

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket Nos. 50-329 OM
	)	50-330 OM
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329 CL
(Midland Plant, Units 1 & 2)	)	50-330 OL

TESTIMONY OF JAMES W. COOK  
ON QUALITY ASSURANCE

I. Introduction and Scope

My name is James W. Cook. I am Vice President, Projects, Engineering and Construction for Consumers Power Company. I have previously set forth my background in my testimony of July 10, 1981 (see my prepared testimony after Tr 1693.) My testimony today is intended to outline the Company's plans for the completion of the plant, particularly as the plans relate to quality assurance and quality control.

The focus of the quality assurance issues in this proceeding has always been somewhat more expansive than those quality assurance matters which relate directly to soils remedial work. The NRC Staff has presented evidence regarding its evaluation of Consumers Power Company's overall quality assurance program and implementation of that program as bearing on the Staff's conclusion concerning reasonable assurance that the program will meet or exceed all regulatory requirements. Since approximately September of 1982, however, the Staff has given

somewhat separate consideration to the Company's quality assurance program and activities for soils remedial work and for all other safety-related work. Mr. Keppler's October 29, 1982 prepared testimony relates mostly to soils remedial quality assurance matters. Mr. Keppler's March 25, 1983 testimony deals with all aspects of the Company's quality assurance program.

I believe that whatever difficulties the Company may have encountered regarding the scope and implementation of the soils-related quality assurance program are largely in the past. This is demonstrated by the performance that has been achieved in the auxiliary building underpinning work which has now been underway for almost four months. This record is gratifying to me and to the entire management of Consumers Power Company. All of us on the management team, including myself, have worked long and hard to formulate and implement the measures which have led to these improvements in the soils program. The details of recent soils quality assurance implementations are included in the testimony of Mr. Mooney.

On December 1, 1982, Consumers Power Company initiated a comprehensive program, the Construction Completion Program (CCP), to complete the Midland nuclear cogeneration plant. This plan is a major initiative both conceived and managed by Consumers Power Company. The overall objectives of the program were established under three general headings. These were:

- (1) to improve project information status,
- (2) to improve implementation of the quality assurance program, and
- (3) to assure

effective and orderly conduct of the remaining project work. Beneath these three general headings, we formulated more detailed objectives which reflected the project's current status and attempt to address comprehensively the underlying or root causes of the problems experienced by the project. The plan developed meets these objectives and entails a number of major changes in the conduct of the final stages of the construction process.

In my view, the Company's decision to undertake the CCP was prompted by two major factors: (1) an awareness on the part of the Company that we were not fully meeting our own and NRC expectations for the appropriate level of disciplined adherence to procedures and requirements, and (2) an increasing level of emphasis and expectation regarding QA on the part of the agency as a result of events in the industry in the last 18 months. The NRC's scrutiny of nuclear plant construction quality has always been substantial, but it is clear to me and others in the industry that both the emphasis and expectations of the NRC regarding quality assurance at construction sites has increased in the last 18 months. Both as part of an industry-wide initiative and on a project specific basis, Consumers Power has taken steps to respond to the challenge put forth by Chairman Palladino in his November, 1981, speech in San Francisco and the detailed interpretation of these objectives by the NRC regional staff.

My characterization of what it is we are trying to achieve can be summarized by the concept of developing both a

more disciplined project construction process and a documentation system which generates a set of design documents and inspection records that are up-to-date, consistent, and unambiguous.

A number of specific events during 1982 influenced the Company's decision to initiate the CCP. These were: (1) examples of inadequate implementation in the soils work during the first half of 1982; (2) the identified inspection deficiencies in the areas of electrical cable routing and pipe hangers; (3) the NRC Staff's calls for improved implementation of the Company's Quality Assurance Program; (4) the Company's experience with system turnovers being delayed; (5) the results of our self-initiated INPO evaluation conducted by the Management Analysis Company (MAC); and (6) the NRC's October-November team inspection of the Midland diesel generator building.

## II. Construction Completion Program

The Company was already studying the concept of using system-by-system teams for project completion at the time the NRC was carrying out its diesel generator building inspection. We had, by then, decided on significant changes in the QA/QC program, but had not fully implemented them. When we became aware of the possible implications of the diesel generator building inspection, we decided that the project needed a major change in approach to effect orderly completion of the project while improving implementation of quality assurance. As a result, we decided to institute several additional measures and

integrate those new measures with the other measures regarding quality assurance which had already been decided upon. Our analysis of all the information then available to us brought us also to the conclusion that an opportunity existed to integrate our responses to all of the issues affecting the project into a comprehensive plan. Such a plan would systematically resolve all of the various outstanding issues under a single program.

On December 2, 1982, we initiated the CCP by halting most safety-related work of the prime contractor (necessitating the layoff of approximately 1,100 workers). The major concepts in the Company's construction completion plan are set forth in my January 10, 1983 letter to Mr. Keppler (Attachment 1). These are as follows:

- significantly reduce safety-related construction by the prime contractor and clear the plant of construction equipment and materials in affected areas;
- review equipment status to assure that proper layup precautions are in place;
- absorb the prime contractor's Quality Control function into the Company's QA department and reorganize to assure effective management and single point accountability;
- recertify quality control inspectors and strengthen the inspection process;
- bring quality inspections up to date;
- verify quality inspections on completed work;
- review the adequacy of certain QA program elements;
- completely survey the plant and develop an accurate and up-to-date status report on construction completion;
- reorganize the construction production forces into teams on a system or area basis to conduct the status assessment;

- complete construction under the direction of the same team that carried out the statusing;
- provide for a formal management review program to monitor CCP activities; and
- establish a third-party review.

Under the construction completion program, all remaining work will be done in two conceptual steps, which we refer to in our documentation as Phase 1 and Phase 2. The objective of Phase 1 is to obtain a definitive picture of the current status and condition of construction work and quality inspections conducted prior to December 2, 1982. In this step, we will do a complete construction and inspection status assessment of all work covered by the program. We will also verify the adequacy of completed inspections on prior work. This will be done by a combination of reinspections and documentation reviews. The objective of Phase 2 is simply to execute the remaining work. The plant will be divided into many distinct modules and the CCP sequence will be applied to each module. As a result, there will be situations in the plant where Phase 2 activities will be occurring immediately adjacent to an area undergoing Phase 1 activities.

In order to carry out the remaining work more efficiently, we have created a team structure for production work on a system or area basis. The quality organization (MPQAD) will be directly represented on the various teams through the team quality representative. This individual will insure that all quality resources and information are made available as required

and that quality inspections are fully coordinated in a timely manner with the production effort and that quality program requirements are fully implemented. However, the quality representative will receive only scheduling requirements from the team and will take all other management direction from MPQAD. The program is designed to insure that the proper independence between production and quality functions is maintained.

We saw the need for reorganization of the quality function itself both to make it work effectively in the new production environment and to accommodate the integration of the QC function into MPQAD. Accordingly, we made the changes in MPQAD which are described in the testimony of Mr Wells.

Some activities were exempted from the CCP. Particular activities that have demonstrated effectiveness in quality program implementation will continue during the construction completion program. These are described in subsection H below.

In the attachment to my January 10, 1983 letter to Mr. Keppler, the Company divided the elements of the plan into eight distinct categories: preparation of the plant, QA/QC organization changes, program planning, program implementation, quality program review, third-party reviews, system layup, and continuing work activities. Each category of work is described briefly below.

A. Preparation of the Plant

The preparation of the plant for the CCP is now complete. During this activity, we cleared the Auxiliary, Diesel

Generator, and Containment buildings and the Service Water Pump Structure of the majority of construction materials, tools, equipment, and temporary facilities including scaffolding and the like. We have also ordered removal, control and storage of uninstalled materials in the work areas and have instituted appropriate housekeeping measures for all areas which will be involved in the remainder of the program and have instituted the necessary measures for proper storage of materials. These actions have been taken to allow adequate access to systems and spaces for personnel carrying out the status survey and the remainder of program activities.

B. QA/QC Reorganization

In my September 17, 1982, letter to Mr. J. G. Keppler, (Serial No. 18850) (Attachment 2), I indicated that the Company had decided to assume direction of the (non-soils) portion of the quality control function previously managed by Bechtel. This approach was consistent with the earlier integration of the quality control function under MPQAD for both heating, ventilating, and air conditioning work being performed by the Zack Company and the soils remedial work. When the CCP was initiated in December the QC integration task was incorporated as part of it. On December 15, 1982, we advised the NRC of the structure of the integrated organization; on January 17, 1983, the transfer to the new organization was complete.

The QA reorganization included the recertification of QC inspectors other than those previously certified to Consumers



Power Company procedures. The recertification effort is described more fully in both the testimony of Mr. Wells and the testimony of Mr. Mooney.

C. Program Planning

Since the CCP execution takes place in two phases, there is specific planning for each phase.

1. Phase 1 Planning

The Phase 1 planning consists primarily of (1) planning a team organization to assess the installation and inspection status of Q-Systems and other components within major safety-related structures as previously noted, and (2) planning for the program to verify the adequacy of previously completed inspections. During Phase 1 planning, project construction will establish team organizations ready to inspect and assess particular systems for installation status and MPQAD will develop the processes and procedures necessary to ascertain inspection status and implement the quality verification program.

Team Organization

A team organization will consist of a team supervisor and personnel from field engineering, planning, craft supervision, project engineering, MPQAD, and Consumers Power Company test and construction personnel. The team may be augmented as required by procurement personnel, subcontract coordinators, and turnover coordinators. This organizational structure and the components thereof will vary depending on the particular systems or areas assigned to the team.

Each team will contain a team quality representative from MPQAD whose line reporting relationship is to the MPQAD organization and not to the team leader. The team quality representative receives scheduling requirements from the team supervisor. The team quality representative will analyze the quality requirements and will plan quality activities for integration into the team effort. He will assure that the necessary Project Quality Control Instructions (PQCI's) and inspection personnel are available for performing required inspections on a timely basis. He will maintain an up-to-date awareness of the status of quality inspections and verification activities that relate to his team's activities. He will insure that construction planning provides for the necessary inspection hold points.

As a part of Phase 1 planning, team members will receive training on the Phase 1 activity assigned to the team, ie, bringing system or area completion status information up to date. (The teams are not involved in the verification effort, which is to be carried out by MPQAD, as described below.) Team members will also be trained in areas of team responsibility, reporting functions, procedures and other matters. Supervisors will be trained to assure that they fully understand team objectives and team role in accomplishing those objectives.

Also, during the Phase 1 planning, a pilot team has been utilized to develop and test processes and procedures for

teams. The use of a pilot team will assure that the final procedures will allow smooth functioning of the CCP teams.

The Phase 1 planning has progressed to the point that team procedures have been drafted, the team organization has been set, available personnel have been assigned, and initial status assessment work in Phase 1 is awaiting management review and team training.

#### Verification

As part of Phase 1 planning activity we are also developing a plan to verify that quality inspections previously performed on completed work were done correctly. The first step is to review the PQCI's in order to improve the total inspection performance and support the verification program. The second step is to develop a plan for verifying past inspections to assure that completed work has been adequately inspected for compliance with quality requirements.

In order to assure that the verification will fulfill those two major objectives, as part of the Phase 1 planning we are reviewing existing PQCI's and revising them as necessary to assure that we identify the attributes of the particular systems, components, or structures which are critical to the safety and reliability of those items, to assure that accept/reject criteria are clearly identified, to specify appropriate controls, methods, inspections and testing equipment for the particular item, and to assure that requisite skill levels are required for the particular job in hand.

As part of the planning, we are also developing a verification plan for completed inspections. This plan involves some reinspection of items of work which are accessible and review of documentation for attributes which are inaccessible for reinspection, such as placement of reinforcing bar in concrete. This verification program is still under review and may rely in part on sampling techniques using accepted statistical procedures and national standards for acceptance or rejection of a sample.

At present, all project PQCI's involved in the verification program are scheduled for review, with the majority of the task scheduled for completion by the middle of May.

## 2. Phase 2 Planning

The Phase 2 planning effort develops the work procedures that will be used by the team organizations to complete work on systems and areas. During Phase 2 planning, procedures will also be established to integrate the quality program and requirements into the on-going completion work.

In the Phase 2 planning activity, we are developing the specific process for completing various system and area work. Under this activity, we will prepare necessary procedures and expand training of team members to cover systems completion work. Teams will be assigned to a specific scope of work and held accountable for the overall completion within this scope.

Phase 2 planning will also establish scheduling methods to be used during completion activities. The team organization which will already be in place as a result of the status and

assessment work will accomplish the actual system and area completion. Each team will undergo training in Phase 2 activities. In this effort, we will increase emphasis on implementation of design in accordance with design requirements and on proper handling of design changes or fields modifications.

The final part of the Phase 2 planning activity will be planning for the QA/QC effort necessary to inspect the construction activities planned for Phase 2. In this activity, we are establishing a new in-process inspection program. This program will require that inspection be directly integrated with future installation schedules to insure that inspection points are integrated with the construction process. In addition, we will assure that the review of PQCI's performed during Phase 1 planning covers all attributes to be inspected during completion work, and that inspection plans for completion work are clear and concise.

D. Program Implementation

Program implementation for Phase 1 activities consists of executing the previously described plans for the installation and inspection status assessment of incomplete work and the quality verification of completed work. Program implementation for Phase 2 consists of carrying out the previously planned construction work necessary to complete the plant on a system or area basis. The results of each planning phase will be the subject of a management review before execution of that phase's work on a designated system or area will be allowed to proceed.

After we have completed the installation and inspection status assessment of each system, subsystem or area, production and quality management will review the results before we allow any Phase 2 completion work to be initiated on a particular system or area.

The management reviews of the Phase 1 and Phase 2 planning results will cover the activities involving verification of completed inspections, the installation and inspection status program, and the plans for the system completion work themselves. Project Management will conduct these management reviews in order to assure that they are satisfied that these programs and processes are thorough, complete, and correct. I am personally participating in these reviews so that I will be satisfied that the project has met its commitments and is ready to proceed with the implementation of these programs. Other Project senior managers will conduct the detailed Phase 2 management reviews of Phase 1 results under my supervision. In this manner, the production and quality managers will review and release each new piece of Phase 2 work having assured themselves that Phase 1 requirements have been met and that a proper disposition of any findings has been achieved.

The first segment of the management review of the Phase 1 planning results is scheduled for mid-April to late April.

E. Quality Program Review

I believe that the Midland Quality Assurance Program was and remains in most respects sound. The inspection of the Diesel Generator Building, however, did raise several open items relating to programmatic issues. These concerns have been categorized under the headings of material traceability, the design control process, Q-listing requirements, document control and receipt inspection. I have directed that MPQAD provide an evaluation of these issues (except for Q-listing, which is assigned to licensing) for the management review which will be completed prior to initiation of Phase 2 activities (actual construction for system completion). In addition, we are pursuing the normal process of addressing and resolving the various individual items identified in the NRC inspection report. We will, of course, incorporate any indicated program changes into the program.

F. Third-Party Reviews

I will describe both the history and the scope of the planned third-party reviews in detail below. Accordingly, I will not discuss them here except to state that in carrying out the CCP we will take into account the findings or recommendations of the third party reviews. We will implement any recommended changes on a case-by-case basis as documented in our responses to particular findings. (See below at p. 18.)

G. System Layup

During the months of January and February, we took steps to protect completed and partially completed plant systems for the duration of the status assessment and until work on system completion resume. These layup activities took various forms on the systems on which construction was halted for the system assessment. The walkdowns on which the layup requirements are based have been completed and the layup activities are ongoing.

H. Continuing Activities

Certain activities were exempted from the CCP. Particular activities that have demonstrated effectiveness in quality program implementation were allowed to continue during the initial steps of the construction completion program. These are NSSS installation by Babcock & Wilcox Construction Company; HVAC installation by Zack Company with QA/QC provided by Consumers Power Company; post-system turnover work under the direct control of Consumers Power Company; hanger and cable reinspections under separately established commitments to the NRC; and remedial soils work which is proceeding under the work authorization program. Design engineering for the remaining installation work and engineering support of various other project activities will continue as needed.

I. Completion of Program Definition

The Project Management team initially described the CCP concept to the NRC regional staff on December 2, 1982. We then



developed this program definition to the point documented in my January 10, 1983, letter and then amplified that material at the public meeting on February 8, 1983. The dialogue with the NRC Staff is continuing on both a formal and day-to-day basis. We have received a letter from Region III dated March 28, 1983, (Attachment 4), outlining the remaining review items of interest to the NRC. We have formally responded to their request in part and will complete that response shortly. (See Attachment 3). We will then proceed to resolve any open items. In the meantime, we are proceeding carefully to implement the program in a step-by-step basis, including initiation of third party audits of the management reviews of the planning for the various phases of the CCP.

### III. Third-Party Reviews

As I noted earlier in this testimony, Consumers Power Company has formulated an Independent Review Program now consisting of an Independent Design Verification (IDV) and a Construction Implementation Overview (CIO). The purpose of this portion of my testimony is to describe the organization, implementation and status of these independent reviews.

Consumers Power Company had planned to perform some type of third-party independent review based on the NRC's recent practice of requiring IDV's for plants at the operating licensing stage. The Company followed developments in other dockets to keep abreast of the evolution of the NRC's informal requirements. In the summer of 1982, the Company began to formulate specific

plans; and after the NRC Staff made a formal request on July 9, 1982, that the Company perform an IDV, the Company developed what we considered an innovative third-party review program for non-soils work. An independent review of soils remedial work is described in the testimony of Mr. Mooney. The concept for the review of the non-soils work was to establish a program consolidating several reviews being conducted or to be conducted, thereby producing a comprehensive evaluation of the project and to require that all of this work be conducted by third parties. The three elements of the program as it was conceived at that time, is described in my October 5, 1982 letter to Mr. Denton and Mr. Keppler, (Attachment 5) and consisted of (1) an independent design verification, (2) the biennial QA program audit and, (3) a self-initiated construction project evaluation (SIE), to meet an industry commitment to conduct plant reviews coordinated through INPO.

This program combined a broad horizontal review of project activities through the INPO SIE with a so-called "vertical slice," in-depth independent design review of a critical plant safety system. Thus, the project's implementation could be examined both over its breadth currently and in depth historically. In addition, the biennial audit would fold in programmatic considerations.

In October, 1982, the NRC advised the Company that the INPO evaluation to be carried out by MAC would not meet the agency's independence criteria. Therefore, the MAC study is no

longer considered a formal part of the Company's independent review program.

The INPO SIE study was carried out by Management Analysis Company (MAC) during late 1982. The results have been transmitted to the Company and the NRC. Project management has reviewed and responded to the findings. Appropriate corrective actions have been completed to or are underway and have been evaluated by MAC and overviewed by INPO for adequacy. The results of the MAC study have been discussed with the NRC Staff and provided to the TERA Corporation, which was selected to conduct the Independent Design Review.

As a part of the formulation of the construction completion program, the Company later added another element to its third-party review program, consisting of the CIO. This activity was modeled to be similar to the construction overview underway in the soils area. The following describes, in some detail, the two non-soils elements of the independent third-party review as presently constituted, the IDV and the CIO.

A. Independent Design Verification

The first part of the third-party review program is an IDV of all aspects, historical and present, of selected safety-related systems. The IDV program proposed in my October 5 letter was to consist of a "vertical slice" independent review of the design and some aspects of the construction of the Midland Unit 2 Auxiliary Feedwater System in order to ensure the system's capability of functioning in accordance with its safety design

bases and to ensure that applicable licensing commitments have been properly implemented. The TERA Corporation was selected as the independent contractor to carry out the program.

On October 25, 1982, the Company met with NRR and Region III personnel to, among other things, discuss the Company's proposed IDV program, and the process TERA would use to report its findings to the NRC Staff. On December 3, 1982, I sent a letter to Messrs. Denton and Keppler which responded to certain questions raised by the Staff, and specifically expanded the scope of the IDV by increasing the construction coverage and by adding an additional system (Attachment 6). Subsequently, on February 8, 1983, a public meeting was conducted in Midland, Michigan at which time additional details concerning the IDV program were presented to the NRC Staff and the public. TERA provided further details about the IDV program to the NRC Staff by a transmittal dated February 9, 1983.

1. TERA Qualifications

The TERA Corporation is highly qualified to carry out the IDV. TERA specializes in providing consulting services for all areas of the nuclear industry. Before deciding to retain TERA, Consumers Power reviewed the qualifications of three potential contractors. TERA was selected based upon the strength of its technical competence, quality assurance program and direct experience with independent design verification assessments at such nuclear construction projects as Diablo Canyon, Grand Gulf and Palo Verde. The qualifications of the TERA Corporation and

the TERA Personnel to be assigned to the IDV team were discussed at the October 25, 1982 meeting with the NRC Staff.

The TERA team assigned to the Midland IDV include personnel experienced in system design in the areas of mechanical, electrical, structural and thermal hydraulic evaluations. The Senior Manager for the TERA team, Mr. John Beck, Vice President of TERA, has served as the Chief Operating Officer and Executive Vice President for Vermont Yankee, and also as the Director of Engineering responsible for the supervision and management of Yankee Atomic Electric Company's plant, reactor and environmental engineering departments.

## 2. TERA Independence

The TERA Corporation and the personnel assigned to the IDV team meet the independence criteria established by Commissioner Palladino in his letter of February 1, 1982, to Representative John Dingell and called out in the Company's contract with Tera, Contract No. CP10-8782, dated November 18, 1982. TERA and the individuals assigned to the IDV have attested to their independence in affidavits supplied to the NRC Staff and attached to Mr. Howard A. Levin's letter to Mr. Keppler and Mr. Eisenhut, dated March 18, 1983, (Attachment 7).

Specifically, neither TERA nor its personnel assigned to perform the IDV at Midland have had any direct previous involvement with the Midland activities being reviewed by TERA. TERA and its personnel assigned to perform the IDV have not been

previously hired to perform the design, construction or quality work on the Midland Project. The personnel assigned to the Midland IDV have not been previously employed by Consumers Power Company within the last three years. Further, the TERA personnel assigned to the IDV do not have household members employed by Consumers Power Company, do not have relatives employed by Consumers Power in a management capacity, and do not own or control significant amounts of Consumers Power Company stock.

### 3. Scope

The IDV will consist of an evaluation of historical and current aspects of the design and construction of the Midland Unit 2 Auxiliary Feedwater System, the diesel generator electric power system and the habitability aspects of the control room HVAC.

The scope of the design portion of the review consists of the following:

- Review of design criteria and commitments
- Review of implementation documents
- Review of calculations and evaluations
- Combination of calculations or evaluations
- Evaluation of drawings and specifications

The construction elements to be reviewed will consist of the following:

- Review of supplier documents
- Review of storage and maintenance documents

- Review of construction installation documents
- Review of selected verification activities
- Verification of physical configuration

The scope of the design review being perform by TERA may expand to include additional areas of other systems to accommodate design review findings with generic implications. Similarly, construction review findings with generic implications will be provided to the independent third-party contractor performing the CIO (see below at p. 25), who will factor such findings into the performance of its responsibilities.

#### 4. Activities to Date

The TERA team assigned to the IDV was on-site and began the design verification for the Auxiliary Feedwater System on November 2, 1982. To support the design verification, Consumers Power and Bechtel have provided TERA with the pertinent FSAR chapters, drawings, specifications and design calculations. In addition, Consumers Power and Bechtel have oriented the IDV team as to the organizations involved with the Midland Project, each organization's responsibilities and provided the IDV team with procedures manuals.

The design review of the Auxiliary Feedwater System continues. As part of this assessment, TERA has reviewed the Section 50.55(e) reports and the nonconformances related to this system.

The design reviews of the diesel generator electric power system and habitability aspects of the control room HVAC

have not yet begun. These two systems were only recently determined to be appropriate for IDV assessment. I was informed of this determination by a letter from Mr. Eisenhut to myself, dated March 22, 1982 (Attachment 8). The construction verification portion of the IDV will not commence in detail until the Construction Completion Program Phase 1 activities to determine the installation and inspection status of these systems have been implemented.

5. Reporting and Communication

As of the date of this testimony, the TERA Corporation will communicate the results of the IDV to the NRC and Consumers Power through the issuance of "findings" and the submission of a final report. This procedure was set forth in the TERA Corporation's Project Quality Assurance Plan which was issued on November 11, 1982, and submitted to the NRC Staff and Region III on February 9, 1983.

The Company has received a letter dated March 28, 1982, from Mr. Keppler of Region III which contains a protocol for communicating within the IDV (Attachment 4). The Company has instructed TERA to prepare a detailed procedure embracing the concepts of the protocol.

B. Construction Implementation Overview

The other major component of the third-party review program for non-soils activities is the Construction Implementation Overview (CIO) which will consist of an independent third-party observing and evaluating the construction activities



being performed at the Midland job site. The purpose of the CIO is to ensure that site work is being performed in accordance with the appropriate procedures and requirements and that the commitments made in the CCP are being fulfilled.

The decision to initiate the CIO was first described to the NRC as part of the initial presentation of the CCP concept on December 2, 1982. In my letter to Mr. Keppler dated January 10, 1983, (Attachment 1), which conveyed the description of the CCP to the Region III NRC Staff, the Company stated that an independent third party would evaluate the CCP work activities.

1. Stone and Webster Qualifications

By a letter to James W. Cook from Region III dated March 28, 1983, the NRC Staff requested Consumers Power Company to recommend a contractor to perform the CIO and submit a proposal defining the scope of the contractor's responsibilities (Attachment 4). On April 6, 1983, Consumers Power responded to the NRC Staff Region III recommending that Stone and Webster Engineering Corporation perform the CIO (Attachment 3). In preparing to select a party to conduct the CIO, the Company considered Stone and Webster and the TERA Corporation, because each had previously been selected to conduct an independent design or construction review at Midland, was familiar with procedures at the site and could quickly and efficiently gear up for a further review effort. The Company had considered both candidates qualified, but, decided that the Stone & Webster proposal was superior based primarily on the experience of team

personnel and the depth of organizational resources within Stone & Webster to support the program. In addition, the Company believed that the TERA Corporation would not be acceptable because Region III held the opinion that the CIO could possibly interfere with the IDV TERA is now conducting.

Stone and Webster is a highly respected engineering construction firm with considerable nuclear power plant design and construction experience. Stone and Webster has acted as engineer-constructor of a number of large nuclear power projects. As a large nuclear architect-engineer, Stone and Webster has the necessary pool of competent personnel to draw from in the many disciplines involved in the CIO. In addition, Stone and Webster has specific experience in conducting independent design reviews at Diablo Canyon and Indian Point 3.

The Stone and Webster team assembled for Midland will include personnel experienced in quality assurance/quality control and construction activities in the electrical, mechanical, instruments and controls, and special process areas. The Program Manager for the CIO, Mr. W. McKay is eminently qualified for this assignment. He has over 25 years experience in power plant construction projects at Stone and Webster. Prior to this assignment, Mr. McKay had served as the Resident Manager at Millstone Nuclear Power Station Unit 3 for Northeast Utilities Service Company at Waterford, Connecticut. As such, he was Stone and Webster's primary manager, responsible for directing all of the Company's activities at that site. He also has experience as

a superintendent of construction for two 815 MW units at Surrey, Virginia.

2. Stone and Webster Independence

The Stone and Webster Corporation has affirmed that, in accordance with the criteria set forth in Chairman Palladino's letter, it is independent from Consumers Power Company.

Specifically, neither Stone & Webster, nor its personnel assigned to perform the CIO work at Midland, have had any direct previous involvement with the Midland activities being reviewed by Stone & Webster. Neither Stone & Webster nor its personnel assigned to perform the independent assessment have been previously hired by Consumers Power Company to perform the Midland design, construction, or quality work relative to the items under review. The personnel assigned to this independent assessment have not been previously employed by Consumers Power Company within the last three years. Further, the Stone & Webster personnel assigned to the assessment project do not have household members employed by Consumers Power Company, do not have any relatives employed by Consumers Power Company in a management capacity, and do not own or control significant amounts of Consumers Power Company stock.

3. Scope

The Stone & Webster program contains the following major elements comprising the CIO:

- a. Development of an assessment program and preparation of a Project Quality Plan

b. Monitoring of the implementation of the Construction Completion Program

c. An Overview Evaluation

The independent contractor will field a site team to monitor the effectiveness of the CCP and other site activities. The team will perform two functions. First, the team will assess the adequacy of and compliance with CCP procedures and inspection plans. Second, the the team will review aspects of construction activities which relate to the performance of the Quality Control Inspection Program. The team will use special procedures, checklists, and sampling techniques to evaluate the following:

- Adequacy of controls and practices in the Quality Assurance Program to determine that design information is incorporated in installed hardware;
- Conformance of installed hardware to design information in specifications and drawing;
- Completeness of Consumers Power Company's and Bechtel's procedures regarding construction activities, personnel qualifications, training programs, and organizational practices;
- Compliance of Construction Completion Program Teams with prescribed procedures; .
- Compliance of Quality Control personnel with applicable procedures;
- Compliance of construction activities with applicable procedures.

In my letter of April 6, 1983, (Attachment 3), to Mr. Keppler responding to a letter from Region III dated March 28, 1983, (Attachment 4), the Company expanded the scope of the CIO to include audits of the management reviews of the CCP described earlier in my testimony. The Company also committed

not to proceed beyond these management reviews without the concurrence of the CIO independent reviewer.

#### 4. Reporting and Communication

To satisfy its overview evaluation responsibilities, the independent contractor will hold weekly progress meetings on site with Consumers Power Company, its contractors and the NRC Staff. At these meetings, the independent contractor will summarize the activities which the CIO site team has observed, the meetings they attended, the quality documents and records they have reviewed and the observations they have made.

In addition, the observations of the CIO site team will be submitted to a Senior Overview Committee, comprised of Senior management of the independent contractor, on a monthly basis. Further, programmatic observations of a serious nature will be submitted immediately to the Committee for review and evaluation. If, upon review, the Committee feels the observations raise significant concerns, the observations will be reported to Consumers Power Company and the NRC.

After six months of CIO operation, the Midland Project's cumulative performance will be evaluated. The independent contractor will submit a report summarizing its findings to the NRC and Consumers Power Company. Based on these findings, Consumers Power Company will recommend to the NRC what modifications, if any, should be made to the independent contractor's CIO responsibilities and reach agreement with the NRC on these actions. The CIO will continue until Consumers Power Company and

the NRC have confidence in the adequacy of the Consumers Quality Assurance Program for the Midland Project.

#### IV. Diesel Generator Building Inspection

During the NRC's October-November 1982 team inspections, results and findings were reported to the Company on a periodic basis. Our initial understanding of the apparent implications of these findings were factors which entered into the Company's decision to institute the Construction Completion Plan. A further significant result of the inspection dealt with In-Process Inspection Notices (IPIN's). On January 18, 1983, immediately after the NRC Staff advised us that weaknesses in the use of IPIN's, in their opinion, could have contributed to missed inspections, I asked Roy A. Wells to investigate all aspects of the issue and recommend corrective action. The task force chartered by Mr. Wells carried out its charge as described in Mr. Wells' testimony and in Attachment 1 to the Response to the Notice of Violation (See Attachment 1 to the testimony of Mr. Bruce H. Peck).

The Company has also investigated and analyzed all specific findings of the NRC's team inspection, and has taken both generic and specific corrective steps. These are described in Attachment 2 to the Response to the Notice of Violation and in Mr. Peck's testimony. The Company's Response was, in my opinion, a comprehensive and candid presentation of the Company's findings

and proposed corrective actions, and is, I believe, an appropriate basis for resolution of all matters identified during the inspection.

VI. Conclusion

In light of the measures which we have instituted to improve the Project's status assessments, systems construction, and quality assurance implementation, I believe that the Midland Plant when completed will conform to NRC regulatory requirements. My belief is based in part on the successful implementation of the remedial soils quality assurance program since December, 1982. The remedial soils quality assurance program was carefully tailored to meet the specific requirements of that activity. The Construction Completion Program likewise represents a major initiative by the Company in instituting an enhanced program for the balance of plant construction. It is my expectation that the Construction Completion Program will assist the Company in completing construction in an orderly manner and with satisfactory implementation of the quality assurance/quality control requirements.



**Consumers  
Power  
Company**

James W Cook  
Vice President - Projects, Engineering  
and Construction

General Offices: 1545 West Farnell Road, Jackson, MI 49201 • (517) 788-0453

January 10, 1983

*2cc R  
1cc B  
Bill Cook*

Mr J G Keppler, Administrator, Region III  
Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT  
MIDLAND DOCKET NOS 50-329, 50-330  
CONSTRUCTION COMPLETION PROGRAM  
FILE 0655 SERIAL 20428

REFERENCE LETTER TO J W COOK, DATED DECEMBER 30, 1982, FROM NRC REGION III  
REGARDING CONSTRUCTION COMPLETION PROGRAM

On December 2, 1982, Consumers Power Company met with Mr Warnick and other members of your staff to discuss the general concept of our proposed Construction Completion Program. The enclosure to this letter documents in detail the Construction Completion Program, as requested at the meeting and in your follow up letter (Reference).

Since our meeting, the program has undergone considerable development and evolution. Details have been supplied and more specific objectives and implementing methods have been established. Further details are still being developed. While the Company expects the Program, as presently constituted, to be a workable and sufficient framework for future action, revisions may be necessary as future needs and experience dictate.

The Construction Completion Program is a positive step in the overall advancement of Project goals. It represents the best efforts of Project management, support and quality assurance personnel. We believe it will produce an improvement in Project installation and inspection status, systems construction and QA implementation. The quality verification effort should provide increased confidence of the NRC that the plant has been properly built. Other aspects of the Program, including the measure to improve ongoing inspections and scheduling interfaces, should contribute to that result. This Program, together with recent Consumers Power Company commitments regarding quality assurance and remedial soils work, can establish a basis for improved relations between the Company and the NRC Region group assigned to inspect Midland. The Construction Completion Program demonstrates the Company's responsiveness to both NRC concerns and the particular needs of this Project. It is our expectation that the Program, created out of a desire to enhance the

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orderliness and quality of construction, will achieve its intended purpose and lead to the successful "completion of construction" of the Midland Plant in accordance with regulatory requirements.

We hope that this submittal fulfills your request for written information regarding the Construction Completion Program. Consumers Power Company is prepared to support the public meeting proposed for January 26, 1983 in Midland, Michigan.

*James W. Croh*

JWC/DMB/cl

CC Atomic Safety and Licensing Appeal Board  
CBechhoefer  
FPCowan, ASLB  
JHarbour, ASLB  
DSHood, NRC  
MMCherry  
RWHernan, NRC  
RJCook, Midland Resident Inspector  
FSKelley  
HRDenton, NRC  
WHMarshall  
WDPaton, NRC  
WDShafer, NRC  
RFWarnick, NRC  
BStamiris  
MSinclair  
LLBishop

BCC RAWells, Midland  
JEBrunner, M-1079  
RCBauman, M-14-314A  
WRBird, P-14-418A  
KRKline, P-14-314B  
GSKeeley, P-14-113B  
ARMollenkopf, P-14-209A  
DBMiller, Midland  
FWBuckman, P-14-113A  
DMBudzik, P-24-517A  
FCWilliam, IL&B  
MIMiller, IL&B  
DFLewis, Bechtel  
DFJudd, B&W  
RWHuston, Washington  
JRSchaub, P-14-305  
DJVandeWalle, P-24-614A  
Bob Lee

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
Docket No 50-329, 50-330

Letter Serial 20428 Dated January 10, 1983

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits its Construction Completion Program.

CONSUMERS POWER COMPANY

By JW Cook  
J. W. Cook, Vice President  
Projects, Engineering and Construction

Sworn and subscribed before me this 10<sup>th</sup> day of January, 1983

Patricia A. Puffer  
Notary Public  
Bay County, Michigan

My Commission Expires 3-4-86

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
 Docket No 50-329, 50-330

Letter Serial 20428 Dated January 10, 1983

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CONSUMERS POWER COMPANY

By           /s/ J W Cook            
           J W Cook, Vice President  
           Projects, Engineering and Construction

Sworn and subscribed before me this \_\_\_\_ day of \_\_\_\_\_.

          /s/ Patricia A Puffer            
           Notary Public  
           Bay County, Michigan

My Commission Expires \_\_\_\_\_

Construction Completion Program  
Executive Summary

The Construction Completion Program has been formulated to provide guidance in the planning and management of the design and quality activities necessary for completion of the construction of the Midland Nuclear Cogeneration Plant. Construction completion is defined in this Plan as carrying all systems to the point they are turned over to Consumers Power Company for component checkout and preoperational testing. The Construction Completion Program does not include the Remedial Soils Program which is treated in separate interactions between Consumers Power Company and the Nuclear Regulatory Commission.

Background

The Construction Completion Program was developed in response to a number of management concerns that have been identified during the period preceding the initiation of the Program. The Midland Project had been proceeding at a high level of activity as it approached completion. The final transition from area construction to system completion, using punch lists, has been difficult for most nuclear projects. The Midland Project has not escaped these difficulties which have been compounded due to the congested space and the continuing numerous design changes, both generally attributable to the age of the Project. These factors lead to the need for improved definition of work status, increased emphasis on overall Project objectives as well as continued focus of construction and inspection resources on completion of systems for short-term milestones and increased effort to complete engineering ahead of field installation.

The Midland Project has been criticized by the NRC regional office as not having met their expectations for implementation of the Project's Quality Assurance Program. The result has been that the Project management has too often, during the past few months, been in a reactive rather than proactive posture with regard to quality assurance matters.

In recognition of these conditions, management has concluded that a change in approach was needed to effectively complete the Project while maintaining high quality standards.

Objectives

The development of the Program has considered the Project's current status and recent history and attempts to address the underlying or root causes of the problems currently being experienced. In order to develop the Program the following overall objectives were established under three general headings. The Program must:

Improve Project Information Status By:

- Preparing an accurate list of to-go work against a defined baseline.

- Bringing inspections up-to-date and verifying that past quality issues have been or are being brought to resolution.
- Maintaining a current status of work and quality inspections as the Project proceeds.

Improve Implementation of the QA Program By:

- Expanding and consolidating Consumers Power Company control of the quality function.
- Improving the primary inspection process.
- Providing a uniform understanding of the quality requirements among all parties.

Assure Efficient and Orderly Conduct of the Project By:

- Establishing an organizational structure consistent with the remaining work.
- Providing sufficient numbers of qualified personnel to carry out the program.
- Maintaining flexibility to modify the Plan as experience dictates.

Description

The Construction Completion Program entails a number of major changes in the conduct of the final stages of the construction process and can be described in summary as a two-phase process.

First, after certain necessary preparations, the safety-related systems and areas of the plant will be systematically reviewed. This first phase will be carried out on an area-by-area basis, but will be accomplished mainly by teams organized with systems responsibility and a separate effort to verify the completed work. The product from this phase of the program will be a clear status of remaining installation work and a current inspection status which provides quality verification of the existing work. The teams organized to carry out this first phase will continue to function in the second phase as the responsible organizational units to complete the work.

In order to achieve its complete set of objectives, the Program contains a number of activities and elements that support and are linked to the two major phases described above. The major components of the Plan, which are discussed in more detail in the balance of this report, can be described as follows:

- A significant reduction in the construction activity in the safety-related portion of the plant, material removal and a general cleanup will be carried out in preparation for installation and inspection status assessment and quality verification activities.

- . A review will be made of equipment status to assure that the proper lay-up precautions have been implemented to protect the equipment until the installation work is completed.
- . The integration of the Bechtel QC function into the Midland Project Quality Assurance Department (MPQAD) under Consumers Power Company management will be completed.
- . The Consumers Power Company is carrying out recertification program of Bechtel QC inspectors, and a review of the inspection procedures to be utilized.
- . The system completion teams will be organized, staffed and trained according to procedures developed to define the team's work process.
- . The systems completion teams will 1) accomplish installation and inspection status assessment, 2) perform systems construction completion and construction quality performance and 3) determine that all requirements have been met prior to functional turnover for test and operation.
- . Quality verification of completed work will be carried out in parallel with installation and inspection status activities of the system completion teams.
- . A series of management reviews will be carried out to carefully monitor the conduct of the Program and to revise the plan as appropriate.
- . Review and resolution will proceed on outstanding issues related either to QA program or QA program implementation as raised by the NRC or third party overviews of the Project.
- . Third party reviews will be undertaken to monitor Project performance and to carry out the NRC's requirements for independent design verification.

#### Schedule Status

The Program was initiated on December 2, 1982 by limiting certain ongoing safety-related work and starting preparations for the phase-one work of status assessment and quality verification activities. Since the Program also has incorporated a number of commitments made to the NRC during the past few months, activities in support of these commitments such as QC integration into MPQAD and the recertification of QC inspectors, had been initiated prior to December.

Status and schedules for each element of the Plan are enumerated in the text. In general, preparation for the Phase 1 activities are underway and will continue through January. A pilot team to develop the procedures and training requirements will be initiated during January. It is expected that the first

4

areas to undergo Phase 1 status assessment will be defined and teams mobilized during March.

Quality verification of completed work will start in late January or early February.

The Program provides for the Phase 1 results on a system or partial system to be reviewed and evaluated prior to initiating Phase 2 system completion work on that system or partial system. Management will monitor both process readiness and Phase 1 evaluation results.

The major areas of continuing safety-related work are NSSS construction as performed by B&W Construction Co, HVAC work under the Zack subcontract, the Remedial Soils Program and post-turnover punch list work released to Bechtel construction by Consumers Power Company. The Zack work is currently limited until a recently identified question on welder certification is resolved.

During the implementation of the Program in 1983, the NRC Resident Inspectors can use the Plan to monitor safety-related construction activities at the site. Since a substantial portion of the Plan directly relates to commitments made to NRC management, Consumers Power Company intends to schedule periodic reviews of Program status and progress with the NRC.



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## 1.0 INTRODUCTION

The Construction Completion Program has been formulated to provide guidance in the planning and quality activities necessary for completion of the construction of the Midland Nuclear Cogeneration Plant. Construction completion is defined in this Plan as carrying all systems to the point they are turned over to Consumers Power Company for component checkout and preoperational testing. The Construction Completion Program does not include the Remedial Soils Program which is treated in separate interactions between Consumers Power Company and the Nuclear Regulatory Commission. The Construction Completion Program will be referred to as the Program in this document which contains the Plan for Program development and implementation.

### Background

The Construction Completion Program is being developed in response to a number of management concerns that have been identified during the period preceding the initiation of the Program. The Midland Project had been proceeding at a high level of activity as it approached completion. The final transition from area construction to system completion, using punch lists, has been difficult for most nuclear projects. The Midland Project has not escaped these difficulties which have been compounded due to the congested space and the continuing numerous design changes, both generally attributable to the age of the Project. These factors lead to the need for improved definition of work status, increased emphasis on overall Project objectives as well as continued focus of construction and inspection resources on completion of systems for short-term milestones and increased effort to complete engineering ahead of field installation.

The Midland Project has been criticized by the Nuclear Regulatory Commission regional office as not having met their expectations for implementation of the Project's Quality Assurance Program. The result has been that the Project management has too often, during the past few months, been in a reactive rather than proactive posture with regard to quality assurance matters.

In recognition of these conditions, Consumers Power Company has concluded that a change in approach is needed to effectively complete the Project while maintaining high quality standards.

### Objectives

The development of the Program has considered the Project's current status and recent history and attempts to address the underlying or root causes of the problems currently being experienced. In order to develop the Program, the following overall objectives were established under three general headings. The Program must:

#### Improve Project Information Status By:

- Preparing an accurate list of to-go work against a defined baseline.

- Bringing inspections up-to-date and verifying that past quality issues have been or are being brought to resolution.
- Maintaining a current status of work and quality inspections as the Project proceeds.

Improve Implementation of the QA Program By:

- Expanding and consolidating Consumers Power Company control of the quality function.
- Improving the primary inspection process.
- Providing a uniform understanding of the quality requirements among all parties.

Assure Efficient and Orderly Conduct of the Project By:

- Establishing an organizational structure consistent with the remaining work.
- Providing sufficient numbers of qualified personnel to carry out the Program.
- Maintaining flexibility to modify the Plan as experience dictates.

PLAN CONTENTS

The Program was initiated on December 2, 1982 by limiting on-going work on Q-systems to pre-defined tasks and preparing the major structures housing Q-systems for an installation and inspection status assessment and verification of completed work. The relationship of the major elements of the Plan is shown in Figure 1-1. The sections of the Plan address the following major activity areas:

PREPARATION OF THE PLANT (Section 2.0)

The buildings are being prepared for a status assessment and verification of completed work.

QA/QC ORGANIZATION CHANGES (Section 3.0)

A new QA organization that integrates the QA and QC functions under a Consumers Power Company direct reporting relationship is being established. As a part of this transition, the Bechtel QC inspectors are being recertified to increase confidence in the quality inspection performance.

## PROGRAM PLANNING (Section 4.0)

The overall Plan for the Program is being developed in two major phases.

The first phase includes:

- A team organization assigned on the basis of systems is being developed to determine present installation and inspection status. The inspection status assessment includes performing inspections on completed work to bring them up to date. A closely coordinated effort involving the construction contractor and Consumers Power Company (QA/QC, testing and construction) will improve quality performance.
- The quality verification of completed work will be based, in part, on a sampling technique using re-certified inspectors as described in Section 3.0.

The second phase includes:

- Following installation and inspection status assessment the team organization will retain responsibility for systems completion work.
- The QC inspection process of new work will be integrated with the systems completion work to ensure adequate quality performance.

## PROGRAM IMPLEMENTATION (Section 5.0)

The first phase implementation of the Program will be initiated with a review of the process, procedures and team assignments that will be used. The plan for verification of completed work will be reviewed separately. The teams will conduct the installation and inspection status assessment; verification of completed and inspected work will proceed, as planned, in coordination with the team effort. Following phase 1 completion of the first work segment, a management review of the plan effectiveness will be made.

In second phase Program implementation, the assigned team will plan and schedule the remaining work needed for completion including QC inspections.

## QUALITY PROGRAM REVIEW (Section 6.0)

The adequacy and completeness of the quality program will be reviewed on an ongoing basis, taking into consideration questions raised by NRC inspections and findings by third party reviewers. The results of these reviews will be considered as part of the management review that are a part of the Program implementation (Section 5).

### THIRD PARTY REVIEWS (Section 7.0)

Independent assessments of the Midland Project will provide management and NRC with evaluations of Project performance.

### SYSTEM LAY-UP (Section 8.0)

The on-going work to protect plant equipment and systems will be augmented as necessary to provide adequate protection during implementation of this Plan.

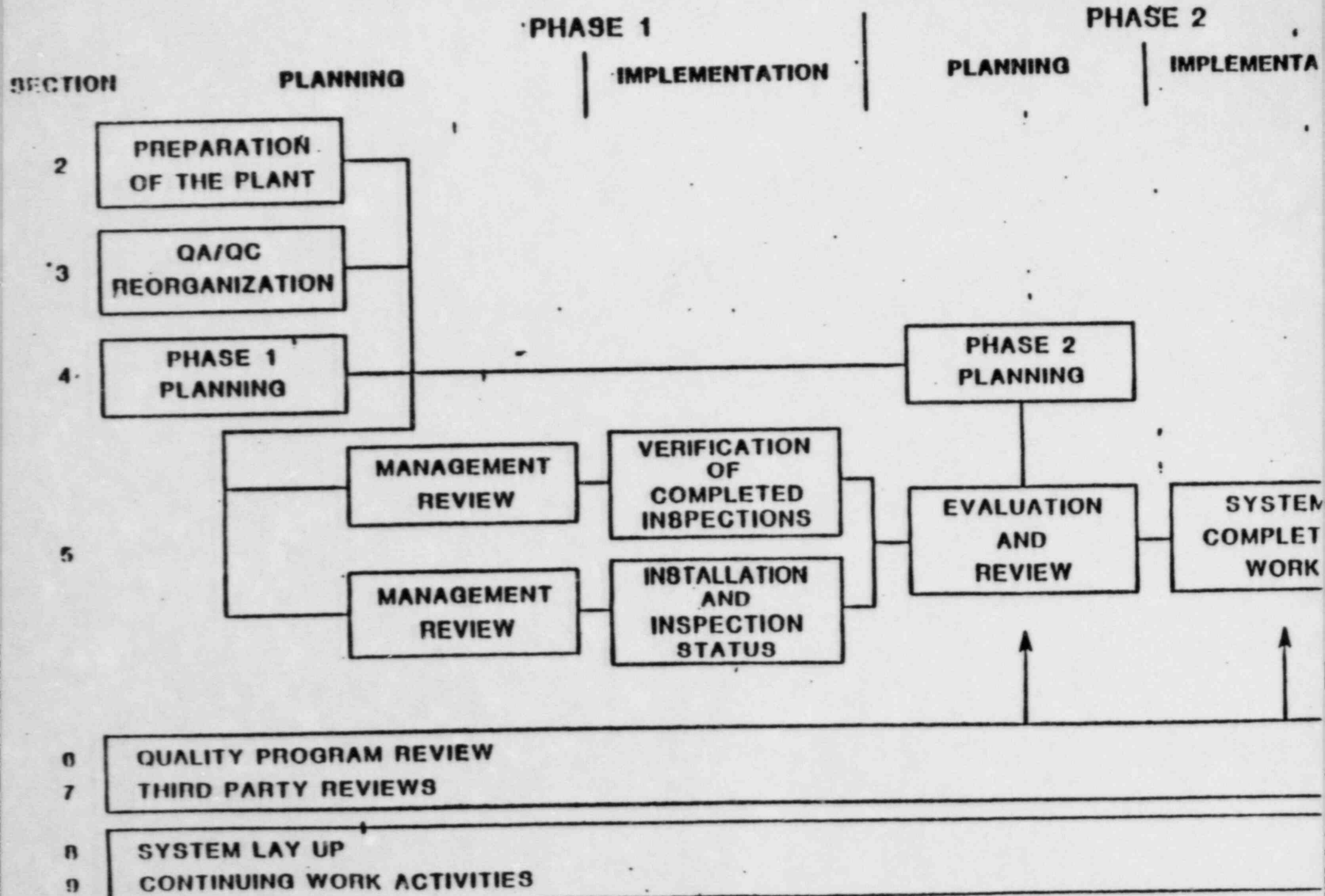
### CONTINUING WORK ACTIVITIES (Section 9.0)

Work on Q-Systems has been limited to specific activities. This limitation permits important work to proceed while allowing building preparation for status assessment and verification activities.

### SUMMARY

Each section of this Plan presents detailed objectives, a description of the activity involved, and a schedule for achieving major milestones. The Program, however, is still in an evolutionary state and revisions to the Plan may be necessary as Consumers Power Company gains experience in the implementation of Program elements.

**FIGURE 1-1  
CONSTRUCTION COMPLETION PROGRAM SCHEMATIC**



## 2.0 PREPARATION OF THE PLANT

### 2.1 Introduction

The preparation of the Plant will clear the auxiliary, diesel generator and containment buildings and the service water pump structure of materials, construction tools and equipment and temporary construction facilities.

### 2.2 Objective

To allow improved access to systems and areas for the Program activities.

### 2.3 Description

The preparation activities minimize obstacles and interferences for the Program activities. This is being accomplished through the following steps.

1. Limitation of Q-work to activities and areas defined in Section 9 resulting in substantial work force reduction.
2. Removal and storage of construction tools and equipment, and temporary construction facilities (scaffolding, etc) from the buildings identified in Section 2.1.
3. Removal, control and storage of uninstalled materials from the buildings identified in Section 2.1.
4. Appropriate housekeeping of all areas following material and equipment removal.

The preparation for each area will be complete before initiating further Program activity. The on-going work described in Section 9 will continue as scheduled during the preparation.

### 2.4 Schedule Status

The preparation of the Plant began on December 2, 1982. It will be complete by January 31, 1983.

### 3.0 QA/QC ORGANIZATION CHANGES

#### 3.1 Introduction

The Consumer Power Company's Midland Project Quality Assurance Department (MPQAD) is being expanded to assume direct control of Bechtel QC activities. The new organization and the plan for the transition are described below. The transferred QC Inspectors will be recertified as part of this transition.

#### 3.2 Objectives

##### Establish New QA/QC Organization

Establish an integrated organization which includes the transition of Bechtel QC to MPQAD while accomplishing the following objectives:

1. Establish direct Consumers Power Company control over the QC inspection process.
2. Establish the responsibilities and roles of the QA and QC Departments in the integrated organization.
3. Use qualified personnel from existing QA and QC departments and contractors to staff key positions throughout the integrated organization.

##### Recertify QC Inspectors

Ensure that those Quality Control inspection personnel transferring to MPQAD from Bechtel will be trained and recertified in accordance with MPQAD Procedure B-3M-1.

#### 3.3 Description

##### Establish New QA/QC Organization

A new organization will be implemented under Consumers Power Company and will be described in appropriate Topical Reports (CPC-1A and BQ-TOP-1) and quality program manuals (Volume II, BQAM and NQAM). Changes to these documents will be submitted to NRC.

Features of the new organization include:

1. Lead QC Supervisors report directly to a QC Superintendent who reports to the MPQAD Executive Manager. Any required support from Bechtel Corporate QC and QA functions (except ASME N-Stamp activities) is provided at the level of the MPQAD Executive Manager.
2. The MPQAD Executive Manager will review the performance of lead personnel in his department.



3. QA will develop and issue Quality Control inspection plans and be responsible for the technical content and requirements of such plans. QC will be responsible to implement these plans.
4. QA will continue to monitor the Quality Control inspection process to insure that program requirements are satisfactorily implemented.
5. MPQAD will continue to use Bechtel's Quality Control Notices Manual (QCNM) and Quality Assurance Manual (BQAM) as approved for use on the Midland Project.
6. ASME requirements imposed upon a contractor as N-Stamp holder will remain with that contractor. MPQAD QA will monitor the implementation of ASME requirements.

An organization chart (Fig 3-1) showing reporting relationships in the new organization is attached.

#### Recertify QC Inspectors

The training and recertification process for QC inspectors has been revised to include commitments made during the September 29, 1982 public meeting with the NRC. Those inspectors transferred from Bechtel to MPQAD will be trained and examined in accordance with MPQAD Procedure B-3M-1. Upon satisfactory completion of the training and examination requirements, inspection personnel will be certified for the Project Quality Control Instruction(s) (PQCI(s)) they are to implement. Inspection personnel will be certified on a schedule which supports ongoing work and system completion team activities.

### 3.4 Schedule Status

#### Establish New Organization

Advise NRC of the structure of the integrated organization. 12/15/82

Transfer the Bechtel QC Organization to MPQAD. 1/17/83

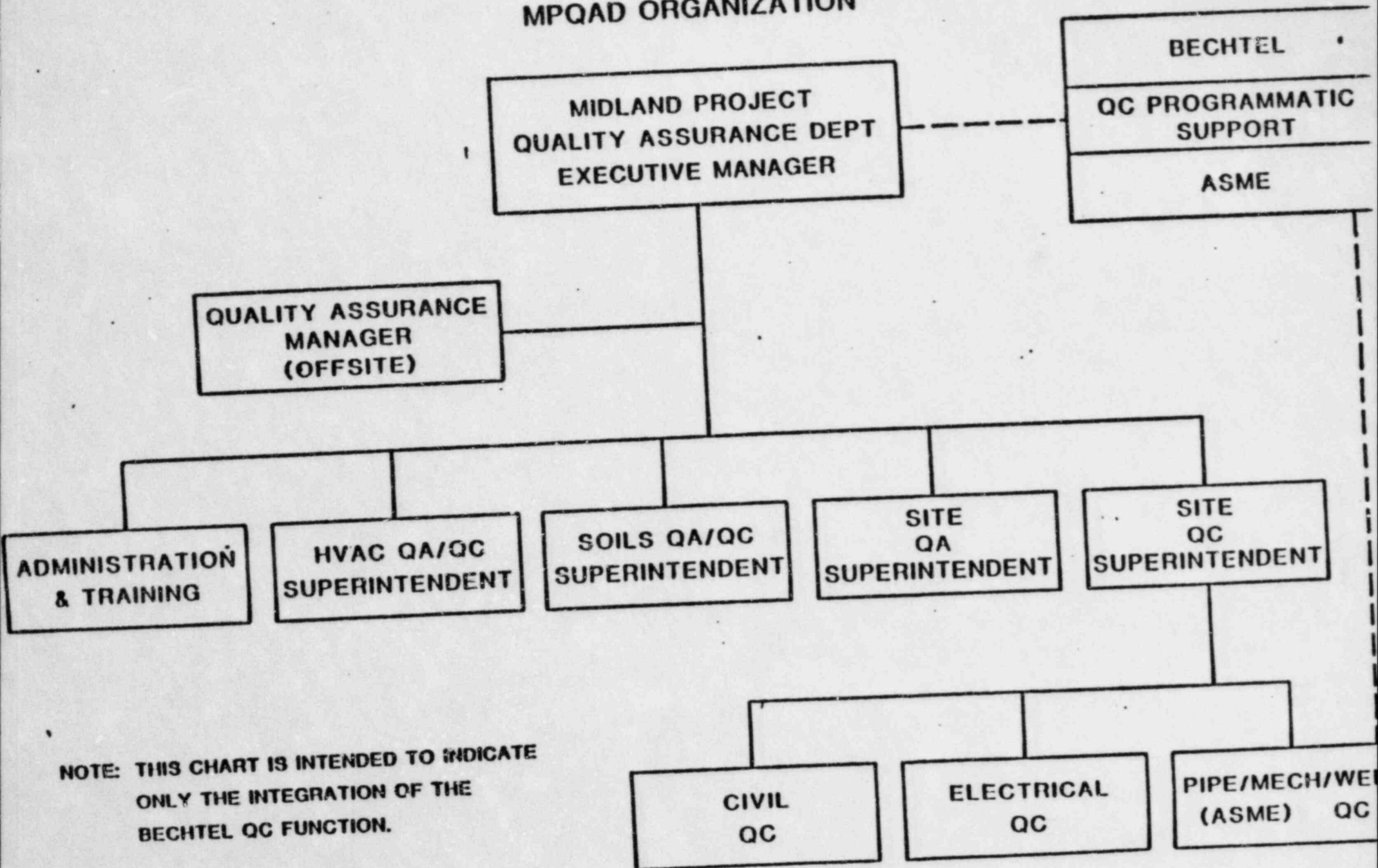
Submit changes to Topical Reports and quality program manuals to NRC. 2/17/83

#### Recertify QC Inspectors

Specify the revised training and examination requirements for certification (B-3M-1). 10/25/82

Complete recertification 4/01/83

**FIGURE 3-1  
MPQAD ORGANIZATION**



**NOTE: THIS CHART IS INTENDED TO INDICATE ONLY THE INTEGRATION OF THE BECHTEL QC FUNCTION.**

## 4.0 PROGRAM PLANNING

### 4.1 Introduction

The detailed planning for the major portion of the Construction Completion Program is described in this section.

Planning in support of Phase 1 consists of the activities to set up a team organization to assess the installation and inspection status of Q-systems within major structures (Section 4.2) and to verify the adequacy of completed inspection effort (Section 4.3).

The Phase 2 planning effort covers the process and procedures that will be used by the team organization for systems completion work (Section 4.4). The procedures to integrate the quality program requirements with continuing systems completion work will be developed (Section 4.5).

### 4.2 Team Organization (Phase 1)

#### 4.2.1 Introduction

Organize and train teams and prepare procedures for an installation and inspection status assessment.

#### 4.2.2 Objective

1. Establish and implement a team organization ready to inspect and assess systems for installation and inspection status.
2. Develop the organizational processes and procedures necessary to implement the team approach for status assessment.
3. Provide training to ensure required inspection and installation status assessment activities are satisfactorily performed.

#### 4.2.3 Description

1. The team organization structure will vary depending upon the assigned scope of work. The organization will consist of a team supervisor and personnel as appropriate from field engineering, planning, craft supervision, project engineering, MPQAD and Consumers Power Company Site Management Office. The team may be augmented by procurement personnel, subcontract coordinators and turnover coordinators.

Teams will be assigned a specific scope of work and held accountable for status assessment and overall completion within this scope. The scope includes the requirements

to develop a viable working schedule and insure early identification and resolution of problem areas. Project processes and procedures will be reviewed and modified to incorporate the team organization. The team MPQAD representative is responsible for providing the QA/QC support for the team. He receives scheduling direction from the Team Supervisor and technical direction from MPQAD. For his team's work, he analyzes the quality requirements and plans the QC activities to integrate them with the team effort. He assures the necessary PQCI's and certified inspection personnel are available for performing the inspections. He maintains cognizance of the quality status of the verification activities.

The Washington Nuclear Plant #2 (WNP-2) team organization will be used as a starting point for a Midland specific approach.

A pilot team or teams will be utilized to develop and test processes and procedures during the development stage to assure that Program objectives can be met. This will also provide practical field input to assure that efficient and workable methods are used.

Team members will be physically located together to the extent practicable to improve communication, status assessment, problem identification and problem resolution.

2. Training for inspection and installation status assessment will be provided to team members. It will include responsibilities, reporting functions, indoctrination of project processes and procedures and familiarization with the project quality program to ensure effective implementation.
3. A separate organization of design engineers (presently existing) will coordinate spatial interaction, review and examination with the activities of these teams.

#### 4.2.4 Schedule Status

- |                                                                              |         |
|------------------------------------------------------------------------------|---------|
| . Designate pilot team.                                                      | 1/21/83 |
| . Complete grouping of systems for assignment to teams.                      | 2/28/83 |
| . Complete assignment of team supervisors and members to designated systems. | 3/31/83 |

## 4.3 Quality Verification (Phase 1)

### 4.3.1 Introduction

The verification program is the activity undertaken to determine, using a variety of methods, that the inspections performed on completed work were done correctly.

### 4.3.2 Objectives

The objectives of the verification program are to:

- . Review existing PQCI's and revise as necessary to assure that:
  - a. Attributes important to the safety and reliability of specific components, systems, and structures are identified for verification.
  - b. Accept/reject criteria are clearly identified.
  - c. Appropriate controls, methods, inspection and/or testing equipment are specified.
  - d. Requisite skill levels are required per ANSI N45.2.6 or SNT-TC-1A.
- . Develop and implement verification inspection plan for completed work which considers:
  - a. Re-inspection of accessible items.
  - b. Review of documentation for attributes determined to be inaccessible for re-inspection.
  - c. Sampling techniques using national standards.

### 4.3.3 Description

PQCI's will be revised as necessary to meet the objectives in Section 4.3.2. Verification of the quality of accessible completed construction, which has been previously inspected will be performed by use of sampling plans based on MIL-S-105D (1963) or other acceptable methods. Attributes determined to be inaccessible for direct re-inspection due to embedment or the status of completed construction or installation (eg, weld preparation of completed welds, reinforcement in placed concrete, installed anchor bolts, etc) will be verified as appropriate, by examination of records.

#### 4.3.4 Schedule Status

- . Complete review and revision of PQCI's. (Date to be determined.)
- . Establish verification inspection plan for completed work. (Date to be determined.)

#### 4.4 System Completion Planning (Phase 2)

##### 4.4.1 Introduction

Establish the processes for system completion, prepare procedures and expand training to cover systems completion work.

##### 4.4.2 Objective

The objectives of the systems completion planning are as follows:

- . Establish processes and interfaces for system completion.
- . Prepare procedures defining tasks of each system completion team.
- . Train team members by expanding upon training received previously for inspection and status assessment.
- . Establish scheduling methods to be used during system completion activities.

##### 4.4.3 Description

The team organization (developed in Section 4.2) and the processes and procedures will be extended to accomplish the systems completion work.

- . Training will be conducted to assure that supervisors understand the team objectives and their role. Emphasis will be placed on completion of all work in accordance with the design requirements, the change control process used when the design must be modified, and changes to the established team processes and procedures.

##### 4.4.4 Schedule Status

- . Complete team preparation for systems completion work. (Date to be determined.)

## 4.5 QA/QC Systems Completion Planning (Phase 2)

### 4.5.1 Introduction

The QA/QC systems completion activity covers the planning to support of system completion work.

### 4.5.2 Objectives

Establish in-process inspection program and complete review and modification of PQCI's.

### 4.5.3 Description

The QC in-process inspection program will be directly coordinated with future installation schedules to insure that inspection points, identified by MPQAD QA in the PQCI's, are integrated with the installation schedule. The identification of applicable PQCI's and required inspection points will be used by system completion teams to insure that QC inspections are adequately scheduled into the process. The system completion team quality representative will be responsible for providing the link between the system completion team and MPQAD to insure that quality requirements are satisfied.

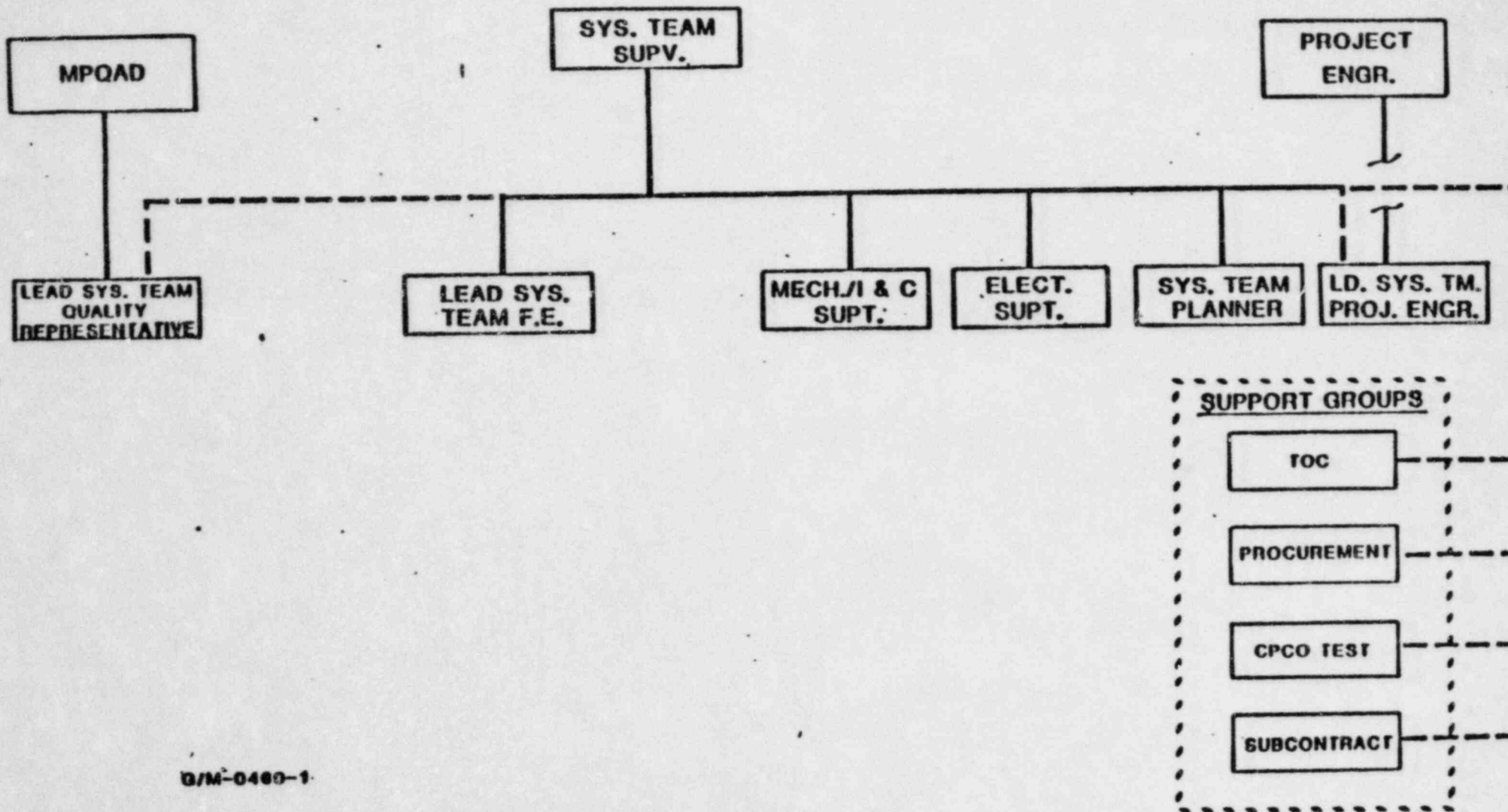
PQCI's will be reviewed, and modified as necessary, to insure that proper attributes are being inspected, that inspection plans are clear and concise, that inspection points are specifically scheduled with installation activities and that inspection results are properly documented. MPQAD QA will be responsible for the PQCI review activity and will obtain assistance, as required, from other project functions, such as Project Engineering and Quality Control. Revised PQCI's will be used to conduct inspection of future installation activities.

### 4.5.4 Schedule Status

Issue procedure for integrating inspection points into the construction schedule.

2/22/83

FIGURE 4-1  
CONCEPTUAL TEAM ORGANIZATION





## 5.0 PROGRAM IMPLEMENTATION

### 5.1 Introduction

The implementation of the Phase 1 Construction Completion Program activities will be initiated after a management review of the overall process insures that Project performance and quality objectives have been addressed. The Phase 1 work will then be carried out by the various teams in accordance with the procedures described in the preceding sections. The installation and inspection status assessment of a system or partial system will be followed by a review of results by MPQAD and a second management review before initiating the Phase 2 systems completion work. The Phase 2 work will then be initiated on that system or partial system.

### 5.2 Objectives

The objectives to be met are:

- . Establish the present installation completion and quality status.
- . Integrate the construction and quality activities for all remaining work.
- . Improve performance in demonstrated conformance to quality goals in all system completion work.

### 5.3 Description

#### Management Reviews

Project management will conduct formal review of the plans for implementation activities prior to initiation of team activities for the Phase 1 work. These reviews will ensure that identified project management and quality issues have been adequately addressed by specific actions and that Program objectives are met. The reviews will cover the process for both 1) the verification of completed inspection activity and 2) the installation and inspection status activity.

The installation and inspection status assessment will be performed on a system and/or area basis. Phase 2 is initiated after a formal Project management review of the first status assessment results to evaluate implementation effectiveness. After completion of this review, a work segment will be released for systems completion. Subsequent status assessment results will be reviewed by site management prior to initiation of additional systems completion segments. Reports will be made to Project management at regularly scheduled meetings.

## Phase 1 Implementation

The existing installation and inspection status will be established in accordance with the plan presented in Section 4.

## Evaluate Phase 1 Results

MPQAD will review the status assessment results to determine if any programmatic or implementation changes must be made. Verification scope will be adjusted, as necessary, based on evaluation results. Also, the evaluation will check for reportability to the NRC (as required by 10 CFR 50.55(e)) and Part 21.

## Phase 2 Implementation

This activity starts systems completion for turnover. Work will be scheduled as installation and inspection status assessments are completed and reviewed. Correction of identified problems will be given priority over initiation of new work, as appropriate, and the system completion teams will schedule their work based on these priorities.

## 5.4 Schedule Status

- . Complete Management review and initiate implementation of plan for verification of completed inspections. (Date to be determined.)
- . Complete Management review and initiate implementation of plan for status assessment. (Date to be determined.)
- . Complete Management review of initial installation and inspection status results and initiate systems completion work. (Date to be determined.)

## 6.0 QUALITY PROGRAM REVIEW

### 6.1 Introduction

The adequacy and completeness of the quality program is reviewed as part of the ongoing Project management attention to quality. These reviews consider any questions raised by NRC inspections or findings raised by third party evaluations.

### 6.2 Objective

Address issues raised by internal audits, NRC inspections and third party assessments. Program changes, if needed, will be evaluated and, as findings are processed, will be factored into the Project work.

### 6.3 Description

Consumers Power Company believes Midland QA program is sound. From time to time, questions arise on detailed aspects of the program or program implementation. The normal process of addressing these issues ensures that all necessary information is provided to NRC and that internal confidence in the program is maintained.

The recent inspection of the diesel generator building has raised several issues of programmatic concern. These are in the areas of material traceability, design control process, Q-system related requirements, document control and receipt inspection. Project management has directed that MPQAD provide an expeditious evaluation of these issues to be considered as part of the management review prior to initiation of Phase 2. Once the NRC inspection report is received and specified items are identified, these items will be addressed and resolved through the normal process of closing the inspection findings. Any corrective action or program changes will be implemented as appropriate in Project work on a schedule provided in the inspection report response.

The Project will also receive, from time to time, findings from third party assessments (Section 7). These findings or recommendations may also result in program modification or adjustments. Corrective action taken by the Project will be implemented on a schedule stated in the response to these findings.

## 7.0 THIRD PARTY REVIEWS

### 7.1 Introduction

This section describes third party evaluations and reviews that have been performed and are planned to assess the effectiveness of design and construction activity implementation. Third party reviews being conducted as part of the Remedial Soils Program are not included in this activity.

### 7.2 Objectives

To assist in improving Project implementation and assessment of Midland design and construction adequacy, consultants will be utilized in order to:

- Achieve a broad snapshot of current Project practices and performance in relation to a national program.
- Provide continuous monitoring and feedback to Management of Project performance.
- Identify any activities or organizational elements needing improvement.
- Improve confidence (including the NRC's and the public's) in overall Project adequacy.

### 7.3 Description

The use of consultants to overview Project design and construction activities with particular emphasis on construction is part of the effort to improve the Project's implementation of the quality program. Specifically, the plan overview employs the use of consultants for three separate functions: (1) To carry out a self-initiated evaluation (SIE) of the entire Project under the INPO Phase I program, (2) to utilize a third party overview of ongoing site construction activities to provide monitoring of the degree of implementation success achieved under the new program and (3) to conduct a third party Independent Design Verification (IDV) Program.

1. The INPO self-initiated evaluation was planned as part of an industry commitment to the NRC in response to concerns over nuclear plant construction quality assurance. For the Midland SIE, the evaluation was contracted to be carried out entirely by third party, experienced personnel from the Management Analysis Company.

The evaluation was performed by a team of 17 consultants familiar with the INPO criteria and evaluation methodology. Over a period of a month they interviewed Project personnel at various locations and observed work in progress. The initial results of their evaluation have been presented to the Company

and a Project response to each finding will be prepared and included as part of the evaluation report to be submitted first to INPO and then to the NRC Region III Administrator, together with the INPO overview.

2. A third-party installation implementation overview is being undertaken using, as a model, the program developed specifically for the underpinning portion of the soils remedial work. The overview will be initiated by retaining an independent firm, having considerable experience and depth of personnel in the nuclear construction field. The consultant's overview team will be located at the Midland Plant site and will observe the work activities being conducted in accordance with this Plan on safety-related systems. The overview will continue for a period of six months, after which the Project's cumulative performance will be evaluated. Based on the overview team's findings, a determination will be made by the Company's top management on what modification, if any, should be made to the consultant's scope of work. Findings identified by the installation overview team will be made available to the NRC in accordance with the procedures established for the conduct of independent verification programs.
3. An Independent Design Verification (IDV) is being conducted by Tera Corporation.

The IDV is directed at verifying the quality of design and construction for the Midland Plant. The approach selected is a review and evaluation of a detailed "vertical slice" of the Project design and construction. The design and as-built configuration of two selected safety systems will be reviewed to assure their adequacy to function in accordance with their safety design bases and to assure applicable licensing commitments have been properly implemented. The field work done in support of this activity will not take place until after Phase I implementation (Section 5) has been completed on the systems being reviewed.

The Unit 2 Auxiliary Feedwater System (AFW) plus another system to be selected with NRC concurrence, will be reviewed to fulfill the requirements of the IDV.

7.4 Status/Schedule

1. INPO Construction Project Evaluation
  - Select consultant and conduct evaluation Complete
  - Submit report to INPO Jan 20, 1983
  
2. Independent Construction Overview
  - Define scope Dec 30, 1982
  - Select consultant Jan 31, 1983
  - Mobilize assessment team (Date to be determined)
  
  - Receive assessment team report (Date to be determined)
  
3. IDV
  - Select 2 Systems
  - .AFW System Complete
  - .Obtain NRC concurrence (Date to be determined)
  - for second system.
  
  - Complete Evaluation (Date to be determined)

## 8.0 SYSTEM LAYUP

### 8.1 Introduction

Perform system lay-up activities to protect plant equipment.

### 8.2 Objectives

Expand the protection of completed and partially completed plant systems and components until plant start-up, to take into account any special considerations during the status assessment.

### 8.3 Description

Procedures and instructions are provided in the Testing Program Manual to protect equipment during the on-going installation and test work. These will be extended to cover special considerations associated with the Program implementation. Both the pre- and post-turnover periods are covered. System and component integrity is ensured through existing programs and implementation of control and verification procedures.

In summary, these procedures and instructions require: Test Engineers to complete walkdowns of Q-Systems (in the auxiliary, diesel generator and containment buildings and the service water pump structure), paying particular attention to systems/components that are open to the atmosphere (eg open ended pipes, open tanks, missing spools, disconnected instrument lines, etc). Systems that have been hydrotested but are not currently in controlled layup require action to place the system in layup. Layup will vary from system to system but in general will consist of air blowing to remove moisture and closing the system from the atmosphere.

### 8.4 Schedule/Status

- |                                           |         |
|-------------------------------------------|---------|
| . Start extended layup activities         | 1/15/83 |
| . Issue walk down schedules               | 1/15/83 |
| . Complete the layup preparation walkdown | 2/28/83 |

## 9.0 CONTINUING WORK ACTIVITIES

### 9.1 Introduction

This section describes the activities that are proceeding in accordance with previously established commitments during the implementation of the Program.

### 9.2 Objectives

- . Maintain installation and support effort on work that will alleviate work interference in congested portions of the plant and facilitate completion and protection of equipment on systems turned over to Consumers Power Company.
- . Meet previous NRC commitments on activities which do not impede the execution of the Program.
- . Provide design support for orderly system completion work and resolution of identified issues
- . Establish a management control to initiate additional specified work that can proceed outside of the systems completion activities

### 9.3 Description

Those activities that have demonstrated effectiveness in the Quality Program implementation will continue during implementation of the Construction Program.

These are:

1. NSSS Installation of systems and components being carried out by B&W Construction Company.
2. HVAC Installation work being performed by Zack Company. Welding activities currently on hold will be resumed as the identified problems are resolved.
3. Post system turnover work, which is under the direct control of Consumers Power Company, will be released as appropriate using established work authorization procedures.
4. Hanger and cable re-inspections which will proceed according to separately established commitments to NRC.
5. Remedial Soils work which is proceeding as authorized by NRC.



- 6. Design engineering which will continue for the Midland Plant as will engineering support of other project activities.

Additional activities related to the systems completion effort, may be initiated, as appropriate, to support orderly completion of the overall Project. Any activities in this category that are initiated prior to release of an area for systems completion work will be reviewed with the NRC Resident Inspector before initiation.

9.4 Status Schedule

These activities are proceeding with schedules that are independent of this Plan.

ENVIRONMENTAL  
POWER  
COMPANY

James W Cook  
Vice President - Projects, Engineering  
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

April 6, 1983

Mr J G Keppler, Administrator, Region III  
Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT -  
MIDLAND DOCKET NO's 50-329, 50-330 -  
CONSTRUCTION COMPLETION PROGRAM THIRD PARTY OVERVIEW -  
FILE 0655, B1.1.7 SERIAL 22268

- REFERENCES
1. LETTER TO J W COOK DATED MARCH 28, 1983 FROM NRC REGION III REGARDING CONSTRUCTION COMPLETION PROGRAM.
  2. LETTER FROM J W COOK DATED MARCH 10, 1983 TO MR R C DEYOUNG REGARDING MIDLAND PROJECT RESPONSE TO NRC NOTICE OF VIOLATION EA83-3 DATED FEBRUARY 8, 1983

Your letter of March 28, 1983 regarding the Construction Completion Program (CCP) consisted of Parts A, B and C. The following is in partial reply to the referenced letter:

- A. Items A1. through A9. will be addressed in a subsequent letter to you except for Item A5. for which our response is as follows:

Mr Keppler has asked that we develop measures that will ensure that our key hold points are honored and that critical parameters of our program are in place before proceeding to the next step. In order to ensure the Project's readiness to undertake the various steps in the CCP, the CCP includes provisions for management review at key points in the process. The review will examine plans for future implementation and ensure that programs and processes are thorough, complete, and correct. To provide the NRC with additional assurance that the CCP processes have, in fact, been and will be implemented as described in my January 10, 1983 letter, this letter, and the forthcoming response to Questions A1-A9 of Mr Keppler's March 28 letter, we will include in the duties of the third party construction overviewer responsibility for audits of our performance of these management reviews of the CCP process. We will not proceed with the CCP implementation beyond these points until the third party overviewer has documented their satisfaction with our readiness to proceed, including satisfaction with our initial response to any audit

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ATTACHMENT 3

findings, in their weekly reports. This commitment will also assure that the CIO is in place in time to audit the management review of Phase I planning, and hence before any physical verification under Phase I takes place. (Note: The title of this particular third party overview is now being entitled Construction Implementation Overview, CIO).

The Company has or will provide information regarding all items which the NRC wished to review through the normal exchange of information with the NRC Staff. This information was provided through the response to the Notice of Violation regarding DGB inspection, through the forthcoming response to Questions A1-A9 of Mr Keppler's March 28 letter, and through daily interaction with the NRC Resident Inspector (the adoption of the QC organization within MPQAD and the resolution of the CP Co stop work order on Zack welding).

- B. A more detailed description of the third party installation implementation overview (now titled CIO) is provided in the enclosed proposal (3 copies attached) from Stone and Webster (S&W).
1. The CIO will encompass all aspects of the CCP from the point that the CIO is mobilized onsite (including the process aspects discussed in A above and the reinspection work). The exception is that the CIO will not include an overview of the other third party evaluations being conducted as described in my letter to Region III dated January 10, 1983.
  2. As defined on Page 2 of Section 2 of the S&W proposal, there will be weekly meetings with S&W, Consumers Power and the NRC and weekly minutes (reports) of these meetings will be issued. The protocol for communications between the parties will be the same as used by S&W on the soils remedial activities.
  3. The CIO will continue until Consumers Power and the NRC have confidence in the adequacy of the Consumers Quality Assurance Program for the Midland Project.
- C. Consumers Power Company proposes that Stone and Webster be the organization to perform the CIO. This is based on the fact that we consider S&W technically capable to perform the activities both in terms of the individual team proposed and in the corporate depth to support this effort. They are presently conducting what we believe is a highly professional overview of the soils remedial activities and have been found acceptable by the NRC for corporate independence. In addition, your letter indicated that it would not be acceptable for the CIO organization to also be involved with the IDV, thereby disqualifying the other evaluated bidder, Tera Corporation.

The proposal submitted by S&W addresses Items C1, 2 and 3 of your letter except that the statements provided in the attachment concerning corporate and personnel independence were inadvertently not notarized. This situation will be immediately corrected and the sworn statements of independence will be sent to you directly by S&W by approximately April 8, 1983.

Enclosure 1 to your letter of March 28, 1983 discussed protocol for IDV on the Aux Feedwater System, Electric Power System (diesel generator), and the HVAC system assuring control room habitability. This protocol will be adopted by asking Tera Corporation to prepare a detailed procedure implementing this protocol.

Based on the need to have the S&W team audit our pending initial management reviews, we have requested S&W to be able to mobilize their team as soon as possible. This is currently scheduled to occur the week of April 18, 1983. We plan to proceed at our risk unless instructed otherwise by your office. However, we would very much appreciate your expeditious review of S&W as a satisfactory contractor for the third party overview of the CCP.

*James W. Cook*

JWC/GSK/lc

CC Atomic Safety and Licensing Appeal Board (w/o att)  
CBechhoefer (w/o att)  
FPCowan, ASLB (w/o att)  
JHarbour, ASLB (w/o att)  
MMCherry (w/o att)  
FSKelley (w/o att)  
HRDenton, NRC (w/att)  
WHMarshall (w/o att)  
WDPaton, NRC (w/o att)  
BStamiris (w/o att)  
MSinclair (w/o att)  
LLBishop (w/o att)

4

BCC RAWells, Midland (w/att)  
JEBrunner, M-1079 (w/att)  
GSKeeley, P-14-113B (w/o att)  
ARMollenkopf, P-14-209A (w/c att)  
DBMiller, Midland (w/att)  
FWBuckman, P-14-113A (w/o att)  
DMBudzik, P-24-517A (w/att)  
MIMiller, IL&B (w/o att)  
DFLewis, Bechtel (w/o att)  
DFJudd, B&W (w/o att)  
RWHuston, Washington (w/att)  
CSundstrum, S&W Boston (w/o att)  
PJGriffin, P-24-513 (w/o att)  
TABuczynski, Midland (w/o att)  
UFI (w/att)  
NRC Correspondence File, P-24-517 (w/att)

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

MAR 28 1983

*cc H. Livingston  
C. Swidstrom*



Docket No. 50-329  
Docket No. 50-330

Consumers Power Company  
ATTN: Mr. James W. Cook  
Vice President  
Midland Project  
1945 West Parnall Road  
Jackson, MI 49201

Gentlemen:

By letter dated January 10, 1983, Consumers Power Company described its proposed Construction Completion Program (CCP) for the Midland nuclear facility. This submittal was followed by a public meeting in Midland on February 8, 1983 for the NRC to obtain a better understanding of your proposed program and to obtain public input on the CCP. As a result of our review of the CCP to date, we find we need the following additional information.

- A. Please provide a more detailed description of the scope of the CCP and how it is going to function. Your discussions should address the following subjects or concerns:
1. Because of problems identified by the NRC during the special inspection of the diesel generator building and because similar problems were found in other areas of the plant during subsequent inspections by CPCo, we believe that 100% reinspection of accessible safety related structures, systems, and components is warranted. Should you intend doing less than 100% reinspection, please provide the details of your proposed program and the technical rationale for accepting a sampling approach.
  2. A description of the reinspection program for accessible systems and components important to safety.
  3. A description of the measures you intend to institute to assure that QC reinspection will be sufficiently independent of team controls.

ATTACHMENT 4

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4. A description of the training that will be provided to all personnel including craftpersons. Concerning QC inspector recertification training, describe the actions you have recently taken to address the adequacy of the review of PQCI's prior to training being initiated on the PQCI's. In addition, describe the steps you have taken to ensure that all questions raised during PQCI training sessions will be resolved prior to certification to affected PQCI's.
  5. As a result of the diesel generator building inspection, hold points were established by the NRC for the purpose of determining that you adequately performed all of the actions to which you have committed before allowing the work to proceed beyond the hold point. In view of the total CCP effort, the NRC does not wish to remain in the approval chain; therefore, you are requested to develop measures that will ensure that key hold points are honored and that critical parameters of your program are in place before proceeding to the next step.
  6. A description of the controls you will use to ensure all problems have been identified during reinspection of a system or area prior to start of repair work or new work on that system or in that area.
  7. A description of the controls you will use to ensure that no new work will be performed that would cause a known nonconformance to be inaccessible.
  8. A description of your proposed program for in-process QC surveillance (inspection) of rework and new work.
  9. A description of the CPCo management review process for changes to CCP and how CPCo intends to keep the NRC informed of such changes.
- B. Please provide a more detailed description of the third party installation implementation overview mentioned in your January 10, 1983 letter. Your description should address the following subjects or concerns:

MAR 28 1983

1. The installation implementation overview appears to focus solely on future construction and rework. We believe the overview should also encompass all aspects of the CCP, including the reinspection work. Please expand the installation implementation overview to include other aspects of the CCP and provide us with additional details of the overview.
  2. Weekly reports, similar to those issued by Stone and Webster to inform the NRC of the results of the soils overview, are needed. Please provide your commitment to have the third party CCP over-viewer prepare weekly reports similar to the soils overview weekly reports.
  3. The CCP overview should continue until CPCo and the NRC have confidence in the adequacy of the CPCo quality assurance program.
- C. Please propose a candidate organization that Consumers Power Company considers acceptable for the installation implementation overview together with your rationale for selecting that organization. The NRC will also need the following:
1. Sworn statements from the candidate corporation and all personnel who will be involved in the third party installation implementation overview, addressing the independence factors described in Chairman Palladino's letter of February 1, 1982 to Congressmen Ottinger and Dingell.
  2. The resumes of the key personnel to be involved in the third party overview.
  3. A description of the experience of the candidate corporation that qualifies the corporation to perform an independent third party overview.

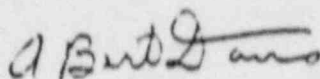
The NRC will determine the acceptability of the candidate corporation and will notify CPCo. Our present view is that the installation implementation over-viewer would not be acceptable to also perform the independent design and construction verification program.



In order to ensure adequate communications between the NRC, CPCo, the independent third party proposed or selected to conduct the independent design/construction verification program, and the public, the protocol in Enclosure 1 should be adhered to. This protocol does not apply to the third party overview of the remedial soils work or the third party overview of the CCP.

Should you have any questions regarding this letter please contact Mr. R. F. Warnick of my staff.

Sincerely,



for James G. Keppler  
Regional Administrator

Enclosure: As stated

cc w/encl:

DME/Document Control Desk (RIDS)

Resident Inspector, RIII

The Honorable Charles Bechhoefer, ASLB

The Honorable Jeffrey Harbour, ASLB

The Honorable Frederick P. Cowan, ASLB

The Honorable Ralph S. Decker, ASLB

William Paton, ELD

Michael Miller

Ronald Callen, Michigan

Public Service Commission

Myron M. Cherry

Barbara Stamiris

Mary Sinclair

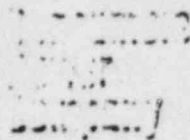
Wendell Marshall

Colonel Steve J. Gadler (P.E.)

PROTOCOL GOVERNING COMMUNICATIONS BETWEEN CONSUMERS

POWER COMPANY AND THE ORGANIZATION CONDUCTING THE INDEPENDENT DESIGN/  
CONSTRUCTION VERIFICATION PROGRAM

1. Recommendations, findings, evaluations and all exchanges of correspondence, including drafts, between the independent reviewer and CPCo will be submitted to the Regional Administrator at the same time as they are submitted to CPCo. For purposes of this protocol, the independent reviewer includes the independent reviewer and any of its subcontractors and Consumers Power Company (CPCo) means CPCo, Babcock and Wilcox, Bechtel, Management Analysis Corporation, S&W, and all of their subcontractors.
2. The independent reviewer has a clear need for prompt access to whatever information is required to fulfill its role. To this end, the independent reviewer may request documentary material, meet with and interview individuals, conduct telephone conversations, or visit the site to obtain information without prior notification to the NRC. All communications and transmittals of information shall, however, be documented and such documentation shall be maintained in a location accessible for NRC examination.
3. If the independent reviewer wishes to discuss with CPCo substantive matters related to information obtained, to provide an interim report to CPCo, or to discuss its findings or conclusions with CPCo in advance of completing its report, or if CPCo desires such communication, such discussions shall be accomplished in meetings open to public observation. In this regard, CPCo shall provide a minimum of five days advance notice to the Regional Administrator of any such meeting. The Regional Administrator shall make reasonable efforts to notify representatives of interested members of the public of the meeting, but the inability of any person to attend shall not be cause of delay or postponement of the meeting. Transcripts or written minutes of all such meetings should be prepared by the organization requesting the meeting and provided to the NRC in a timely manner. Any portion of such meetings which deals with proprietary information may be closed to the public.
4. All meetings between the Staff and CPCo and/or the independent reviewer will be open to public observation, except where the Staff determines that it is appropriate to conduct a meeting(s) in private with CPCo and/or the independent reviewer.
5. All documents submitted to, or transmitted by, the NRC subject to this Protocol, unless exempt from mandatory public disclosure, will be placed in the NRC Public Document Rooms in Midland, Michigan and Washington, D. C., and will be available there for public examination and copying.



James W Cook  
Vice President - Projects, Engineering  
and Construction

General Offices: 1945 West Parnell Road, Jackson, MI 49201 • (517) 788-0453

September 17, 1982.

Harold R Denton, Director  
Office of Nuclear Reactor Regulation  
Division of Licensing  
US Nuclear Regulatory Commission  
Washington, DC 20555

James G Keppler  
Regional Administrator  
US Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT  
MIDLAND DOCKET NOS 50-329, 50-330  
QUALITY ASSURANCE PROGRAM IMPLEMENTATION  
FILE: 0485.16 SERIAL: 18850

REFERENCE: CPCo Letter Serial 18845, 9/17/82, "Quality Assurance Program  
Implementation for Soils Remedial Work"

The referenced letter summarized Consumers Power Company's discussions with the NRC management regarding the implementation of the Quality Assurance Program for the Midland soils remedial work. In addition to the discussions specifically related to soils, the total Midland Quality Assurance Program implementation was reviewed and areas were identified where additional efforts should be directed to insure successful overall project implementation and the performance of the primary inspection function (QC) on site. In response to these concerns Consumers Power made two significant new commitments which are conceptually described in the following paragraphs. Additional documentation will be provided as the details of these commitments are worked out.

#### Quality Control Function

In order to improve the performance of the Quality Control function and to make it more responsive to direction from the Quality Assurance organization, the responsibility for directing the entire Quality Control function will be assumed by Consumers Power. The Quality Control group will functionally report to MPQAD. The programmatic aspects now in place will continue to be used and the combined inspection resources of both Bechtel and CPCo will be integrated. This reorganization will be fully implemented as soon as the appropriate procedural changes are finalized. The integration of the QC resources for soils into MPQAD has already been accomplished as a separate action.

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Independent Verification - Total Project

Consumers Power proposes a new and expanded approach for verifying the overall quality of the project. This approach will give a broader overview than the assessments currently being recommended by the NRC for other NTOL plants. The assessment which is suggested for Midland is to combine an INPO type construction project evaluation, which is a broad "horizontal" type review of many aspects of current project operations with the detailed "vertical slice" review of all aspects, current and historical of a critical plant system or subsystem. The entire review will be performed by one or more independent contractors who are currently being selected. With the assistance of the selected contractors, the detailed plans for this extensive independent assessment will be finalized and presented to NRC management shortly for their concurrence prior to initiating the major work activities.

The INPO portion of the program will be initiated immediately at least through the planning phase to comply with the INPO schedule and industry commitments to the NRC. The INPO construction program evaluation for Midland will differ from the majority of the industry's self-initiated evaluations in that an independent contractor rather than utility personnel will carry out the INPO evaluation. The results will then be overviewed by the INPO staff to assure adequacy and consistency with other evaluations.

Additional Assessment Programs

In addition to the above, Consumers Power has proposed to retain a qualified third party for an assessment of the underpinning activities as detailed in the referenced letter.

Consumers Power Company has also initiated other appraisals to assess the adequacy of the Quality Assurance Program. Two major recent examples of this practice that have occurred are as follows.

In 1981, Management Analysis Company (MAC) conducted an assessment which focused on performance in three major areas as follows:

1. Adequacy and timeliness of both part and process corrective actions taken on a sample of the historical hardware problems that have been identified at Midland over its lifetime.
2. The degree to which the physical characteristics of selected supplied components and parts meet their respective quality requirements.
3. The overall adequacy of the Quality Assurance Program with particular emphasis in corrective actions, effectiveness of the supplier documentation review efforts and personnel qualifications.

This assessment has been completed, the results were positive and all open items have been resolved and closed. The final report has been previously submitted to the NRC.

A Bechtel Corporate Staff project evaluation was initiated in April 1982. A report on the results of this assessment is being finalized at this time. The

purpose of this evaluation was to review the Midland engineering activities to determine if design criteria have been implemented and if the design assumptions, design methods, and the design processes are satisfactory. Bechtel Corporate Management was asked to initiate this assessment in order to certify that the Midland project met all the standards expected of any Bechtel project. To carry out this assignment the assessment team was specifically chosen to be independent from the Bechtel Ann Arbor Power Division. The team consisted of senior experienced personnel with appropriate expertise having previously performed similar work on other projects. A Consumers Power representative was a direct participant on the assessment team. The final report will be sent to the NRC upon completion and whatever other documentation or discussion as may be requested will be provided.

Conclusion

Based on the discussion outlined above and in the reference letter, Consumers Power believes that steps have been taken to insure both the successful implementation of the remaining work to complete the plant and a verification program, including quality records, test program results, and third party assessments, that will certify the adequacy of the plant as constructed.

*James W. Cook*

JWC/JAM/bjw

CC Atomic Safety and Licensing Appeal Board  
CBechhoefer, ASLB  
MMCherry, Esq  
FPCowan, ASLB  
RJCook, Midland Resident Inspector  
RSDecker, ASLB  
SGadler  
JHarbour, ASLB  
GHarstead, Harstead Engineering  
DSHood, NRC (2)  
DFJudd, B&W  
JDKane, NRC  
FJKelley, Esq  
RBLandsman, NRC Region III  
WHMarshall  
JPMatra, Naval Surface Weapons Center  
WOtto, Army Corps of Engineers  
WDPatton, Esq  
SJPoulos, Geotechnical Engineers  
FRinaldi, NRC  
HSingh, Army Corps of Engineers  
BStamiris

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
Docket No 50-329, 50-330

Letter Serial 18850 Dated September 17, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information regarding the implementation of the Consumers Power Company Quality Program for the Midland Plant.

CONSUMERS POWER COMPANY

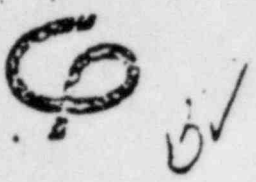
By           /s/ J W Cook            
          J W Cook, Vice President  
          Projects, Engineering and Construction

Sworn and subscribed before me this 17th day of Sept 1982 .

          /s/ Patricia A Puffer            
          Notary Public  
          Bay County, Michigan

My Commission Expires 3-4-86

NRC chron



James W Cook  
Vice President - Project Engineering  
and Construction

RIT 46-82

General Office: 1545 West Farnell Road, Jackson, MI 49201 • (517) 788-0453

October 5, 1982

Harold R Denton, Director  
Office of Nuclear Reactor Regulation  
Division of Licensing  
US Nuclear Regulatory Commission  
Washington, DC 20555

J G Keppler  
Administration, Region III  
US Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT  
MIDLAND DOCKET NOS 50-329, 50-330  
MIDLAND PLANT INDEPENDENT REVIEW PROGRAM  
FILE: 0485.16 SERIAL: 18879

REFERENCES: (1) R L TEDESCO LETTER TO J W COOK DATED JULY 9, 1982.  
(2) J W COOK LETTER TO H R DENTON, SERIAL 18850  
DATED SEPTEMBER 17, 1982.

ENCLOSURES: (1) MIDLAND PLANT INDEPENDENT REVIEW PROGRAM  
(2) PERFORMANCE OBJECTIVES AND CRITERIA FOR CONSTRUCTION PROJECT  
EVALUATION INFO, SEPTEMBER 1982

The ACRS interim report on the Midland Plant, dated June 2, 1982, contained a recommendation for a broader assessment of Midland's design adequacy and construction quality. In its correspondence of July 9, 1982, which is Reference 1 above, the NRC endorsed this ACRS recommendation and requested our proposal for performing an independent design adequacy review.

We briefly outlined several assessment activities for the Midland Project in our correspondence of September 17, 1982, identified above as Reference 2. Additional details of the program referred to in Reference 2 are enclosed for the NRC's review.

We have contacted our NRC Project Manager, Dan Hood, to arrange a meeting with the NRC Staff to discuss our Independent Review Program and to receive your concurrence or redirection of our plans. We will complete the planning phase, including team orientation and training, for the INFO program by

8210120296



October 29, 1982. We wish to initiate the implementation phase of the INPO program by November 8, 1982, in order to support our own and industry commitments to NRC.

*James W. Cook*

JWC/GSK/RLT/bjw

- CC Atomic Safety and Licensing Appeal Board, w/a 1
- CBechhoefer, ASLB, w/a 1
- MMCherry, Esq, w/a 1
- FPCowan, ASLB, w/a 1
- RJCook, Midland Resident Inspector, w/a 1 & 2
- RSDecker, ASLB, w/a 1
- SGadler, Esq, w/a 1
- JHarbour, ASLB, w/a 1
- GHarstead, Harstead Engineering, w/a 1
- DSHood, NRC, w/a 1 & 2 (2)
- FJKelley, Esq, w/a 1
- WHMarshall, w/a 1
- WDPatton, Esq, w/a 1
- WDShafer, NRC, w/a 1 & 2
- BStamiris, w/a 1
- MSinclair, w/a 1
- LIBishop, Esq, w/a 1

BCC RCBauman, P-14-312B, w/o  
JBeck, TERA, w/a 1  
JEBrunner, M-1079, w/a 1 & 2  
EMHughes, Bechtel, w/a 1  
RWHouston, Washington, w/a 1  
BWMarguglio, JSC-220A, w/a 1  
DBMiller, Midland, w/a 1  
MIMiller, IL&B, w/a 1  
GSKeeley, P-14-113B, w/a 1  
LKube, MAC, w/a 1  
JARutgers, Bechtel, w/a 1  
PSteptoe, IL&B, w/a 1 & 2  
TJSullivan/DMBudzik, P-24-624A, w/o  
RLTeuteberg, P-24-505, w/a 1  
FCWilliams IL&B, w/a 1  
JDeMeester, P-24-414, w/o  
DFJudd, B&W, w/a 1  
NRC Chron File

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
Docket No 50-329, 50-330

Letter Serial 18879 Dated October 5, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits Midland Plant Independent Review Program.

CONSUMERS POWER COMPANY

By           /s/ J W Cook            
          J W Cook, Vice President  
          Projects, Engineering and Construction

Sworn and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_.

          /s/ Barbara P Townsend            
          Notary Public  
          Jackson County, Michigan

My Commission Expires \_\_\_\_\_

## MIDLAND PLANT INDEPENDENT REVIEW

1. INTRODUCTION & SUMMARY
2. BIENNIAL QUALITY AUDITS
3. INPO CONSTRUCTION EVALUATION
4. INDEPENDENT DESIGN VERIFICATION
5. APPENDIX: PREVIOUS ASSESSMENTS

## 1. INTRODUCTION AND SUMMARY

The ACRS report dated June 8, 1982 on Midland Units 1 and 2 stated that "the NRC should arrange for a broader assessment of Midland's design adequacy and construction quality with emphasis on installed electrical, control, and mechanical equipment as well as piping and foundations."

On July 9, 1982, the Staff issued a letter to Consumers Power Company requesting a report on Midland Design Adequacy and Construction Quality. In this letter, the Staff stated that "With respect to assessment of Midland's design adequacy, such assessment would represent a significant contribution to the licensing review process if performed by a qualified, independent source following procedures utilized by some operating plants for Independent Design Verifications."

On September 17, 1982, the Company issued a letter to Mr Harold R. Denton and Mr J G Keppler outlining the approach Consumers Power Company proposed for an Independent Review of the Midland Project and indicated that there had also been a Bechtel Corporate Staff project evaluation performed (described in more detail in attached appendix). It was stated that Consumers Power Company believes that the approach we are proposing for the forthcoming Independent Review will give a broader overview than assessments currently being recommended by the NRC for other NTOL plants.

The overall Independent Review Program described herein consists of three specific evaluations combined into a single program. The INFO type construction evaluation (horizontal type review), will examine the current

overall project against the criteria developed by INPO for this program (a copy of the INPO Performance Objectives and Criteria for Construction Project Evaluations is attached). As indicated in the September 17, 1982 letter to Mr Denton and Mr Keppler, the INPO program for Midland will be different from most of industry's self-initiated evaluations in that an independent contractor rather than utility personnel will carry out the INPO evaluation. The second part of the Program described is the Biennial QA Audit which has been a requirement of the Company's QA Program for several years. The third part of the Program described in more detail is the Independent Design Verification (Vertical slice) of all aspects, historical and current, of a critical plant system or subsystem.

Consumers Power Company received proposals from several potential contractors to perform the complete program described above. With respect to the INPO type construction evaluation and Biennial QA Audit, we have selected Management Analysis Company (MAC) to perform these activities based on our evaluation of their technical capabilities and experience.

MAC has many years of experience in the Nuclear Industry and has performed Biennial QA Audits in addition to other type reviews of Company activities. MAC has previously consulted extensively at nuclear construction sites with identified QA problems. MAC was also a major participant in the development and implementation of the Palisades Regulatory Performance Improvement Program which has resulted in significant improvement to date at that facility. A description of other MAC assessments of Midland activities is included in the Appendix to this document.

The MAC Team will be under the direction of Mr L J Kube who has over 20 years experience in project management, engineering management, marketing, planning/scheduling, and design engineering having been employed by General Atomic and A O Smith Corporation prior to his employment with MAC. Mr Kube has been involved in the development of the INPO evaluation criteria, has participated in the three INPO Pilot evaluations and is the Project Manager for MAC for conducting an INPO evaluation on River Bend. The INPO type evaluation will be independent in that no Consumers Power Company or Bechtel personnel will be involved and MAC has never performed a direct line engineering or construction activity for Consumers Power Company.

For performance of the Independent Design Verification, we have selected Tera Corporation based on our evaluation of their technical capabilities and experience. Tera has many years of varied experience in the nuclear industry including independent design reviews, FSAR preparation, initial design of certain systems, and engineering, construction, operation and administration planning. Tera personnel are experienced in system design in the areas of mechanical, electrical, structural, and thermal hydraulic evaluations. Mr John W Beck, Vice President of Tera will be Project Manager for the Tera team. Mr Beck previously worked for Vermont Yankee Nuclear Power Corp as Executive Vice President serving as Chief Operating Officer. Prior to that he was Director of Engineering for Yankee Atomic Electric Co responsible for supervision and management of the plant, reactor, and environmental engineering departments. Prior to employment with Yankee, he was a Scientist at Bettis involved in Shippingport core design.

Individuals taking part in any of the three specific evaluations which make up the overall Independent Review Program will meet the "Independency Criteria" of Chairman Palladino's February 1, 1982 letter to Representative John Dingell and which are described as follows:

1. No individuals on the Project team will have been previously utilized by Consumers Power Company to perform design or construction work.
2. No individual involved will have been previously employed by Consumers Power Company.
3. No individual owns or controls significant amounts of Consumers Power Company stock.
4. No members of the present household of individuals involved are employed by Consumers Power Company.
5. No relatives of individuals involved are employed by Consumers Power Company in a management capacity.

MAC will be responsible for integrating an overall evaluation report made up of the three inputs.

The major objective of the overall evaluation report is to provide the NRC, ACRS, and the Consumers Power Company Chief Executive Officer with an assessment of the overall quality of the Midland Project. We believe that this assessment will adequately address the NRC, ACRS, and public's questions regarding the adequacy and construction quality of the plant.



The final report will be submitted to the NRC and an auditable record will be maintained of all comments on any draft or final reports, any changes made as a result of such comments, and the reasons for such changes.

## 2. BIENNIAL QUALITY AUDITS

### Background Of Biennial Quality Audit Requirements

The Consumers Power Company Quality Assurance Program Manual For The Midland Nuclear Plant, Topical Report CPC-1-A, requires the review of the Consumers Power Corporate Nuclear Quality Assurance Program to be performed at least once every 24 months or once every second calendar year by a Quality Assurance Program Audit (referred to as the Biennial Quality Audit).

This audit may be accomplished by a team consisting of Environmental & Quality Assurance personnel, selected employees from other Consumers Power Company departments or by an audit team of Quality Assurance personnel under contract to Consumers Power Company.

### Plans For The 1982 Biennial Quality Audit

The scope of the 1982 Biennial Quality Audit will be similar to the audits conducted in 1976, 1978 and 1980. The audit will evaluate the Quality Assurance Program being utilized by Consumers Power Company and by Bechtel and will evaluate on a sampling basis, the degree of compliance with the Program by Consumers Power Company and by Bechtel. Specifically, the 1982 Biennial Quality Audit will be conducted by Management Analysis Company (MAC) and will comply with the requirements of NRC Regulatory Guides 1.144 (9/80, Rev 1) and 1.146 (8/80, Rev 0).

### 3. INPO CONSTRUCTION EVALUATION

#### General

In early 1982, utility nuclear power plant construction problems stimulated industry initiative and action to ensure that programs in effect nationwide meet performance goals as intended. Accordingly, the Institute of Nuclear Power Operations (INPO) was tasked by the Utility Industry to develop and manage a construction project evaluation program. The first effort was to define Performance Objectives and Criteria for project evaluations. Use of these criteria for an overall evaluation is intended to provide considerably more depth than an audit, for an audit generally does not go beyond conformance to program requirements. The evaluations include some assessment of administrative and quality records ~~and~~ more important, focus on evaluating the success and efficiency of the project organization, systems and procedures in achieving the desired end results.

Following the drafting of the Performance Objectives, three pilot evaluations were conducted by INPO on plants under construction ie, Vogtle, Shearon Harris, and Hope Creek. During the last pilot a representative from NRC was present during data collection, evaluation and exit interview with utility personnel.

Following the pilot evaluations, the Performance Objectives and associated criteria were modified to reflect experiences gained. A copy of the criteria to be used for the INPO evaluation is attached.

The performance objectives are broad in scope; each generally covers a single, well-defined area. The supporting criteria are more narrowly focused statements of activities that support or help meet the performance objectives. Several criteria are listed under each performance objective.

There are five Performance Objectives and associated Criteria which specifically address design effort. These are:

DC.1 Design Input

Process for defining and controlling design input

DC.2 Design Interfaces

The identification and coordination of interfaces to ensure input requirements are satisfied

DC.3 Design Process

Process followed to ensure safe, reliable and verifiable designs in compliance with requirements

DC.4 Design Output

Development of designs which are complete, accurate, understandable and constructable

DC.5 Design Changes

Control of changes to ensure compliance with design requirements

In addition there are numerous Performance Objectives which support evaluating design control. These include: Construction Engineering, Project Planning, Training, Independent Assessments, etc.

The above INFO Performance Objectives and associated Criteria will be utilized for planning the Independent Design Verification.

The INFO type self evaluation is aimed at achieving a level of performance above that required to meet Regulatory Requirements. Members of 35 Utilities (including Consumers Power) met, drafted and reviewed performance objectives and criteria to support the performance objectives of seven areas including design. A complete list of the areas whose objectives are intended to define optimum performance is:

Organization and Administration

Design Control

Construction Control

Process Support

Training

Quality Programs

Test Control

The thrust of this type of evaluation is that if utilities attempt to meet standards above those normally required to achieve quality, there will be greater assurance that Regulatory Requirements are met. The program was then applied during three pilot evaluations and modified based on the experience gained during the pilot evaluations. It essentially looks at all aspects of work in progress. This program has been developed during the calendar year 1981 and industry has made a commitment to the NRC to initiate INFO type evaluation on nuclear plants under construction by the end of 1982. The only exceptions will include those plants very close to fuel load.

Consumers Power Company selected MAC to perform the INFO Construction

- Evaluation primarily because of MAC's involvement in the development of the Performance Objectives and participation in all three pilot evaluations. The team supplied by MAC will be individuals experienced in multi-discipline activities associated with nuclear power plant engineering and construction. In addition, team members will be experienced in interviewing and evaluating in the type of activity MAC has been performing for the nuclear industry over the past seven years.

#### PREPARATION FOR INFO TYPE EVALUATION

The evaluation team leader will review the job status, select work areas to be evaluated and select team members based on the above. A request will then be made to CP Co for background documents. The team will then review the documents and prepare a schedule. Individual assignments will also be made. Three team members of the team organization representing Civil, Mechanical, and Electrical disciplines will be part of the MAC INFO type evaluation team. Prior to actually performing the evaluation, all team members will receive training in plant orientation, procedures and INFO evaluation techniques.

#### PERFORMING THE EVALUATION

The entire evaluation team will initially meet at the Site to review the work in progress. Sections of the team will then move to the Designer's and Owner's Offices. Team members will then begin the task of collecting pertinent facts relative to various aspects of the job via observations, inspections, discussions and review of documents. These facts will be analyzed to the appropriate performance objectives and reviewed against the

objective. As findings develop, additional investigations may take place. During this time, the team will communicate with the project personnel to assure validity of findings and draft evaluation summaries will be prepared.

### REPORTING

At the conclusion of the evaluation, the team will verbally communicate their findings to the project. A formal report will then be prepared and presented to CP Co management. CP Co will acknowledge the findings and transmit the findings with their plans for corrective action concurrently to the NRC and INFC. INFC will assimilate various utilities reports into a comprehensive summary document and report the overall program progress to the NRC.

#### 4. INDEPENDENT DESIGN VERIFICATION

##### Goals and Objectives

The independent design review is directed at verifying the quality of design engineering for the Midland Plant. The approach selected is a review and valuation of a detailed "vertical slice" of the project design by a technically competent, independent organization. The design and as-built configuration of a selected safety system will be reviewed to assure its adequacy to function in accordance with its safety design bases and to assure applicable licensing commitments have been properly implemented.

##### Impact and Scope of Effort

The independent design verification (~~will~~ will consist of an independent design review of the Unit 2 auxiliary feedwater system (AFW) as an applicable sample of the design engineering effort at Midland Plant. This system was selected based upon system selection criteria discussed below. The review will be conducted by Tetra Corporation and will utilize a multidisciplinary team of senior staff personnel to assure that the design and as-built configuration of the AFW conforms to its safety design bases and Consumers Power Company's licensing commitments as a benchmark for its acceptability. In the design process, from concept to installation, will be identified and interfaces between design engineers evaluated to assure sufficient controls be placed on the transfer and specification of important design information. Although the review will focus on the AFW, the interfacing systems will be reviewed to determine that appropriate design constraints were imposed to



assure functionability of the AFW. Initially, important design elements for AFW will be outlined to assure the IDV includes an appropriate sample of the design interfaces between Consumers Power, B&W the nuclear steam supply system (NSSS) vendor, Bechtel the architect engineer, and other service related contractors. Design elements such as environmental qualification envelopes, seismic analysis, hydraulics and system control requirements will be selected to allow a diverse review of the various engineering disciplines (eg, Mechanical, Civil, Electrical). The design reviews in each area will evaluate the design approach used and, where appropriate, independent analytical techniques will be used to confirm questionable approaches or to permit assessment of the significance of any identified discrepancies.

To assure that the installed equipment reflects system design requirements, design specifications and drawings will be reviewed and in-field inspection of selected sections of the AFW conducted. The in-field inspection will confirm that the AFW is configured as specified in the design documents.

Throughout the IDV, all findings will be documented by each reviewer. Each finding will then be evaluated by the team leaders and more significant findings forwarded to a senior review team. At the conclusion of the effort, a preliminary report will be provided to Consumers Power and the original designers for review and provision of additional documentation that could have an impact on the final report findings. An auditable record of comments and additional information provided will be maintained. The final report will summarize the work accomplished, procedures used and a complete list and description of all findings from the review.

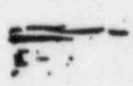
### System Selection Criteria

The selection of a system to be reviewed by the independent contractor was based on the six criteria which follow.

- Importance to Safety - The system should have a relatively high level of importance to the overall safety of the Midland Plant.
- Inclusion of Design Interfaces - The system should be one which involves multiple design interfaces among engineering disciplines as well as design organizations, such as the NSSS vendor, architect engineer and sub-tier contractors. The system should also be one where design changes have occurred and thus provide the ability to test the effectiveness of the design process exercised by principal internal and external organizations or disciplines in areas of design change.
- Ability to Extrapolate Results - The system should be sufficiently representative of other safety systems such that the design criteria, design control process and the design change process are similar so that extrapolation of findings to other systems can be undertaken with confidence.
- Diverse in Content - The major engineering disciplines should all have input to the design of the system.
- Sensitive to Previous Experiences - The system should be one which includes design disciplines or interfaces which have previously exhibited problems and thus a test of the system should be indicative of any general condition.

Ability to Test As-Built Installation - The system construction should be sufficiently completed that the as-built configuration can be verified against design.

The auxiliary feedwater system was selected for the independent design review after consideration of a number of other candidate systems. The auxiliary feedwater system had a sufficiently high profile for each of the criterion to justify its selection. Specifically, it involves interface with the NSSS vendor criteria, with containment design criteria, interface with design organizations, and the methodology of determining a water system's mechanical, electrical, and control component design criteria.



## Technical Approach

The independent design verification (IDV) effort is comprised of three phases; Program Development, Review and Reporting.

The Program Development Phase includes the preparation of an IDV work plan and the development of a detailed review scope. The IDV work plan will include procedures and instructions for the work to be performed by Tera Corporation, the IDV contractor. An initial identification of the specific verification methods and depth of review to be utilized in addressing system design elements will also be completed as part of this phase.

The Review phase is the major activity of the IDV. This phase includes a design review of the systems as well as a field installation/as-built review to assure conformance of the design and the constructed facility. Initial efforts of the system design review will focus on the identification of the design process (chain) for the selected system. Emphasis will be placed on identifying design organizations and their subelements who contributed to the design and understanding the design practices and interactions between the design engineers. Parallel to this effort, the design and licensing criteria will be reviewed. It is anticipated that system design criteria information will include utility, E&E and Technical design requirements, licensing commitments, as well as other sub-site documents.

The methods to be utilized in the review of system design elements will vary in scope. Depending upon the design area, the specific method may be a review of design criteria, a review of design calculations, a "blind" confirmatory

evaluation (eg alternative calculation or computer analysis by the DV contractor) or a combination. Where appropriate, independent analytical techniques will be used to confirm design calculations or to permit assessment of the significance of any identified discrepancies. It is anticipated that the primary review method will be a review of calculations. Ultimately, the choice of review method will depend upon the nature of the design area and the type of verification method which is most effective in enabling the DV reviews to reach a judgement as to the design adequacy in that design area.

This review will concentrate on each major step in the design process, for example:

Design input information (transfer among designers, conformance with design criteria and commitments).

Analyses and Calculations (selected review of inputs, assumptions, methodology, validation and usage of computer programs and reasonableness of certain analytical outputs).

Drawings and Specifications (selected reviews for conformance with system design criteria, commitments, and incorporation of results of analyses and calculations).

Field Verification (audit to ensure that the as-built configuration reflects design requirements and pre-operational check verify design analyses).

Findings from the DV review as well as input from other sources such as...

audit reports, etc. The reports, design change reports and other...

also be considered to concentrate review in more depth in any areas where the design process may be suspect by historical evidence.

The IDV review scope will be broad enough in terms of design elements to include samples from each significant design organization, design interface and major engineering disciplines.

The design elements to be evaluated include:

- \* Civil/Structural design of structures housing the AFW (eg, external or internal flooding, wind or tornado loads, seismic analysis, foundation design or missile protection).
- \* Mechanical/Electrical design of AFW systems and components (eg, pipe rupture protection, seismic subsystem evaluation, ASME code considerations, equipment qualification, penetrations design, cable routing and separation, instrumentation and control system, system interlocks, fire protection, seismic and quality group classification or use of appropriate codes and standards).
- \* System performance requirements (requirements for accident mitigation, design transients and normal operation, hydraulic design, over-pressure protection, reliability, NPSH for pumps).

The installation/as-built verification review will include a walkdown of the selected system and inspection of system components. This review is intended to confirm system geometry and component nomenclature data. Input from this evaluation will be assessed for its comparability with design documents such as specifications and drawings.

The DV will be conducted under project instructions and procedures that will require apparent discrepancies to be documented throughout the review.

Initially, these findings will be categorized based upon the lead reviewer's judgement as to status as follows:

- 1) Open- The finding has the potential for becoming a confirmed error, but additional investigation or confirmatory analysis is necessary to make a final judgement;
- 2) Confirmed - The finding is judged to be an apparent error by the review team and will require corrective action, such as additional documentation not utilized by the team that documents the resolution of the findings or additional analysis, design or construction changes or procedural changes that may be necessary to resolve the finding;
- 3) Resolved - Sufficient additional information was available in the ongoing review to resolve the findings and to completely close out any additional concern about the findings.

Additionally, findings will be categorized as to whether or not they affect the AP's safety function or licensing criteria. Additional design information will be solicited to allow the lead reviewers to reach disposition of each finding. As the reviews of each major design element reach a suitable stage, the individual findings will be evaluated in an integrated manner by the project team to further define or resolve the findings and to assure the classification is proper. After the team has completed its review, each finding will be submitted to a senior level review team to provide additional professional opinion regarding the classification of the finding.

Reporting will be in two stages, preliminary and final. The preliminary reports, including the findings, as modified by the senior review team, will be provided to Consumers Power Company for review by the original designers. The preliminary report will provide an opportunity for additional information to be supplied which could have an impact on the findings but was not known to the DV project team. All comments, additional information and changes to the findings will be maintained in an auditable manner. The final report will summarize the work accomplished, procedures used and include a complete description of all findings.



## APPENDIX

PREVIOUS ASSESSMENTS OF DESIGN  
AND CONSTRUCTION QUALITY AT MIDLAND

Historically, Consumers Power Company and its contractors have been committed to perform their work using QA programs which respond to all 10CFR50 Appendix B Quality Assurance criteria.

In addition to the Consumers Power Company audits in the areas of design and construction, the Company has utilized outside consultants to conduct Biennial Quality Audits. The Consumers Power Company Biennial Quality Audits were first instituted in 1976 and were subsequently conducted during 1978 and 1980. These audits were conducted to determine the Program's adequacy and to determine, on a sampling basis, the degree of compliance with the program. A summary of these audits are as follows:

A. 1976 Biennial Quality Audit

In 1976, the Biennial Quality Audit was conducted by the Nuclear Audit and Testing Company (NATCO) and included approximately 24 man-days of audit efforts. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Reactor Nuclear Quality Assurance Manual at the Midland Site. Audit findings resulting from this audit have been closed out.

1978 Biennial Quality Audit

In 1978, the Biennial Quality Audit was conducted by the Management Analysis Company (MAC) and included approximately 70 man-days of audit effort. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Bechtel Nuclear Quality Assurance Manual at the Bechtel Ann Arbor, Michigan offices (engineering) and at the Midland Site. Audit findings resulting from this audit have been closed out.

1980 Biennial Quality Audit

In 1980, the Biennial Quality Audit was conducted by the Management Analysis Company (MAC) and included approximately 46 man-days of audit effort. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Bechtel Nuclear Quality Assurance Manual at the Bechtel Ann Arbor, Michigan offices and at the Midland Site. Audit findings resulting from this audit have been closed out.

MAC also performed a special Assessment of Midland in 1981 which covered the following areas: Corrective actions resulting from 1978 items including adequacy of corrective action, corrective inspection and system walkdown. Corrective action status closure of 1980 biennial Corporate Audit, assessment

of adequacy of Midland QA program (based on first two items), review of documentation (supplier quality verification records, radiographic records, certificates of compliance, and Bechtel F.A.C.S program), and assessment of Bechtel and Consumers personnel (Bechtel QC and auditors, Consumers auditors, and Bechtel welders' qualification).

Starting in 1976 upon the discovery of missing rebar in three areas of the auxiliary building (later this was determined to not be a safety problem), Consumers instigated a surveillance of construction activities by Consumers QA personnel. Consumers Power surveillance provides formalized quality control inspections beyond those quality control inspections performed by the Bechtel Quality Control group.

In August 1980 the Quality Assurance Organizations of Consumers Power Company and Bechtel were integrated into one group with Consumers having the responsibility for direction and management. Consumers Power at this time set up a Design QA Engineering (DQAE) group at the Bechtel Ann Arbor offices to conduct day to day monitoring of engineering activities of Bechtel. The Consumers Power DQAE provides design and procurement quality/reliability services of problem prevention and early problem detection, resolution, and corrective action. DQAE personnel are degreed and have had direct design related experience in the areas of nuclear, mechanical, electrical, electronics and civil engineering. The DQAE functions consist of:

- 1. Technical reviews of Design and Procurement documents (engineering procedures/instructions, selected design and procurement documents, and supplier design deviation requests).

2. Monitors that requirements of controlling documents are being implemented (FSAR, engineering procedures, Appendix B, codes and standards) into specifications, drawings, material requisitions, supplier documentation and design calculations.
3. Audits of engineering, supplier QA Department, Bechtel Quality Engineering and Document Control.

Starting in January 1979, NRC Region IV Vendor Inspection Branch has conducted seven inspections of the Bechtel Ann Arbor Office. The latest inspections were in May and July 1982. In three of these inspections, there were no findings. Corrective action has been completed on all of the findings from inspections prior to 1982. There were no findings from the May 1982 inspection and the one finding from the July 1982 inspection has not been closed out as yet.

Although not requested by the NRC, Consumers Power Company decided in early 1982 that based on occurrences at Diablo Canyon and other plants, an Independent Design Audit or Review was prudent. The Company did not know what NRC staff requirements would be applied to an independent audit for plants that are in the construction and licensing stage similar to Midland. It was decided that this particular Independent Design Review would be undertaken as soon as possible in order to provide timely identification of problems so that corrective action could be taken consistent with overall project schedules. The purpose was to review Bechtel Project Engineering activities to determine if design criteria are being correctly implemented and if design management, design methods and the design processes are satisfactory. It was also noted

about the Bechtel design process but were not working on Midland design such as Bechtel personnel located in offices other than Ann Arbor or Consumers personnel that have not been directly involved in Midland.

The review team consisted of six Bechtel and one Consumers Power Company employees with disciplines represented in the areas of mechanical, nuclear, electrical, civil/structural, plant design, control systems and technical support for plant operations. Short term assistance was provided by specialists and consultants from other Bechtel offices in specific areas such as piping design and seismic analysis. The general approach of the review was to conduct a broad review of important design methods and then to review in-depth, including field walkdowns, four features of the plant. Emphasis was on engineering and factors important to safety, calculations, and design features which will not be demonstrated by tests during construction and start-up. Interfaces within Bechtel and between Bechtel and B&W were also reviewed. The basic criteria and commitments used by the review team were the TCR, Bechtel Topical Reports, project procedures, and industry guides and standards. Design methods selected for review included piping analysis, equipment qualification, separation hazards, instrumentation, structural and seismic analysis, and various nuclear analyses. The piping review included independent computer analysis of selected stress problems and larger designs and a review of unique computer programs developed for the Midland Project. The four features of the plant for an in-depth review were: reactor cavity design, on-site electrical systems, decay heat removal system and piping for a high pressure safety injection system outside containment. The review has been completed with findings issued and replied to. The final report is well

All other design review information will be submitted to SAC and Tech for use  
in the performance of their activities.

~~SECRET~~

September 1982  
Criteria  
Preliminary

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Performance  
Objectives  
and Criteria  
for Construction  
Project Evaluations

INPO 

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PERFORMANCE OBJECTIVES

AND CRITERIA

FOR CONSTRUCTION

PROJECT EVALUATIONS

INSTITUTE OF NUCLEAR POWER OPERATIONS

September 1982

PRELIMINARY

For Use In

SELF-INITIATED EVALUATIONS

## FOREWORD

In early 1982, utility nuclear power plant construction problems stimulated industry initiative and action to ensure that programs in effect nationwide meet performance goals as intended. Accordingly, the Institute of Nuclear Power Operations (INPO) was tasked to develop and manage a construction project evaluation program. The first effort was to define performance objectives and criteria for project evaluations. Use of the criteria is intended to provide considerably more depth than an audit, for an audit generally is regarded to be no more than a check of the paper trail. An evaluation includes some assessment of administrative records, but more important it focuses on evaluating the quality of the end result of implementing the project systems and procedures. It also includes assisting the utility by transferring technology, management systems, and procedural systems when the utility is not as strong as has been observed elsewhere in the industry. Such an evaluation can result in an uplifting, or upgrading, by specific recommendations on how to achieve a higher level of excellence.

This program is not intended to evaluate whether or not the design is adequate. Rather, the program will evaluate if the design documents are controlled and if the plant is being constructed as the design specifies; therefore, design control and quality of construction are the key objectives being evaluated.

These performance objectives and criteria are intended for use by INPO member utilities and third parties in the evaluation of the quality of engineering and construction of nuclear power plants. The scope of this document addresses the phase of the project beginning with the plant design process and extending through design, construction, and testing to issuance of the Nuclear Regulatory Commission operating license.

The performance objectives are broad in scope; each generally covers a single, well-defined area. The supporting criteria are more narrowly focused statements of activities that support or help meet the performance objectives. Several criteria are listed under each performance objective.

Corporate and project organizations among INPO member utilities vary widely. Accordingly, no specific organization has been assumed in developing this document. The areas addressed represent those relevant to achieving the highest standards in construction of a nuclear power plant. Rather than addressing a specific organizational structure, the program is designed to evaluate the systematic control of functions and approaches that are necessary to produce the desired results for project completion. The performance objectives and criteria emphasize management involvement in the design and construction of a nuclear power plant, since monitoring and control at the management level are essential to the achievement of an optimum end product.

This document is intended to provide a basis for INPO and INPO member utilities to assess the quality of utility management in select areas related to nuclear plant design and construction. Since the performance objectives and criteria are intended for use in evaluating the results, they do not necessarily prescribe or establish methods of achieving those results.

PERFORMANCE OBJECTIVES AND CRITERIA  
FOR  
CONSTRUCTION PROJECT EVALUATIONS

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ORGANIZATION AND ADMINISTRATION



## OA.1 ORGANIZATIONAL STRUCTURE

### PERFORMANCE OBJECTIVE

The owner's corporate organization and all other project organizations responsible for the design, engineering, planning, scheduling, licensing, construction, quality assurance, and testing of a nuclear plant should provide an organizational structure that ensures effective project management control.

### CRITERIA

- A. The project organizational structure is defined clearly and establishes an effective relationship among the owner's and contractors' responsible executives and managers for design, construction, procurement, planning, testing, quality assurance, and licensing of a nuclear power plant to support the success of the project.
- B. Managers associated with the project, either owner's, nuclear steam system vendors', architect/engineering firms', or contractors', at the executive, corporate, project, design, procurement, construction, start-up, operations, and quality assurance levels, understand clearly their relationships regarding the project, including their authorities, responsibilities, and accountabilities.
- C. An owner's manager is assigned responsibility for the project activities (hereafter referred to as project manager). This is his primary responsibility and preferably his sole responsibility. Also, he has the authority to direct the project.
- D. The owner's project-level managers are assigned responsibility for the following listed functional areas in support of the nuclear project activities. Sufficient authority is held by each individual to carry out assigned responsibilities.



1. project control, including planning, scheduling, and cost control
  2. engineering, analysis, and design control
  3. procurement control
  4. construction control
  5. management information systems
  6. training and qualifications
  7. construction testing and turnover control
  8. quality assurance
  9. material receipt, handling, storage, and maintenance
  10. record and document management
  11. legal and licensing requirements
  12. staffing, personnel policy, and salary administration
- E. The project manager exercises control in those functional areas assigned to managers who do not report to him to ensure that the plant is engineered, designed, constructed, and licensed in a manner resulting in a safe and reliable plant.
- F. The project manager's relationship to higher corporate management and ultimately to the chief executive officer is defined clearly and documented.
- G. Clearly defined access to the project manager is provided to other managers having responsibility for the functional areas under Criterion D.
- H. Corporate administration of contracts is delegated clearly with contractual obligations well-understood and enforced. Responsibility and appropriate authority for prompt action on contract changes, renegotiations, or violations of contracts have been assigned.
- I. Staffing for all project organizations is adequate for the authorities and responsibilities assigned.

## OA.2 MANAGEMENT INVOLVEMENT AND COMMITMENT TO QUALITY

### PERFORMANCE OBJECTIVE

Senior and middle managers in the owner's corporate office, designer's office, and at the construction site who are assigned functional responsibility for matters relating to the nuclear project should exhibit, through personal interest, awareness, and knowledge, a direct involvement in significant decisions that could affect their responsibilities.

### CRITERIA

- A. Procedures or written statements of policy address subjects relating to the engineering, design, and construction of nuclear projects. They include policies related to project quality, such as workmanship, problem identification and correction, action item tracking, reporting, and procedural compliance.
- B. Project personnel in the corporate office and at the construction site and designer's offices are aware of these procedures and policy statements and have them readily available for reference. They are able to explain how they are put into practice.
- C. Project personnel demonstrate compliance with these policy statements and the statements have a high degree of credibility.
- D. Both vertical and horizontal communication of significant problems and corrective actions are effective and coordinated to provide an accurate representation of conditions.
- E. Meetings involving corporate and project management personnel result in the regular review of key aspects of the nuclear project.

- F. Corporate managers are made aware of and utilize appropriate design and construction progress data and trends in setting goals and objectives and in management decisions involving the project.
- G. Methods are established that permit data and trends to be compared with results at other utilities with similar construction projects.
- H. Corporate managers responsible for the nuclear project are familiar with activities and reports that affect design and construction. They are cognizant of and sensitive to problems and external factors that might affect progress or quality. Examples of such involvement include the following:
  - 1. review of applicable audit, evaluation, and inspection results conducted by internal and external organizations
  - 2. personal interface with the engineering, design, and construction organizations and personal observations of their activities
  - 3. review of industry's engineering, design, and construction experience and trends
  - 4. review of project plans and schedules and reports of actual progress versus planned progress
  - 5. review of worker performance indicators such as rework and reject rates
- I. Management support and actions reflect appropriate attention to areas such as project management, scheduling, planning, staffing, training, personnel relations, and owner-contractor relations that affect project quality.
- J. Corporate managers responsible for nuclear matters are committed to seek out and employ methods and information systems for identifying problem areas and their underlying causes and for taking coordinated, corrective action to eliminate these problems.

- K. Designated managers associated with the project have responsibility and authority, by policy and practice, to stop or delay engineering, design, or construction activities when their judgement indicates that continuation will result in a failure to meet the project objectives.
- L. Management accountability for the project is consistent with the project structure and extends to the contractors, architect/engineering firm, and nuclear steam supply system supplier contractor.
- M. A complementary relationship is evident between management and quality assurance that supports implementation of a strong corporate commitment to quality.
- N. Decisions are made known to appropriate individuals for implementation.

QA.3 THE ROLE OF FIRST-LINE SUPERVISORS AND MIDDLE MANAGERS

PERFORMANCE OBJECTIVE

The project first line supervisors and middle managers should be qualified by verified background and experience and have the necessary authority to carry out their functional area responsibilities.

CRITERIA

- A. Position descriptions or the equivalent are employed for each key management and supervisory position.
- B. Minimum qualification, experience, and training requirements are defined for project first-line supervisors and middle managers.
- C. Authorities and responsibilities are defined clearly. Personnel clearly understand and accept their relationship in the organization and their authorities, responsibilities, and accountabilities.
- D. The first-line and middle managers are actively and personally involved in the nuclear project functional activities. Functions that could be performed include the following:
  1. approval of qualification requirements for positions that report directly to them
  2. provisions for input to and understanding of project policies governing each functional area covered in this document
  3. assessment of selected programs and activities relating to project activities, including follow-up on corrective actions
  4. close involvement with safety review groups performing independent reviews of matters affecting safety and reliability
  5. assurance that effective actions are taken on reports of significant and unusual project deficiencies in the managers' areas of responsibility

6. regular review of project status and current problems
  7. review of selected data and trends discussed in the functional sections of this document
  8. monitoring of organization's performance against established goals and objectives
  9. involvement in and understanding of trending programs and corrective actions related to developing adverse trends
  10. active involvement in ensuring that construction practices and procedures are followed in a manner that enhances the quality of the end product
  11. responsibility for ensuring that workers are qualified for their individual assignments and that they perform their work to project standards
- E. The project middle managers are sensitive to the need to control work assignments to ensure that project-related effort is not diluted.
- F. Appropriate supervisory, technical, and procedural training is conducted for first-line and middle managers having responsibilities for functional areas in support of project activities. Appropriate records of attendance, material presented, and test results (if given) are retained to document this training.



DESIGN CONTROL





## DC.1 DESIGN INPUTS

### PERFORMANCE OBJECTIVE

Inputs to the design process should be defined and controlled to achieve complete and quality designs.

### CRITERIA

- A. Design inputs such as codes, standards, regulatory commitments and requirements, criteria, and other design bases are identified, defined clearly, documented, evaluated, approved, and their scope of applicability is defined prior to their use in the design process.
- B. The design inputs include consideration of all of the requirements necessary to produce a quality design including feedback from pertinent industry engineering, design, and construction experience.
- C. Plant constructability, operability, inspectability and maintainability are considered in plant designs.
- D. The design inputs are provided at a level of detail and clarity necessary to be useable and understandable by all persons using these inputs.
- E. A systems, components, and materials experience information base, to the extent available, is a key element in the design process. Specifications for key safety-related equipment that does not have a substantial service history contain a requirement for supplier acceptance tests.
- F. The issuance and use of design inputs is controlled by the use of complete and understandable procedures.
- G. All changes to the approved design inputs are documented and approved prior to their use.
- H. Design personnel utilize supplier expertise as applicable in the design process.
- I. Design and design control information is readily available for use by all design personnel.

- H. Design personnel utilize supplier expertise as applicable in the design process.
- I. Design and design control information is readily available for use by all design personnel.

## DC.2 DESIGN INTERFACES

### PERFORMANCE OBJECTIVE

Design organization external and internal interfaces should be identified and coordinated to ensure a final design that satisfies all input requirements.

### CRITERIA

- A. Design organization engineering authority is documented, and limits of responsibility and authority are defined clearly.
- B. The flow of design information between both external and internal organizations is controlled and timely.
- C. The external and internal interfaces and responsibilities are defined and controlled by procedures.
- D. Oral and other informal means of communication, including letters and memos, which provide significant design information, are confirmed and promptly made a part of the design input by a controlled document.
- E. System interaction is considered in system design and analysis.
- F. Systematic and effective lines of communication are established.
- G. Design and design change information are coordinated effectively with all affected disciplines and operating personnel.
- H. Transfer of design responsibilities and documents from one organization to another is planned and implemented in a controlled manner.

### DC.3 DESIGN PROCESS

#### PERFORMANCE OBJECTIVE

The management of the design process should result in designs that are safe, reliable, verifiable, and in compliance with the design requirements.

#### CRITERIA

- A. The design process is documented, planned, and scheduled to ensure an orderly, sequenced process for completing design.
- B. Responsibility for controlling each function of the design process, including the preparation, review, and approval of input, in process, and output documents, is defined clearly, documented, and understood.
- C. The overall design review process includes system design reviews; verifications of calculations, methods, and computer runs; and validations of computer codes and models. The reviews or verifications are performed by individuals or groups other than those who performed the original design.
- D. Design documents include scope and applicability as well as the identity of the originator and checker.
- E. Calculations and analyses clearly specify information such as applicability, assumptions, design inputs, reference, methods, and results in a manner that allows a technically qualified person to understand the calculations or analyses.
- F. When an independent check of calculations and analyses is required, it is performed by a technically qualified person, and the method of checking is noted on the documents.
- G. Design process problems are identified, and decisions are made to resolve the problems in a timely and effective manner.

- H. Supervisory and management involvement in the design process is evident by the quality and timeliness of the output information and resolution of design problems.
- I. Design personnel provide timely technical support and follow-up on systems they have designed.
- J. Design processes are monitored for compliance with design commitments.
- K. Design control measures, such as procedures and checklists, are used to ensure that design inputs, such as design criteria, design bases, regulatory requirements, codes, and standards, are translated correctly into design documents, including specifications, calculations, drawings, procedures, instructions, and other documents needed to build a plant.
- L. Drawings, specifications, and other design documents are prepared under a controlled process that establishes standards for pertinent items such as format, content, status, and revision.

## DC.4 DESIGN OUTPUT

### PERFORMANCE OBJECTIVE

Project design documents should specify constructable designs in terms of complete, accurate, and understandable design requirements.

### CRITERIA

- A. The purpose of each type of design document is defined clearly.
- B. Design output documents reflect a constructable, operable and maintainable design that meets the design input requirements.
- C. The total design package is complete and understandable without the need for extensive coordination or interpretation by construction or vendor personnel.
- D. The design organization is aware of the capabilities and requirements of the supplier and the construction organization.
- E. Sufficient detail, legibility, and clarity for interpretation and reproduction are provided in design output documents to facilitate correct implementation of the design.
- F. The design organization is responsive to the need for clarification of design output documents where these needs are identified.
- G. Design output documents are issued and kept current using a controlled process.

## DC.5 DESIGN CHANGES

### PERFORMANCE OBJECTIVE

Changes to released project design documents should be controlled to ensure that constructed designs comply with the most recent design requirements.

### CRITERIA

- A. The design organization's response is timely and effective regarding identified changes.
- B. Reasons for the change are identified, evaluated, and, if necessary, actions taken to avoid future problems.
- C. The responsible design organization considers inputs to the original design before a change is issued.
- D. Design changes are coordinated with any affected discipline and/or organization in a timely manner.
- E. Appropriate procedures and methods are revised if design changes make these revisions necessary.
- F. Prior to the approval of the design change, consideration is given to quality, safety, cost, and schedule.
- G. Changes are subject to control measures commensurate with those of the original design.
- H. A system is utilized to determine whether or not the change being made impacts other parts of the system being changed, other areas of the plant, or other plants under construction.
- I. Methods are in place to ensure that changes are implemented in a timely manner.
- J. All changes, including those initiated by regulation, construction, vendor, or design, are properly reviewed by the design organization and, if approved, incorporated into the design documents.
- K. Appropriate design changes are evaluated promptly by each affected discipline, and necessary corrective action is taken and documented in a timely manner.



L. Design change review considers the change impact on items such as calculations, system functional requirements, original safety analysis assumptions, inspectability, maintainability, and selection of equipment and material.

CONSTRUCTION CONTROL



## CC.1 CONSTRUCTION ENGINEERING

### PERFORMANCE OBJECTIVE

Engineering and design performed under the authority of the construction organization should be controlled as to consistency with the basic design criteria to ensure compliance with applicable codes, standards, and regulatory commitments.

### CRITERIA

- A. Construction engineering authority is documented and limits of responsibility and authority are defined clearly.
- B. Procedures are effective in controlling the engineering and design processes of the construction engineering organization.
- C. Guidelines are issued to ensure that the basic design criteria used by the construction engineering organization is consistent with that used in the original plant design.
- D. Interface links between architect/engineering home office and the construction engineering group are efficient, effective, and defined clearly.
- E. Interface links among major vendors and subcontractors and the construction engineering group are efficient, effective, and defined clearly.
- F. Construction engineering field change control is maintained effectively as required to support the construction effort and to ensure final as-built conditions are defined.
- G. Construction engineering supports major construction equipment processes (e.g., special rigging studies and transportation studies) with calculations and design prior to important field construction effort.
- H. State-of-the-art engineering and design verification exists for construction engineering processes.

- I. Adequate engineering and design issuance procedures are in effect to support the engineering and construction process and to ensure management awareness of generic design or constructability problems.
- J. Field detail sketches and drawings for fabrication and installation accurately reflect basic design drawings and documents.
- K. Linkage to the document control system exists to ensure engineering and design documents are handled properly.

## CC.2 CONSTRUCTION FACILITIES AND EQUIPMENT

### PERFORMANCE OBJECTIVE

Construction facilities and equipment should be planned for, acquired, installed, and maintained consistent with project needs to support quality construction.

### CRITERIA

- A. A site plan has provided for key location of facilities such as warehouses, craft shops, equipment storage, and production facilities.
- B. Construction equipment is acquired in a manner to support the construction schedule and is maintained in optimum condition to support quality work.
- C. Facilities and equipment, both temporary and permanent, meet the project needs and specifications, and are maintained in accordance with established requirements.
- D. Periodic inspections or surveillances of the work areas and activities are performed to ensure that facilities and equipment support construction needs.

### CC.3 MATERIAL CONTROL

#### PERFORMANCE OBJECTIVE

Material and equipment should be inspected, controlled, and maintained to ensure the final as-built condition meets design and operational requirements.

#### CRITERIA

- A. The receiving process ensures that receiving inspections include evaluations of incoming materials and equipment against the procurement specifications. This process results in proper and timely disposition of deviations.
- B. Materials and equipment are identified properly to control installation and use.
- C. Quality documentation for received material is accounted for, reviewed, accepted, filed, and retrievable.
- D. Items received are processed in a timely manner to allow early identification of those items requiring special handling, storage, and preventive maintenance.
- E. Nonconforming items are identified and controlled to prevent unapproved use.
- F. Material and equipment storage, handling, and security are controlled effectively in accordance with specified requirements.
- G. The warehousing facility has an accurate inventory control system that provides for the effective location of items.
- H. The issuance process ensures that correct material is issued in accordance with engineering requirements.
- I. Effective preventive maintenance, including maintenance of cleanliness standards, is initiated at the appropriate time and continues throughout the construction process.
- J. Environmentally sensitive equipment is protected adequately from the degrading effects of temperature, humidity, and dirt.

#### CC.4 CONTROL OF CONSTRUCTION PROCESSES

##### PERFORMANCE OBJECTIVE

The construction organization should monitor and control all construction processes to ensure the project is completed to design requirements and that a high level of quality is achieved.

##### CRITERIA

- A. Construction activities are identified in advance to allow for development of procedures and selection, training, and qualification of personnel.
- B. Work procedures and instructions have sufficient detail to ensure that construction activities are in accordance with engineering requirements.
- C. Construction activities are performed in accordance with work procedures, instructions, and current revisions of drawings approved for construction.
- D. Rework activities are performed in accordance with established procedures and are subject to required inspections.
- E. Work is performed by and under the supervision of qualified personnel who recognize and accept a responsibility for quality.
- F. Proper tools are available and are used correctly.



## CC.5 CONSTRUCTION QUALITY INSPECTIONS

### PERFORMANCE OBJECTIVE

Construction inspections should verify and document that the final product meets the design and quality requirements.

### CRITERIA

- A. The inspection process is defined accurately prior to the start of the work and is controlled to meet the requirements of the project.
- B. An effective system is in place to encourage the reporting of degraded quality.
- C. Inspection procedures are clear, define the inspection process in detail, and reference appropriate acceptance criteria.
- D. Inspections are integrated into the construction processes and work schedules.
- E. Inspections are performed using written procedures.
- F. Calibrated equipment used in inspections is of the proper type, range, and accuracy.
- G. The quality control inspectors are separate from the production function.
- H. The records clearly indicate the scope of the inspections, the inspector, and the results.
- I. Records are reviewed for completeness and accuracy prior to their storage in accordance with project requirements.

## CC.6 CONSTRUCTION CORRECTIVE ACTIONS

### PERFORMANCE OBJECTIVE

The construction organization should evaluate audits, inspections, and surveillances; process replies and follow-up; and take corrective action to prevent recurrence of similar problems.

### CRITERIA

- A. The construction organization tracks construction audits and surveillances, prepares well-researched replies that address the deficiencies, and takes prompt and effective corrective action.
- B. The construction organization evaluates audits for generic problems and trends and takes appropriate action to prevent recurrence.
- C. Nonconformances are identified, tracked, and closed out in a timely manner.
- D. The construction organization reviews nonconformances to ensure corrective actions have been taken, evaluates for trends, and reports problem areas to upper management.

CC.7 TEST EQUIPMENT CONTROL

PERFORMANCE OBJECTIVE

Measuring and test equipment should be controlled to support construction testing effectively.

CRITERIA

- A. Measuring and test equipment utilized for testing is identified uniquely.
- B. Measuring and test equipment is controlled to ensure that only properly calibrated equipment is used for testing.
- C. Specific programs are implemented to provide regular calibration of instrumentation and to track status and calibration of each instrument used for testing.
- D. Special procedures are implemented to identify retest requirements when instrumentation is found to be defective.
- E. The construction organization tracks equipment out-of-tolerance reports and work performed to correct work previously done incorrectly.
- F. The construction organization establishes regular maintenance and calibration intervals for all equipment and ensures timely calibration for each device.
- G. Calibration is accomplished correctly using certified equipment traceable to recognized standards or methods. Calibration records are retained and retrievable.

PROJECT SUPPORT



PS.1 INDUSTRIAL SAFETY

PERFORMANCE OBJECTIVE

The construction site industrial safety program should achieve a high degree of personnel safety.

CRITERIA

- A. An effective industrial safety program with clearly defined policies, procedures, scheduled training requirements, and individual responsibilities is implemented with the full support of managers and supervisors.
- B. Selected data and trends of industrial safety activities are monitored, including the following:
  - 1. summary analysis of first aid treatments
  - 2. analysis of accidents requiring doctor's care
  - 3. incidence of lost-time accidents
  - 4. frequency of safety violations identified
- C. General housekeeping practices prevent the accumulation of debris and trash.
- D. A safe and orderly job site working environment exists.
- E. Lifting and rigging equipment is checked regularly.
- F. A fire protection program is defined, organized, and well-publicized.
- G. The site controls hazardous materials effectively.
- H. A safety tagging program exists and is implemented effectively to protect equipment, personnel, and material.

PS.2 PROJECT PLANNING

PERFORMANCE OBJECTIVE

Project plans should ensure completion of the project to the highest industry standards by identifying, interrelating, and sequencing the tasks of the project organizations.

CRITERIA

- A. The project master plan presents the interrelationships of tasks within and among the plans for the various elements of the project.
- B. The project plans are documented and approved by the appropriate level of management.
- C. The project plans are updated to reflect changing conditions.
- D. The project plans are communicated to the responsible project members.
- E. Clear lines of authority and responsibility exist between the individual assigned responsibility for plan development and those responsible for plan implementation.
- F. Individuals assigned responsibility for planning for each functional area of the project are provided the necessary data.

PS.3 PROJECT CONTROL

PERFORMANCE OBJECTIVE

Project scheduling and work planning and coordination should ensure that the objectives of the project plan are met through effective and efficient use of project resources.

CRITERIA

- A. Individuals responsible for functional areas demonstrate an awareness of the need for and knowledge of project controls and utilize these controls as required.
- B. Elements of work are defined into manageable segments that can be accomplished by a typical work unit on a definite schedule.
- C. Elements of work are defined in a way that identifies clearly the construction unit or discipline responsible for the work.
- D. Based on input and feedback from responsible project personnel, a controlling construction schedule exists that provides a plan for completion of work elements and commitments and that provides management with a clear, concise, and understandable method of tracking project milestone completion.
- E. Elements of work are recorded in a tracking system that is established prior to the work being performed and that allows project construction completion to be monitored based on installed quantities.
- F. Work elements are integrated into the construction schedule in a manner that facilitates construction erection sequence, minimizes interferences and rework, and optimizes project resources.
- G. Deviations from the project schedule and plan, caused by regulatory, productivity, design and other changes and interferences, are communicated to the proper level



of management and analyzed for trends. Corrective actions are taken to modify the schedule and plan.

- H. Quality control hold point inspections are integrated with the work activities.
- I. The work activities address support requirements for the segments of work to be accomplished.
- J. Work plans provide for a smooth transition from bulk scheduling to system completion scheduling.

PS.4 PROJECT PROCUREMENT PROCESS

PERFORMANCE OBJECTIVE

The project procurement process should ensure that equipment, materials, and services furnished by suppliers or contractors meet project requirements.

CRITERIA

- A. Procurement documents provide clear and adequate technical, quality assurance, commercial, and administrative requirements necessary to define the scope and requirements of the contract.
- B. The preparation, review, and approval of procurement documents are controlled in accordance with established procedures.
- C. A list of qualified suppliers or contractors is used to identify sources of quality products and services.
- D. Only those suppliers or contractors who are listed as qualified are requested to furnish bids or proposals.
- E. Proposals and bids are evaluated for compliance with the requirements and scope defined in the procurement documents. These evaluations are performed by the personnel responsible for the preparation of the procurement specifications.
- F. The recommendation and contract award are conducted in accordance with established procedures.
- G. Subtier suppliers or contractors are contractually bound to adhere to related portions of the contract.
- H. Supplier and contractor performance histories are used to improve the procurement process.
- I. Purchasing and contract documents are reviewed to ensure inclusion of requirements to achieve quality.

PS.5 CONTRACT ADMINISTRATION

PERFORMANCE OBJECTIVE

Methods for administering and controlling contractors and suppliers and for managing changes to their contracts should ensure effective control of performance.

CRITERIA

- A. Changes are prepared, reviewed, and approved in a manner consistent with the original requirements.
- B. Changes are justified with respect to quality, safety, cost, and schedule and are approved by an appropriate level of management.
- C. All verbal or informal changes are approved and confirmed promptly in writing within the guidelines of the change procedures.
- D. Performance is monitored, and corrective action is implemented as required.

PS.6 DOCUMENTATION MANAGEMENT

PERFORMANCE OBJECTIVE

The management of project documentation should support the effective control and coordination of project activities and provide a strong foundation for the documentation/information requirements of the plant's operational phase.

CRITERIA

- A. A comprehensive records management plan and schedule exists to do the following:
1. identify the documents and records required by regulations, purchase specifications, corporate requirements, and standards
  2. specify the minimum content and format requirements and acceptance criteria for each record/document type
  3. clearly designate responsibility for receipt, review of acceptability, resolution of deficiencies, and control of documents during construction
  4. contain proper methods for declaring appropriate documents "as-built" during construction
  5. determine what, when, how, to whom, by whom, and in what format records will be turned over to the plant's operational staff
- B. The records management plan is effective in identifying the current status of project documents such as the following:
1. design drawings
  2. specifications
  3. structure/system descriptions
  4. vendor drawings and manuals
  5. design criteria and procedures

- C. The records management plan effectively incorporates approved changes or revisions into the project documents within an acceptable time frame.
- D. The distribution system is defined and ensures timely distribution of current project documents to engineering, construction, and project support personnel within the project organization and to appropriate contractors and vendors.
- E. The project maintains master files of the latest revision of project documents that are correct and accessible.
- F. Storage facilities provide secure maintenance of permanent and nonpermanent records.

TRAINING



## TN.1 TRAINING MANAGEMENT SUPPORT

### PERFORMANCE OBJECTIVE

Management should ensure that an effective program exists for indoctrination, training, and qualification of personnel involved in the project.

### CRITERIA

- A. Corporate managers in each area have an active interest and involvement in the training program.
- B. Managers are trained and have adequate knowledge in areas related to their roles in the design and construction of a safe and reliable plant.
- C. Training is neither interrupted, deferred, or cancelled, nor are personnel diverted routinely from training to other activities.
- D. Management and supervisors are involved actively in assessing the qualifications and training needs of individuals with respect to their assigned tasks.
- E. Management makes use of feedback information to improve the effectiveness of the training program.
- F. Actions taken as a result of monitoring training and qualification trends are reviewed by appropriate levels of management on a periodic basis.



## TR.2 TRAINING ORGANIZATION AND ADMINISTRATION

### PERFORMANCE OBJECTIVE

The training organization and administration should ensure effective control and implementation of training activities.

### CRITERIA

- A. The training organization is defined clearly.
- B. Training and qualification goals and objectives are established.
- C. Training and qualification efforts are governed by procedures that outline responsibilities of the training organization.
- D. Training personnel are provided training and opportunities to enhance their performance as instructors.
- E. Training programs address organizational needs at appropriate levels.
- F. Technical and nontechnical training requirements for individuals are defined clearly and documented.
- G. An active program exists to acquire feedback for the purpose of developing, modifying, and improving the training programs.
- H. Training activities are conducted regularly, and results are documented.

### TN.3 GENERAL TRAINING AND QUALIFICATION

#### PERFORMANCE OBJECTIVE

The training program should ensure that all employees receive indoctrination and training required to perform effectively, and that employees are qualified as appropriate to their assigned responsibilities.

#### CRITERIA

- A. Initial selection, training and indoctrination enable individuals to perform assigned responsibilities effectively.
- B. The previous qualification and training of new hires and transfers are verified.
- C. Individuals are qualified as appropriate for their assigned responsibilities.
- D. Training on a continuing basis, both formal and on-the-job, maintains the employee's ability to perform consistently and effectively.
- E. Continuing training provides an effective means of keeping employees up-to-date regarding changes to policies, procedures, processes, instructions, and commitments.
- F. Individuals are requalified or recertified as required to keep their qualifications current.
- G. Feedback is acquired and used to modify and improve training methods and content.

#### TR.4 TRAINING FACILITIES, EQUIPMENT, AND MATERIAL

##### PERFORMANCE OBJECTIVE

The training facilities, equipment, and material should support and enhance training activities.

##### CRITERIA

- A. Classroom facilities are provided for group instruction.
- B. Reference materials are up-to-date and readily accessible.
- C. Equipment is available as needed to support training material development.
- D. Training aids and material are provided to support the program.
- E. Test and certification records are available and are updated regularly, and a follow-up system for required recertification of personnel is utilized.

QUALITY PROGRAMS



## QP.1 QUALITY PROGRAMS

### PERFORMANCE OBJECTIVE

The quality assurance program scope, content, and applicability should be appropriate, defined clearly, and understood.

### CRITERIA

- A. The quality assurance and quality control programs include all necessary program elements.
- B. Day-to-day activities are observed and monitored under a continuing program designed to ensure the highest quality of personnel performance, workmanship and attention to detail.
- C. The quality assurance program is applied to the project in an appropriately graduated way.
- D. The relationship between manuals and the applicability of procedures is defined clearly and understood.
- E. Audit and surveillance schedules are modified as appropriate to verify the effectiveness of program implementation and to reflect the need for increased monitoring.
- F. The utility conducts evaluations of contractors' quality assurance program with sufficient regularity and in sufficient depth to ensure program effectiveness.
- G. The programs provide for indoctrination and training of personnel as necessary to ensure that suitable proficiency is achieved and maintained.
- H. The "stop process" and "stop work" authority is understood clearly and implemented effectively.

QP.2 PROGRAM IMPLEMENTATION

PERFORMANCE OBJECTIVE

Quality assurance and quality control functions should be performed in a manner to support and control the quality of the project activities.

CRITERIA

- A. The relationship of the quality assurance and quality control organizations with other organizations and individuals is defined clearly to ensure their independence.
- B. Quality assurance and quality control personnel experience a cooperative relationship with other project personnel and are free of harrassment and intimidation.
- C. Quality assurance and quality control areas function in a manner that supports management.
- D. The quality assurance programs of vendors and contractors include measures to achieve quality and are implemented in an effective manner.
- E. Project organizations utilize technical specialists in the implementation of the quality requirements.

### QP.3 INDEPENDENT ASSESSMENTS

#### PERFORMANCE OBJECTIVE

Management should provide an effective, independent assessment of project activities affecting the quality of the project.

#### CRITERIA

- A. A plan is implemented to ensure that audits and surveillances effectively assess applicable project activities in a timely manner.
- B. The results of the independent assessments identify substantive issues affecting performance.
- D. Independent assessments are performed by individuals with no direct functional responsibilities for the area being assessed.
- E. Independent assessments are performed by individuals suitably qualified to conduct the assessment.
- F. The analysis of the assessments properly evaluate the activity assessed.
- G. The results of the assessments and evaluations are directed to and used by the management of organizations to improve their effectiveness.
- H. Periodic evaluations of the effectiveness and adequacy of the total quality program are performed. Results are reported to the senior management level, and appropriate action is implemented.



QP.4 CORRECTIVE ACTIONS

PERFORMANCE OBJECTIVE

Conditions requiring corrections or improvements should be resolved in an effective and timely manner.

CRITERIA

- A. Conditions adverse to quality are reported promptly and accurately.
- B. The responsible organization assumes its responsibility for and its management is involved in and supports the correction of adverse quality.
- C. The senior levels of management are apprised of adverse quality conditions and hold the responsible supervisors accountable.
- D. Corrective action resolves not only the reported item, but also the basic cause in a manner that ensures the quality of future activities.
- E. Effective corrective action is taken in a timely manner.
- F. The quality assurance, quality control, and project organizations cooperate in identifying and solving problems effectively.
- G. Quality performance trends are developed and analyzed to effectively address generic problems and basic causes of degraded quality.

TEST CONTROL



## TC.1 TEST PROGRAM

### PERFORMANCE OBJECTIVE

The test program should verify the plant's full capability to operate as intended by testing the plant's systems functionally.

### CRITERIA

- A. A clear policy is developed and endorsed by top management that describes the test organization's responsibility for component, system, and preoperational testing.
- B. The principal design organization is involved in formulating test objectives and acceptance criteria.
- C. The test program describes the scope of system testing, provides detailed guidance for conduct of testing, and includes methods for evaluation of completed tests.
- D. Nonconforming conditions and discrepancies are identified and tracked, and appropriate resolution or corrective action is achieved.
- E. Adequacy of plant operating and maintenance procedures is demonstrated.
- F. The test program describes the quality assurance program under which it functions.

## TC.2 TEST GROUP ORGANIZATION AND STAFFING

### PERFORMANCE OBJECTIVE

The test group organization and staffing should ensure effective implementation of the test program.

### CRITERIA

- A. The test group organizational structure and organizational relationship to interfacing organizations are defined clearly.
- B. The staff build-up accommodates the early requirements for testing procedure and schedule preparation.
- C. The staff size is sufficient to accomplish the assigned tasks as dictated by the test schedule.
- D. Permanent plant personnel are utilized during testing, to the maximum extent practical, in order to enhance their experience and training.
- E. Key management, supervisory, and professional positions are described in writing.
- F. Personnel who are assigned to perform testing meet the experience and qualification requirements as delineated in the written position descriptions.
- G. Qualifications of test personnel are maintained.

### TC.3 TEST PLAN

#### PERFORMANCE OBJECTIVE

The test organization should prepare a plan and a schedule that describe the sequence of system or component testing to support major schedule milestones.

#### CRITERIA

- A. The plan and schedule are developed by personnel experienced in test and start-up operations.
- B. The plan and schedule are coordinated with the engineering and construction schedules so restraints are identified for project management action.
- C. The plant systems are scoped into logical, bounded, well-defined subsystems that can be tested as units.
- D. The schedule for individual system or component testing describes the required elements of testing, including those systems required to support individual system testing.
- E. The status of testing is monitored by a tracking system.

#### TC.4 SYSTEM TURNOVER FOR TEST

##### PERFORMANCE OBJECTIVE

The construction testing and turnover process should be controlled effectively to ensure that program objectives are met.

##### CRITERIA

- A. Jurisdiction is delineated for organizations responsible for the conduct of tests, acceptance of results, and turnover to succeeding test programs.
- B. Tests are performed and results evaluated for conformance to design requirements.
- C. Retests are performed when necessary and are controlled to ensure completeness of verification.
- D. System walk-downs are conducted by appropriate and qualified individuals and entities who effectively identify engineering, maintenance, and construction deficiencies.
- E. System turnover procedures identify clearly participants, duties, responsibilities, and documentation necessary for the turnover process.
- F. Turnover documents identify boundaries, material, equipment, deficiencies, and exceptions existing at the time of turnover.
- G. Turnover exceptions are tracked effectively and are corrected in a timely manner.
- H. The lead design, construction, quality control, and testing organizations integrate project needs effectively and accomplish the turnover process in a timely manner.
- I. System and area cleanliness and maintenance programs are continued during the test phase.

## TC.5 TEST PROCEDURES AND TEST DOCUMENTS

### PERFORMANCE OBJECTIVE

Test procedures and test documents should provide appropriate direction and should be used effectively to verify operational and design features of respective systems.

### CRITERIA

- A. The necessary technical data are used in test procedure preparation.
- B. Approved test procedures are available in advance of their intended use to allow adequate test preparation and training.
- C. The test procedures describe clearly the objectives, prerequisites, system boundaries, and acceptance criteria for tests.
- D. Test procedures receive the prescribed review before approval.
- E. Tests are performed in accordance with approved procedures.
- F. Necessary retesting is conducted when design changes occur during or after completion of the test phase.
- G. The results of the test program receive an independent review and approval.



## TC.6 SYSTEM STATUS CONTROLS

### PERFORMANCE OBJECTIVE

A method should exist to identify the status of each system or component and the organization holding control or jurisdiction over that system or component to prevent interference and ensure equipment and personnel safety.

### CRITERIA

- A. Policies and procedures for plant status controls are implemented during testing.
- B. A system is implemented to ensure current knowledge of the status of systems.
- C. Activities affecting the status of systems and changes of status are authorized by designated personnel and are appropriately documented.
- D. Tagging systems are coordinated among the various groups involved in the project to ensure control of status and of equipment and personnel safety.
- E. Procedures are implemented to install, control, remove, and review periodically temporary field modifications.
- F. Jurisdiction and control of construction work on systems after initial turnover are defined clearly and implemented.
- G. Complete and current system documentation packages, including all changes and revisions resulting from the testing program, are provided to the plant operating staff in a timely manner.

James W. Cook  
Vice President - Projects Engineering  
and Construction

General Offices: 1945 West Parnell Road, Jackson, MI 49201 • (517) 788-0453

December 3, 1982

Harold R Denton, Director  
Office of Nuclear Reactor Regulation  
Division of Licensing  
US Nuclear Regulatory Commission  
Washington, DC 20555

J G Keppler  
Administration, Region III  
US Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT  
MIDLAND DOCKET NOS 50-329, 50-330  
MIDLAND PLANT INDEPENDENT REVIEW PROGRAM  
FILE: B1.1.5 SERIAL: 19750

REFERENCES: (1) J W COOK LETTER TO H R DENTON AND J G KEEPLER,  
SERIAL 18879 DATED 10/5/82

(2) NRC SUMMARY DATED 11/8/82 OF 10/25/82 MEETING  
ON INDEPENDENT DESIGN VERIFICATION

Reference (1) provided a description of the Midland Plant Independent Review Program. Reference (2) summarized the October 25, 1982 meeting wherein Consumers Power Company and their contractors, Management Analysis Company (MAC) and Tera, discussed in more detail the Independent Review Program. During this meeting, questions posed by the Staff were responded to by the Company and its contractors.

At the end of the meeting, Consumers Power Company requested the Staff to provide the applicant with policy guidance on the proposed Independent Review Program. The Staff agreed to provide preliminary feedback to Consumers Power Company by October 29, 1982 and to arrange for additional meetings as deemed appropriate. This was subsequently done and an additional meeting was held on November 5, 1982 to provide the NRR Staff more details of the Stone and Webster third party assessment of the implementation of the soils underpinning work.

82/2080392

Based upon the meeting of October 25, 1982 and subsequent feedback from the NRC Staff, Consumers Power proposes the following changes to the Independent Review Program as submitted in Reference (1) and discussed at the October 25, 1982 meeting:

- (1) The three specific evaluations will not be combined into a single program with coordination of the individual reports by MAC.
- (2) The Tera Independent Design Verification (IDV) effort will be completely separate from the MAC effort, with neither subcontractor having members from their company involved in the other company's efforts.
- (3) The Tera IDV will be on the Auxiliary Feedwater System (AFWS) as originally planned, and will also be implemented on another system which the Staff is to select based on three candidates provided by Consumers Power Company on a risk assessment basis. The three candidate systems proposed by Consumers Power Company are:
  - a. Electric Power System (Diesel Generator)
  - b. Safeguards Chilled Water System
  - c. Containment Isolation System
- (4) The Tera IDV will be expanded to include a more in-depth review of construction activities to provide assurance of as-built construction adequacy of the systems included in the Tera (IDV).
- (5) For the IDV, any discussions between project personnel and Tera on confirmed findings will take place in formal meetings with the NRC being notified of the meetings in time to attend, if they desire.
- (6) For the INPO Construction Project Evaluation, a copy of the final report will be given to the NRC when it is sent to INPO.

We believe that this letter documents the conclusions reached between our organizations regarding the Midland Independent Review.

*James W. Cook*

JWC/GSK/bjb

CC Atomic Safety and Licensing Appeal Board  
CBechhoefer, ASLB  
MMCherry, Esq  
FPCowan, ASLB  
RJCook, Midland Resident Inspector  
RSDecker, ASLB  
SGadler, Esq  
JHarbour, ASLB  
GHarstead, Harstead Engineering

ISHood. W  
FJKelley. Esq  
WJMarshall  
WDPatton. Esq  
WDShafer. NRC  
BStamiris  
MSinclair  
LLBishop

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
Docket No 50-329, 50-330

Letter Serial 19750 Dated December 3, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits Midland Plant Independent Review Program.

CONSUMERS POWER COMPANY

By /s/ J W Cook  
J W Cook, Vice President  
Projects, Engineering and Construction

Sworn and subscribed before me this 3 day of December, 1982

/s/ Barbara P Townsend  
Notary Public  
Jackson County, Michigan

My Commission Expires September 8, 1984

100-1-1034

RCBauman, P-14-312B  
JBeck, TIA (Dallas)  
JEBrunner, M-1079  
EMHughes, Bechtel  
RWHouston, Washington  
RAWells, Midland  
DBMiller, Midland  
MIMiller, IL&B  
GSKeeley, P-14-113B  
LKube, MAC  
JARutgers, Bechtel  
PStephoe, IL&B  
TJSullivan/DMBudzik, P-24-624A  
RLTeuteberg, P-24-505  
FCWilliams IL&B  
JDeMeester, P-24-414  
DFJudd, B&W  
HLevin, TERA (Bethesda)  
NRC Chron File

# TERA

March 18, 1983

Mr. J. G. Keppler  
Administrator, Region III  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Mr. D. G. Eisenhut  
Director, Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Re: Docket Nos. 50-329 and 50-330  
Midland Nuclear Plant - Units 1 and 2  
Independent Design and Construction Verification (IDCV) Program

The following information is addressed under this cover:

- Corporate and Individual Independence
- Professional Qualifications
- Scope of Review
- Reporting and Auditability
- Program Status

## CORPORATE AND INDIVIDUAL INDEPENDENCE

Consumers Power Company (CPC) Contract No. CP10-8782-Q, executed on November 18, 1982 between CPC and TERA Corporation, specifies the criteria for corporate independence and individual independence of personnel assigned to work on the Midland IDCV program. The specified independence criteria are set forth in a letter from Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission (NRC), to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives, dated February 1, 1982. TERA Corporation has determined that the Corporation, its subsidiaries, and individual members of the Midland IDCV team satisfy these independence criteria.

Prior to this contract, TERA Corporation has never been under contract to Consumers Power Company.

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ATTACHMENT 7

TERA CORPORATION

Mr. John W. Beck, Vice President of TERA Corporation and Principal-in-Charge of TERA's team which is conducting the Midland IDCV program has signed an affidavit on behalf of TERA Corporation and its subsidiaries which provides a statement of corporate independence (Attachment 1). In the event that outside specialized services (e.g., nondestructive examination or material testing, etc.) are required to meet project objectives, TERA Corporation will obtain a corporate affidavit from the subcontracted organization as well as its assigned personnel.

Signed affidavits for members of TERA's team are attached (Attachment 2). In the event that additional personnel are required to meet project objectives and are assigned to the team, TERA Corporation will obtain affidavits from these individuals as well.

### PROFESSIONAL QUALIFICATIONS

The personnel assigned responsibility for project direction, the Senior Review Team, lead technical review, technical review, and site activities have been selected based upon their unique technical and management qualifications and experience. Key personnel are listed along with a short description of their areas of expertise, number of years of experience and highlights of their previous employment (Attachment 3). Resumes have been provided previously to the NRC under separate cover in Appendix C of the Project Quality Assurance Plan, Revision 2, for the Midland IDCV program. (Reference: Letters from Mr. Howard A. Levin to Mr. J. G. Keppler and Mr. D. G. Eisenhut dated February 9, 1983 and February 17, 1983.)

### SCOPE OF REVIEW

The scope of review of the Midland IDCV Program is documented in Project Instruction PI-3201-009, the "Engineering Program Plan (EPP)." This document is part of the Project Quality Assurance Plan and was previously transmitted under the same cover.

The IDCV approach selected is a review and evaluation of a detailed "vertical slice" of the Midland project with a focus on providing an overall assessment of the quality of the design and the constructed plant.

At this time, TERA is currently reviewing the Unit 2 auxiliary feedwater (AFW) system. This system was selected based upon criteria documented in Section 1.3 of the Engineering Program Plan which was discussed at public meetings held on October 25, 1982 at the NRC's Bethesda, Maryland office and on February 8, 1983 at Midland, Michigan. It is our understanding from these discussions that the NRC plans to expand the IDCV sample based upon candidate systems identified by CPC (Reference: Letter from Mr. J. W. Cook to Mr. H. R. Denton





and Mr. J. G. Keppler, dated December 3, 1982). We stand ready to provide you with our comments on this selection based upon the results of the Midland IDCV program to date and the attributes of the candidate systems which would in our opinion best extend the current system sample. The multi-disciplined aspect of the systems selected is critical to the effective execution of a vertical slice Midland IDCV program effort. Our experience to date suggests that the selection of the AFW system utilizing the criteria which were documented in the Engineering Program Plan was successful in that this system provides for a comprehensive "test" of the project design and construction efforts throughout many technical disciplines (e.g., electrical, instrumentation and control, civil/structural, systems and mechanical) and interfaces. An early selection would facilitate the overall efficiency and progress of the Midland IDCV program.

#### REPORTING AND AUDITABILITY

From project inception the Midland IDCV program has operated in accordance with the reporting requirements that are documented in Project Instruction PI-3201-008, "Preparation of Open, Confirmed and Resolved Item Reports, Finding Reports, and Finding Resolution Reports" (Also transmitted to the NRC with the PQAP.) and Section 5.0 of the Engineering Program Plan. The provisions of these documents are largely consistent with the approaches followed at other independent assessments within the nuclear industry. We seek your comments and direction relative to these documents and offer any clarifying detail that you may need.

We are acutely aware of the importance of maintaining an auditable review process. Auditable records are maintained to document substantive elements of the Midland IDCV review and evaluation process, to document technical conclusions including the status of disposition of items associated with the review process leading to findings, to document the revision of records, and to establish quality assurance measures necessary to provide adequate confidence and assurance of the quality of services. Section 4.0 of the Engineering Program Plan establishes documentation requirements for engineering evaluations, calculations, field verification, and external communications. Section 5.0 of this Plan establishes the requirements for reporting documentation. Section 6.0 of this Plan establishes the QA documentation requirements.

#### PROGRAM STATUS

In the interim since our last status report during the February 8, 1983 public meeting, the Midland IDCV program has progressed to the point where confirmed items have been identified. A confirmed item is judged to be an apparent finding by the review team and will require action, such as additional documentation not utilized by the team that documents the resolution of the item or additional analysis, design or construction changes or procedural changes that may be



Mr. J. G. Keppler,  
Mr. D. G. Eisenhut

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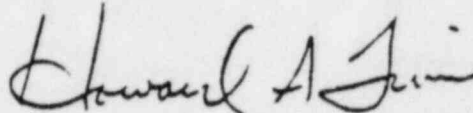
March 18, 1983

necessary to resolve the item. Confirmed Items that are later verified become findings as defined in the Engineering Program Plan and Project Instruction PI-3201-008.

To date these confirmed items have not been distributed outside the Midland IDCV program; however, to reach disposition of these items, interaction with the responsible design or construction organizations is necessary to obtain any pertinent additional information that may not have been available to the review team as well as clarification. Prior to initiating this activity we would like to discuss with you our procedure for handling these items as documented in Project Instruction PI-3201-008.

Your earliest attention to these matters will be greatly appreciated. We are prepared to immediately respond to any questions that you may have. Please contact either me at (301) 654-8960 or Mr. John Beck at (214) 871-1075.

Sincerely,

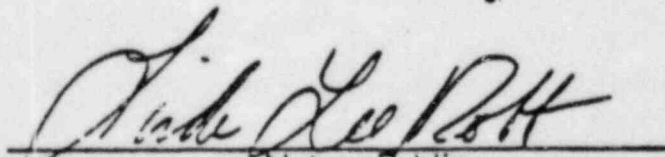


Howard A. Levin  
Project Manager  
Midland Independent  
Design and Construction  
Verification Program

cc: J. Cook, CPC  
G. Keeley, CPC ✓  
D. Hood, NRC

Enclosures

Sworn and Subscribed Before Me This 18<sup>th</sup> Day of March 1983

  
\_\_\_\_\_  
Notary Public

My Commission Expires \_\_\_\_\_ My Commission Expires July 1, 1985



TELE CORPORATION



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JWC  
1/17/83

March 22, 1983

*C. R. 17-29.0706*

Docket Nos: 50-329 OM, OL  
and 50-330 OM, OL

Mr. J. W. Cook  
Vice President  
Consumers Power Company  
1945 West Parnall Road  
Jackson, Michigan 49201

Dear Mr. Cook:

Subject: Selection of Additional System for Midland  
Plant Independent Design and Construction  
Verification Program

Your letter of December 3, 1982, noted that the Independent Design Verification effort to be performed by the TERA Corporation would be based upon the Auxiliary Feedwater System (AFWS) and would also be implemented on another system which the staff would select based on three candidates provided by Consumers Power Company on a risk assessment basis. The three candidate systems identified were (1) the electric power system (diesel generator), (2) the safeguards chilled water system, and (3) the containment isolation system. You further noted that the TERA program would be expanded to include a more in-depth review of construction activities to provide assurance of as-built construction adequacy. Your letter of January 10, 1983, the associated meeting of February 8, 1983, and TERA's Engineering Program Plan transmitted February 9 and 17, 1983, provided further information regarding the expanded program.

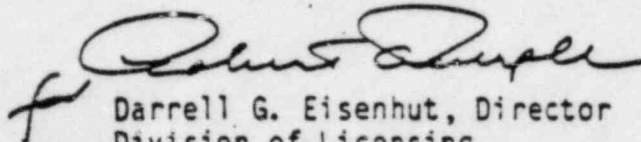
The staff has reviewed the three candidate systems for the second system for TERA's Independent Design and Construction Verification Program. We have also reviewed the six selection criteria specified in TERA's Engineering Program Plan, Section 1.3 and have selected the electric power system (diesel generator) for the second system. For both the AFWS and the electric power system (diesel generator), we request that special attention be applied to the program provisions regarding cable sizing, routing, and installation and to program provisions for expansion of scope and reassessment of elements of the review based on TERA's early observations.

The staff is also concerned that the AFWS and electric power system may not provide a sufficient sample of the independent review of heating, ventilating and air conditioning (HVAC) systems commensurate with QA problems and corrective actions. For this reason, we request that the portion of the HVAC system assuring control room habitability also be selected for an independent review.

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We understand that the TERA program documents will be updated to reflect the additional selections and resubmitted for staff review.

Sincerely,



Darrell G. Eisenhut, Director  
Division of Licensing  
Office of Nuclear Reactor Regulation

cc: John Beck, TERA Corp.  
J. Keppler, RIII

MIDLAND

Mr. J. W. Cook  
Vice President  
Consumers Power Company  
1945 West Parnall Road  
Jackson, Michigan 49201

cc: Michael I. Miller, Esq.  
Ronald G. Zamarin, Esq.  
Alan S. Farnell, Esq.  
Isham, Lincoln & Beale  
Three First National Plaza,  
51st floor  
Chicago, Illinois 60602

James E. Brunner, Esq.  
Consumers Power Company  
212 West Michigan Avenue  
Jackson, Michigan 49201

Ms. Mary Sinclair  
5711 Summerset Drive  
Midland, Michigan 48640

Stewart H. Freeman  
Assistant Attorney General  
State of Michigan Environmental  
Protection Division  
720 Law Building  
Lansing, Michigan 48913

Mr. Wendell Marshall  
Route 10  
Midland, Michigan 48640

Mr. Roger W. Huston  
Suite 220  
7910 Woodmont Avenue  
Bethesda, Maryland 20814

Mr. R. B. Borsum  
Nuclear Power Generation Division  
Babcock & Wilcox  
7910 Woodmont Avenue, Suite 220  
Bethesda, Maryland 20814

Cherry & Flynn  
Suite 3700  
Three First National Plaza  
Chicago, Illinois 60602

Mr. Don van Farrowe, Chief  
Division of Radiological Health  
Department of Public Health  
P.O. Box 33035  
Lansing, Michigan 48909

Mr. Steve Gadler  
2120 Carter Avenue  
St. Paul, Minnesota 55108

U.S. Nuclear Regulatory Commission  
Resident Inspectors Office  
Route 7  
Midland, Michigan 48640

Ms. Barbara Stamiris  
5795 N. River  
Freeland, Michigan 48623

Mr. Paul A. Perry, Secretary  
Consumers Power Company  
212 W. Michigan Avenue  
Jackson, Michigan 49201

Mr. Walt Apley  
c/o Mr. Max Clausen  
Battelle Pacific North West Labs (PNWL)  
Battelle Blvd.  
SIGMA IV Building  
Richland, Washington 99352

Mr. I. Charak, Manager  
NRC Assistance Project  
Argonne National Laboratory  
9700 South Cass Avenue  
Argonne, Illinois 60439

James G. Keppler, Regional Administrator  
U.S. Nuclear Regulatory Commission,  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

cc: Lee L. Bishop  
Harmon & Weiss  
1725 I Street, N.W., Suite 506  
Washington, D. C. 20006

Mr. Ron Callen  
Michigan Public Service Commission  
6545 Mercantile Way  
P.O. Box 30221  
Lansing, Michigan 48909

Mr. Paul Rau  
Midland Daily News  
124 McDonald Street  
Midland, Michigan 48640

Billie Pirner Garde  
Director, Citizens Clinic  
for Accountable Government  
Government Accountability Project  
Institute for Policy Studies  
1901 Que Street, N.W.  
Washington, D. C. 20009

Mr. Howard Levin, Project Manager  
TERA Corporation  
7101 Wisconsin Avenue  
Bethesda, Maryland 20814

Mr. J. W. Cook

- 3 -

cc: Commander, Naval Surface Weapons Center  
ATTN: P. C. Huang  
White Oak  
Silver Spring, Maryland 20910

Mr. L. J. Auge, Manager  
Facility Design Engineering  
Energy Technology Engineering Center  
P.O. Box 1449  
Canoga Park, California 91304

Mr. Neil Gehring  
U.S. Corps of Engineers  
NCEED - T  
7th Floor  
477 Michigan Avenue  
Detroit, Michigan 48226

Charles Bechhoefer, Esq.  
Atomic Safety & Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dr. Frederick P. Cowan  
Apt. B-125  
6125 N. Verde Trail  
Boca Raton, Florida 33433

Jerry Harbour, Esq.  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Geotechnical Engineers, Inc.  
ATTN: Dr. Steve J. Poulos  
1017 Main Street  
Winchester, Massachusetts 01890



Consumers  
Power  
Company

James W Cook  
Vice President - Projects, Engineering  
and Construction

General Offices: 1945 West Farnall Road, Jackson, MI 49201 • (517) 788-0453

September 17, 1982

Harold R Denton, Director  
Office of Nuclear Reactor Regulation  
Division of Licensing  
US Nuclear Regulatory Commission  
Washington, DC 20555

J G Keppler  
Administrator, Region III  
US Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

MIDLAND NUCLEAR COGENERATION PLANT  
MIDLAND DOCKET NOS 50-329, 50-330  
QUALITY ASSURANCE PROGRAM IMPLEMENTATION FOR SOILS REMEDIAL WORK  
FILE: 0485.16 SERIAL: 18845

This letter summarizes recent discussions with NRC management regarding implementation of soils remedial construction and presents the Company's documentation of those discussions.

#### BACKGROUND

The 1980/1981 SALP Report, presented to Consumers in late April of this year, indicated that activities in the soils area should receive more inspection effort on the part of both the NRC and CP Co. Follow-up discussions with the NRR staff and Region III Inspectors led to the conclusion that the Quality Assurance Program and its definition was adequate; however, there was concern that certain aspects were not being or might not be satisfactorily implemented.

Consumers Power has performed an in-depth review of the implementation plans for the Midland soils work activities. This review included the areas of design and construction requirements and plans, organization and personnel, project controls and management involvement. The results of this review and the proposed steps to assure the successful implementation of all aspects of the work were discussed with the NRC management in a meeting held in Chicago on September 2, 1982.



## STEPS TO IMPROVE IMPLEMENTATION

A number of new steps have or are being taken by Consumers Power Co to enhance the implementation of the quality program with regard to the soils remedial work. These measures touch upon all aspects of the work, from design to post construction verification and include the following:

- (1) Retaining a third party to independently assess the implementation of the auxiliary building underpinning work;
- (2) Integrating the soils QA and QC functions under the direction of MPQAD;
- (3) Creating a "Soils" project organization with dedicated employees and single-point accountability to accomplish all work covered by the ASLB order;
- (4) Establishing new and upgraded training activities, including a special quality indoctrination program, specific training in underpinning activities, and the use of a mock-up test pit for underpinning construction training;
- (5) Developing a quality improvement program (QIP), specifically for soils remedial work;
- (6) Increasing senior management involvement in the soils remedial project through weekly, on-site management meetings wherein both work progress and quality activities are reviewed;
- (7) Improving systems for tracking of and accounting for design commitments.

What follows is a description of the soils implementation plan, as it will be carried out using the new approaches outlined above, together with other specific aspects which we believe will be critical to the successful performance of the job. The discussion is limited to the implementation features specific to soils, is divided into areas roughly describing the progression of the job from design to completion and ends with a description of organizations, management involvement and NRC overview.

## DESIGN ADEQUACY AND IMPLEMENTATION

The design for the required remedial activities is in an advanced state; design details and adequacy have been reviewed by numerous organizations. A special ACRS Subcommittee reviewed the soils activities and commented favorably on the thoroughness and conservatism of the review and remedial approaches. Numerous submittals to the NRC have been presented to clarify the design intent. It is our understanding that the Staff is completing its detailed review of all design aspects and is in the process of issuing an SSER. This advanced state of design has permitted the early development of a thorough planning effort and assisted in the organization and development of detailed training effort. Following-up on design activities, the Project has assigned to the site a design team comprised of experienced structural and geotechnical engineers under the Resident Engineer. This team will monitor

and review the field implementation as specified in design documents, resolve on a timely basis routine construction questions requiring engineering response and administer the specific contingency plans immediately if any problem should arise during the underpinning work. Additional engineering resources for the soils work will continue to be located in Ann Arbor.

#### IMPLEMENTATION OF DESIGN FEATURES AND COMMITMENTS

All soils activities covered by the ASLB Order of April 30, 1982 are covered under soils-specific QA plans. These plans require that appropriate procedures are in place to accomplish the work in a quality manner and that detailed inspection plans be developed and utilized. Additionally, a Work Authorization Procedure and Work Permit System insure that the NRC and CP Co have specifically authorized and released the work. Under this system, the NRC reviews proposed work details, asks for additional information when necessary and authorizes construction activities in advance. CPCo then authorizes the work to proceed.

To further assure that commitments made to the NRC are properly accounted for in design documents, Consumers Power and Bechtel review the written records of commitments and insure that they are being incorporated into design documents. The Project is currently undertaking an additional review of past correspondence to create a computer listing of commitments. This computer list will be periodically reviewed to insure that commitments are incorporated in design or construction documents in a timely fashion.

#### PERFORMANCE OF PROJECT CONSTRUCTION, QUALITY ASSURANCE AND QUALITY CONTROL ACTIVITIES

To assure that project construction, quality assurance and quality control personnel correctly carry out their appointed tasks, a number of measures have been taken, including a reorganization of quality control, upgraded training programs, direct Company involvement in construction scheduling and control, and utilization of a contract format to minimize any cutting of corners by contractors. These elements of enhanced performance are described more specifically below.

First, the project has reorganized the Soils QA-QC effort, creating an integrated organization with single-point quality accountability under the MPQAD. This new organization is expected to improve QC performance, increase CPCo involvement in the management of the quality control function and improve QA-QC interfaces.

Second, extensive training programs for the soils underpinning work have been developed. This overall training program, which includes the major Construction and Quality organizations involved in soils work, covers both general training in quality and specific training relative to the construction procedures.

The majority of the personnel associated with Remedial Soils work have attended a special Quality Assurance Indoctrination Session. The QA indoctrination has been provided to Bechtel Remedial Soils Group, CPCo

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Construction, QC, QA, Mergentime and Spencer, White and Prentis (SW&P) personnel down to the craft foreman level. This training consists of one three-hour session covering Federal Nuclear Regulations, the NRC, Quality Programs in general and the Remedial Soils Quality Plan in detail.

With regard to the work procedures, a requirement on both Mergentime and SW&P is that specific training on the procedures be provided prior to initiating any quality related construction activity. The identification of individuals to receive this training is spelled out in each procedure pertaining to a specific construction activity. Completion of the specific training requirements is a QA hold point which must be satisfied before work can proceed.

In further recognition of the importance of training to the underpinning work, the Company is utilizing a mock-up test pit as part of its training program for underpinning construction. The purpose of this test pit is to provide specific training in the construction of a pier, bell and grillage assembly from initial issuance of design drawings through completion of construction. This allows supervisory and craft personnel to perform work under the conditions, requirements and restraints which will be encountered when the actual underpinning starts. It also allows the various quality organizations to inspect the work and insure that their concerns and requirements are properly reflected in the procedures.

Third, to further enhance the performance of key project organizations, Consumers Power will maintain control over scheduling, both through the construction authorization process and by frequent meetings with the involved contractors and subcontractors. Each week, underpinning subcontractors will present proposed construction work to the Company. In addition, to assure the best quality work, the major subcontracts were entered into on a time-material basis. This should improve subcontractor attention to detail and acceptance of owner direction in the performance of specific construction activities.

Last, the Company is establishing a separate Quality Improvement Program (QIP) for the soils project. Although not part of the formal Quality Assurance program, the QIP is a management system that should be helpful in communicating and reinforcing project policies and expectations to all project participants. To launch this effort, an indoctrination program will be presented to all individuals, stressing the absolutes of Quality and the concept of "Doing it right the first time." Measurements specific to soils will be developed for those critical areas which are indicative of a "quality product". Tracking these activities will provide an indication of the effectiveness of the program. The QIP will provide mechanisms for individual "feedback" from all individuals involved, including the craft personnel.

#### INDEPENDENT ASSESSMENT

A third party will be retained to independently appraise the initial phases of the construction of the auxiliary building underpinning. This consultant will be mobilized as soon as possible and, after familiarizing itself with the design, will evaluate the auxiliary building underpinning construction work at

the site. If significant problems or adverse trends are observed, the third party assessment program will be extended in both scope and duration until a satisfactory conclusion can be drawn. The initial evaluation will be carried out over a three-month period.

The independent assessment will be conducted by a team of nuclear plant construction and quality assurance experts. This team will be supplemented by the addition of an underpinning consultant who will review the soils design documents, construction plans and construction itself to assure not only that the design intent is being implemented but also that the construction is consistent with industry standards. The assessment will further assure that the QA Program is being implemented satisfactorily and that the construction is being implemented in accordance with the construction documents. Arrangements are being made with Stone and Webster Engineering Corp to assume the lead role in this appraisal. They will be assisted by Parsons, Brinkerhoff, Quade and Douglas, Inc who will provide underpinning expertise. The NRC will be apprised of all findings of this independent assessment in a timely manner.

#### ORGANIZATION, MANAGEMENT INVOLVEMENT AND NRC OVERVIEW

The project organization formed for the performance of the soils remedial work incorporates single-point accountability, dedicated personnel to the extent practical, minimum interfaces-particularly at the working level, and a quality organization integrating QA and QC. The soils project organization is tailored to the task at hand. The entire organization, including quality assurance and quality control are staffed with well qualified, experienced personnel, augmented by design consultants and construction subcontractors nationally recognized in the underpinning field.

The soils remedial effort will also include a high level of senior management involvement. Project senior management will conduct weekly in-depth reviews, on site of all aspects of the work including quality and implementation of commitments. In addition, the reporting chains to the senior project personnel have been shortened. The Company's CEO is briefed on a regular basis and schedules bi-monthly briefings on all aspects of the project including soils. During the bi-monthly briefings, the CEO normally tours the Midland site.

Complementing the CPCo management role, NRC Region Management overview of the construction process will be enhanced by monthly meetings, agreed upon by the Region, to overview the results of the quality program and the progress of the soils project. These meetings will cover any or all aspects of the project of general or special interest to the NRC management.

#### CONCLUSION

Based on the discussion outlined above, CP Co believes that the soils program has been thoroughly and critically evaluated and that all prerequisites for successful implementation have been or are being accomplished. The Company's program, with the initial overview from the independent implementation assessment, and the continuing overview by the NRC staff and management should

provide adequate assurance that the remedial soils activities will be successfully completed.

*James W. Cook*

JWC/JAM/bjw

CC Atomic Safety and Licensing Appeal Board  
CBechhoefer, ASLB  
MCherry, Esq  
FPCowan, ASLB  
RJCook, Midland Resident Inspector  
RSDecker, ASLB  
SGadler  
JHarbour, ASLB  
GHarstead, Harstead Engineering  
DSHood, NRC (2)  
DFJudd, B&W  
JDKane, NRC  
FJKelley, Esq  
RBLandsman, NRC Region III  
WEMarshall  
JPMatra, Naval Surface Weapons Center  
WOtto, Army Corps of Engineers  
WDPatton, Esq  
SJPoulos, Geotechnical Engineers  
FRinaldi, NRC  
HSingh, Army Corps of Engineers  
BStamiris

CONSUMERS POWER COMPANY  
Midland Units 1 and 2  
Docket No 50-329, 50-330

Letter Serial 18845 Dated September 17, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information regarding the implementation of the Consumers Power Company Quality Program for the Midland Plant Soils remedial work.

CONSUMERS POWER COMPANY

By           /s/ J W Cook            
J W Cook, Vice President  
Projects, Engineering and Construction

Sworn and subscribed before me this 17th day of Sept 1982 .

          /s/ Patricia A Puffer            
Notary Public  
Bay County, Michigan

My Commission Expires 3-4-86

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
798 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

FEB 24 1983

Docket No. 50-329  
Docket No. 50-330

Consumers Power Company  
ATTN: Mr. James W. Cook  
Vice President  
Midland Project  
1945 West Parnall Road  
Jackson, MI 49201

Gentlemen:

We have reviewed your proposal to have the Stone and Webster Corporation (S&W) perform the third party independent assessment of the soils remedial work activities.

The staff has received sworn statements from the S&W Corporation and from the key S&W personnel (Attachments A and B respectively) attesting to corporate and individual independence.

The staff has also reviewed a letter, J. E. Brunner to W. D. Paton, dated November 15, 1982 (Attachment C) which describes the contracts undertaken by S&W for the Consumers Power Company and indicates that S&W or its subsidiaries have no holdings of Consumers Power Company stocks. The attachments to this letter have been subsequently notarized.

The staff has considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the independent review of Consumers Power Company's management of the Midland soil project. Inputs to this review included the information supplied in the above submittals, the staff's existing knowledge of S&W performance at other nuclear power plants and information as to S&W personnel competence.

Our evaluation of these documents revealed that the competence and independence criteria have been met as set forth in Chairman Palladino's letter to Congressmen Ottinger and Dingell of February 1, 1982.

Based on our reviews we have determined that the S&W Corporation is an acceptable organization to perform the third party assessment of the soils remedial work; however, the scope of the S&W assessment should be broadened to include the following:

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FEB 24 1983

- (1) Provide a QA overview and assessment of the design work packages to ensure accuracy and adequacy.
- (2) Provide a QA overview and assessment of the QC inspector requalification and certification program.
- (3) Provide a QA overview and assessment of the training conducted for all personnel in the soils remedial work effort.
- (4) Expand the work contract to include an assessment of all underpinning work on safety-related structures on which underpinning work is done while your contract with Stone and Webster is in effect.

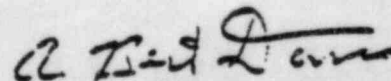
In addition, the Midland Section has reviewed Consumers Power Company's performance regarding the installation of Piers W12 and E12 and has concluded that no major discrepancies were identified during this work (Memorandum, R. Landsman to R. F. Warnick, dated 2/15/83, Attachment D).

Stone and Webster in their letter dated February 14, 1983 (Attachment E) also indicated that no major performance problems have been identified. They have stated that in their opinion additional underpinning work could be released for construction.

Based on the inclusion of the previously described contract changes, your performance record regarding Piers W12 and E12, and the acceptability of the Stone and Webster Corporation as the third party independent reviewer, we conclude that underpinning activities of safety-related structures may proceed. Please submit documentation of the expansion of the third party assessment to include the four areas identified above. The work activities will be authorized in accordance with the approved NRC/CPCo Work Authorization Procedure.

Should you have any questions regarding this letter please contact Mr. R. F. Warnick of my staff.

Sincerely,



James G. Keppler  
Regional Administrator

Enclosures: As stated

cc w/encl:  
See attached distribution list



cc w/encl:  
D&B/Document Control Desk (RIDS)  
Resident Inspector, RIII  
The Honorable Charles Bechhoefer, ASLB  
The Honorable Jerry Harbour, ASLB  
The Honorable Frederick P. Cowan, ASLB  
The Honorable Ralph S. Decker, ASLB  
William Paton, ELD  
Michael Miller  
Ronald Callen, Michigan  
Public Service Commission  
Myron M. Cherry  
Barbara Staniris  
Mary Sinclair  
Wendell Marshall  
Colonel Steve J. Gadler (P. E.)



## STONE &amp; WEBSTER MICHIGAN, INC.

P.O. Box 2325, BOSTON, MASSACHUSETTS 02107



Mr. J. G. Keppler  
Administrator, Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

February 14, 1983

J.O. No. 14358  
MPS-7

RE: DOCKET NO. 50-329-330  
MIDLAND PLANT - UNITS 1 AND 2  
INDEPENDENT ASSESSMENT OF AUXILIARY BUILDING  
UNDERPINNING  
INDEPENDENCE OF ASSESSMENT TEAM

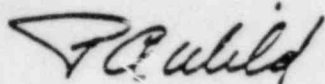
Consumers Power Company Specification CC-100 originally issued on September 20, 1982, sets forth the criteria for independence for the Assessment Team. Stone & Webster Michigan, Inc., determined that the Corporation and the individual members of the Team satisfy the requirements of the Specification. We have also determined that our subcontractor, Parsons Brinckerhoff Michigan Inc. meet these requirements as set forth in a letter signed by Thomas R. Kuessel, Senior Vice President of Parson Brinckerhoff Michigan Inc., dated November 4, 1981.

In particular both Corporations satisfy the following criteria:

- The Corporations or individuals assigned to this work do not have any direct previous involvement with Midland activities that they will be reviewing.
- The Corporations or individuals assigned to this work have not been previously hired by the Owner to perform design, construction, or quality work relative to the soils remedial program.
- The individuals assigned to this work have not been previously employed by the Owner within the last 3 years.
- The individuals assigned to this work do not have present household members employed by the Owner.
- The individuals assigned to this work do not have any relatives employed by the Owner in a management capacity.
- The Corporations and individuals assigned to this work do not control a significant amount of Owner stock.

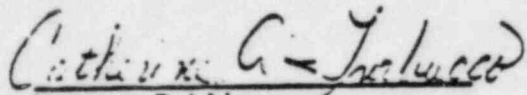
February 14, 1983

Under separate cover we are sending signed affidavits for each member of the Assessment Team. If you have any questions, please contact Mr. A. Stanley Lucks at (617) 589-2067.



P. A. Wild  
Vice President

Sworn and subscribed to before me on this 14th day of February, 1983.



Notary Public  
Suffolk County Massachusetts  
My Commission Expires November 8, 1985.

Catherine Trabucco

NOTARY PUBLIC

For the Commonwealth of Massachusetts  
My Commission Expires Nov. 8, 1985



STONE & WEBSTER MICHIGAN, INC.

P.O. Box 2325, BOSTON, MASSACHUSETTS 02107



Mr. J. G. Keppler  
Administrator, Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

February 15, 1983  
J.O. NO. 14358  
MPS-9

RE: DOCKET NO. 50-329/330  
MIDLAND PLANT - UNITS 1 AND 2  
INDEPENDENT ASSESSMENT OF AUXILIARY BUILDING UNDERPINNING  
ASSESSMENT OF WORK ON PIERS W12 AND E12  
TEAM MEMBER AFFIDAVITS

Enclosed with this letter are signed affidavits for the Stone & Webster and Parsons Brinckerhoff Assessment Team members.

If you have any questions with respect to these affidavits please call me at (617) 589-2067.

A.S. Lucks  
Project Manager

ASL:PJC

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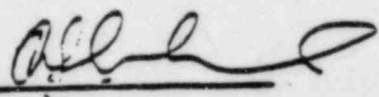
FEB 16 1983

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2

Docket No. 50-329 OM  
50-330 OM  
Docket No. 50-329 OL  
50-330 OL

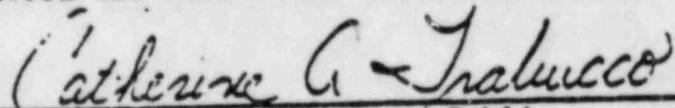
February 14, 1983

AFFIDAVIT OF 

My name is A.S. Lucks. I am employed by Stone & Webster Engineering Corporation as Project Manager.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentine Company relating to soils of underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentine Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentine stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentine stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentine Company.

Sworn and Subscribed Before Me This 14th Day of February 1983



Notary Public  
Suffolk County, Massachusetts

My Commission Expires November 8, 1985

Catherine Trabucco  
NOTARY PUBLIC  
For the Commonwealth of Massachusetts  
My Commission Expires Nov. 8, 1985

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2

Docket No. 50-329 OM  
50-330 OM  
Docket No. 50-329 OL  
50-330 OL

February 14, 1983

AFFIDAVIT OF W. E. Kilker

My name is W. E. Kilker. I am employed by Stone & Webster Engineering Corporation as Project Engineer.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils of underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14th Day of February 1983

Catherine A. Trabucco

Notary Public  
Suffolk County, Massachusetts

My Commission Expires November 8, 1985

Catherine Trabucco  
NOTARY PUBLIC

For the Commonwealth of Massachusetts  
My Commission Expires Nov. 8, 1985

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
50-330 OM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF Paul F Barry

My name is PAUL F BARRY. I am employed by STONE + WEBSTER ENGINEERING CORP.  
as a STRUCTURAL ENGINEER

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 11<sup>th</sup> Day of Feb 1982 PP

Patricia A. Puffer

Notary Public  
Jackson County, Michigan

My Commission Expires 3-4-86

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
50-330 OM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF AB Scott

My name is A B. Scott. I am employed by Stone & Webster  
as Engineer.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, ~~Bechtel~~, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14<sup>th</sup> Day of Feb 1983

Patricia A. Puffer

Notary Public

Bay  
Jackson County, Michigan

My Commission Expires 3-4-86

I was employed by Bechtel Corporation from March 1951 to July 1968 and from June 1972 to September 1976. AS



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
50-330 OM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF Lawrence T. Rouan

My name is Lawrence T. Rouan I am employed by Stone and Webster Engr' Corp.  
as Senior Quality Assurance Engineer.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, my own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 11<sup>th</sup> Day of Feb <sup>1983</sup> ~~1982~~

Patricia A. Luffer

Notary Public

Washtenaw County, Michigan

My Commission Expires 3-4-86

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
50-330 OM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF AB Scott

My name is A B Scott. I am employed by Stone & Webster  
as Engineer.

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Sworn and Subscribed Before Me This 14<sup>th</sup> Day of Feb 1983

Patricia A. Luffer

Notary Public

Bay  
Jackson County, Michigan

My Commission Expires 3-4-86

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NUCLEAR REGULATORY COMMISSION  
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In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No. 50-329 OM  
50-330 OM  
Docket No. 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF \_\_\_\_\_

*Barry L. Holsinger*  
My name is Barry L. Holsinger. I am employed by Stone & Webster  
as QA Engineer.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

*Barry L. Holsinger*

Sworn and Subscribed Before Me This 11<sup>th</sup> Day of February 1983

*Nancy S. Noble*  
Notary Public

NANCY S. NOBLE  
Notary Public in the State of New York  
Qualified in Chert. Co. No. 24-2277730  
My Commission Expires March 30, 1984

My Commission Expires \_\_\_\_\_

1 K K

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OH  
50-330 OH  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF Thomas R. Kuesel

My name is Thomas R. Kuesel. I am employed by Parsons Brinckerhoff Quade & Douglas, Inc. as Senior Vice President.

I am currently assigned to the task which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14 Day of Feb 1983

James S. Bayl  
Notary Public  
~~Jackson County, Michigan~~  
NOTARY  
No. 31-40  
Commission Expires February 20, 1983

\* From 1963 to 1967 I was employed by Parsons Brinckerhoff-Tudor-Bechtel, General Engineering Consultants for design and construction management of the San Francisco Bay Area Rapid Transit System, in the capacity of Assistant Manager of Engineering.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OE  
50-330 OE  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF

Louis G. Silano

My name is Louis G. Silano I am employed by Parsons Brinckerhoff Quade & Douglas, Inc.  
as Technical Director.

Major Structures  
I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14 Day of Feb 1983

James A. Boyd  
Notary Public  
~~Jackson County, Michigan~~

My Commission Expires

JAMES A. BOYD  
NOTARY PUBLIC  
MICHIGAN  
COMMISSION EXPIRES

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

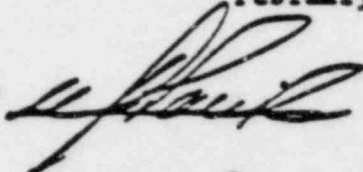
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
50-330 OM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

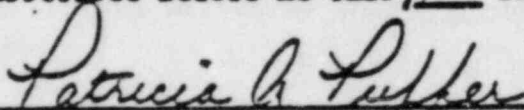
AFFIDAVIT OF



My name is W.C. PARKER. I am employed by Parsons Brinckerhoff Cassi & Co  
as Structural Engineer.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 11<sup>th</sup> Day of Feb 1983



Notary Public

Jackson County, Michigan

My Commission Expires

3-4-86

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OH  
50-330 OH  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF

Louis G. Silano

My name is Louis G. Silano I am employed by Parsons Brinckerhoff Quade & Douglas, Inc.  
as Technical Director.

Major Structures

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Sworn and Subscribed Before Me This 14 Day of Feb 1983

James R. Boyd  
Notary Public  
Jackson County, Michigan

My Commission Expires \_\_\_\_\_

JAMES R. BOYD  
NOTARY PUBLIC, STATE OF MICHIGAN  
COMMISSION EXPIRES \_\_\_\_\_  
COMM. NO. \_\_\_\_\_

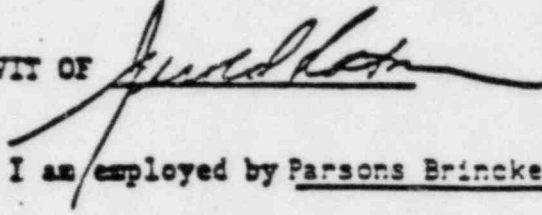
UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 OM  
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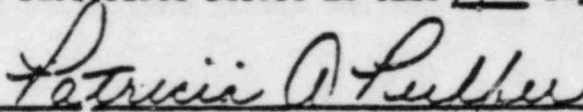
February 11, 1983

AFFIDAVIT OF 

My name is Jerrold Ratner. I am employed by Parsons Brinckerhoff, Quade and Douglas  
as Manager, Construction.

I am currently assigned to the team which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14<sup>th</sup> Day of Feb 1983



Notary Public

~~Washtenaw~~ County, Michigan

Bay

My Commission Expires 3-4-86



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
CONSUMERS POWER COMPANY  
(Midland Plant, Units 1 and 2)

Docket No 50-329 CM  
50-330 CM  
Docket No 50-329 OL  
50-330 OL

February 11, 1983

AFFIDAVIT OF Vincent J. Madilli

My name is Vincent J. Madilli as employed by Parsons Brinckerhoff Quade & Douglas, Inc.  
as Senior Engineer.

I am currently assigned to the task which is conducting an independent assessment of soils work at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Mergentime Company relating to soils or underpinning. I have never been employed by Consumers Power Company, Bechtel, or Mergentime Company. I do not own any shares of Consumers Power Company, Bechtel, or Mergentime stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Mergentime stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Mergentime Company.

Sworn and Subscribed Before Me This 14 Day of Feb 1983

James S. Boyd  
Notary Public  
~~Jackson County, Michigan~~

My Commission Expires JAN 1 1983  
Notary Public for New York  
No. 514  
Qualified to take for County  
Commission Expires Initial No. 5023



John C. Kelly, Esq  
Attorney General of the  
State of Maryland  
Charles Stetson, Esq  
Assistant Attorney General  
Department of Corrections Div  
720 New Building  
Baltimore, MD 21202

John M. Kelly, Esq  
One Elk Street  
Suite 4501  
Chicago, IL 60611

Mr. William W. Marshall  
1111 N  
Washington, DC 20540

Charles Decker, Esq  
Attorney General & Secretary  
John P. Hall  
U S Justice Regulatory Com  
Washington, DC 20535

Mr. Frederick W. Cook  
612 N. State Street  
Chicago, IL 60610  
1000 North, DC 20543

Charles W. Mahoney  
Sabcock & Wilson  
PO Box 1260  
Lynchburg, Virginia 24505

James W. Brimmer, Esq  
Construction Power Company  
212 West Michigan Avenue  
Jackson, MI 49201

Mr. D. F. Judd  
Sabcock & Wilson  
PO Box 1260  
Lynchburg, VA 24505

Steve Galtier, Esq  
2120 Canyon Avenue  
St Paul, MN 55108

Attorney General & Secretary  
John P. Hall  
U S Justice Regulatory Com  
Washington, DC 20535

Mr. C. B. Stephens  
Chief, Docking & Services  
U S Justice Regulatory Com  
Office of the Secretary  
Washington, DC 20535

Mr. Mark Stimpert  
711 Constitution Street  
Baltimore, MD 21202

William D. Smith, Esq  
General Counsel for the DC State  
U S Justice Regulatory Com  
Washington, DC 20535

Attorney General & Secretary  
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Lee J. Staley  
Sabcock & Wilson  
1725 7th Street, NW #506  
Washington, DC 20006

Mr. T. Miller, Esq  
Latham, Lincoln & Seale  
Three National Plaza  
52nd Floor  
Chicago, IL 60603

John Sabcock, Esq  
John Sabcock, Esq  
Washington, DC 20535



STONE & WEBSTER MICHIGAN, INC.

P.O. Box 2325, BOSTON, MASSACHUSETTS 02107

November 9, 1982

Mr. John R. Schaub  
Project Manager  
Consumers Power Company  
1945 W. Parnall Road  
Jackson, Michigan 49201

Dear Mr. Schaub:

Per your request to Mr. Carl F. Sundstrom I am enclosing a list and description of jobs that Stone & Webster Michigan Inc. has undertaken for Consumers Power Company (CPCo). I am also providing the results of my investigation of our holdings in CPCo securities.

If we can be of further assistance, please call Mr. Carl F. Sundstrom at (617) 389-2780.

Very truly yours,

F. A. Wild  
Vice President



STONE & WEBSTER MICHIGAN, INC.

P.O. Box 2325, BOSTON, MASSACHUSETTS 02107

November 9, 1982

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Very truly yours,

P. A. Wild  
Vice President

<u>Start Date</u>	<u>End Date</u>	<u>Brief Description</u>	<u>Key Person</u>
3/78	12/81	Review Midland Plant list of equipment and recommend spare parts.	RDevitt RMontross GSligh
6/78	6/80	Prepare an outage critique report on the Palisades Station second outage and provide planning support for the September, 1979 refueling outage.	RSpencer
11/78	6/80	Procure a mobile security access module to be used for outage work forces at Palisades.	RSpencer
3/82	7/82	Evaluate and make recommendation for training and implementation of the Midland Site Emergency Plan. *	RDoane SHowall WBeckman
9/82	—	Perform an independent assessment of construction activities related to the auxiliary building and feedwater isolation valve pit remedial work at the Midland Site.	JCook JMooney JSchaub
10/82	—	Provide emergency planning consulting services for the Big Rock Site.	RSindermann WMiller
10/82	—	Perform vibration analysis on the boiler feed pump at the J. M. Campbell Unit 3 and recommend and implement corrective actions.	JFord TMehl GKeller
10/82	—	Provide services and materials to coordinate the 1983/84 Palisades refueling outage.	TIlwood JSchneider

\* Note - S&W did the review but NUTTEK who was already working in Michigan for Detroit Edison at the Fermi Station is doing the detailed planning.

HOLDINGS OF CFCO SECURITIES

Stone & Webster, Inc., the parent company of Stone & Webster Engineering Corporation and its subsidiaries (including SWEC) have no holdings of CFCO securities. The Employee Savings Plan of Stone & Webster, Incorporated and participating subsidiaries is administered by the Chase Manhattan Bank, N.A. as trustee. Funds may be invested in the Employee Benefit Investment Funds, Equity Fund of the Chase Manhattan Bank which is a commingled fund. Stone & Webster exercises no direct control over the investment of such funds.

The Chemical Bank of New York is trustee for the Employee Retirement Plan of Stone & Webster, Inc. and for participating subsidiaries. There are no CFCO securities held in the plan.

February 15, 1983

MEMORANDUM FOR: E. F. Warnick, Director, Office of Special Cases

THRU: W. D. Shafer, Chief, Midland Section

FROM: R. B. Landsman, Reactor Inspector, Midland Section

SUBJECT: LICENSEE PERFORMANCE ON PIERS 12E and 12W

RIII on December 9, 1982, authorized CPCo to initiate work activities pertaining to the drift, excavation and installation of Piers 12E and 12W. Subsequent to that authorization the licensee began work on December 13, 1982. Due to the Diesel Generator Building Inspection I have had only enough time to perform five inspections to determine the acceptability of the licensee's work in regards to these piers including removal of fill concrete, shaft excavation and bracing, bell excavation and bracing, and reinforcing details and proposed concreting activities.

I have identified three concerns since underpinning work began which have been subsequently corrected or are in the process of being corrected by the licensee. They are:

- a) That the craftworkmen were not receiving the required amount of specialized remedial soils underpinning training. The licensee has agreed to expand the scope of craft training, but does not have the details worked out to date.
- b) That the licensee wanted to use a super plasticizer as an additive to the concrete mix in lieu of good concreting practices, i.e., consolidation by vibration. The licensee after what I consider to be excessive discussions finally agreed to vibrate all underpinning concrete in accordance with good engineering practice.
- c) That the third party independent assessment team is not reviewing the design documents for technical adequacy. They are only doing implementation review to assure that the design documents are being followed. From discussions with Stone and Webster personnel, it was determined that this important parameter was not included in their contract. The licensee is presently considering including this in the contract documents.

Besides these three concerns no other issues or deviations from regulatory requirements have been identified.

83032/10372

OFFICE	RIII			R. B. LANDSMAN	
	AND			Reactor Inspector	
RECEIVED	Landsman	15	Shafer		





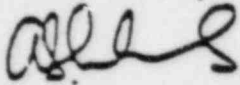
JGK

2

February 14, 1983

Based upon these observations and findings, the Assessment Team is of the opinion that additional piers could be released for construction. This will benefit the quality of the work by allowing the Contractor to maintain the experienced labor teams from piers W12 and E12.

If you have any questions, please contact me at (617) 589-2067.



A.S. Lucks  
Project Manager



CONSUMERS  
POWER  
COMPANY

J A Mooney  
Executive Manager  
Abland Project Office

General Offices: 1945 West Parnell Road, Jackson, MI 49201 • (517) 788-0774

February 24, 1983

Mr A S Lucks  
Stone and Webster Michigan, Inc  
PO Box 2325  
Boston, MA 02107

FILE 0485.16 SERIAL 20498

Dear Mr Lucks:

In accordance with Consumers Power Company Specification CC-100, Rev 1, "Independent Assessment of Auxiliary Building Underpinning", Section 2.1 (j), Stone and Webster Michigan, Inc shall expand the scope of the independent assessment of Soils Remedial Activities to include the following:

- 1) Provide a QA overview and assessment of the design work packages to ensure accuracy and adequacy. This overview is to insure conformance to procedural and programmatic requirements.
- 2) Provide a QA overview and assessment of the QC inspector requalification and certification program.
- 3) Provide a QA overview and assessment of the training conducted for all personnel in the soils remedial work effort.
- 4) Expand the work contract to include an assessment of all underpinning work on safety related structures on which underpinning work is done while the contract with Stone and Webster Michigan, Inc is in effect.

This scope revision shall become effective immediately.

Very truly yours,

A handwritten signature in dark ink, appearing to read "J. A. Mooney".

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket Nos. 50-329 OM
	)	50-330 OM
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329 OL
(Midland Plant, Units 1 & 2)	)	50-330 OL

TESTIMONY OF ROBERT M. WHEELFR  
ON QUALITY ASSURANCE

- Q1. Please state your name and position.
- A1. My name is Robert M. Wheeler. I am Soils Section Head in Consumers Power Company Midland Construction Department. I previously testified in these proceedings on February 14, 15, and 16, 1983.
- Q2. Mr. Wheeler, have you read the Staff's testimony on quality assurance which was filed October 29, 1982?
- A2. Yes, I have.
- Q3. Mr. Wheeler, paragraph 11(c) of Attachment B to Mr. Keppler's October 29, 1982 testimony raises the concern that the Company had set up to drill a well hole in safety-related dirt using a technique which was not authorized. Would you please describe the cir-

5304130309

cumstances surrounding this event?

- A3. The situation involved the setting up of a rotary drill rig to drill a temporary construction dewatering well between the turbine and diesel generator buildings (ME55). On June 11, 1982, Dr. Ross Landsman informed the Company that the rotary method of drilling which we planned to use for ME55 had not been approved by the NRC. The Company halted rotary drilling until this issue could be satisfactorily resolved.

Prior to the concern raised on the auxiliary building construction wells, the Company had discussed and submitted plans to the NRC outlining the locations and a schematic for the proposed wells. Based on discussions with NRR and the NRC review of the wells for the service water structure which utilized the rotary method, the Company believed that the NRC concurred with the rotary method for the auxiliary building wells. The discussion and agreement with the NRC to install the additional auxiliary building dewatering wells occurred on May 26, 1982.

During the May 26, 1982 call, the NRC expressed concerns regarding fines monitoring for the auxiliary building construction dewatering wells, and the Company agreed to implement the monitoring criteria. Because of the May 26, 1982 discussion, the Company believed

that the requirement for NRC staff notification for the installation of the wells had been fulfilled.

When the question concerning drilling techniques was again raised in June, it was decided that NRR should be contacted to determine if the rotary drilling was authorized. Mr. Joe Kane of NRR was called to discuss this matter. Mr. Kane stated that he expected these wells to be installed using the cable tool method used for permanent wells. I concluded from the call however, that some confusion existed even on the NRC's part as to what the real concerns were with regard to well installation.

Based on the call with NRR and the need to resolve the confusion surrounding this matter, a stop work letter was issued on June 11, 1982 and work was stopped. No drilling for ME55 had taken place by this time.

During a June 25, 1982 meeting with the NRC, the Company verified and confirmed that the rotary drilling method is acceptable for auxiliary building construction wells.

- Q4. Why did the Company seek to continue excavation of soils in proximity of the Feedwater Isolation Valve Pit without determining whether the supports were adequate as described in Mr. Keppler's October 29, 1982 testimony,

Attachment B, paragraph 14?

A4. Originally, the structural steel supports for the Feedwater Isolation Valve Pit ("FIVP") were installed and load tested non-Q. The original load test was conducted to demonstrate that the steel support system was capable of supporting the calculated weight of the FIVP. The original load test was successfully completed by June 1981.

In June 1982 Consumers Power Company presented a plan to the NRC which called for modifications to the FIVP support system. The Company's reason for proposing the modification was to provide increased margins of safety. In a letter from the Company to Harold Denton dated June 18, 1982, an attachment entitled "Supplemental Information on Feedwater Isolation Valve Pits" described the construction restriction related to excavation near the FIVP, i.e., the support system adequacy would be verified prior to excavating under the FIVP. It was the Company's position that the FIVP support modification and the new proof load only affected excavation work under the FIVP. Therefore, the Company believed that excavations which did not go directly under the FIVP could begin prior to completion of the FIVP support modifications.

The NRC inspection report (August 9, 1982) dis-

cussed the need to complete the FIVP modification work in terms of excavation below elevation 609; piers 11, 12, 13, 14 and KC2 (phase 2A). Since none of these piers resulted in excavations directly under the FIVP, the Company desired to begin this phase of the work. Any work of this nature would be discussed and prior approval from NRC Region III would be obtained.

The NRC suggested that the structural steel should first be overviewed since it had been installed non-Q. The Company inspected the steel and noted minor changes which were approved by Engineering as is. After several discussions with the NRC inspector, it was agreed that the modifications and the new load test did not need to be completed prior to drifting to the pier 12 (part of phase 2A). This agreement is documented in an August 25, 1982 letter to W. D. Shafer from D. B. Miller.