

Testimony on Facility Construction - Quality Assurance Program

Midland Units 1 and 2

By

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I. INTRODUCTION

My present position is that of Technical Assistant to the Director, Directorate of Regulatory Operations, Region III. I have held this position since April 1974. Prior to that time, my position was that of Chief, Reactor Construction Branch, Directorate of Regulatory Operations Region III. In that position I was responsible for the supervision of the ten reactor inspectors engaged in routine construction inspection activities at reactor facilities located within the Region III geographical area. With respect to the Midland facility, in addition to supervision of construction inspection debriefing and report review, I participated in five inspections at the construction site and in four inspections held at the Consumers Power Company corporate office located in Jackson, Michigan.

This testimony will describe the scope and the results of the Regulatory Operations inspection program as it relates to construction activities at the Midland Nuclear Power Plant authorized by the Atomic Energy Commission under Construction Permits No. CPPR-81 and No. CPPR-82.

Inherent in the concept of private activities, subject to licensing and regulation by a Government agency, is the fact that the applicant is held responsible for meeting all of the requirements imposed by the licensing and regulatory process. For facilities under construction, these regulatory requirements are found in the construction permit; the application, as amended; the provision of the act; and the rules and regulations of the Commission.

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The objective of the Regulatory Operations inspection program, as obtained by means of selective sampling inspections, is to obtain reasonable assurance that licensed activities are in accord with these requirements and are not, or will not be, inimical to the health and safety of the public or to the common defense and security.

The Directorate of Regulatory Operations, as an integral part of the Commission's regulatory staff, is responsible for conducting field inspections of the activities of AEC permittees and applicants for licenses. Regulatory Operations inspections of nuclear power reactors under construction, pursuant to an AEC construction permit, provide the basis for continuing, reasonable assurance of conformity of the construction to the requirements noted above.

The Regulatory Operations inspection program is conducted from five regional offices, with each office having responsibility for the inspection of all AEC licensed activities within an assigned geographical area. The inspection program at the Midland Nuclear Power Plant is the responsibility of the Directorate of Regulatory Operations, Region III Office, located in Glen Ellyn, Illinois. The Chief, Reactor Construction Branch, who reports to the Regional Director, is responsible for supervising the inspection program carried out by the Reactor Construction Branch. The Directorate of Regulatory Operations Headquarters Staff develops guidelines to be used by Regional Inspectors during the conduct of inspection activities, provides technical support to the Region when necessary, and keeps the Regional Staff informed concerning inspection experiences of the other offices.

Regulatory Operations inspection personnel are experienced and knowledgeable in the practical aspects of construction of nuclear reactors. In addition to Region III inspection activities, specialists in appropriate fields of engineering and technology, who are assigned to the Directorate of Regulatory Operations Headquarters and field staffs and to other Directorates of the regulatory staff, participate in the inspection program. Consultants to the AEC also provide assistance as required.

The principal activity of our (Regulatory Operations) inspection has been review of construction quality assurance/quality control programs for conformance to 10 CFR Part 50, Appendix B, requirements and selective examinations of safety-related activities at the construction site. These site examinations, or inspections, were conducted on both announced and unannounced bases.

The Regulatory Operations inspection activities are directed toward obtaining reasonable assurance that a completed facility will conform to AEC regulatory requirements. Systems and components of the facility are chosen for examination on the basis of the AEC regulatory staff's judgment as to their importance to the safe operation of the facility. These inspection activities include the following:

- A. Examination of the applicant's and major contractor's overall quality assurance and quality control programs for the purpose of comparing the requirements and controls actually imposed by the applicant on their activities with commitments made in the application. Included in the areas examined are: (1) the

- existence and performance of appropriate quality assurance organizations, (2) the corrective measures regarding deficiencies taken or planned to improve and/or maintain the quality of fabrication and construction, and (3) a system for conduct of vendor inspections by the applicant and/or his contractor.
- B. Inspections of quality control records, such as concrete strength test data, material test reports for plate and piping, supplier certifications for piping, valves, and fittings, and nondestructive test records for welding.
 - C. Observations of construction work in progress; e.g., concrete placement, welding associated with containment vessel liner plate, and nondestructive testing. This inspection effort includes a determination of whether onsite work in progress is being conducted in accordance with prescribed quality control procedures and practices.
 - D. Examinations, on a selective basis, of construction procedures; e.g., welding procedures and nondestructive testing procedures.

II. INSPECTION ACTIVITIES

During an inspection debriefing with Messrs. Rohrbacher and Williams, on the morning of November 9, 1973, subsequent to a routine inspection conducted by them at the Midland construction site on November 6-8, 1973, it appeared that: (1) site construction personnel and quality control personnel could not clearly relate to Cadweld void measurement techniques and acceptance criteria, (2) records were not adequately comprehensive to demonstrate correct performance of Cadwelding, and (3) existing procedures inadequately provided for proper control and documentation

of Cadwelding activities. Based on the foregoing information, it was concluded that Cadwelding operations at the site should not continue until major changes in the implementation of the Midland Consumers Power Company - Bechtel Corporation quality assurance/quality control programs had been accomplished, and not until such time as existing Cadwelds at the site had been reinspected and determined to meet quality requirements. Later on the same day, at about 11:00 a.m., on November 9, this matter was discussed by me with the Director, RO:III, who agreed with my position that Cadwelding at the site should be suspended pending adequate corrective action by Consumers Power.

In view of the above, at approximately 11:25 a.m., on November 9, I telephoned Mr. W. E. Kessler, the Consumers Power Company Project Manager for the Midland Plant, with a request that Cadwelding be suspended pending corrective action and review of corrective action on the part of RO:III inspection personnel. In response, Mr. Kessler said he felt there had been major quality assurance/quality control problems associated with Cadwelding at the site, that a hold had been placed on Cadwelding late on the previous day, and that Consumers Power Company personnel had thoroughly reviewed the matter with Bechtel personnel. Mr. Kessler added that, as a result of subsequent steps to assure that Cadwelding would be performed in a satisfactory manner, Consumers Power felt that the hold on Cadwelding should be lifted. I informed Mr. Kessler that, in my view, serious QA/QC program problems appeared to have led to the improper Cadwelding activities and that a minimum of several days would be required to identify the problems and

take adequate corrective action. Moreover, Mr. Kessler was informed that Cadwelding should not be resumed until: (1) all existing Cadwelds had been reinspected and requalified by properly qualified personnel, and (2) a determination by RO:III had been made that an acceptable program for Cadwelding had been developed and implemented. Mr. Kessler was also requested to inform me, within an hour or two, if he was unable to bring about a suspension of Cadwelding on these terms. Later on the same day, at approximately 2:30 p.m., on November 9, Mr. Kessler telephoned to say that Cadwelding at the site had been suspended in accordance with the terms discussed during the earlier telephone call with me at approximately 11:30 a.m., on November 9.

In addition to the above, the Director, RO:III, telephoned Mr. S. H. Howell, Vice President Electrical Plant Projects, Consumers Power Company, during the afternoon of November 9, 1973, to discuss the Cadwelding matter and apparent quality assurance/quality control program problems in general. This telephone conversation was confirmed in a letter from the Director, Region III, to Mr. Howell, dated November 9, 1973.

Based on the Consumers Power Company agreement to reinspect and requalify all existing Cadwelds, R. A. Rohrbacher of my staff visited the construction site on November 15, 1973, to determine the scope and adequacy of the Cadweld reinspection program. The results of this special inspection indicated that the licensee's reinspection effort was properly defined and that Cadweld reinspection was being satisfactorily implemented. Later, on November 19, 1973, the licensee

informed Mr. R. A. Rohrbacher that corrective action relative to the Cadwelding matter would be completed by the end of the day. Consequently, I scheduled a special inspection to be started on the morning of November 20, 1973.

The special inspection was performed under my direction on November 20 and 21, 1973, and it was determined that, while substantial corrective action had been taken relative to the specific problems associated with Cadwelding, further corrective action was needed. Moreover, it was determined that, while Consumers Power Company orally related to increased quality assurance/quality control involvement, they had not taken specific steps necessary to deal with apparent shortcomings in implementation of the Midland quality assurance/quality control program which, in my view, led to the specific Cadwelding problem. Consequently, the licensee was informed at the conclusion of the November 20 - 21 inspection that Cadwelding should not be resumed until: (1) some additional corrective action steps relative to the specific problem of Cadwelding had been completed, and (2) until Consumers Power Company could demonstrate that the Midland quality assurance/quality control programs had been analyzed for shortcomings by Consumers Power Company and until corrective action, indicated to be necessary as a result of quality assurance/quality control program shortcoming analysis, had been adequately prescribed.

On December 6 - 7, 1973, in response to telephone information received from Consumers Power Company earlier in the week that corrective action relative to the Cadwelding matter had been completed, a special

inspection was conducted by me and members of my staff at the site. The results of this inspection were such as to remove concern on my part regarding: (1) the adequacy of corrective action covering violations and deficiencies identified during the inspection of Cadwelding activities on November 6 - 8, 1973, and (2) the adequacy of corrective action in terms of Consumers Power Company awareness, and response, concerning generic quality assurance/quality control shortcomings which appeared to have led to the unacceptable Cadwelding activities. Consequently, it was my view that Cadwelding activities at the site could be restarted and performed in a manner consistent with applicable quality criteria. Specifically, inspection personnel, under my direction, had thoroughly examined (by reference to documentation, observations, and discussions with site and management personnel) corrective action concerned with Cadwelding program violations and deficiencies and that, as a result of this inspection effort, I concluded that steps had been taken by Consumers Power Company and Bechtel Corporation to provide reasonable assurance that Cadwelding would be conducted with proper attention to quality requirements.

Furthermore, it was my view, as a result of the December 6-7 inspection, that Consumers Power Company had properly responded to the question of adequate management awareness and corrective action, relative to apparent shortcomings in the implementation of the Midland quality assurance/quality control programs. This view is based on my evaluation of this matter during my visits to the site on November 20 and 21, and December 6 and 7, 1973, which is discussed as follows.

It appeared that the Cadwelding program violations and deficiencies were a basic result of inadequate work procedures (both in scope and detail) and inadequate quality control activities. While this seemed to be a basic cause, secondary causes appeared to be: (1) a lack of Consumers Power Company quality assurance activity and personnel staffing at the site, and (2) a lack of quality assurance involvement on the part of Consumers Power Company management, both at the middle and upper levels.

As previously stated in this testimony, during the inspection on November 20 - 21, 1973, Consumers Power Company personnel provided verbal information which indicated middle and upper management level concern, but physical evidence to establish this concern was unacceptably minimal. Therefore, at that time, Consumers Power Company was requested to establish that: (1) Consumers Power Company had analyzed the circumstances associated with the Cadwelding problem in terms of generic quality assurance/quality control program shortcoming, and (2) to take measures, as needed to correct any such shortcoming. This was identified as a prerequisite for continuation of Cadwelding activities. Later, during the inspection on December 6 - 7, 1973, action steps, on the part of Consumers Power Company, were determined to be adequate and are discussed as follows:

A. In a letter from G. S. Keeley, Consumers Power Company Director of Quality Assurance Service, to S. H. Howell, Consumers Power Company Vice President, dated November 27, 1973, Mr. Keeley identified the basic causes of the Cadwelding activity problem to be:

1. Unclear inspection procedures.
2. Unclear work requirements.
3. Inadequate site audit, on the part of Consumers Power Company quality assurance personnel, both in terms of frequency and scope.

In his November 27 letter, Mr. Keeley recommended corrective action which included the following:

- a. With respect to continuing work activities, Bechtel should consider the Cadwelding problems when setting up inspection procedures and inspection acceptability criteria.
 - b. A system should be adopted to assure that work specifications are consistent with any peripheral specifications or related criteria.
 - c. Consumers Power Company quality assurance personnel should review Bechtel's Master Inspection Plans prior to the commencement of work.
 - d. The depth of Consumers Power Company site quality assurance audits should be increased, and a more formal plan for site audits to provide quality assurance audit guidance should be developed. Consumers Power Company site quality assurance personnel must thoroughly audit site activities, based on the requirements of Part 50, Appendix B.
 - e. Consumers Power Company site quality assurance personnel should be provided additional training.
- B. By way of response to Mr. Keeley's letter, in a letter dated November 29, 1973, Mr. Howell stated that he agreed with Keeley's

analysis and recommendations, that the problem had broader symptomatic aspects to the total quality assurance program and the remainder of the project, and requested that the whole program be critically studied for problems or weaknesses.

C. In addition to 1. and 2., above, during a meeting with Mr. Howell on December 7, 1973, I was informed by Mr. Howell that:

1. Management at his level and above had concluded that nothing short of full attention to quality assurance/quality control programs, on their part, was acceptable in the interest of proper construction of the Midland Plant.
2. Two additional persons had been assigned full-time quality assurance responsibilities at the Midland site.
3. Immediate steps were to be taken to provide quality assurance/quality control consultant services for the Midland site to assure that a proper quality control/quality assurance program was maintained.
4. A meeting had been scheduled with four, top ranking members of the Bechtel corporate structure to establish a Consumers Power position that construction activities at the Midland construction site were not to be conducted without full attention to all quality assurance/quality control program requirements, and that immediate steps must be taken by Bechtel to assure that this position was accommodated. This meeting was held on December 6, 1974.

On January 10 - 11, 1974, a follow-up inspection relative to this matter was performed. The purpose of the January 10 - 11 inspection

was to determine the degree of implementation of commitments on the part of Consumers Power Company and the Bechtel Corporation, i.e., commitments contained in RO:III Inspection Reports No. 050-320/73-08 and 050-330/73-08; No. 050-329/73-10 and No. 050-330/73-10; No. 050-329/73-11 and No. 050-330/73-11; and in Consumers Power Company answer to the Order to Show Cause which was issued by the Director of Regulation on December 3, 1973.

The results of the January 10 - 11 inspection are contained in RO:III Inspection Report No. 050-329/74-01 and No. 050-330/74-01. Implementation of corrective action commitments, relative to specific Cadwelding violations and deficiencies, was examined by inspection personnel under my direction during the January 10 and 11 inspection.

Concerning implementation of corrective action related to quality assurance/quality control program shortcomings (i.e., action on the part of Consumers Power Company to analyze quality assurance/quality control programs and take corrective action, indicated to be needed by such an analysis), this matter was examined by me, and the results of my review of implementation of commitments during the January 10 - 11 inspection are discussed as follows.

CONSUMERS POWER COMPANY ANALYSIS - RECOMMENDED ACTION

1. With respect to work activities, Bechtel should consider the Cadwelding problem when setting up inspection procedures and acceptance acceptability criteria.

ACTION

To this end, Bechtel was in the process of revising all Class I work inspection procedures and had done so for three of the work activities in progress (concrete, containment liner plate, and Cadwelding). Moreover, the Bechtel, Ann Arbor, Quality Assurance Supervisor has issued instructions that "All inspection, examination, and testing activities of record required for compliance with Criterion X will be performed by Quality Control Engineers". During the inspection on January 10 - 11, it was established that this requirement had been referenced in the inspection plan covering the three areas of work discussed earlier in this paragraph.

2. A system should be adopted to assure that work specifications are consistent with any peripheral specifications and related criteria.

ACTION

Such a system was adopted by Bechtel by Revision No. 1 to the Design Document Requirements Procedure, dated November 30, 1973. This procedure now requires that any changes in Preliminary Safety Analysis Report requirements must be approved by Consumers Power Company and contains a checklist which is to be used to assure that all peripheral design requirements are appropriately considered for inclusion in design documents, and to assure that design criteria is consistent with work procedures and/or specifications.

3. Consumers Power Company quality assurance personnel should review Bechtel's Master Inspection Plans prior to commencement of work.

ACTION

During the inspection on January 10 -11, 1974, it was determined that Consumers Power Company had received seven Master Inspection Plans from Bechtel Corporation for review and comment, and a program had been developed to assure that all additional Master Inspection Plans covering Class 1 work are transmitted to Consumers Power Company for review and comment prior to the start of work.

4. The depth of Consumers Power Company site quality assurance audits to provide quality assurance audit guidance should be developed. Consumers Power Company must thoroughly audit site activities, based on the requirements of 10 CFR Part 50, Appendix B.

ACTION

By way of implementing this commitment, Consumers Power had developed a master schedule of Consumers Power quality assurance construction site audits covering the first half of 1974. The master schedule for site audits identifies audit scope, audit responsibility, and audit frequency.

To facilitate increased audit requirements, two additional persons have been assigned full-time quality assurance responsibilities at the construction site. Currently, four Consumers Power quality assurance personnel are assigned full-time quality assurance site audit responsibilities, as opposed to one individual at the time of the November 6 - 8 inspection wherein the Cadweld problem was identified. In

addition, Consumers Power quality assurance personnel have established a program for developing field audit procedures for site Class I work activities. This program requires that work procedures be reviewed and related to a specific field audit plan, based on each of the applicable requirements of 10 CFR Part 50, Appendix B. At the time of the January 10 - 11 inspection, Consumers Power quality assurance personnel had completed, or were in the final stage of completion, five audit plans for site Class I work.

5. Consumers Power Company site quality assurance personnel should be provided additional training.

ACTION

The Consumers Power Company Quality Assurance Services Department established a quality assurance indoctrination and training program in mid-December 1973, and the first of seven, scheduled sessions to be held by June 1974, was held on January 3 - 4, 1974. All four Consumers Power Company site quality assurance personnel were in attendance, among others, and AEC quality assurance program requirements and Consumers Power quality assurance policies and procedures were topics included in the January 3 - 4 training session.

With respect to the special meeting held by Mr. Howell with Bechtel corporate level personnel on December 6, 1973, Bechtel has responded in the form of a letter to Mr. Howell from Mr. A. P. Yates, Vice President, outlining a six-point program to identify "our renewed emphasis upon areas of quality

assurance/quality control and to assure you that this direction will be transmitted to all project personnel". During the inspection on January 10 - 11, 1974, inspection personnel, under my direction, reviewed evidence of implementation of the "Yates letter" six-point program and determined that appropriate implementation had occurred.

III. CONCLUSIONS

- A. The information discussed above is considered to be such as to establish that Consumers Power management personnel has analyzed the Midland quality assurance/quality control programs to identify any shortcomings as a result of the Cadwelding problems, and has taken appropriate, corrective action. Therefore, in my view, reasonable assurance now exists that compliance will continue throughout the construction process.

Reasonable assurance, as used above, is based on the fact that:

- (1) shortcomings in implementation of the Midland quality assurance/quality control programs have been identified and corrected, and
- (2) Consumers Power Company management personnel have demonstrated awareness of the need to become involved, and stay involved, with quality assurance/quality control programs designed to assure proper construction of the Midland Plant.

Compliance, as used above, means that the construction of the plant can be accomplished with an acceptable level of quality assurance/quality control problems and an acceptable frequency and severity of noncompliance. Compliance, as used above, does

not mean that a history of "zero violations", nor a complete absence of quality assurance/quality control problems, is required to demonstrate compliance.

- B. Based on direct findings on my part as discussed in this testimony, and the findings made known to me by inspection personnel under my supervision, the following specific conclusions have been reached.
1. The licensee has demonstrated, and continues to demonstrate, that he is in compliance (as compliance is described in A, above) with the Commission's regulations pertaining to quality assurance, and:
 2. The licensee has provided reasonable assurance (as reasonable assurance is described in A, above) that such compliance will continue throughout the construction process.