of Regulatory Operations inspections of reactor facilities under construction is to assure that the licensee (and his contractors, vendors, etc.) has an effective and working quality assurance program to provide reasonable assurance that the facility has been constructed in accordance with applicable requirements. Consequently, a primary objective of the RO inspection program is to establish that construction activities are in accord with an adequate quality assurance program, as well as other applicable

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requirements relative to structures, components, and systems that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the general public. This objective is achieved by a review of quality assurance programs, quality control procedures, other quality records, review of construction records, interviews with plant personnel, and observations at the construction site.

II. INSPECTION ACTIVITIES FROM JUNE 26, 1973, TO NOVEMBER 5, 1973

On December 15, 1972, the AEC issued Construction Permits No. CPPR-81 and No. CPPR-82 to Consumers Power Company, authorizing construction of two pressurized water nuclear reactors designated as the Midland Plant, Units 1 and 2.

During June 1973, I conducted a site inspection to review and observe preconstruction activities. These activities included removal of temporary, protective coverings and enclosures from existing structures, initiation of evaluation of stored components and materials, and work relative to the restart of construction activities. (RO Inspection Reports No. 050-329/73-05 and No. 050-330/73-05)

An inspection of the Architect-Engineer (Bechtel Corporation) relative to design and procurement activities for the Midland Plant, was conducted in September 1973 by T. E. Vandell and M. W. Dickerson. Certain violations of AEC rules and regulations were identified during this inspection. (RO Inspection Reports No. 050-329/73-08 and No. 050-330/73-08.) The subsequent, corrective action measures proposed, relative to

these violations, were considered adequate. Implementation of these measures is continuing in a satisfactory manner. (RO Inspection Reports No. 050-329/74-01 and No. 050-330/74-01)

III. INSPECTION ACTIVITIES SUBSEQUENT TO NOVEMBER 5, 1973

During a routine RO:III construction site inspection, conducted by C. C. Williams and myself on November 6 - 8, 1973, apparent violations related to activities associated with Cadweld splicing of reinforcing steel were identified. As a result of this matter and discussions between Consumers Power Company and RO:III personnel following this inspection, Consumers Power Company suspended Cadwelding operations at the site on November 9, 1973. RO:III informed Consumers Power Company that Cadwelding should not be resumed until all existing Cadweld splices had been reinspected and requalified by properly trained personnel and, in addition, a determination by RO:III that an acceptable program for Cadwelding activities had been developed and implemented.

I conducted a special inspection at the Midland Plant construction site on November 15, 1973, to determine the scope and adequacy of the Cadweld reinspection program. At the conclusion of the inspection, it was determined that: (1) adequate cleaning of Cadwelds had been completed prior to reinspection, (2) adequate procedures, techniques, and tools were being utilized, (3) Cadweld inspectors were adequately trained and competent, and (4) important quality aspects for each Cadweld were determined and recorded concurrent with inspection. (RO Inspection Reports No. 050-329/73-10 and No. 050-330/73-10, Attachment A)

On November 16, 1973, via telephone, Consumers Power Company (H. W. Slager and G. S. Keeley, part time) informed me that Consumers Power Company expected to be ready for a reinspection by RO:III on November 20, 1973. (On several occasions, November 16 through November 19, 1973, telephone conversations took place on this subject between Consumers Power Company and RO:III personnel.)

RO:III scheduled a follow-up inspection for November 20 and 21, 1973. I participated in this special inspection, which was to determine the adequacy of corrective action relative to deficiencies in Cadwelding activities and the apparent lack of management involvement in the implementation of the Midland Plant quality assurance program. The results of the inspection established that, although corrective action was substantial, it was not adequate relative to the above two matters. Consumers Power Company was informed, at the conclusion of the inspection, that Cadwelding should remain suspended pending additional corrective action and review of this corrective action by RO:III. (RO Inspection Reports No. 050-329/73-10 and No. 050-330/73-10, Attachment B)

Subsequent to notification from Consumers Power Company that corrective action, relative to the Cadweld matter, had been completed, a special inspection was scheduled. I participated in this inspection (conducted at the construction site on December 6 and 7, 1973) to determine the status of the licensee's corrective action relative to specific Cadwelding violations and quality

assurance/quality control program deficiencies previously identified in conjunction with Cadwelding activities. It was the opinion of the RO:III inspection team (W. E. Vetter, R. A. Rohrbacher, C. C. Williams, and D. E. Whitesell) based on the results of this inspection, that the corrective action relative to Cadwelding violations and deficiencies were adequate and that Cadwelding at the site could be resumed with reasonable assurance that such activities would be fully consistent with applicable quality criteria. Moreover, the corrective action relative to Consumers Power Company management response to quality assurance program shortcomings was considered to be adequate. (RO Inspection Reports No. 050-329/73-11 and No. 050-330/73-11)

On January 10 and 11, 1974, I participated in a special, unannounced inspection at the Midland Plant construction site. The primary purpose of this inspection was to determine the adequacy of implementation of the corrective action previously committed to by the licensee relative to specific violations and to quality assurance/quality control deficiencies identified in conjunction with Cadwelding activities and in conjunction with design and procurement activities of the architect-engineer (Bechtel Corporation). The inspection team determined that the current implementation of corrective action measures, relative to the above matters, was adequate. (RO Inspection Reports No. 050-329/74-01 and No. 050-330/74-01)

The licensee initiated a number of corrective action measures relative to quality assurance/quality control deficiencies identified by RO:III during the latter part of 1973. These commitments and their implementation are included in RO Inspection Reports No. 050-329/73-11 and No. 050-330/73-11, No. 050-329/74-01 and 050-330/74-01, and No. 050-329/74-03 and No. 050-330/74-03. I was involved with the following corrective action measures and their implementation during recent RO:III inspections at the Midland Plant construction site.

- A. Consumers Power Company to provide a master schedule of Consumers Power Company quality assurance construction site audit activities and field audit procedures to be used for these audits. I reviewed the Consumers Power Company quality assurance site audit activities schedule (Field Audit Program) at the site on February 6, 1974. I observed that it was approved by the Consumers Power Company quality assurance administrator on January 15, 1974, and that it was adequate and current. In regard to field audit procedures, I reviewed the new format and arrangement of the Consumers Power Company quality assurance field audit procedures on February 6, 1974. I observed that these new procedures (which replace similar individual procedures previously developed by Consumers Power Company) are included in Section 12.0 of the Consumers Power Company Quality Assurance Services Procedures Manual (QAS-PM). This section was approved by the director of Quality Assurance Services on February 1, 1974. I concluded that procedures included and/or required by Section 12.0 of the Quality Assurance Services Procedures Manual to be adequate for Consumers Power Company quality assurance field audits.

- B. Consumers Power Company quality assurance personnel to be satisfied with Bechtel Corporation efforts to requalify existing Cadweld splices at the Midland Plant site. I reviewed a Consumers Power Company letter, R. E. Whitaker to S. H. Howell, "Requalification of Cadweld Splices", dated November 30, 1973. This letter identifies the steps taken by Consumers Power Company quality assurance to verify the adequacy of the Bechtel Corporation reinspection activity and confirms the adequacy of the reinspection. During the January 10, 1974, RO:III inspection, I selectively examined the Bechtel Corporation Cadweld reinspection records and discussed the matter with Bechtel Corporation personnel to verify, for RO:III, the adequacy of the reinspection effort.
- C. Consumers Power Company quality assurance personnel to review Bechtel Corporation Cadwelding work and quality control procedures. During the January 10, 1974, inspection, I determined that Consumers Power Company quality assurance personnel at the Midland Plant site had reviewed the following Cadwelding work and quality control procedures and had no adverse comment:
1. Bechtel Specification No. 7220-C-231, Section 10, Revision 4.
 2. Bechtel Field Inspection Manual.
 3. Bechtel Quality Control Procedure No. C-231-1, Revision 2.
 4. Bechtel Inspection Plan C-231-1 (Cadweld), Revision 6.
 5. Erico Manual RB5M 768.
 6. Bechtel Cadweld Rebar Splicing Instructions for the Operator, Revision 1.

- D. Inspection plans, developed by Bechtel Corporation, are to be sent to Consumers Power Company quality assurance for review. From a review of records and discussions with site personnel on March 7, 1974, I established that about twenty Bechtel Corporation inspection plans for the Midland facility had been received and reviewed by Consumers Power Company and returned to Bechtel Corporation with comments, prior to March 1, 1974. At the time of this inspection (March 7, 1974) resolution of comments between Consumers Power Company and Bechtel Corporation personnel, relative to these inspection plans, was in progress.
- E. Consumers Power Company agreed to initiate a more formal training program for their quality assurance personnel. From a review of records and from discussions with Consumers Power Company personnel during site inspections, I determined that Consumers Power Company did establish such a program in December 1973 and that all four Consumer Power Company site quality assurance personnel, among others, attended the first (January 3 and 4, 1974) and second (February 11 - 14, 1974) sessions. The training program is continuing, and additional sessions are scheduled.
- F. Complete (Bechtel Corporation) procedure revisions for Cadwelding activities. The following documents were revised by Bechtel Corporation and reviewed by me to verify their adequacy.
1. Section 10, Mechanical Splicing of Reinforcing Bars, of Bechtel Specification No. 7220-C-231(Q), Technical Specifications for Forming, Placing, Finishing, and Curing of Concrete, Revision No. 4, November 14, 1973.

2. Bechtel Quality Control Procedure No. C-231-1, Inspection of Cadweld Mechanical Splicing of Concrete Reinforcing Steel, Revision No. 2, December 6, 1973.
 3. Cadweld Inspection and Test Report, Form QC (Cadwelds), Revision No. 1, November 29, 1973.
- G. Provide adequate procedures for Cadweld splice inspection. I reviewed the revised (Bechtel Corporation) procedures and discussed this matter with Consumers Power Company and Bechtel Corporation personnel at the site. I established that the following documents were adequate relative to Cadweld splice inspection:
1. Bechtel Quality Control Procedure No. C-231-1, Inspection of Cadweld Mechanical Splicing of Concrete Reinforcing Steel, Revision 2, dated December 6, 1973.
 2. Bechtel Quality Control Inspection Plan No. C-231-1 (Cadweld), Revision 6, dated December 5, 1973.
 3. Bechtel Form QC (Cadwelds), Revision 1, dated November 29, 1973, which is used in conjunction with Inspection Plan No. C-231-1.
- H. Cadweld inspection records are to provide evidence that Cadweld splices conform to quality requirements and provide adequate visibility of inspection results. I reviewed current Cadweld inspection records and revised procedures relative to this matter and determined that the commitment had been implemented. The documents relative to this matter are included under F and G, above.

- I. Bechtel Corporation will place the Midland Plant construction site testing laboratory under the functional and technical direction of a Bechtel Corporation field quality control engineer. From discussion with Bechtel personnel and observations at the site, I determined that this commitment was implemented in December 1973.
- J. Consumers Power Company agreed to contact firms having quality assurance expertise to determine whether it would be desirable to obtain additional quality assurance program viewpoints. It was determined, from a review of records and discussions with Consumers Power Company personnel, that Consumers Power Company had contacted four firms relative to the above matter. In this regard, Consumers Power Company activated an existing consultant contract with the NUS Corporation to review the Midland Plant quality assurance program. This work is nearing completion, and Consumers Power Company stated that they have reviewed and discussed the preliminary findings of the NUS Corporation team that conducted this work. In addition, Consumers Power Company informed RO:III that Consumers Power Company management personnel have contacted and discussed the Midland Plant quality assurance program with personnel from Grumman Aerospace Corporation, United States Testing Company, and Nuclear Services Corporation.

The details of specific RO:III inspection results, relative to Cadwelding activities and related quality assurance/quality control deficiencies, are included in RO Inspection Reports No. 050-329/74-01 and No. 050-330/74-01, and No. 050-329/74-03 and No. 050-330/74-03.