Donald B Miller, Jr
Site Manager
Midland Project

Midland Project: PO Box 1963, Midland, MI 48640 • (517) 631-8650

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September 17, 1982

Mr. W. D. Shafer, Chief
Midland Project Section
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND PROJECT GWO 7020
NON-Q MATERIALS FOR THE UNDERPINNING
File: 0485.16 UFI: 42*05*22*04 Serial: CSC-6323
C-195

To meet a CPCo commitment to the NRC we must inform NRC Region III of all material which we will procure Non-Q "for the underpinning of Auxiliary Building and the Service Water Pump Structure. This letter consolidates all old lists and presents new items which we would like to procure Non-Q".

For the Auxiliary Building underpinning (Subcontract 7220-C-195Q) the previously approved items are as follows:

1. Freeze wall, other than for the protection of Category I utilities which are covered.

2. Auxiliary Building access shaft activities above elevation 609 and soldier piles.

3. The procurement of soldier pile material; tools and equipment (such as torque wrenches, jacks, gauges and threading machines - but their calibrations are covered); steel and wood lagging; backpacking material; rock bolts and rock and earth anchors already installed for temporary installations; and glue.

4. Structural shapes for instrument covers [Ref: Drawing 7220-C-1491(Q), lower right hand corner.]

5. Plexiglass for instrument covers [Ref: Drawing 7220-C-1491(Q), lower right-hand corner.]

6. 1/4-inch self tapping screws for instrument covers [Ref: Drawing 7220-C-1491 (Q) lower right-hand corner.]

7. Plexiglass instrument blocks for linear variable differential transformers (LVDTs) [Ref: Drawing 7220-C-1491(Q)] (Provided by WJE)

8. Plexiglass disk for LVDTs [Ref: Drawing 7220-C-1491(Q). (Provided by WJE)

9. 1/4-inch diameter bolts for securing instrument block to bracket [Ref: Drawing 7220-C-1491(Q), Note 11]

10. Plunder Reaction ∠'s [Ref: Drawing 7220-C-1491(Q)]

11. EMT/rigid raceway materials including supports.

12. Covers for extensomers and strain gages.

13. Brass plate or stainless steel.

14. Plexiglass for instrument covers [Ref: Drawing 7220-C-1492-1(Q)]

15. Expanded metal 3.0# carbon steel [Ref: Drawing 7220-C-1492-1(Q) C-1491]

16. Flexible closure for upper tell-tale at blockout [Ref: Drawing 7220-C-1492-1(Q)]

17. Grout for soil stabilization (silicate and cement) (For site wide work.)

The materials we wish to add to this list are as follow:

MATERIAL: Trench jacks for bell piers for the Auxiliary Building underpinning, and construction support aids.

The trench jacks shall be embedded in the base of the concrete bells whenever the horizontal projection of the bell extends 3'-6" or more.

For the Service Water Pump Structure no materials or equipment have been previously identified as non-Q. The materials and equipment we wish to purchase non-Q are as follows:

MATERIAL: Wood lagging plus construction aids (nails, etc.), metal lagging plus construction aids (bolts, nuts, fasteners, etc.), structural and miscellaneous steel for support of access shafts and support of existing utilities (wales, plates, angles, etc.), drift steel, trench jacks for the bell piers, construction support aids for the Carlson stress gages, back packing materials (excelsior, hay, ethafoam, etc.) Temporary dewatering well components (screens, casings, eductors, etc.), and adhesives for non-structural temporary components.

EQUIPMENT: Jacks and gages (calibration is "Q") torque wrenches, construction aids, tools, equipment and trench jacks.

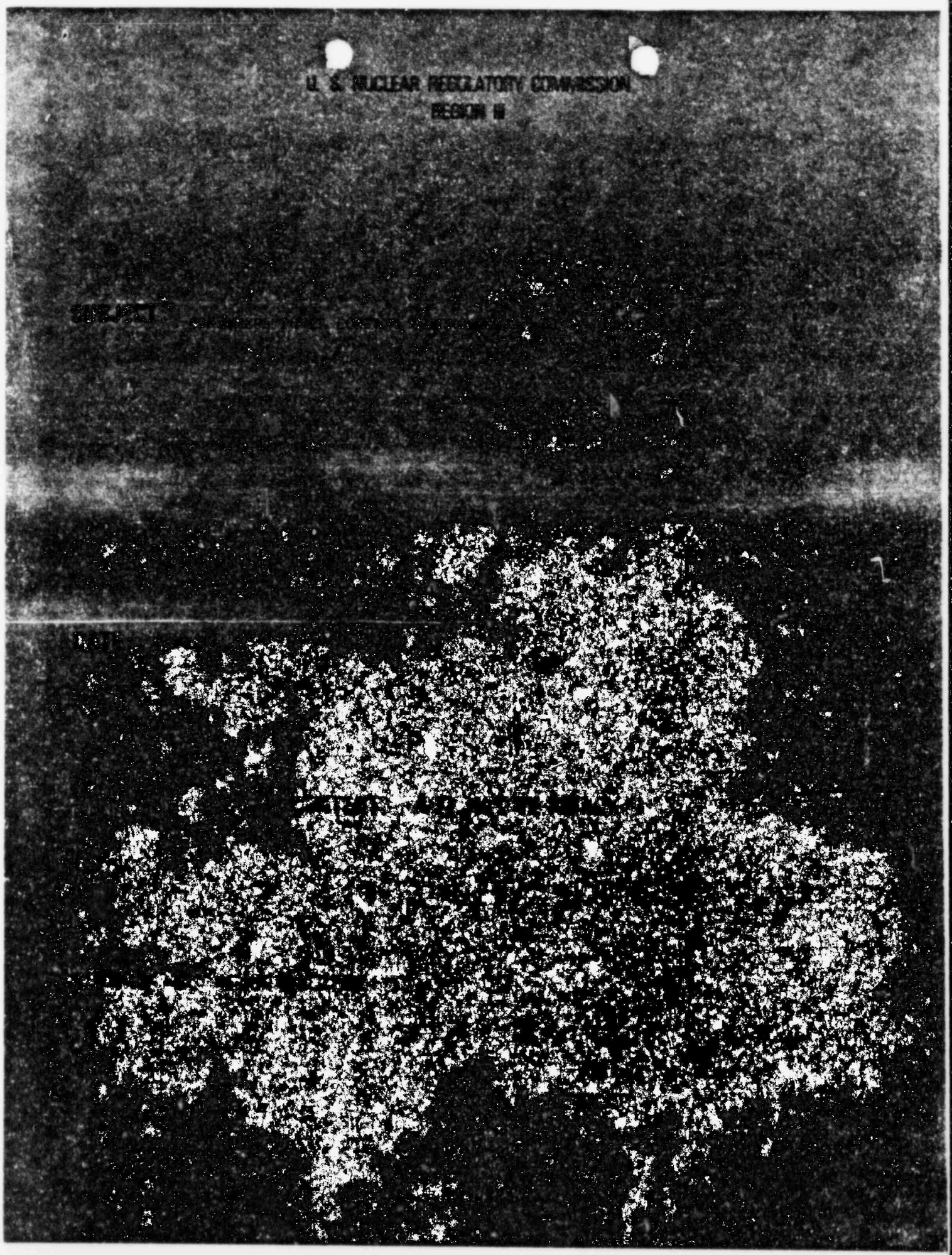
The above materials and equipment will be purchased non-Q however CPCo will invoke Quality Assurance Program requirements upon receipt and installation.

This letter is to confirm discussions CPCo had with Dr. Ross Landsman on site on

September 16, 1982, that Region III concurs with and approves the above lists.

D. B. Miller
Site Manager

U. S. NUCLEAR REGULATORY COMMISSION
REGION III



Consumers Power Company

J A Mooney
Executive Manager
Midland Project Office

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

June 28, 1983

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Mr J J Harrison
Midland Project Section
U S Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND ENERGY CENTER GWO 7020
RESPONSE TO NRC QUESTIONS
File: 0485.16 UFI: 42*05*22*04 Serial: CSC-6773
70*01

The following responses to questions raised by Dr. Ross Landsman, NRC Region III Inspector, were provided to B. Burgess, NRC Resident Inspector, on June 8, 1983, by R. H. Wieland of Consumers Power Company.

QUESTION:

1. Is there a requirement for the revolving of the concrete truck drum from charging to discharging?

RESPONSE:

There are no specific requirements for continuous drum rotation between charging and discharging for a fully batched mix. This same question was discussed previously with MPQAD, Project Engineering, and NRC Personnel. The specific requirements relative to this activity are 300 revolutions maximum and 90 minutes total elapsed time prior to discharge.

QUESTION:

2. Why wasn't the QC Inspector present at the W10 Pier pour on June 7, 1983, aware of any requirements relative to the stopped drum?

RESPONSE:

Since there is no specific requirement to maintain the drum revolving, the QC Inspector had no reason to document the fact that the drum was not rotating.

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QUESTION:

3. How many attachments are on Drawing C-1427?

RESPONSE:

An inspection of controlled Drawing C-1427 shows 13 FCR attachments which is within the project requirements for number and type of attachments.

JAM/RHW/klm

full

Consumers Power Company

J A Mooney
Executive Manager
Midland Project Office

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June 9, 1983

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SRA		RC	
		FILE	

Mr J J Harrison
Midland Project Section
U S Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND ENERGY CENTER GWO 7020
LOAD TEST FOR PIER W11
File: 0485.16 UFI: 42*05*22*04 Serial: CSC-6735
70*01

During the NRC visit of May 11 and 12 at the Midland Site, data for the load test at Pier W11 was presented. The applicant believed that based on the data from Pier W11 as well as other prototype piers that the apparent soil modulus, E, value shown was consistent with the design assumptions for the permanent underpinning design. However, the NRC believed that an E value of 1500 ksf and a differential settlement of ½" between the electrical penetration area/control tower and the main auxiliary building was appropriate. Hence the NRC asked Consumers to look at the following options:

A. Review the building capacity for an E of 1500 ksf or differential settlement of ½" and provide results of shear strength from unconsolidated undrained triaxial tests on representative samples taken within 1½ feet of the bearing stratum of some piers (to confirm the design ultimate bearing capacity of 44 ksf).

B. Increase the jacking load so that the remaining differential settlement after lock off is ¼" and provide results of triaxial tests as discussed in option (A).

C. Hold the jacking load on the permanent wall long enough so that the remaining differential settlement after lock off is ¼" and provide results of triaxial tests as discussed in option (A).

D. Perform another pier load test. One of the requirements is that friction between the pier and surrounding soil is eliminated. The NRC may provide additional requirements if the applicant chooses this option. One of the additional requirements may be to hold the duration of each load increment longer. In this case provide results of triaxial tests as discussed in option (A).

JUN 20 1983

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E. Perform a plate load test for a plate of 18" minimum size. The plate should be loaded so as to reach failure load (or the assumed ultimate bearing capacity) of the soil. The results of this test should demonstrate that a minimum E value on the order of 3000 ksf is achieved. If this test is performed to ASTM standards, NRR Washington need not review the test procedure further. Region III can give approval directly before the test is performed.

Consumers Power Co. was to indicate to the NRC which option they would adopt. Based on CPCo review of the options we wish to adopt option (A). We have conducted a parametric study for the auxiliary building with reduced spring values in order to achieve the suggested differential settlement of ½". The reduced spring constants correspond to apparent modulus values less than 1500 ksf. These reduced springs induced differential settlements of 0.47" for the EPA (relative to the Main Auxiliary Building) and 0.44" for the control tower (relative to the Main Auxiliary Building).

Our review of the analysis, based on the structural design criteria, has indicated that:

1. The existing structure south of column row G is adequate.

2. The permanent underpinning wall reinforcement as designed remains unchanged.

3. All control owers Piers including CT1, CT3, CT11 and CT12 also remain unchanged.

4. The connection between the EPA and the Main Auxiliary Building and the Control Tower underpinning and the building may have some minor effect. The final design of these connections is underway.

5. Based on review of the most critical settlement loading combination of the main building north of column row G, there are a couple of localized areas at elevation 634' and 659' which are slightly overstressed. We believe that a more detailed evaluation will demonstrate these areas to be adequate. In case these areas can not be shown to be adequate, the appropriate repairs will be made.

The calculations performed for the above study are available for review. We have also reviewed option (C) i.e. holding the jacking load longer. Since the parametric study shows that the structure can take a larger differential settlement than originally assumed, we believe the present acceptance criteria for final lock-off of the permanent foundation should be redefined. The present acceptance criteria for lock off, referenced in SSER section 3.8.3.1 page 3-9, is as follows:

1. Reaching secondary consolidation on the semi-log plot.

2. Settlement increment of .05" in last 30 days.

3. Settlement increment of .01" in last 10 days.

The second criteria translates to ¼" additional total settlement for 40 years after lock off. The differential settlements corresponding to these criteria

would be even smaller since the Main Auxiliary Building will also be settling during this time.

Since a study has been performed per option (A), items 2 and 3 of the acceptance criterian should be redefined as follows:

2. .05" in last 15 days. (This translates to ½" additional total settlement for 40 years after lock off.)

3. .01" in last 5 days.

Based on the above, Consumers Power Company believes that the structure is satisfactory for the lower E value for control tower and EPA and we have therefore decided not to perform a new load test. Based on the capacity of the structure, we would also redefine the acceptance criteria for the lock off of the permanent wall. We also commit to provide NRC with results of the triaxial tests.

JA Mooney

JAM/KBR/klm

	ACTION	INFORMATION
J W Cook, P26-336B	———	———
R A Wells, MPQAD	———	———
A J Boos, Bechtel Ann Arbor	———	———
J A Mooney, P14-115A	———	———
J E Brunner, M-1079	———	———
J R Schaub, P14-305	———	———
R C Bauman, P14-312B	———	———
W R Bird, P14-418A	———	———
J K Meisenheimer, Midland	———	———
A R Mollenkopf, P14-408A	———	———
D B Miller, Midland	———	———
F W Buckman, P24-624A	———	———
D B Budzik, P24-517A	———	———
N J Saari, Midland	———	———
D F Lewis, Bechtel Ann Arbor	———	———
R W Huston, Consumers Power Company 7910 Woodmont Avenue Suite #220 Bethesda, Maryland 20014	———	———
R L Tueteberg, P24-505	———	———
NRC Correspondence File, P24-517	———	———
Mr. Mike Miller Isham, Lincoln & Beale 3 First National Plaza, Suite #5100 Chicago, IL 60602	———	———
Isham, Lincoln & Beale 1120 Connecticut Avenue N.W. Washington, D.C. 20036	———	———
R M Wheeler, Midland	———	———
A E Blocher, Midland	———	———
T R Thiruvengadam, P14-400	———	———
Neil Swanberg, Bechtel Ann Arbor	———	———
Mr. Ron Callen Michigan Public Service Commission 6545 Mercantile Way Lansing, MI 48909	———	———

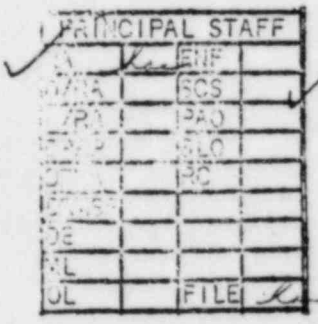
File: 0485.16 UFI: 42*05*22*04

Consumers Power Company

James W Cook
Vice President - Projects, Engineering and Construction

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

June 7, 1983



Orig + 3

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

MIDLAND NUCLEAR COGENERATION PLANT
MIDLAND DOCKET NOS 50-329, 50-330
SYSTEM INTERACTION REVIEW
FILE: 0921.1 SERIAL: 22457

During the March meeting, the Systems Interaction reviewers requested Consumers Power Company forward a copy of the Systems Interaction Program documents for their information when available. These documents are enclosed for your information and are for the identification phase of the program.

G. S. Heins
V. P. System Operations

JWC/KJT/bjb

CC RJCook, Midland Resident Inspector
RHernan, US NRC
JGKeppler, Administrator, NRC Region III

JUN 13 1983

oc0683-0462a100

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

Letter Serial 22457 Dated June 7, 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 System Interaction Program documents.

CONSUMERS POWER COMPANY

By G L Heins VP System Operations for J. W. Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 7 day of June, 1983.

Barbara B Townsend
Notary Public
Jackson County, Michigan

My Commission Expires September 8, 1984

oc0683-0462a100

sent to DMB 7/11/83 file

James W Cook
Vice President - Projects, Engineering and Construction

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

June 3, 1983

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: 23151

References

1. Letter to J W Cook, dated December 30, 1982, from NRC Region III regarding Construction Complation Program.

2. Letter to Mr J G Keppler dated January 10, 1983, from Mr J W Cook regarding Construction Completion Program.

3. Letter to Mr J W Cook dated March 28, 1983 from Mr J G Keppler regarding Construction Completion Pr gram.

4. Letter to Mr J G Keppler dated April 6, 1983 from Mr J W Cook regarding Construction Completion Program third party overview.

5. Letter to Mr J G Keppler dated April 22, 1983 from Mr J W Cook 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. A detailed description of this program was submitted on January 10, 1983 (Reference 2). The program was further discussed with you in a public meeting in Midland, February 8, 1983. We have also provided formal responses to your questions (Reference 3) in References 4 and 5.

The enclosure to this letter is an integration of all previous correspondence on the Construction Completion Program, as well as the development of program details that have occured since December 2, 1983. We believe that this document constitutes sufficient information on the program commitments to warrant your approval of the program. You will also find contained within the

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program a controlled mechanism for review and approval for revisions that future needs and experience may 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 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 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 trust this submittal fulfills your request for written information regarding the Construction Completion Program. In response to a specific NRC request, we will notify Mr Harrison of your staff at the conclusion of our Construction Completion Program Management review activities described in Section 5 of the enclosure. At that time, Mr Harrison can inform us of what audit or review activities the Region desires regarding the Construction Completion Program implementation.

/James M. Cook

JWC/DMB/psd

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

oc0683-4007a-66-125

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

Letter Serial 23151 Dated: June 3, 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 J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 4th day of June, 1983.

Beverly A. Avery
Beverly A. Avery Notary Public
Jackson County, Michigan

My Commission Expires January 16, 1985

MIDLAND NUCLEAR COGENERATION PLANT
Docket No-50-329, 50-330

CONSTRUCTION COMPLETION PROGRAM

Consumers Power Company
June 3, 1983

mi0583-4086a-66-125

TABLE OF CONTENTS

CONSTRUCTION COMPLETION PROGRAM

Executive Summary

The Construction Completion Program has been formulated to provide guidance in the planning and management of the construction 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 months preceding this Program, 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 the quality of completed work is acceptable.
- 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 has been carried out in preparation for installation and inspection status assessment and quality verification activities.

- A review has been 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 Engineer/Constructor QC function into the Midland Project Quality Assurance Department (MPQAD) under Consumers Power Company management has been completed.

- MPQAD is carrying out a recertification program of QC inspectors, and review of the inspection procedures to be utilized.

- The completion teams are being organized, staffed and trained according to procedures developed to define the team's work process.

- The completion teams will 1) accomplish installation and inspection status assessment, 2) complete installation and ensure quality inspections are performed 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 completion teams.

- A series of management reviews are being carried out to carefully monitor the development and 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 are being undertaken to monitor Project performance and to carry out the NRC's requirements for independent design verification.

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 period prior to December 2, 1982, activities in support of these commitments such as QC integration into MPQAD and the recertification of QC inspectors, had been initiated prior to December.

Milestones for each element of the Plan are enumerated in the text. In general, preparation for the Phase 1 activities are in place and the

management reviews are being held. A pilot team is developing the procedures and training requirements. It is expected that the Phase 1 will begin shortly.

The Program provides for the Phase 1 results on an area, 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 outside the Construction Completion Program 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.

During the continuing implementation of the Program in 1983, the NRC Region III 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.

1.0 INTRODUCTION

The Construction Completion Program has been formulated to provide guidance in the planning, and implementation of the construction 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 was developed in response to a number of management concerns that were 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 months preceding this Program, been in a reactive rather than proactive posture with regard to quality assurance matters.

In recognition of these conditions, Consumers Power Company 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 the quality of completed work is acceptable.
- 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 activities:

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

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

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 or areas developed to determine present installation and inspection status. The installation status assessment includes a comparison of partially installed work to current design and identification of remaining work items for completion. The inspection status assessment includes performing additional inspections on partially completed or completed work to bring them up to date. A closely coordinated effort involving the Engineer/Constructor and Consumers Power Company (QA/QC, testing and construction) personnel will improve quality performance.

- The quality verification of completed work initiated on a 100% basis using re-certified inspectors.

The second phase includes:

- Work completion, following quality verification, installation and inspection status assessment under responsibility of the team organization.

- An integration of the QC inspection process for new work with the completion work to ensure adequate quality performance.

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 verification and status assessment segment, a management review will be made of the evaluation of the initial Phase 1 results and the process and procedures for Phase 2 activities. In second phase Program implementation, the assigned team will plan and carry out the remaining work needed for completion including QC inspections.

The adequacy and completeness of the quality program will be reviewed, as appropriate, on an ongoing basis, taking into consideration questions raised by NRC inspections and findings by third party reviewers.

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

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

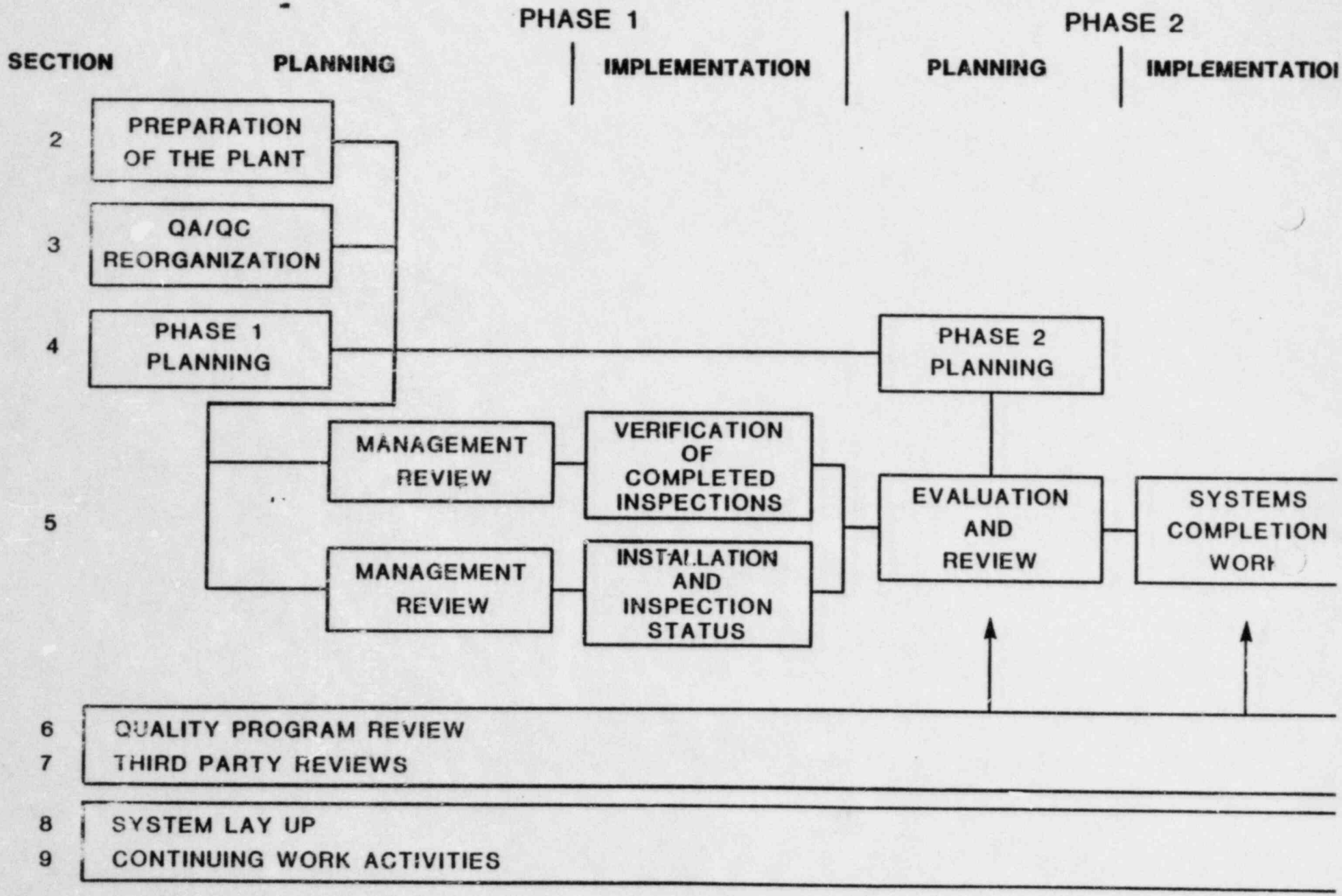
Work on Q-Systems has been limited to specific activities. This limitation permits important work to proceed outside of the Construction Completion Program while allowing building preparation for status assessment and verification activities on that work which is under the Construction Completion Program.

Summary

The program is a comprehensive plan to complete the Midland Nuclear Cogeneration Plant in a manner that assures the licensibility of the plant when construction is complete. Cost and schedule for completion of the Midland Project are also a concern for Consumers Power Company. The Company believes that the most efficent way to project completion is to understand the current plant status, establish the requirements to finish the project and complete the work according to these requirements. Thus the theme of the Construction Completion Program to verify past work and proceed on future work with improved performance is consistent with this philosophy.

FIGURE 1-1

CONSTRUCTION COMPLETION PROGRAM SCHEMATIC



2.0 PREPARATION OF THE PLANT

2.1 Introduction

The preparation of the Plant cleared 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 specific 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 of the Plant for CCP activities.

2.4 Milestones

Complete preparation of affected areas of the plant. (Complete)

3.0 QA/QC ORGANIZATION CHANGES

3.1 Introduction

The Consumer Power Company's Midland Project Quality Assurance Department (MPQAD) was expanded to assume direct control of site project quality functions including Engineer/Constructor QC except ASME. The new organization is described below. The transferred QC Inspectors are being recertified as part of this transition.

3.2 Objectives

Establish New QA/QC Organization

Establish an integrated organization which includes the transition of Engineer/Constructor 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 will be trained and recertified in accordance with MPQAD Procedure B-3M-1.

3.3 Description

Establish New QA/QC Organization

A new organization was implemented under Consumers Power Company and has been described in the appropriate Topical Report (CPC-1A), the FSAR and quality program manuals (Volume II, BQAM and NQAM). Changes to CPC-1A were approved by NRC on March 14, 1983.

Features of the new organization include:

1. Lead QC Supervisors report 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 [illegible] 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 current reporting relationships is attached. The official organization chart is contained in project procedures.

Training of MPQAD Personnel

MPQAD initiated a program in late 1982 to retrain and recertify all Engineer/Constructor QCE's (Inspectors) to existing PQCIs. A significant number of QCE's have been recertified under this process. Early in 1983, MPQAD decided to terminate recertification of old PQCIs except in selected cases, focus efforts on completing the review and revision of PQCIs, and then train and recertify to the new PQCIs.

MPQAD current plans are to re-train and re-certify all inspectors to the revised PQCIs. As a part of this activity, the Project Quality Control Instructions (PQCI) are undergoing a complete review to assure:

Attributes that affect the safety and reliability of specific components, systems and structures are identified for verification.

Accept/reject criteria are clearly identified.

Appropriate controls, methods, inspection and/or testing equipment are specified.

Requisite skill levels are required per ANSI N45.2.6 or SNT-TC-1A.

After the PQCIs are revised as necessary, Quality Control Engineers (Inspectors) are being trained and must pass an examination and demonstration test to assure their proficiency in utilizing the new instruction. Upon successful completion, each inspector is being certified to perform inspections to those PQCIs in which he was trained.

The adequacy of PQCIs prior to training is assured by the following programmatic requirements:

1. The PQCI evaluation effort is being conducted under the direction of MPQAD QA personnel. MPQAD Procedure E-3M was issued April 11, 1983 and establishes the responsibilities and requirements for the preparation, revision, and control of PQCIs by QA personnel.

   As a part of the initial PQCI revision process, Project Engineering does a review of the PQCI for MPQAD to assist in ensuring that attributes that affect safety have been identified for inspection, and further to ensure that the PQCI is consistent with the specification requirements and that clarifications are made to specifications wherever necessary. The final responsibility for the content of the inspection plan remains with MPQAD-QA.

2. Whenever a PQCI is revised, the revision is evaluated to determine if a pilot run for testing the implementing capability of the PQCI is required. If a pilot run is required, the PQCI is tested by a team from QA, QC and Training. Based on this pilot run, the PQCI may be further revised.

3. Once the PQCI is ready for issue, an effectivity date is established in conjunction with the Training Department.

   A. For PQCIs on which training was not previously conducted, the training and certification process is then started.

   B. For PQCIs on which training and/or certification was previously conducted, a determination is made as to the need for retraining or recertification. When a revised PQCI is issued, it is evaluated in accordance with established procedures to determine if retraining and recertification is required. Based on this evaluation, appropriate action is taken.

4. During the training process, student questions (see below) are solicited and monitored. Based on this, further revision to a PQCI may be initiated.

Steps taken to ensure all questions raised during PQCI training sessions are resolved prior to certification include:

1. The development of an MPQA Department "Statement of Training Policy." A copy of the current Policy is included as Figure 3-2.

2. The Policy Statement is handed out at the start of each class and reviewed with the trainees.

3. Statement 2 of the Policy deals with student questions. Instructors handle many questions as a routine part of a class. However, when an instructor is faced with questions he cannot answer, he makes note of them for subsequent resolution with the students.

4. When the instructor determines the need, a QA Engineer, Project/Resident Engineer or other resource person is scheduled to

participate as part of the class and answer questions raised by the students.

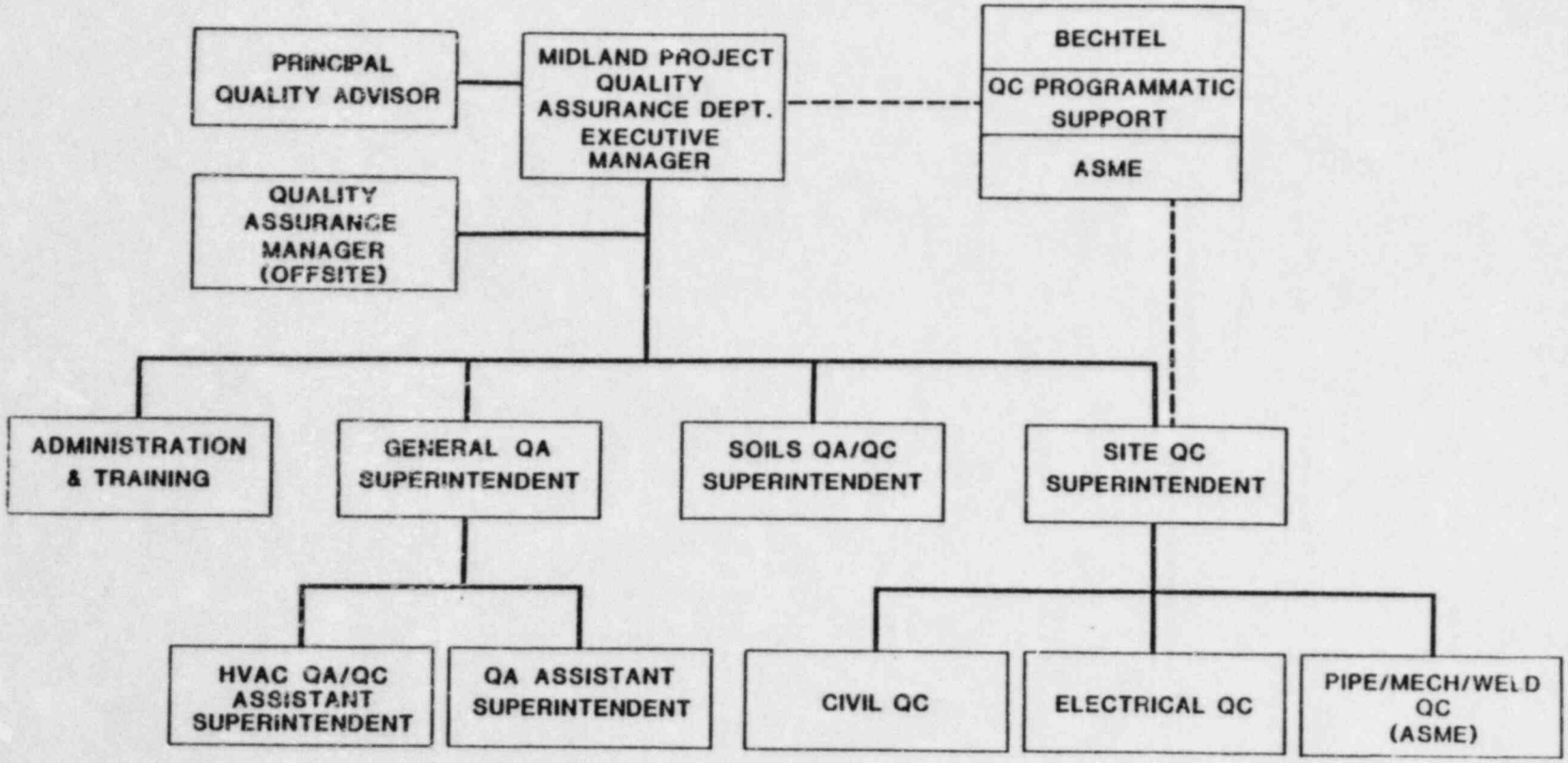
5. If there are unanswered questions at the end of the scheduled class time, an evaluation is made by the instructor as tc whether training can nevertheless be considered complete and the examination given without jeopardizing the students opportunity to satisfactorily write the exam.

6. Even if the examination can be given, prior to answering questions, the questions are still tracked and answered prior to certification.

7. When a trainee indicates that he is not prepared to take an examination or a performance demonstration, he shall not be administered the examination or performance demonstration until his specific concerns are resolved.

FIGURE 3-1

MPQAD ORGANIZATION



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

MPQA DEPARTMENT STATEMENT OF TRAINING POLICY

FIGURE 3-2

It is the objective of the MPQAD Training Department to provide training that meets the needs of the trainees. To help meet these needs the following policies apply:

1. Personnel who are required to attend classroom training shall not be administered an examination without 100% classroom attendance. 100% attendance is defined as total classroom time less instructor excused absences for brief periods of time. A lesser percentage may be requested in writing by the trainees supervisor and approved by the appropriate Training Supervisor.

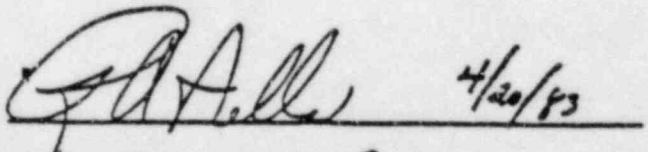
2. When trainees have pertinent questions that relate to the training subject matter the instructor shall take action to answer the questions or obtain the answers and provide them to the students prior to final examination or certification as appropriate.

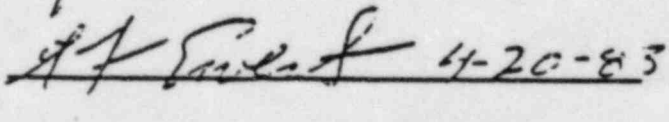
3. The time required for self-study prior to examination shall be determined and scheduled by the appropriate Training Coordinator, based on the duration of the lesson and complexity of the subject.

4. The instructor will review the class evaluation sheets or a composite to determine the acceptability of the training prior to administering the exam to the class. If judged unacceptable, the exam will not be administered until appropriate action has been taken.

5. When a trainee indicates that he is not prepared to take an examination or a performance demonstration he shall not be administered the examination or performance demonstration until his specific concerns are resolved.

STUDENT HANDOUT

RAWells  4/20/83

GFEwert  4-20-83

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Recertify QC Inspectors

The training and recertification process for QC Inspectors as just discussed satisfies commitments made during the September 29, 1982 public meeting with the NRC. Those inspectors transferred from the Engineer/Constructor to MPQAD are 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 are certified on a schedule which supports ongoing work and system completion team activities.

Where individual inspectors fail to achieve recertification, a determination will be made, based on the cause of the failure, as to whether reinspection of that individuals past work is required.

3.4 Milestones

Lstablish New Organization

Transfer the Bechtel QC Organization to MPQAD. Complete

Submit changes to Topical Reports and quality program manuals to NRC. Complete

Recertify QC Inspectors

Specify the revised training and examination requirements for certification (B-3M-1) Complete

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, process and procedures to assess the installation and inspection status of Q-systems, Q-components and Q-structures (Section 4.2) and to verify the quality status of hardware installed and inspected prior to December 2, 1983, (Section 4.3).

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

4.2 Team Organization (Phase 1)

4.2.1 Introduction

The planning for team organization consists of procedures preparation and team organization and training for an installation and inspection status assessment.

4.2.2 Objectives

1. Establish and implement a team organization ready to inspect and assess work 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

Team Orgainzation

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 are 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 are being 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 but receives all other direction from and reports to management within MPQAD. To support the team, 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 assures validation of NCR's. He maintains cognizance of the quality status of the verification activities.

Pilot teams are being utilized to develop and test processes and procedures during the development stage to assure that Program objectives can be met. This also provides practical field input to assure that efficient and workable methods are used.

Team members are physically located together to the extent practicable to improve communication, status assessment, problem identification and problem resolution. The MPQAD representative, however, will continue to report to MPQAD management and will maintain a permanent physical assignment within the MPQAD area.

Team Training

The construction training procedure (FPG-2.000) has been revised to incorporate the training requirements of the CCP. The procedure sets down specific requirements for type of training and subject matter for each organization element. The training requirements by type and subject are defined in a matrix for each organization, management and staff level including craftpersons. The training matrix will be approved by Consumers Power Company.

The team training includes the major elements described below:

1. General training will be provided in

    A. Quality requirements for nuclear work

B. Requirements of the CCP

C. Safety orientation

D. Inspection and work procedures

Training in Items (1) through (3) and selected parts of (4) will be conducted in a formal setting and will be given to all personnel including the craftpersons.

In addition, a "tool box" training session will be conducted periodically for the craftpersons by the foreman. The subject matter will be developed by the training coordinator, and will include information regarding quality issues across the job.

2. Training in the procedures used to govern the performance of work will be conducted for designated field engineering, support personnel and craft foreman as appropriate.

   Formal training will be conducted for identified procedures that define the control of designated work processes, procedures for control of special processes and requirements for inspection and acceptance of completed work. Formal training includes classroom or field demonstration/discussion sessions.

3. Training in procedures for selected processes will be conducted for the craftpersons. This will consist of discussion and/or field demonstrations for the selected process. A list of the selected processes will be maintained by the Training Coordinator.

Documentation of Nonconformances

Non-conformances on the finished portion of partially completed work identified during the status assessment will be documented on Non-conformance Reports (NCR's).

4.2.4 Milestones

. Complete assignment of team supervisors and members to designated systems.	Complete
. Complete organization description and procedures for team functions.	Complete
. Set up training program for teams.	

4.3 Quality Verification (Phase 1)

4.3.1 Introduction

The verification program is the activity undertaken to establish, using a variety of methods, that the hardware installations completed and inspected prior to December 2, 1982 have an acceptable quality status and that prior inspections were performed in an acceptable manner.

4.3.2 Objectives

The objectives of the verification program are to:

- Develop and implement a verification inspection plan using reviewed/revised PQCI for completed and inspected work which considers:

  a. Re-inspection of accessible items for quality verification.

  b. Verification of acceptability of inaccessible attributes by a review of documentation, over-inspection results and past corrective actions and supplementary to these reviews, if required, by NDE techniques and destructive examination.

4.3.3 Quality Verification Program Description

The Quality Verification Program is provided in Appendix 1 of this document.

The quality verification program is based on a 100% reinspection of accessible attributes and review of documentation for inaccessible attributes. At some future date, once the quality level of completed work has been established, Consumers Power Company will make a determination as to whether or not further verification efforts can appropriately be based on less than a 100% reinspection program.

When Consumers Power Company believes that sufficient justification exists for a reduction in the 100% commitment, it will recommend such a reduction to the NRC in accordance with the statistical sampling plan described in an appendix to the Quality Verification Program.

4.3.4 Milestone

- Issue Quality Verification Plan — Complete

4.4 Completion Planning (Phase 2)

4.4.1 Introduction

Establish completion processes, prepare procedures and expand training to cover completion work.

4.4.2 Objective

The objectives of completion planning are as follows:

- Establish processes and interfaces for work completion.
- Prepare procedures defining tasks of each completion team.
- Train team members by expanding upon training received previously for inspection and status assessment.
- Establish scheduling methods to be used during 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 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 and procedural requirements, and the change process to be used when the design or the procedures must be modified.

4.4.4 Milestone

- Complete team procedures and training program for initiation of completion work.

4.5 QA/QC Completion Planning (Phase 2)

4.5.1 Introduction

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

4.5.2 Objectives

Establish in-process inspection program and complete review and modification of PQCIs.

4.5.3 Description

The QC in-process inspection program will be directly coordinated with construction work plans for new work to insure that inspection points 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 completion team quality representative will be responsible for providing the interface between the completion team and MPQAD to insure that quality requirements are satisfied.

Procedure for Control and Release of New Work

The process for release of work will be controlled by procedures that ensure that the requirements of the Construction Completion Program are met prior to initiation of new work. The requirements for release of work include; checking, review and approval to ensure that verification and status assessment activities are completed and that the new work activity will not cover up (make inaccessible) items that have existing nonconformances. These procedures are identified in Figure 4-1. They define the overall process for identification and approval prior to release of work. These procedures require an identification of equipment or items that may be affected by the new work package and a check to see that there are no existing nonconformances or incomplete inspections on these items.

The interactions between project management, the completion team and the QA/QC organization are as follows. Prior to Phase 1, quantification of Q items will be performed by the completion team. The completed items will be identified to the QA/QC organization for the association of closed IRs and subsequent verification during Phase 1. The remaining items will be placed in an incomplete category and will be the basis for the status assessment by the completion team during Phase 1. A commodity list will be prepared as the Phase 1 verification and status assessment activities are carried out and will result in a documented status for each system/area.

This documented status will form the basis for site management review prior to release for Phase 2 completion work. Construction work plans (CWPs) for new work will be prepared based on the lists as they are developed.

There are several major steps in the preparation and approval of the CWP. Each CWP will have a comparable Quality Work Plan (QWP) that defines the quality activities. Inspection hold points will be identified and included in the CWP. Following initial preparation of the CWP, the package is

taken by the team quality representative. The inspection hold points are reviewed and approved according to MPQAD procedure and a QWP is initiated for this work activity. The QWP contains the inspection records that will be required for that work activity. A review will be performed to ensure existing nonconformances or uninspected work are not covered up. The review will be based on the steps in the three procedures identified in Figure 4-1. After the CWP is returned to construction, and the QWP is prepared, work can proceed.

4.5.4 Milestone

- Complete procedures for integration of inspection points with construction work process.

- Complete procedures for control and release of new work.

FIGURE 4-1

Procedures for Controlling Release for New Work

Procedure	Organization	Purpose
Area Release for Construction (FIG 7.500)	Construction	These three procedures together ensure proper completion of verification and status assessment activities prior to initiation of new work and ensure no cover-up of existing nonconformances
Construction Work Plans (FPG 7.300)	Construction	
Control, Release and Handling of Construction Work Plans and Quality Work Packages (T-3)	MPQAD	

5.0 PROGRAM IMPLEMENTATION

5.1 Introduction

The implementation of the Phase 1 Construction Completion Program activities will be initiated after management reviews 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 and inspection personnel in accordance with the procedures described in the preceding sections. The verification and installation and inspection status assessment of an area, system or partial system will be followed by a review of results and a second management review before initiating the Phase 2 completion work.

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.
- Establish a management involvement that ensures program committments are properly defined and carried out.

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 completion.

The Phase 1 management review and the initial Phase 2 management review will be audited by the Construction Implementation Overview Third Party as described in Section 7.3.

Management Release

Subsequent status assessment results will be released by site management prior to initiation of additional completion segments. Reports will be made to Project management at regularly scheduled meetings.

Phase 1 Implementation

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

Phase 2 Implementation

This activity starts 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 completion teams will schedule their work based on these priorities.

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.

5.4 Milestones

- Complete Management review and initiate implementation of plan for verification of completed inspections.
- Complete Management review and initiate implementation of plan for status assessment.
- Complete Management review of initial verification and installation and inspection status results and initiate systems completion work.

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 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 an expeditious evaluation of these issues to be considered as part of the management review prior to initiation of Phase 2. Items identified in the NRC D/G Bldg inspection report are addressed and being 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 12 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 have been 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 Construction Implementation Overview (CIO)is being undertaken using, as a model, the program developed specifically for the underpinning portion of the soils remedial work. The overview was initiated by retaining an independent firm, having considerable experience and depth of personnel in the nuclear construction field. The consultant's overview team is located at the Midland Plant site and observe the work activities being conducted in accordance with this Plan. The overview will continue until Consumers Power and the NRC have confidence in the adequacy of the implementation of the Consumers Quality Assurance Program for the Midland Project. Findings identified by the installation overview team will be made available to the NRC in accordance with established procedures. The protocol for communications between the parties will be the same as used on the soils remedial activities.

   In order to ensure the Project's readiness to undertake the major steps in the Construction Completion Program (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, the duties of the third party CIO will include responsibility for audits of Project performance of these management reviews of the CCP process. The CCP implementation will not proceed 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 findings, in their weekly reports or other memoranda.

   The CIO will also overview site construction activities while in residence, although the significant focus will be on the implementation of the CCP. The exception is that the CIO will not include an overview of the other third party evaluations being conducted.

   Consumers Power Company has proposed that Stone and Webster (S&W) be the organization to perform the CIO. This is based on the fact that S&W is considered 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 an independent overview of the soils remedial activities and have been found acceptable by the NRC for corporate independence.

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 three 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), The Control Room Habitability System and the Emergency Power Supply, will be reviewed to fulfill the requirements of the IDV.

7.4 Milestones

1. INPO Construction Project Evaluation

Select consultant and conduct evaluation	Complete
Submit report to INPO	Complete

2. Independent Construction Overview

Define scope	Complete
Select consultant	Complete
Mobilize CIO Team	Complete

3. IDV

Select Systems	Complete
Complete Evaluation	

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 were 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 Milestones

- Complete the layup preparation walkdown — Complete

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 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 CCP 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 activites.

Other programs that are not a part of the Construction Completion Program (CCP) will be integrated with the CCP effort as required for

overall project coordination and control by Midland Project Site Management Office.

A separate organization of design engineers (presently existing) will carry out spatial systems interaction (SSI) review and examination. Although not part of the CCP, this will be done in coordination with the activities of the CCP. The conduct of the SSI is not a prerequisite to either Phase 1 or Phase 2 of the Construction Completion Program. This program is being overviewed by the CIO as described in Section 7.3. The SSI represents the Project response to the generic licensing issue of "important to safety" and is being handled outside of the CCP with NRC NRR.

Additional activities related to the 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, system or partial system for completion work will be reviewed with the NRC Region III before initiation.

9.4 Milestones

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

10.0 CHANGES TO THE CONSTRUCTION COMPLETION PROGRAM

10.1 Introduction

The mechanism for obtaining approval to initiate activities that do not meet the requirements of the CCP is described in this section.

10.2 Objectives

Establish a management control to ensure that any activities that do not meet the requirements of the CCP are reviewed and approved prior to initiation.

10.3 Description

A procedure (MPPM-19) is being issued to control changes to the CCP. The procedure will provide that Q work activity outside the exceptions defined in Section 9.0 will meet the requirements of the CCP. Any changes to the defined CCP process will receive management review and approval for any deviation from the CCP requirements. The requirements that must be maintained for work activities under the CCP are:

A. Management reviews are scheduled and held of (1) activity planning for verification and status assessment and (2) results of status assessment and planning prior to new work activity.

B. A process is in place to ensure that no existing nonconformances will be covered up by new work activities.

C. Procedures to control work definition and release including definition of inspection requirements and hold points are in place.

D. Inspection and construction personnel involved must have received all required training.

Any work activity that does not meet these conditions will be considered a change. A change will be reviewed by the Construction Implementation Overviewer. The NRC Region III management will be informed prior to implementation.

QUALITY VERIFICATION PROGRAM
MIDLAND NUCLEAR COGENERATION PLANT UNITS 1 AND 2

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QUALITY VERIFICATION PROGRAM
MIDLAND NUCLEAR COGENERATION PLANT UNITS 1 AND 2

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QUALITY VERIFICATION PROGRAM

Midland Nuclear Cogeneration Plant Units 1 and 2

1. Purpose: To confirm through a verification program under the direction of Consumers Power Company, the acceptable quality status of safety related procurement and construction activities completed and inspected by the Engineer-Constructor quality control personnel prior to December 2, 1982.

2. Scope: This program will cover all closed Inspection Records of inspections performed by the Engineer-Constructor quality control personnel on safety related material, systems, components and structures of the Midland Nuclear Cogeneration Plant Units 1 and 2 prior to December 2, 1982, except:

   2.1 Remedial Soils Work, which has been under the direction of Consumers Power Company Quality Assurance (QA) personnel since August, 1982.

   2.2 HVAC work, which has been under the direction of Consumers Power Company QA personnel since the major reorganization in June 1981.

   2.3 Verification of cable routing, identification and other accessible attributes which is being done on a 100% reinspection basis in accordance with PQCI E-4.0.

   2.4 Verification of ASME haugers which will be done under a separate reinspection program as previously committed to the NRC on November 15, 1982 and March 29, 1983. This program requires 100% reinspec-

tion of all hangers with closed IR's as of December 1982. This program will be conducted under the direction of Consumers Power Company QA personnel.

2.5 B&W Construction Company activities which have been performed under the B&W Quality Assurance Program.

3. References:

3.1 Regulatory Guide 1.58, Rev 1, Qualification of Nuclear Power Inspection, Examination and Testing Personnel.

3.2 MPQAD Procedure E-3M, Preparation and Approval of Project Quality Control Instructions

4. Definitions:

Population:	The entire quantity of closed Inspection Records (IR) as of December 2, 1982 relating to a specific PQCI.
Project Quality Control Instruction (PQCI):	The document that provides Quality Control Engineers (QCEs) with specific direction as to attributes to be verified, how they are to be verified and the acceptance criteria.

Inaccessible: An item or attribute of an item which, due to its physical location or configuration, cannot be physically or visually reinspected without removing and thereby invalidating installed work. Under the Quality Verification Program, this includes those items or attributes normally inspected in process and which subsequent construction processing makes inaccessible, eg, piping fit-up, root weld and subsequent layers under the cover pass, anchor bolt hole drilling, internal cleanliness, embedment in concrete, etc. Inaccessible does not include those items which can reasonably be reached by scaffold erection, limited access (remote) areas which require the physical size of the inspection personnel to be limited or those items that can be viewed by removal of access cover or panels, eg, electrical consoles, cabinets, conduit boxes, etc.

The inaccessibility of attributes covered by insulation or coatings will be

handled on a case by case basis. When such coverings can be practically removed and replaced and where their particular reinspection is required to establish an acceptable level of confidence of the quality of a particular attribute, the coverings will be removed. Items which fall into this category and are scheduled for verification in accordance with plan requirements will not be considered inaccessible unless so approved on a case by case basis by the Executive Manager - MPQAD.

Inspection Record (IR): A report that scopes the inspection to be performed, relating it to a specific PQCI and a system, component, structure or portion thereof and which records the results of inspections.

In Process Inspection Notice (IPIN): A form previously used to record nonconforming conditions on work returned to construction forces for rework prior to completion of inspection activities for the unit in question.

Discrepancy Report (DR):	A form similar to the IPIN and used to report inprocess nonconformances.
Nonconformance Report (NCR):	A document used for reporting nonconforming conditions.
Reinspection:	As used in this Verification Program, reinspection means a complete review of requisite documentation and a physical or visual recheck of accessible inspection attributes covered by a specific PQCI or a review of applicable inspection records and related quality documentation where attributes are not accessible.
Inspection by Attributes:	Inspection whereby the characteristic or item or attribute is classified simply as conforming or nonconforming without regard for the degree of nonconformance.
Nonconformance:	A deficiency in characteristic, documentation or procedure which renders the quality of an item unacceptable or indeterminate.

Verification: As used in this program, verification refers to the overall process of establishing the quality acceptance of the total population of completed and inspected work through combinations, as applicable, of efforts such as re-inspection documentation review, review of past efforts to investigate and resolve problems, analysis of past overinspection results and, if necessary, NDE techniques and destructive examination.

5. Program Content: As identified in Section 2, Scope, Consumers Power Company (CPCo) will conduct a Quality Verification Program of safety related procurement and construction work in which the prior 100% inspections have been performed under the direct supervision of the Engineer-Constructor. Such inspections were performed in accordance with approximately 100 PQCIs, as listed in Appendix A, that specified the inspection requirements to be achieved by Quality Control (QC) Personnel. As noted in section 5.1, this listing includes all inspections completed by the Engineer-Constructor prior to December 2, 1982, including those excluded from this program for reasons stated herein. The Quality Verification Program has the purpose of establishing a quality baseline for the completion of construction of the Midland Project.

5.1 Detailed Scope: The program will include approximately 100,930 IRs subject to the Quality Verification Program, for which the Engineer-Constructor has a record of completed inspections as documented by closed Inspection Records (IR) and for which no other 100% verification activity has taken place or is scheduled to take place. There are approximately 147,500 closed IRs of which approximately 14,700 were for reinspections which occurred due to design change, construction rework, etc., and approximately 31,890 which are excluded, due to previous commitments under the Remedial Soil, HVAC, Cable routing and identification and ASME Hanger Programs. Where a reinspection has occurred on a specific item or attribute the verification will relate to the latest IR. In addition, prior to the use of PQCIs, Material Receipt Inspections (MRI), Field Inspection Plans (FIP) and Welding Inspection WR-5 forms were used as quality instructions and records. These also will be used for quality verification. Where applicable, the results of the inspections will be grouped with like PQCIs. Otherwise they will be treated as separate populations.

5.2 Methodology: This program will provide assurance of the quality of completed work and establish the validity of prior inspections. To accomplish this, accessible attributes of items covered by completed IRs will be reinspected to the lastest design requirements with PQCI's which have been reviewed and revised to assure clarity of acceptance criteria and uniformity of implementation. For

inaccessible attributes, the original inspection documents will be reviewed for evidence of acceptability, and justification will be developed as described in section 6.5 to establish hardware quality and support the validity of inspections associated with such PQCIs. Each IR relates to a specific PQCI. PQCIs are organized by discipline and further structured to activities within that discipline, e.g., there are separate PQCIs and corresponding IRs for pre-placement, placement and post-placement inspections of concrete. Closed IRs related to each PQCI provide a population of like activities. Closed IRs are those where the Engineer-Constructors 100% inspection of construction and installed hardware has been completed.

To assess the validity of these past completed inspections, and verify the hardware quality, CPCo will initiate a 100% reinspection of the population to provide adequate confidence that safety related systems components and structures will perform satisfactorily in service.

The initial 100% reinspection effort will be based on a systems/area orientation to provide a quality baseline for subsequent construction completion activities. System/area reinspections will be supplemented by random plant-wide inspections as appropriate to establish a valid quality baseline on an expeditious basis.

At some future date, once the quality level of completed work has been established, CPCo will make a determination as to whether or not further verification efforts can appropriately be based on less than a 100% reinspection program.

When CPCo believes that sufficient justification exists for a reduction in the 100% commitment, it will recommend such a reduction to the NRC in accordance with the statistical sampling plan attached as Appendix C.

5.3 Identification of Deficiencies: Any nonconforming condition observed during the implementation of this program other than those previously identified on nonconformance reports, will be identified by a nonconformance report and will be dispositioned in accordance with established procedures.

5.3.1 Deficiencies Found During Reinspection of Accessible Attributes: Reinspections will be conducted in accordance with PQCIs which have been reviewed or revised since implementation of the Construction Completion Program (CCP) and in accordance with current design drawings and specifications. An acceptable reinspection will validate both the hardware quality and the prior IR. Any deficiencies, other than those previously identified on nonconformance reports as a result of prior inspections, will be identified on a

nonconformance report which will be traceable to both the verification and original IR and the item or attribute in question. When a nonconformance documents a difference between the as built condition of the unit and the referenced design drawing or specification, a further check will be made to determine the design basis against which the IR was originally completed, as well as the current stage of construction, to further establish the validity of the original IR.

5.3.2 Deficiencies Found During Reinspection of Documentation for Inaccessible Attributes: The verification process for inaccessible attributes is discussed in Section 6.5. As noted in that section, any documentation deficiencies will be recorded on the new IR, entered on a nonconformance report and cross referenced to the original IR.

6. Special Program Elements

6.1 Cable Reinspection: As noted in Section 2, Scope, reinspection of routing and identification of installed cables is underway and is being performed 100% for all accessible attributes per PQCI E-4.0. Other electrical work, including cable tensioning and terminations, on which inspections have been completed by the the Engineer-Constructor will be handled in accordance with this program. This

includes PQCIs E-1.0, E-1.1, E-1.60, E-2.0, E-2.1, E-3.1, E-5.0, E-6.0, E-6.2, E-6.6 and E-6.6.1. These PQCIs are further defined and affected quantities of IRs are shown in Appendix A.

6.2 IPIN and DR: In accordance with approved procedures the QC inspection process has used in the past In Process Inspection Notices (IPIN) and Discrepancy Reports (DR) rather than Nonconformance Reports (NCR) to record nonconforming conditions noted by the inspector on work returned to construction for rework. The process required that IPINs be dispositioned before the Inspection Record could be closed. Because the use of IPINs and DRs raises the possibility that a complete inspection may not have been performed on items or attributes covered by IRs with associated IPINs or DRs, all such IRs will be treated as a unique population and will be reinspected 100%. IPINs are no longer used in the inspection process. Discrepancy Reports (DR) were used prior to the use of the IPINs. They are no longer in use, but are recorded and will be treated the same as the IPIN.

6.3 Exceptions to this Program: Exceptions to this Program shall not be taken unless such exceptions can be fully justified. One such example would be a case where objective evidence is available of a CPCo overinspection of the the Engineer-Constructor's inspections and which demonstrates effective quality control and provides the basis to verify acceptability of the items or attributes covered by these past IRs.

Where such exceptions are proposed to be taken, a special report will be prepared by the MPQAD-QA General Superintendent for review and approval of the Executive Manager-MPQAD. This report will contain full justification for the exception and documentation of objective evidence to support the exception. The Executive Manager-MPQAD will inform the NRC Region III whenever he has made a decision to allow such an exception to the Program prior to implementing the exception.

6.4 Purchased Material: Purchased safety related material and components whether source inspected or inspected upon receipt are subject to this Program for verification of completed receipt inspections performed by the Engineer Construction prior to December 2, 1982. In many cases, purchased items have been installed and are not fully accessible for reinspection; however inaccessible interfaces will have been demonstrated and their functional acceptability proven through installation and subsequent testing. Accessible features will be reinspected in accordance with this Program. The total number of IRs associated with PQCI R-1.00, Material Receiving Inspection, is approximately 12,000. In addition, prior to the introduction of PQCI R-1.00, approximately 150 MRIs and 20 FIPs were used for receipt inspection, covering approximately 700 items. Based upon further review, receipt inspections covered by MRIs will either be grouped with like items covered by PQCI R-1.00 or be reinspected separately. FIPs were also used for construction

activities and will be treated separately under this plan. Where materials such as rebar, certain structural members or features of components are inaccessible for reinspection, documentation will be reviewed in accordance with this Program.

6.5 Inaccessible Attributes: There are 57 PQCIs which cover activities that appear to be inaccessible for reinspection. These include rebar installed in placed concrete, containment building tendon reinspection, and PQCIs relating to surveillance of subcontractor actions. A complete listing of these is given in Appendix B to this Program. A brief statement as to why attributes of these IRs are considered inaccessible and why verification by documentation review is appropriate appears in Appendix B. Documentation relating to these PQCIs will be reviewed as indicated in this Program, in accordance with a revised PQCI or checklist specifically developed for review of documentation. These PQCIs, either individually or by groups, will be reviewed and specific detailed justification will be developed to verify the quality status of associated hardware. This will be done by a combination of methods, applied as necessary to achieve verification, including validation of prior inspections through documentation review, reinspections of attributes that may still be accessible, a review of past overinspections, a review of past activities to resolve problems, and if required, application of NDE techniques or limited destructive examinations. This justification, or recommendations

for additional verification activities, where this justification cannot be established, will be provided by the MPQAD-QA General Superintendent to the Executive Manager-MPQAD for decision and approval. Deficiencies in documentation will be reported on nonconformance reports, the disposition of which will determine further actions necessary. These actions will include special testing programs as required to satisfactorily establish the quality acceptance of this category of PQCIs.

7. Documentation and Reports:

7.1 Documentation of Results: Results of reinspections and document reviews will be recorded on new IRs opened specifically for this purpose. Each such new IR will be cross-reference to the closed original IR. A proper notation will be made on the new IR to identify whether the existing original inspection covered by the IR was validated, rejected or is indeterminate. The new IR will provide the basis to document the quality status of the items or attributes being reinspected.

7.2 Documentation of Nonconformances: Nonconforming conditions observed during reinspection activities will be documented on a nonconformance report and appropriately analyzed for management attention. This includes instances where a design or construction modification has occurred since the Inspection Record was closed and a new IR not yet opened. (Note discussion in Section 5.3.1)

7.2.1 Trending: Deficiencies noted during the verification process will be trended as appropriate for analysis and management information.

7.3 Reports:

7.3.1 Reports to Executive Manager-MPQAD: A weekly status report will be made jointly by the CPCo BOP Quality Control (QC) Superintendent and Quality Assurance (QA) General Superintendent to the Executive Manager - Midland Project Quality Assurance Department (MPQAD) summarizing the results of the program. The report will note the completed Inspection Reports by the unique PQCI number, Nonconformance Reports issued and identification of attribute(s) causing the nonconformance(s).

7.3.2 Reports from Executive Manager-MPQAD: The Executive Manager-MPQAD will inform the CPCo Site Manager, the Engineer-Constructor Project Manager, and the Vice President, Projects, Engineering and Construction, of the status of the quality verification program on a biweekly basis and will provide them with a formal monthly report of the verification effort. As appropriate, he will also report on the acceptability of completed work as it may be impacted by nonconformances.

7.3.3 Reports to NRC and Construction Implementation Overview Team: The Executive Manager-MPQAD will provide copies of the monthly reports noted in section 7.3.2 to NRC Region III and the Construction Implementation Overview Team.

8. Implementation: This program will be implemented under the direct control of MPQAD through procedures approved and issued according to normal programmatic requirements.

8.1 Organizational Responsibilities: The Executive Manager-MPQAD has total overall responsibility and authority for the development and implementation of all quality related aspects of this verification program. He will be responsible for seeing that the implementation phase of the program is coordinated with other project departments as required to assure proper support for this plan commensurate with overall project goals.

8.1.1 MPQAD - BOP QA: is responsible for the programmatic elements of the verification program including, but not limited to, procedure development, PQCI review and approval, nonconformance review, analysis of results, justification for document review, verification of inaccessible attributes, program content modifications and certifying that the verification has been completed for a given area or system, and performing management overview of the reinspection process with appropriate documentation of results.

8.1.2 MPQAD - BOP QC: is responsible for program implementation including, but not limited to, conducting the reinspection activities with QC personnel that satisfy Regulatory Guide 1.58, Rev 1, which requires personnel certification in accordance with ANSI N45.2.6 (no person will reinspect activities for which he performed the original inspection), reporting results to the Executive Manager-MPQAD, reporting nonconformances to MPQAD-BOP QA, and coordinating with Construction Services and Consumers Site Management Office to establish schedule priorities for reinspection activities.

8.1.3 MPQAD - Site Audit Section: is responsible for formal audits of the overall verification program implementation.

8.1.4 MPQAD - QA Administration and Training: MPQAD Procedures will be developed in accordance with programmatic requirements to direct implementation of this plan.

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-1.02	Compacted Backfill	181			Hardware & documentation under remedial soils program
C-1.09	Inspection of Crack for BWST Foundation Ring Wall	5			Hardware & documentation under remedial soils program
C-1.10	Insp of Grouting and Dry Packing	1833	±	±	Surface condition and documentation
C-1.11	Drilling & Grouting Rebar	66	±	x	
C-1.20	Concrete Preplacement Inspection	767	±	±	Inspection of remaining unplaced concrete areas plus past documentation
C-1.21	Inspection of Reinforcing Steel	259	±	±	Inspection of accessible rebar plus past documentation
C-1.22	Inspection of Reinforcing Steel at Construction Joints	19	±	±	Inspection of accessible rebar at remaining joints plus past documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-1.30	Concrete Placement Inspection	780	±	x	
C-1.31	Inspection of Concrete Activities	246	±	x	
C-1.40	Concrete Post Placement Inspection	1002	±	±	Inspection of concrete surfaces plus documentation
C-1.50	Installation and Testing of Expansion Anchors	4982	±	±	Inspection for proper installed condition
C-1.51	Retest Verification of Drop In Expansion Anchors	54	±	x	
C-1.52	Reinspection of Seismic Category I Pipe Support Expansion Anchors	294	±	x	
C-1.53	Reinspection of Expansion Anchors for Seismic Cat I Support	0			

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-1.56	Reinspection of Rock Bolt Installation	20	±	x	
C-1.60	Concrete Drilling and Cutting Reinforcing Steel	325	±	x	
C-1.70	Installation of Pressured Concrete Pipe	2	±	x	
C-1.80	Installation of Concrete Unit Masonry	102	±	x	
C-1.81	Installation of Concrete Unit Masonry	139	±	x	
C-1.90	Installation of SWI Sluice Gates	0			
C-2.00	Plant Area Dewatering	59			Hardware and documentation under remedial soils program

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-2.02	Permanent Gravel Packed Wells	17			Hardware and documentation under remedial soils program
C-2.03	Drawdown Recharge Test	1			One time test under remedial soils program
C-2.05	Drilling Q-Listed Areas for Underpinning Operations	14			Remedial Soils Program
C-2.10	Structural Steel Erection	121	±	±	Inspection of accessible attributes plus documentation
C-2.11	Installation of Watertight and Airtight Doors	0			
C-2.20	Field Fabrication of Miscellaneous Steel	1502	±	x	
C-2.21	Field and Offsite Fabrication of Reinforcing Steel	0			

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-2.56	Load Monitoring of the Feedwater/Isolation Valve Pit Rod & Rock Bolt	0			Remedial Soils Program
C-3.01	Installation Inspection of Spent Fuel Storage Racks	20	±	±	Inspection of accessible attributes plus documentation
C-3.02	Installation Inspection of Spent Fuel Storage Racks	8	±	±	Inspection of accessible attributes plus documentation
C-3.03	Inspection of Test for Acceptability of the Spent Fuel Rack Cells	0			
C-4.10	Batch Plant Inspection	929	±	x	
C-5.10	Shear Connector Installation	503	±	x	
C-6.00	Mechanical Splicing of Reinforcing Bars	787	±	x	

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-7.00	Erection of Reactor Building Liner Plate	10	±	x	
C-8.50	Inspection of Surface Preparation Application Touch Up & Repair of Coating	908	±	x	
C-8.51	Inspection of Decontamination Coat for Concrete	17	±	±	Inspection of surface condition plus documentation
C-8.60	Inspection of Surface Preparation Application Touchup & Repair of Coatings Reactor Bldg Liner Plate	0			
C-9.00	Installation-Post Tensioning Components	40	±	x	
C-9.10	Post Tensioning System Stressing	309	±	x	

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-9.20	Containment Bldg Tension Reinsp	11	±	x	
CW-1.00	Welding & NDE of "Q" Listed Non ASME Items	381	±	±	Inspection of surface condition and radiographs plus documentation
E-1.0	Installation of Conduit Boxes and Supports	4716	±	±	Inspection of accessible attributes plus documentation
E-1.1	Installation of Boxes	9	±	±	Inspection of accessible attributes plus documentation
E-1.60	In Process Inspection of Electrical Item Installation	85	±	x	
E-2.0	Installation of Cable Tray and Wireway	1368	±	±	Inspection of accessible attributes plus documentation
E-2.1	Installation of Tray Supports	799	±	±	Inspection of accessible attributes plus documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
E-3.0	Final Electrical Area Completion Activity	0			
E-3.1	Electrical System Turnover Activities	108	±	x	
E-4.0	Installation of Electric Cables	7954	±	x	Inspection of accessible attributes has been accomplished under cable routing & ID program
E-5.0	Cable Terminations	12361	±	±	Inspection of accessible attributes plus documentation
E-6.0	Installation of Electric Equipment and Instrumentation	346	±	±	Inspection of accessible attributes plus documentation
E-6.1	Modification of Electric Equipment	209	±	±	Combine with RW 1.10 Inspect accessible attributes plus documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
E-6.2	Installation of Terminal Boxes	108	±	±	Inspect accessible attributes plus documentation
E-6.6	Installation of Electric Penetrations	127	±	±	Inspect accessible attributes plus documentation
E-6.6.1	Installation of Feed Through Assy's for Elec Penetration	388	±	±	Inspect accessible attributes plus documentation
E-6.7.1	Installation of Batteries & Racks	9	±	±	Inspect accessible attributes plus documentation
EW-1.10	Modification to Electrical Equipment	144	±	±	Combine with E-6.1 Inspection of accessible attributes plus documentation
I-1.10	Installation of Instruments	159	±	±	Inspection of accessible attributes plus documentation
M-1.00	Installation of Mechanical Equipment	11	±	±	Inspection of accessible attributes plus documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
M-2.00	Installation of Rotating Equipment	28	±	±	Inspection of accessible attributes plus documentation
M-3.10	Installation of Cranes	1	±	±	Inspection of accessible attributes plus documentation
M-4.00	Complete Installations of Mechanical Equipment	2	±	±	Inspection of accessible attributes plus documentation
MP-1.00	Disassembly Reassembly and Modification of Systems and Components	4	±	±	Inspection of accessible attributes plus documentation
MW-1.00 Rev 1	Welding and NDE of Mechanical Equipment	0			
P-1.00	Piping Completed Line Installation	80	±	±	Inspection of accessible attributes plus documentation
P-1.10	Piping Subassembly Field Installation RW	1858	±	±	Inspection of accessible attributes plus documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
P-1.20	Piping Subassembly Shop Fab & Rework	994	±	±	Inspection of accessible attributes plus documentation
P-1.30	Valve and Inline Component Install	1247	±	±	Inspection of accessible attributes plus documentation
P-1.60	In Process Insp Fab/Installation Rework of Piping	167	±	x	
P-2.00	Pipe Component Supports Final Setting	5	±	±	Inspection of accessible attributes plus documentation
P-2.10	Pipe (Component) Support Installation	7057	±	±	Inspection of accessible attributes plus documentation
P-2.20	Pipe (Component) Supports Fabrication	6460	±	±	Inspection of accessible attributes plus documentation
P-2.30	Pipe (Component) Support P119/P129 Walkdown	0			Closed IR's from P-2.10 and P-2.20 will be reinspected to requirements of P-2.30 where installed

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
PF-1.10	Pipe Flange Installation and Rework	820	±	±	Inspection of accessible attributes plus documentation
PI-1.40	Field Fabrication and Installation of Piping Related Instrumentation	204	±	±	Inspection of accessible attributes plus documentation
PI-2.40	Off-Site Fabrication/ Weld of Pipe Related Instrument Supports	84	±	±	Inspection of accessible attributes plus documentation
PIW-1.00	Welding and NDE of Instrument Tubing and Fittings	642	±	±	Inspection of accessible attributes plus documentation
PW-1.00	Fab/Weld/Heat Treat and NDE of ASME III Piping	31014	±	±	Inspection of accessible attributes plus documentation
R-1.00	Material Receiving Inspection	12007	±	±	Inspection of accessible attributes plus documentation

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
R-1.60	Receiving Area and Storage Facilities Inspection	45	±	x	Walk through of existing conditions plus documentation
R-2.00	Receiving Inspection for NSS Equipment	198	±	x	
R-2.10	Receiving Inspection for NSSS Equipment	42	±	x	
R-2.20	Receiving Inspection for NSSS Equipment Documentation	217	±	x	
S-1.00	Storage Area/ Facilities Surv	67	±	x	Walk through of existing conditions plus review of documentation
SC-1.05	Material Testing Services	306	±	x	

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
SC-1.06	Recoating Work of Cont Bldg Liner Plate, Misc Steel, and Pipe Hanger Attachment	0			
SC-1.07	Agreement for Tech Services for Soils Laboratory Testing	0			
SC-1.10	Earthwork Subcontract Surveillance	0			
SC-1.11	Concrete and Unit Masonry Surface Sub/ Contract Surv	406	±	x	
SC-1.14	Subcontract Surveillance of Installation of Underpinning	0			
SC-1.16	Field Erected Storage Tanks/Subcontract Surveillance	108	±	x	

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
SC-8.00	Subcontractor Surv of Installation of Soil and Crack Monitoring Devices	58			Remedial Soils Program
SE-1.00	Measuring and Testing Equipment Laboratory Surveillance Inspection	31	±	x	
SM-1.03	Heat, Ventilation and Air Conditioning Subconract Surveillance	828	±	x	
SM-1.04	Field Erected Component Cooling Water Surge Tanks Subcontracts Surveillance	108	±	x	
SM-1.17	Field Fabricated Incore Installation Tanks Subcontract Surveillance	183	±	x	
SW-1.01	NDE-Subcontractor Surveillance	120	±	x	

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
T-1.00	Hydrostatic and Pneumatic Leak Testing	460	±	x	
T-1.10	Final Cleaning of Interior Surfaces of Piping, Mech Equipment and Instrumentation	0			
T-5.00	Lift Test for Cranes	0			
W-1.00	Welding, Heat Treatment and Non Destructive Examination	20251	±	±	Inspection of accessible attributes, radiography plus documentation
W-1.60	Area Inspection Of In Process Activities For Welding Q-Listed And ASME III Items	164	±	x	
C-1.01	Excavation in Q-Soil Area	NA			Remedial Soils Program

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not accessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
C-2.01	Gravel Packed Wells	224			Documentation and hardware is under remedial soils program
C-2.22	Field Fabrication Of Reinforcing Steel	0			
C-3.05	Inspection Of The Feedwater Isolation Valve Pit Jacking Operation	NA			Remedial Soils program
EU-1.0	Installation Of Conduit & Box For Under Pinning Data Aquisitions System	61			Documentation and hardware is under remedial soils program
EU-4.0	Installation Of Electrical Cables For Under Pinning Data Aquisition System	117			Documentation and Hardware is under remedial soils program
EU-5.0	Cable Termination For Under Pinning Data Aquisition System	178			Documentation and Hardware is under remedial soils program

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
EU-6.0	Installation Of Instruments For Under Pinning Data Aquisitions System	25			Documentation and hardware is under remedial soils program
EU-6.1	Installation Of Instrument Supports For Under Pinning Data Aquisitions System	29			Documentation and Hardware is under remedial soils program
IC-1.0	Instrument Checkout	67			Documentation and Hardware is under remedial soils program
[illegible]-1.00	Storage & Maintenance Of Material Released To Mergentine	NA			Remedial soils program
[illegible]-1.00	Storage & Maintenance Of Material Released To Spencer, White & Prentis	NA			Remedial soils program

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

PQCI #	PQCI TITLE	QUANTITY	DOC'T	HARDWARE	REMARKS
CM-1.0	Crack Monitoring Of The Feedwater Isolation Valve Pits Sub-Contract Surveillance	36			Documentation and Hardware is under remedial soils program
-1.0	Monitoring, Reducing and Reporting Under Pinning Instrument Data Sub-Contracts Surveillance	189			Documentation and Hardware is under remedial soils program
UP C-1.004	Welding And NDE Of "Q" Material	8			Documentation and Hardware is under remedial soils program
UP C-1.008	Excavation And Lagging Of Access Pits Piers and Drifts For UP	1			Documentation and Hardware is under remedial soils program
UP -1.010	Field Fabrication Of Steel Sets For Under Pinning Of Aux Bldg & FIVP	5			Documentation and Hardware is under remedial soils program

KEY:
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not acessible for reinspection

A LIST OF ALL PQCI'S WITH QUANTITY AND REINSPECTION INFORMATION

The Remedial Soils Program has initiated the following additional PQCI's for which there are no Engineer-Constructor IR's, Inspections have all been conducted by CPCo supervision

UP-C-1.002	UP-C-1.011	UP-C-1.019	SD-2.0
UP-C-1.003	UP-C-1.012	UP-C-2.003	
UP-C-1.005	UP-C-1.013	UP-C-2.004	
UP-C-1.006	UP-C-1.014	UP-C-2.005	
UP-C-1.007	UP-C-1.015	UP-C-2.007	
UP-C-1.009	UP-C-1.016	UP-C-2.008	
UP-C-1.011	UP-C-1.017	UP-C-2.009	
UP-C-1.019	UP-C-1.018	UP-C-2.010	
UP-C-1.020		UP-C-2.019	
UP-C-1.023		UP-C-2.042	
		UP-C-2.150	
		UP-C-3.001	
		RM/RS-1.00	

KEY
± Document-Review documentation for completeness
± Hardware-Reinspect accessible attributes
x Hardware-Attributes not accessible for Reinspection

APPENDIX B

PQCIs To Be Verified by Review of Documentation Only

The following PQCIs are deemed inaccessible for attribute reinspection. Hardware acceptability will be established by documentation validation where possible and by supplemental verification efforts where documentation review alone does not establish hardware acceptability:

1. Remedial Soils Program

C-1.02 - Compacted Backfill

C-1.09 - Inspection of Crack for BWST Foundation Ring Wall

C-2.00 - Plant Area Dewatering

C-2.01 - Gravel Packed Wells

C-2.02 - Permanent Gravel Packed Wells

C-2.05 - Drilling in Q-Listed Areas for Underpinning Operations

EU-1.0 - Installation Of Conduit and Boxes For UP Data Acquisition System

EU-4.0 - Installation Of Electrical Cables for UP Data Acquisition System

EU-5.0 - Cable Termination for UP Data Acquisition System

EU-6.0 - Installation Of Instruments For UP Data Acquisition System

EU-6.1 - Installation Of Instrument Supports For UP Data Acquisition System

IC-1.0 - Instrument Checkout For UP Data Acquisition

SCM-1.0 - Crack Monitoring Of FW Iso Valve Pits Subcontractor Surveillance

SD-1.0 - Monitoring, Reducing and Reporting UP Inst. Data Subcontractor Surveillance

UP-C-1.004 - Welding And NDE of Q-Material

UP-C-1.008 - Excavation & Lagging of Access Pits, Piers and Drifts For UP

UP-C-1.010 - Field Fabrication Of Steel Sets for UP Of Aux. Building and FIVP.

The above PQCIs relate to the remedial soils program which has been established as a separate project and for which inspections have been performed under the direction of MPQAD since August 1982. Soils work and related documentation have been reviewed by MPQAD for acceptability and corrective measures instituted where required.

2. Reinspection of Expansion Anchors and Rock Bolt Installation.

C-1.51 - Retest Verification of Drop In Expansion Anchors

C-1.52 - Reinspection of Seismic Category I Pipe Support Expansion Anchors.

C-1.56 - Reinspection of Rock Bolt Installation

The above PQCIs relate to reinspections which have been completed and results reported to the NRC.

3. In-Process Activities.

E-3.1 - Electrical System Turnover Activities

E-1.60 - In Process Inspection of Electric Item Installation

R-1.60 - Receiving Area and Storage Facilities Inspection

W-1.60 - Area Inspection Of In Process Activities For Welding Q-listed and ASME III Items

S-1.00 - Storage Area/Facilities Surveillance

P-1.60 - In Process Inspection of Fabrication/Installation Rework of Piping

The above PQCIs relate to in-process activities where affected work would now be completed and any reinspection would be of completed work covered by other PQCIs, e.g., PQCIs E-6.0, W-1.00 and PW-1.00. In the cases of R-1.60 and S-1.00, these are an inspection or surveillance of general facilities maintenance which can be repeated, but not on a basis which would have any meaning relative to conditions existing when the inspections were made. In short, a single inspection can attest to conditions existing today without relation to past conditions.

4. Surveillance of Subcontractor Activities.

SC-1.05 - Material Testing Services

SC-1.11 - Concrete and Unit Masonry Surface Subcontract Surveillance

SC-1.16 - Field Erected Storage Tanks Subcontractor Surveillance

SC-8.00 - Subcontractor Surveillance of Installation of Soil and Crack Monitoring Devices

SE-1.00 - Measuring and Testing Equipment Laboratory Surveillance Inspection

SM-1.03 - HVAC Subcontract Surveillance

SM-1.04 - Field Erected Component Cooling Water Tank Subcontractor Surveillance

SW-1.01 - NDE Subcontractor Surveillance

SM-1.17 - Field Fabricated Incore Installation Tank Subcontractor Surveillance

The above PQCIs all relate to surveillance of subcontractor activities. Where work has not been completed, such surveillance activities can be repeated when safety related work resumes. Otherwise, they can be evaluated only by a review of documentation and a single walk down of affected areas for assessment of current inplace conditions, but not of past activities. In addition, SM-1.03 - HVAC Subcontractor Surveillance, relates to activities outside the scope of this quality verification program. In depth participation by CPCo continues in this work.

5. Hydrostatic and Pneumatic Leak Testing.

T-1.00 - Hydrostatic and Pneumatic Leak Testing

CPCo has already conducted an extensive evaluation of hydrostatic and pneumatic leak testing and corrective actions relative to such evaluation are being conducted separately from this reinspection program.

6. Special "One Time Only"Testing.

C-2.03 - Drawdown Recharge Test.

This is a test required to have been performed once and which demonstrated acceptable results. The remedial soils program which is not within the scope of this verification program would provide any necessary justification for a repeat of such a test.

7. Previously Documented Responses to the NRC.

C-6.00 - Mechanical Splicing of Reinforcing Bars

This PQCI relates to necessary inspections of the "Cadweld" process of mechanically splicing reinforcing steel. The constructor's processes were the subject of extensive investigation by the NRC in 1973 and 1974 which determined that corrective action had been identified and implemented including requalification of personnel, review of work instructions for Class I work, CPCo QA review of work procedures, and audits of Class I work. Affected mechanically spliced rebar is now inaccessible due to concrete placement. CPCo overinspection of any continued use of this process in remaining construction will be a continuing process.

C-7.00 - Erection of Reactor Building Liner Plate

This PQCI relates to the preparation and installation of steel plates which provide the inner surface for the containment building. The liner is now accessible only from one side, being backed up by reinforced concrete on the outside. Extensive review was made by CPCo in 1974 of the accuracy of liner plate records. Controls implemented after NRC investigation were evaluated and found satisfactory. In 1977, a deformation of liner plate occurred due to freezing of an embedded construction water line. This resulted in extensive removal and replacement of steel liner plates. Quality of the liner plate installations have been verified through radiography, and extensive CPCo involvement in the installation and repair. The NRC has reviewed actions taken and closed its reports on the installation of steel liner plates.

C-1.11 - Drilling and Grouting of Rebar

This PQCI provides documented instructions for the drilling and grouting of reinforcement steel and in itself is a corrective action for previously cited deficiencies that such a procedure did not exist. Its usage is documented evidence of the implementation of corrective action.

C-5.10 - Shear Connector Installation

This PQCI is used to assure that the proper installation of shear connectors has been accomplished which tie the supporting beams, steel and concrete floor decking into a composite structure. Since the shear

connector serves as concrete reinforcement, it is not visible once the concrete is placed. NRC reviewed corrective actions relative to installation problems with Nelson stud shear connectors and closed reports relative to this problem. PQCI 5.10-IRs document accomplishment of required inspections.

C-8.50 - Inspection of Surface Preparation Application Touch Up and Repair of Coating

This PQCI addresses the preparation of concrete surfaces and the application of a coating to seal the surface to prevent contamination being absorbed into the concrete. Once the coating is applied, the surface preparation cannot be examined. The final coating can be examined for presence but not for the process steps that applied the coating.

C-1.60 - Concrete Drilling and Cutting Reinforcing Steel

This PQCI describes the quality control steps necessary in drilling concrete to minimize cutting of reinforcing steel. Completion of the PQCI-IR identifies whether proper inspections were made and results encountered and documented. Since the holes will have been drilled, and items either mounted in the holes or the holes grouted, it is not possible to physically inspect the concrete or the reinforcement. This is particularly true where expansion anchors have been used which cannot be nondestructively removed.

8. Post Tensioning Requirements.

C-9.00 - Installation-Post Tensioning Components

C-9.10 - Post Tensioning System Stressing

C-9.20 - Containment Building Tension Reinspection

These PQCIs document the re-routing of tendon sheathing, tendon installation and tensioning. CPCo identified a problem to the NRC in 1977 indicating the misplacement of two tendon sheaths and the omission of two sheaths. The misplacement of the two sheaths brought about approved re-routing of the tendons. The omitted sheaths were replaced. The NRC conducted a special investigation of the corrective measures in May 1977 and deemed them acceptable. A final 50.55(e) report was issued by CPCo in August 1977.

9. Concrete Placement Activities.

C-1.30 - Concrete Placement Inspection

C-1.31 - Inspection of Concrete Activities

The PQCIs relate to inspections during placement of concrete. Where concrete has been placed, inspections will be made in accordance with C-1.40 "Concrete Post Placement Inspection." Where concrete has not been placed, a preplacement inspection will be required before placement when construction is resumed.

C-1.80 Installation of Concrete Unit Masonry

C-1.81 Installation of Concrete Unit Masonry

These PQCIs relate to the installation of concrete block walls many of which have been removed as a result of subsequent plant modifications. The remaining walls can be inspected for presence of the wall and visual quality but not for the process controls necessary to properly erect them.

C-4.10 - Batch Plant Inspection

This PQCI was prepared for necessary controls of concrete batch plant activities. The batch plant has now been removed from the site. Concrete necessary for completion of the plant is procured from an offsite supplier. Currently concrete is procured only for the Soils program and for non-Q construction. Reinspection is limited to review of documents of past operations. Adherence to this PQCI will be enforced on procured concrete for balance of plant safety related constructions when construction is resumed.

10. Field Fabrication

C-2.20 - Field Fabrication of Miscellaneous Steel.

This PQCI addresses fabrication of steel which will have been consumed and erected into items which will be inspected if accessible, under other PQCIs.

11. NSSS Receiving Inspection Activities.

R-2.00 - Receiving Inspection for NSSS Equipment

R-2.10 - Receiving Inspection for NSSS Equipment

R-2.20 - Receiving Inspection for NSSS Equipment Documentation

These PQCIs address the constructor's receiving inspection of components and materials used by the NSSS supplier constructor. In general, the items will have been installed by that contractor. Any accessible attributes will have been confirmed by activities of the NSSS constructor.

12. Other.

C-1.70 - Installation of Pressured Concrete Pipe

This PQCI covered the installation of the main water line from the river to the cooling pond. This line is now submerged as the pond is full. Inspection of internal surfaces could be performed through use of divers. Integrity has been demonstrated through use of the system.

E-4.0 - Installation of Electrical Cables

One hundred percent reinspection of installed cables has been completed and reported under a separate program. Documentation has not yet been reviewed.

STATISTICAL SAMPLING PLAN
INDEX OF TOPICS

SAMPLING PLAN FOR CPCo QUALITY VERIFICATION PROGRAM

1. Purpose:

To provide a statistically valid method, under the direction of Consumers Power Company, of confirming the acceptable quality status of safety related procurement and construction activities completed and inspected by the Engineer-Constructor Quality Control personnel prior to December 2, 1982.

2. Scope:

This plan applies to closed Inspection Records (IR's) related to specific Project Quality Control Instructions (PQCI's) where the quantity of closed IR's is in excess of one hundred and for which there are no other ongoing or planned programs to confirm quality.

3. References:

MIL-STD-105D Change Notice 2 (March 1964), Sampling Procedures and Tables for Inspection by Attributes.

US NRC I&E Bulletin 79-02, Reinspection of Anchor Bolts.

MIL-HDBK-53-1A 1 FEB 1982 - Guide for Attribute Lot Sampling and MIL-STD-105.

4. Definitions:

Population: The entire quantity of closed (IR's) relating to a specific PQCI.

Time Centered:	The term used to describe the ordering of lots, and items within a lot, based upon the time sequence in which an IR was initiated
Homogeneity:	Homogeneity implies that a series of units of product should be alike or similar in nature. Homogeneity under this plan will be achieved by utilizing specific project Quality Control Instruction (PQCI) categories covering like activities and generally within a defined time period.
Acceptance Number (AC):	The number of nonconformances permitted to be found in a sample of a lot without rejecting the lot for a specific acceptable quality level.
Rejection Number (Re):	The number of nonconformances found in a sample of a lot that requires rejection of the lot for a specific acceptable quality level.

Acceptable Quality Level (AQL): The AQL is the maximum percent of nonconformances that, for the purpose of sampling inspection, can be considered satisfactory as a process average.

Attribute: An attribute is a characteristic or property which is appraised in terms of whether it does or does not comply with a given requirement.

Inspection by Attributes: Inspection for which the item or attribute is classified simply as conforming or nonconforming without regard for the degree of nonconformance.

Limiting Quality (LQ): The term applies to sampling plans that provide not less than a specified percentage of quality protection. Consumers Power Company has selected an LQ of five percent which provides 95% confidence that at least 95% of inspection elements of the lot/population will be acceptable.

Lot: A quantity of items, such as completed inspection records covering the same activity, equal to or less than the total population and representing a subdivision of that population.

Nonconformance: A deficiency in characteristic, documentation or procedure which renders the quality of an item unacceptable or indeterminate.

Pa - Probability of Acceptance: The probability of accepting a lot with a predetermined percent defective, when a given sample plan is used.

Random Sample: A sample taken from a population or lot in which each of the items has an equal chance of being selected, regardless of its quality. If the units in a lot have been arranged without bias as to their quality a sample drawn anywhere in the lot will meet the requirements for randomness [1]. PQCI's are logged in accordance with the date they were opened, totally independent of the

(1 Mil-Hdbk - 53 -1A Para 12.2)

resulting quality, thus sampling by logged date or other means meets this requirement.

Sampling Plan: A sampling plan indicates for a given lot size the number of items or components from each lot (sample size or a series of sample sizes) which are to be inspected from the lot and the criteria for determining the acceptability of the lot.

5.0 Plan Content

5.1 Detailed Scope: This sampling plan applies to closed Engineer-Constructor IR's related to specific Project Quality Control Instruction (PQCI's) for Balance of Plant safety related materials, components, systems and structures, which are not covered by other ongoing programs to confirm quality. It is applicable to closed IR's where the quantity of closed IRs for a given PQCI is in excess of 100 and where it has been demonstrated by one hundred percent inspection of a significant portion of each population that the accepted quality level of that population has been established. The specific PQCIs and quantities of closed IRs that make up this total population are identified in Appendix A. That appendix also indicates whether both hardware and documentation are planned to be verified or whether documentation alone is planned to be reviewed because of inaccessibility of hardware features.

5.2 Description of Sampling: Sampling inspection is that type of activity in which units of product are selected at random and examined for one or more quality attributes. Sampling inspection is an acceptable way of determining the conformance or nonconformance of items to specified quality requirements. The amount of inspection can be increased where the product quality is deteriorating or reduced where the level of quality is high[2].

(2 Mil-Hdbk - 53-1A)

Statistical sampling methods force one hundred percent verification of quality whenever the required quality level has not been attained. The statistical methods proposed herein are designed to provide 95 percent confidence that the inspectable elements of the entire population are acceptable based upon the acceptability of items or attributes previously 100 percent inspected to provide a satisfactory quality baseline. This is consistent with past NRC recommendations related to reinspections of safety related items[3] and will produce results at least equivalent to those expected from 100% inspection.

The statistical quality control methods proposed are in accordance with MIL-STD-105D Tables I, IIA and VIIA. MIL-STD-105D is probably the most widely used sampling standard in the United States. This Program is a rigorous application of statistical quality control methods to assess the quality of nuclear power plant construction.

(3 NCR I&E Bulletin 79-02, Appendix A)

5.3 Sampling Process: The application of statistically valid sampling plans requires lot sizes to be large enough to permit taking of a sample quantity sufficient to limit the risk of accepting nonconforming items. When quantities are not large enough, one hundred percent reinspection will be performed. Because of the Limiting Quality planned to be used, populations of PQCI items are required to be greater than 50 to be eligible for sampling further; however, CP Co has committed to performing 100 percent inspection of PQCIs having 100 or less IRs. In addition, populations to be sampled must be first qualified by having demonstrated acceptable quality levels through one hundred percent inspection of a quantity of items sufficient to provide adequate confidence the existing quality level is acceptable. When 100% inspections have established this confidence, CPCo will consider that the one hundred percent inspection of a significant portion of each PQCI has established a valid basis for statistical sampling of any remaining quantities.

The statistical sampling plan will be conducted as follows:
Two lots for each PQCI will be sampled at normal sampling levels in accordance with MIL-STD-105D, Tables I, IIA and VIIA to a limiting quality of 5 percent at a 95 percent confidence level. If these two successive lots validate that the required level of quality has been maintained, remaining lots will be sampled to the same criteria, but at reduced sampling levels per MIL-STD-105D, Table IIA.

The Executive Manager may recommend to the NRC discontinuance of further sampling where quality levels have demonstrated that past Engineer-Constructor inspections have provided acceptable control of quality.

5.3.1 Switching: The sampling plan will include switching procedures to provide Consumers Power Company the protection provided by the tightened plan, when evidence that the desired quality level is below prescribed levels and the advantage of the reduced plan, when evidence that the desired quality level has been achieved. Due to the known quantities of specific PQCI's available for sampling (non-continuous production run) the following switching rules will be implemented:

- o Establish acceptable base quality level through 100% reinspection.
- o Single normal plan for two lots.
- o From single normal, switch to single reduced, after acceptance of two consecutive lots. Switch back to single normal after the first rejected lot.
- o From single normal, switch to single tightened, after the first rejected lot for two consecutive lots, then switch back to single normal if both lots are acceptable. If either or both of the single tightened lots are rejected switch to 100% inspection of lots, until two consecutive lots are accepted.

5.4 Sampling Tables: The following tables indicate sampling information for Single Normal, Single Reduced and Single Tightened sampling plans:

SINGLE NORMAL

Population Lot Size N	Sample Size n	Accept Number Ac	Reject Number Re
2-50	ALL	0	1
51-500	50	0	1
501-1200	80	0	1
1201-3200	125	2	3
3201-10,000	200	3	4
10,001-00	315	7	8

SINGLE REDUCED

2-50	ALL to 20	0	1
51-500	20	0	1
501-1200	32	0	1
1201-3200	50	1	2
3201-10,000	80	1	2
10,001-00	125	3	4

SINGLE TIGHTENED

0-80	All	0	1
80-500	80	0	1
500-1200	125	0	1
1201-3200	200	3	4
3201-10,000	315	5	~~6~~
10,001-00	500	10	11

The specific PQCIs and total quantities of closed Inspection Records to which these lot and sample sizes apply are included in Appendix A to the Quality Verification Program.

5.5 Determination of Lot Sizes: A reinspection lot is a collection of units of product (closed inspection records of like activities) from which a sample is drawn and inspected to determine conformance with the acceptance criteria and may differ from a collection of units designated as a lot for other purposes such as production or procurement[4]. The size of the lot is one of the factors that determines the sample size to be used in sampling inspection. For this program the formation of each lot is planned to be at least equal to the normal sample size for the entire population; thus for a population of 1000, the minimum lot size would be 80; the optimal lot size would be 281 or greater.

Normally the total quantity of the population will not be a direct multiple of the lot size. After dividing the population quantity

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(4 Mil-Hdbk - 53 Para 6.4.1)

by the lot quantity, any residual quantity may be combined with the last lot, or be treated separately for sampling convenience so long as the sample size is in accordance with MIL-STD-105D. Lots will be time centered. The purpose of this is to further enhance homogeneity for each lot and to identify and isolate conditions which may have occurred in specific time periods during construction of the Midland Plant. This method of stratifying samples and lots, yields more information for corrective action than sampling the entire population. Quantities used for determining lot sizes will exclude inspection records where reinspections have occurred, since this will preclude counting the same item twice. A limited number of PQCI's cover like activities. These will be grouped, where appropriate, to provide a single population. An example of such grouping would be PQCI's E-6.1 and RW-1.00, "Modification of Electrical Equipment."

5.6 Sample Selection: Samples will be selected by dividing the lot size by the sample size indicated by MIL-STD-105D Tables I and IIA for normal sampling. For example, for a lot of 500, the sample size is 50. In this case any of the first 10 IRs and every tenth IR for a specific PQCI would be selected for reverification. This assures randomness, since the manner of filing is totally independent of the quality of the item and of the person selecting the sample, and all IRs have an equal chance of selection. It also provides a cross section as related to time, since the IRs are

logged by the date they were opened. Where there are multiple lots of the same size, the same method may be used, so that each sequential lot is time centered with the preceding lot and each item sampled is time sequenced within the lot.

5.7 Substitution: Where accessibility is found to inhibit inspection of attributes of a specific item intended for sample reinspection, the Executive Manager-MPQAD has sole authority to direct the selection of a substitute random item for reinspection from the same lot, or in the event that no item(s) is accessible for reinspection, a documentation review of the inaccessible item(s). Justification for this substitution will be documented.

5.8 Increased or Reduced Sampling: The Executive Manager-MPQAD has authority to direct 100% reinspection at any point where the ability to conduct a valid sample reinspection is determined to be impractical. Switching to reduced or tightened sampling will require prior approval by the Executive Manager-MPQAD in accordance with criteria described in this plan.

5.9 Treatment of Reinspection Deficiencies in Verification Sampling Program: Deficiencies identified by reinspections will be recorded on a nonconformance report and promptly reported to MPQAD-QA and others for processing per procedure. The party responsible for recommending the initial disposition of the nonconformance will

review the intended disposition with MPQAD-QA prior to further processing of the nonconformance. The purpose of this MPQAD-QA review is to insure proper treatment of the nonconformance in the sampling analysis. Deficiencies determined to be acceptable to "use as is" will be evaluated by Project Engineering to determine whether the design criteria requirement which the attribute failed to meet will be modified to clarify the inspection requirement. If Project Engineering modifies the requirement on a generic basis, the deficiency will be considered "acceptable" for purposes of sample analysis. The final decision as to whether the deficiency constitutes a sample defect will be made by the Executive Manager-MPQAD. This decision and its justification will be documented.

5.10 Deficiencies Found During Reinspection of Documentation for Inaccessible Attributes: The verification process for inaccessible attributes is discussed in Section 6.5 of the Quality Verification Plan. As noted in that section, any documentation deficiencies will be noted on the verification IR, entered on a nonconformance report and cross referenced to the original IR. The treatment of sampled lots containing nonconformances will be determined on a case by case basis and further verification requirements will be determined taking into account the disposition of the nonconforming condition.

6.0 Documentation and Reports

6.1 Documentation of Results: Results of sampling reinspection will be documented on IR's and statused to specifically identify the PQCI, the lot number, the quantity in the lot, the quantity inspected, the quantity found acceptable, the NCR's identifying any deficiencies and the results of the nonconformance disposition, and acceptability of the lot.

6.2 Documentation of Nonconformances: Nonconforming conditions will be reported and dispositioned in accordance with approved procedures. Disposition of the nonconformances will include necessary actions to be taken on the balance of the lot; e.g., screen balance of the lot for the rejected attributes, or 100% inspect the balance of the lot.

6.3 Reports: The results of the sampling plan for each lot related to each PQCI will be included in reports made by the CPCo BOP Quality Control Superintendent and the Quality Assurance General Superintendent QA as described in section 7.3 of the Quality Verification Program.

7.0 Implementation: This plan will be implemented as directed by the Executive Manager MPQAD. The organizational responsibilities are the same as shown in section 8 of the Quality Verification Program. In addition, MPQAD BOP Quality Control shall have the responsibility of selecting the IR's to be sampled from lot sizes predetermined by MPQAD-QA.

sent to DMB 6/10/83 file

Consumers Power Company

Donald B Miller, Jr
Site Manager
Midland Project

Midland Project: PO Box 1963, Midland, MI 48640 • (517) 631-8650

PRINCIPAL STAFF			
RA		ENF	
D/RA		CSS	
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ML			
OL		FILE	

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June 2, 1983

Mr J J Harrison
Midland Project Section
U S Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND ENERGY CENTER GWO 7020
EXCAVATION PERMIT PROCEDURE REVISION
File: 0485.16 UFI: 42*05*22*04 Serial: CSC-6725
53*50*02
12*50

Enclosed is a copy of the Bechtel Field Procedure FIC-5.100 Rev 2, Excavation Permit System for your review. We have revised the procedure to increase the scope of work to include all excavations associated with the underpinning of the Auxiliary Building and Service Water Pump Structure.

DBM/RHW/klm

Attachments

JUN 6 1983

8306130368

[redacted]

FIC-5.100
Rev. 2
6-01-83

QUALITY RELATED

Bechtel Power Corporation

Field Instruction

UNCONTROLLED
NOT TO BE USED
FOR CONSTRUCTION

FIC-5.100 (Q)

Excavation Permit System

This Supersedes FIC-5.100 dated 6/24/82

To: All Field Engineers and Superintendents

Prepared By: Ralph Cantsiate Date 5/23/83

Staff or Team Lead
Discipline Engineer Review: S. Harvey Date 5-23-83

Document Control Review: C.H. Bouville Date 5/24/83

PQAE Review: M.A. Dietrich Date 5/26/83

PFE Approval: [illegible] Date 5/26/83

Site Manager Approval: [illegible] Date 5/26/83

Consumer Power Company Review and Acceptance:

Project Management Organization [illegible] Date 5/27/83

MPQAD James K. Meisenheimer Date 5/27/83

D-126-11

8306130372

1.0 Purpose

To provide instructions for the proper application, approval, and use of the Excavation Permit. The Permit is intended to prevent disturbance of foundation subgrade for structures, maintain the integrity of compacted backfill, protect existing buried installations, and therefore, the health and safety of personnel, and to provide notification to affected parties of planned work.

2.0 Scope

2

The Excavation Permit as delineated in this Field Instruction is required for all excavations in both Q and Non-Q soil areas.

3.0 References

3.1 Specification 7220-C-211(Q) - Technical Specification for Backfill.

3.2 Instruction FIC - 1.100 - Q-Listed Soils Placement Job Responsibilities Matrix.

3.3 Instruction FIG-1.120 - Administrative Corrections to Procedures/Instructions.

3.4 Project Engineering Procedure PEP 2.14.7 - Onsite Geotechnical Soils Engineer for Backfill and Laboratory Testing for the Midland Project.

3.5 Project Engineering Procedure PEP 2.14.8 - Resident Geotechnical Engineer for Remedial Soils Activities for the Midland Project.

3.6 Design Drawings C-45, C-109, C-111, and C-112 - Class I Fill Material Areas

3.7 Procedure FPG-1.000 - Field Procedures, Instructions and Administrative Guidelines and Specifications

3.8 Procedure FPU-2.000 - Soils Work Permit System

4.0 Definitions

4.1 Excavation - as used in this Field Instruction, exca-

vation is a general term for removal or displacement of soil by any means, to any final dimensions. Excavations covered by this Field Instruction can be categorized as one of the following three types.

4.1.1 Drilled holes - any circular excavation vertically or at an angle into the soil by drilling, driving, or jetting methods.

4.1.2 Pile Driving - as used in this Field Instruction is the mechanical insertion of sheetpiling or load-bearing piles whether of timber, concrete, steel, or composite construction.

4.1.3 Open Pit Excavations - all other excavations not covered by section 4.1.1 or 4.1.2. Methods of excavation include power shovel, draglines, clamshells, hoes, trenching machines, etc.

5.0 Responsibility

5.1 The Project Field Engineer is responsible for the direction and implementation of this Instruction.

5.2 The Lead Civil Field Engineer (LCFE) is responsible for the following:

5.2.1 Maintaining the log and numbering system.

5.2.2 Determining whether additional procedures are required.

5.2.3 Issuing and distributing the permit application only when all appropriate signatures have been obtained.

5.2.4 Maintaining a file of approved permits.

(2) 5.3 The Area Team Civil Field Engineer will ensure that Section 5.4.3 has been adhered to by the originator before signing off the Excavation Permit.

5.4 The originator of the excavation permit is responsible for complying with this Instruction in regard to the following:

5.4.1 Filling out the Excavation Permit.

5.4.2 Obtaining proper signatures prior to starting the work.

2 5.4.3 Processing a procedure/instruction change in accordance with FIG-1.120 when underground utilities for which he is filling out an Excavation Permit is shown on a drawing that is not listed in Attachment 3.

5.5 All work covered by this instruction shall be monitored by the Onsite Geotechnical Soils Engineer.

6.0 Method of Processing Permit

6.1 The originator fills in his name, the date, and the following on the attached form:

6.1.1 "Date Work to be Started" - obtained from Supervision. This is a forecast only and is dependent upon complete sign-off of the Excavation Permit prior to start of work.

2 6.1.2 "Purpose of Excavation" - the reason for the excavation including drawing references, if applicable, must be stated here. If the drawings referenced show underground utilities and are not listed in Attachment 3 they should be added to Attachment 3 of this procedure.

This is to be accomplished by the originator processing a procedure/instruction change sheet in accordance with FIG-1.120. This requirement includes, but is not limited to all new designs for underground utilities whether issued by Project Engineering or the field.

The work item which is to be placed within

the excavation is to be noted on the Excavation Permit under this section.

6.1.3 "Location and Limits of Excavation" - this description shall give the limits of excavation in terms of yard coordinates. Depth shall also be specified. A sketch will be used if a written description cannot be made clear. Any structures or known utilities in the proximity of the proposed excavation shall be noted. Variations in these limits are per section 7.3.

6.1.4 "Method of Excavation" - such as power shovel, dragline, clamshell, hoe, trenching machine, auger drilling, rotary drilling, jetting, etc. If sheetpiling or any other method of slope control is to be utilized, it should be noted here.

6.1.5 "Q-List" - Yes or No. This refers to the soil. Civil design drawing C-45 should be consulted for limits of Q-listed soil. If any portion of the excavation falls within the limits of the Q-listed soil, this will be marked "Yes".

6.1.6 If the excavation is a drilled hole, page 2 of the Permit shall be completed.

6.2 The form is then routed by the originator for signatures by Supervision, Field Engineering, and the Onsite Geotechnical Soils Engineer (OGSE). The OGSE will obtain the signature of the Resident Geotechnical Engineer (RGE) where appropriate.

6.3 As noted on the form, the signatures by Bechtel Supervision, (i.e. Superintendents) and Bechtel Field Engineering signify a review of existing underground installations and appropriate action taken to protect them. Any structures or utilities which will be encountered within the confines of the excavation or in the proximity of the excavation will be noted and initialed under the "Remarks" section and the appropriate drawing numbers noted therein. Any appropriate

2 action to be taken should be noted under the "Remarks" section also (attach additonal sheets if necessary). The list of drawings in Attachment 3 shall be utilized by each Discipline Field Engineer in this sign-off process.

6.4 It is the responsibility of the LCFE before he signs to review for the need of additional procedures. These may be beyond design requirements. Of particular concern is deep drilled holes by Subcontractors. Also, the LCFE is to ensure that Sections 5.4.3 and 6.1.2 concerning updating Attachment 3 have been adhered to by the orginator before signing off the Excavation Permit.

6.5a. The OGSE (or RGE) reviews the permit for the possibility of influence of the proposed work on adjacent structures or utilities. He also determines whether the geotechnical aspects of the proposed action to be taken have been adequately considered.

6.5b. The signoff by the OGSE (or RGE) indicates an awareness of the work and that the review in 6.5a was performed.

6.6 The sign-off by CPCo Construction is for verification that the excavation and all work associated with the excavation through completion of backfill is within the scope authorized by the NRC at the time of initial sign-off only. Any subsequent changes to the status of NRC authorizations will be controlled by the Work Permit System.

6.7 When the Q-listed section is checked yes, a signature by MPQAD is required. This sign-off indicates an awareness of work and that appropriate plans to provide QA/QC coverage will be available.

2 6.8 After all signatures have been obtained, copies must be distributed as noted on the permit, prior to start of work.

6.9 All excavation and backfill operations are monitored by the OGSE (or RGE) to verify that work is performed in accordance with approved permit and References 3.1 through 3.3. Field Engineering will verify that the excavation and backfill operations are performed

in accordance with the approved Excavation Permit and applicable drawings, specifications and procedures. For Q-listed soils the FSO Field Engineer will verify the work and for Non Q-listed soils the Area Team Field Engineer will verify the work.

7.0 Additional Requirements

7.1 The LCFE or his designee shall maintain a log (see Attachment 2), a corresponding permit file, and unique numbering system for all approved Excavation Permits.

7.2 Structure foundations and exposed utilities shall be protected from the effects of frost while an excavation remains open.

7.3 Variations in excavation limits and construction methods must be approved by the LCFE and OGSE (or RGE). Such approvals are documented by the OGSE or RGE's daily report and the appropriate project procedure when applicable.

7.4 The CGSE or RGE, LCFE or designee, and MPQAD (Soils) will be notified:

7.4.1 If during open-pit excavation, an unidentified (not listed in remarks section on form) permanent utility is encountered.

7.4.2 If during drilling or pile-driving operations any obstruction is encountered.

Concurrence to proceed or other disposition will be documented on a Field Engineer's report form, signed by OGSE, LCFE or designee, and MPQAD (SOILS).

7.5 If an unaccountable loss of drilling fluid (water, bentonite slurry, revert, etc.) occurs during drilling, all work on that hole shall stop and the OGSE (or RGE) and Project Field Engineer are to be notified immediately.

2 8.0 Attachments

8.1	Attachment 1	Excavation Permit (Page 1 and 2)
8.2	Attachment 2	Excavation Permit Log
8.3	Attachment 3	List of Reference Drawings for Underground Utilities (Page 1 - 8)
8.4	Flow Diagram	MFD - C13 Rev. 0

EXCAVATION PERMIT

Permit # _____
(To be completed prior to Start of Work)

Originator: _____ Date: _____
Date Work to be Started: _____
Purpose of Excavation: _____

Location and Limits of Excavation: _____

Method of Excavation: _____
Q-List: YES _____ NO _____

2 NOTE: Page 2 of the excavation permit must be completed for drilled holes only.

Signatures below signify review of existing underground and appropriate action taken to protect existing installation.

Area Team Civil FE	_____	Date _____
Chief Surveyor	_____	Date _____
Staff Mechanical FE	_____	Date _____
Staff Electrical FE	_____	Date _____
Security System FE	_____	Date _____
Civil Support Services Supt	_____	Date _____
Mechanical Support Services Supt	_____	Date _____
Electrical Support Services Supt	_____	Date _____
Lead Civil Field Engineer	_____	Date _____
Onsite Geotechnical Soils Engineer (or Resident Geotechnical Engineer)	_____	Date _____
FSO FE (Q-ONLY)	_____	Date _____
CPCo Construction	_____	Date _____
MPQAD (Q-only)	_____	Date _____

Remarks or Special Instructions: _____

cc: Lead Civil QC Engineer (Q-only)
MPQAD Section Head (Q-only)
Onsite Geotechnical Soils Engineer
(or Resident Geotechnical Engineer)
CPCo Construction
Lead Civil Field Engineer

Excavation Permit

(To be completed prior to start of work)

2 NOTE: This page must be completed for drilled holes only. See Page 1 for general information.

Method of Advancing Hole: _____

Method of Stabilizing Hole: _____

Method of Backfilling the Hole: _____

Time restraints to backfill (or install equipment) after drilling is completed. _____

Specific steps to be taken if an obstruction is encountered _____

NOTE: If an unaccountable loss of drilling fluid (water, bentonite slurry, revert, etc.) occurs during drilling, all work on that hole shall stop and the Onsite Geotechnical Soils Engineer (or Resident Geotechnical Engineer) and Project Field Engineer are to be notified immediately.

FIC - 5.100
Rev. 2
Attachment 2

Excavation Permit Log

Excavation Permit #	Originator	Date By Originator	Purpose	Date Approved Copy Received

List of Reference Drawings For Underground Utilities

Multi-Discipline

FSK-CY-52, Sheet 1
FSK-CY-52, Sheet 2
FSK-CY-52, Sheet 3
FSK-CY-52, Sheet 4
FSK-CY-52, Sheet 5
FSK-CY-52, Sheet 6
FSK-CY-250
FSK-CY-251
FSK-CY-252
FSK-CY-253
FSK-CY-254
FSK-CY-255
FSK-CY-256
FSK-CY-257
FSK-CY-258
FSK-CY-259
FSK-CY-260
FSK-CY-261
FSK-CY-262
FSK-CY-263
FSK-CY-264
FSK-CY-265
FSK-CY-266
FSK-CY-267
FSK-CY-268
FSK-CY-269
FSK-CY-270
FSK-CY-271
FSK-CY-272
FSK-CY-273
FSK-CY-274

List of Reference Drawings For Underground Utilities

Civil

C-3
C-4
C-5
C-6
C-7
C-8
C-42
C-43
C-46
C-51
C-52
C-57
C-71
C-82
C-83
C-91
C-92, Sheet 1
C-92, Sheet 2
C-92, Sheet 3
C-93
C-109
C-111
C-112
C-127
C-128
C-131
C-132
C-133
C-134
C-135
C-699
C-987
C-992
C-993, Sheet 1
C-998
C-1190
C-1310
C-1311
C-1312
C-1313

List of Reference Drawings For Underground Utilities

Civil

C-1314
C-1315
C-1316
C-2016
C-2017
C-2018
C-2019
7220-C-195-36

List of Reference Drawings For Underground Utilities

Electrical

E-500, Sheet 2A
E-500, Sheet 2B
E-500, Sheet 2C
E-500, Sheet 2D
E-500, Sheet 2E
E-500, Sheet 3A
E-500, Sheet 3B
E-500, Sheet 3C
E-500, Sheet 4A
E-500, Sheet 4B
E-500, Sheet 4C
E-500, Sheet 4D
E-500, Sheet 5A
E-500, Sheet 5B
E-500, Sheet 5C
E-500, Sheet 5D
E-500, Sheet 5E
E-500, Sheet 12
E-501, Sheet 1
E-501, Sheet 2
E-502, Sheet 1
E-504, Sheet 1
E-505, Sheet 1
E-506, Sheet 1
E-508
E-509, Sheet 1
E-510, Sheet 1
E-511
E-512, Sheet 1
E-513, Sheet 1
E-520
E-521, Sheet 1
E-522, Sheet 1A
E-522, Sheet 1B
E-522, Sheet 1C
E-522, Sheet 1D
E-522, Sheet 2A
E-522, Sheet 2B
E-522, Sheet 2C
E-522, Sheet 3

List of Reference Drawings For Underground Utilities

Electrical

E-523, Sheet 1
E-523, Sheet 3
E-526, Sheet 1
E-526, Sheet 2
E-526, Sheet 3
E-526, Sheet 4
E-526, Sheet 5
E-526, Sheet 6
E-526, Sheet 7
E-527, Sheet 1
E-527, Sheet 2
E-528, Sheet 3
E-529, Sheet 1
E-529, Sheet 2
E-530, Sheet 1
E-530, Sheet 2
E-531, Sheet 1A
E-531, Sheet 1B
E-531, Sheet 1C
E-531, Sheet 1D
E-531, Sheet 2
E-532, Sheet 1
E-543, Sheet 1
E-547, Sheet 1
E-594, Sheet 1
E-595, Sheet 1
E-596, Sheet 1
E-600, Sheet 1
E-601, Sheet 1
E-698, Sheet 1
E-698, Sheet 2
E-698, Sheet 3
E-698, Sheet 4
E-699, Sheet 1
E-699, Sheet 2
FSK-EY-3
FSK-EY-9
FSK-EY-17
(2) FSK-EY-38, Sheet 1
FSK-EY-45

List of Reference Drawings For Underground Utilities

Electrical

FSK-EY-64
FSK-EY-66
FSK-EY-69, Sheet 1
FSK-EY-69, Sheet 2
FSK-EY-74
FSK-EY-79
FSK-EY-93
FSK-EY-94
FSK-EY-104
FSK-EY-106
FSK-EY-108
FSK-EY-111
FSK-EY-150, Sheet 1
FSK-EY-150, Sheet 2
FSK-EY-151, Sheet 1
FSK-EY-151, Sheet 2
FSK-EY-151, Sheet 3
FSK-EY-151, Sheet 4
FSK-EY-152
FSK-EY-153
FSK-EY-154
FSK-EY-155
FSK-EY-156
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FSK-EY-159
FSK-EY-160
FSK-EY-161
FSK-EY-162
FSK-EY-163
FSK-EY-164
FSK-EY-165
FSK-EY-166
FSK-EY-167
FSK-EY-168
FSK-EY-169
FSK-EY-170
2 FSK-EY-171
FSK-EY-172
FSK-ET-2-4

List of Reference Drawings For Underground Utilities

Mechanical

M-58, Sheet 1
M-58, Sheet 2
M-152
M-165
M-166
M-167
M-168
M-169
M-170, Sheet 1
M-170, Sheet 2
M-607, Sheet 16
M-612, Sheet 7
M-612, Sheet 8
M-613, Sheet 7
M-613, Sheet 8
M-649, Sheet 1
M-649, Sheet 2
M-649, Sheet 3
M-665, Sheet 1
FSK-MPY-16, Sheet 1
FSK-MPY-16, Sheet 2
FSK-MPY-18
FSK-MPY-24
FSK-MPY-29
FSK-MPY-32
FSK-MPY-33
FSK-MPY-45
FSK-MPY-46
FSK-MPY-72
FSK-MPY-98
FSK-MPY-108
FSK-MPY-165
FSK-MPY-166
FSK-MPY-167
FSK-MPY-168
2 FSK-MPY-170
FSK-MPT-1-1
FSK-MPT-1-2, Sheet 1
FSK-MPT-1-2, Sheet 2
FSK-MPT-1-2, Sheet 3
FSK-MPT-1-2, Sheet 4

List of Reference Drawings For Underground Utilities

Mechanical

FSK-MPT-1-35
FSK-MPT-2-1
FSK-MPT-2-2
FSK-MPT-2-4
FSK-MPT-2-44, Sheet 1
FSK-MPT-2-44, Sheet 2
FSK-SP-561, Sheet 3
FSK-M-OCCC-1-1
FSK-M-OJBD-217-1
FSK-M-1CCB-45-4
FSK-M-1HBC-3-2
FSK-M-1HBC-3-3
FSK-M-1HBC-3-4
FSK-M-1HBC-4-1
FSK-M-1HBC-4-2
FSK-M-1HBC-4-3
FSK-M-1HBC-4-4
FSK-M-1HBC-4-5
FSK-M-1HBC-497-1
FSK-M-1HBC-497-2
FSK-M-1HBC-497-3
FSK-M-1HBC-498-1
FSK-M-1HBC-498-2
FSK-M-1HBC-498-3
FSK-M-1HBC-498-6
FSK-M-2HBC-3-1
FSK-M-2HBC-3-2
FSK-M-2HBC-3-3
FSK-M-2HBC-3-4
FSK-M-2HBC-4-1
FSK-M-2HBC-4-2
FSK-M-2HBC-4-3
FSK-M-2HBC-4-4
FSK-M-2HBC-497-1
FSK-M-2HBC-497-3
FSK-M-2HBC-498-1
FSK-M-2HBC-498-2
FSK-M-2HBC-498-3
FSK-M-2CCB-45-4

~~Central Files~~
file

Consumers Power Company

Midland Project: PO Box 1963, Midland, MI 48640 • (517) 631-8650

PRINCIPAL STAFF			
RA	X	ENF	
D/RA		SCS	✓
A/RA		PAO	
DPRP		SLO	
DRMA		RC	
DRMSP			
DE			
ML			
OL		FILE	X

✓ ✓ orig+3

May 12, 1983

Mr. J. J. Harrison
Midland Project Section
U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND ENERGY CENTER GWO 7020
BWST CRACK GROUTING
File: 0485.16.3 UFI: 42*05*22*04 Serial: CSC-6702

REFERENCE: WARNICK TO COOK LETTER, DATED JANUARY 18, 1983, DOCKET NO. 50-329 AND DOCKET NO. 50-330

Transmitted herewith is CPCo report entitled "Evaluation of Pressures in Lines of Grouting Equipment - Crack Repair BWST Foundations". It contains results of demonstration tests performed at Structural Bonding Co. facilities in Flint, MI, Feburary 24, 1983. These tests showed conclusively that line pressures in both lines of the grout component ahead of the mixing nozzle were equal over the entire range of operating pressures. Also, the positive displacement pumps were checked for mixing ratios over the range of operating pressures and the mixing ratios were within specifications.

This report should provide you with the information needed to close this unresolved item. If you wish to discuss the matter further, we will be happy to oblige.

Donald B. Miller
Site Manager

DBM/RHW/klm

Attachments

MAY 16 1983

8305190280

Midland Energy Center
Consumers Power Company

EVALUATION OF PRESSURES IN LINES OF GROUTING EQUIPMENT CRACK REPAIR BWST FOUNDATIONS

Requested By: NRC Region III
Report Date: 5/5/83
Report By: J.K.Meisenheimer, MPQAD Soils Donald E Horn for
R.H.Wieland, SMO R.H. Wieland 5/10/83

INTRODUCTION

This report is in response to the NRC unresolved item (329/82-18-04; 330/82-18-03) presented in the NRC Region III letter January 18, 1983 from R F Warnick to J W Cook, Consumers Power Company. Additional calibration tests were performed using pressure gauges on both pressure lines of grouting equipment used for crack repair of the borated water storage tank (BWST) foundations. The results of these tests are included in the following sections of this report.

CONCLUSIONS

Results of tests performed on February 24, 1983 indicate that the pressure in both lines of the grout mixing equipment remains the same during grout injection operation. Calibrated pressure gauges were attached to both lines going to the epoxy grout mixing gun and injection nozzle. Pressures in the lines and mixing gun were controlled by a valve in the injection nozzle. With every pressure adjustment and fluctuation, the gauges for each line always indicated identical pressures. The pressure in both gauges rose and dropped together, with no lag indicated between lines.

The results of this study indicate that a pressure reading from a single gauge installed on any one of the grout lines would be indicative of the pressure in both lines as well as pressures in the mixing gun.

INVESTIGATIVE STUDY

General

On February 24, 1983, R H Wieland, CP Co SMO, J K Meisenheimer, CP Co MPQAD Soils and H E Entrekin,Bechtel, conducted the investigative study at Structural Bonding Company, Inc facilities in Flint, Michigan. Bechtel provided calibrated pressure gauges and measuring cylinders used to calibrate equipment. Structural Bonding Company provided the epoxy grout, pumping equipment, and mixing gun used for the study. All instructions for conducting the study, data collection, witnessing of the results and analysis was performed by the CP Co representatives. The following sections provide details of the study conducted and the results.

Grout Pumping Equipment

The grout pumping equipment used for this study is the same type that was used for crack repair of the BWST foundation. According to Structural Bonding Company records, the equipment (Unit No 18) used for this study was the same unit used at the Midland Plant.

The A and B components of the epoxy grout are fed to the pressure lines by positive displacement gear pumps driven by the same electric motor. Mixing ratios are controlled by varying the size of sprockets used to drive the pumps. Refer to Photograph 1 for the grout pumping equipment used and Photograph 2 for typical positive displacement pump used.

Calibration of Pumps

The pumps were calibrated to verify that required mixing ratios were obtained while operating within backpressures ranging from 0 to 160 psi.

The Bechtel approved Procedure for Grouting Cracks in the Borated Water Storage Tank Foundation Ring Wall, FSC-426-1-1 was used to calibrate the pumping equipment. Section 3.3.2.1 of the Guideline Specification Structural Concrete Bonding Process was used to test for proper ratio. Exception to the procedure was taken for testing at the maximum discharge pressure of 200 psi. Since the calibrated gauges had a maximum capacity of 200 psi, the maximum test pressure for calibration was maintained at approximately 185 psi, which is well above the maximum allowable grouting pressure of 160 psi. The same type of epoxy grout admixtures A and B used for crack repair of the BWST foundation was utilized for this study, CONCRESIVE 1380, Lot 28306, from Adhesive Engineering Company.

Calibrated pressure gauges and graduated cylinders provided by Bechtel were used for mix ratio calibration. The grout lines were calibrated at 0 psi and 185 psi line pressures. The valves for both the A and B lines had to have minor adjustments during calibration to maintain the higher pressure at steady level. The line pressures were both maintained at approximately 185 psi, but would fluctuate between 180 to 190 psi during the test. The required mixing ratio was maintained within a tolerance of ±5% by volume. Refer to Photographs 3 through 6, calibration at 0 and 185 psi. Data and test results are presented on Test Data Sheet.

Calibration Line Pressures

Two calibrated pressure gauges were attached to the mixing gun and injection nozzle. (Refer to Photograph No 7). With both grout lines attached to the mixing gun, the pressure in both lines was monitored as the valve in the injection nozzle was adjusted to change pressure within the system. Adjustment of the nozzle valve simulated flow restrictions that occur during actual grouting operations causing backpressure fluctuations within the sytem.

With the nozzle valve wide open, a backpressure in the lines of approximately 28 psi was observed and recorded for the gauges on both lines. The valve was adjusted so the system was operating at approximately 100 psi and again adjusted so the system was operating at approximately 160 psi.

With every pressure adjustment and fluctuation, the gauges in each line always indicated the identical pressures. The pressure in both gauges rose and dropped together, with no lag indicated between lines. Refer to Photographs 8 through 10 for pressures in lines when operating at steady pressure.

TEST REPORT SHEET

Prepared By: J K Meisenheimer Date 5/9/83

Checked By: R J Wideau Date 5/10/83

TEST LOCATION

Structural Bonding Company - Flint, Michigan

All data from: Field Test Data Sheet dated 2/24/83 Prepared by J K Meisenheimer

TEST STUDY

Calibration grout equipment used for BWST foundation crack repair.

UNIT - No. 18, positive displacement pump

MATERIAL -Concresive 1380, Lot 82306 Adhesive Engineering Company

CALIBRATION GAUGES AND GRADUATED CYLINDERS

Supplied by Bechtel and Calibrated by U.S. Testing

	Test Used
Gauge No. BPCM1194(200 psi) Cal. Due Date 5-23-83	(A-Component)
Gauge No. BPCM1190(200 psi) Cal. Due Date 5-23-83	(B-Component)

1000 ml. cylinder no. 525 Cal. Due Date 2-23-84 (0 psi)
500 ml. cylinder no. 745 Cal. Due Date 2-23-84 (0 psi)

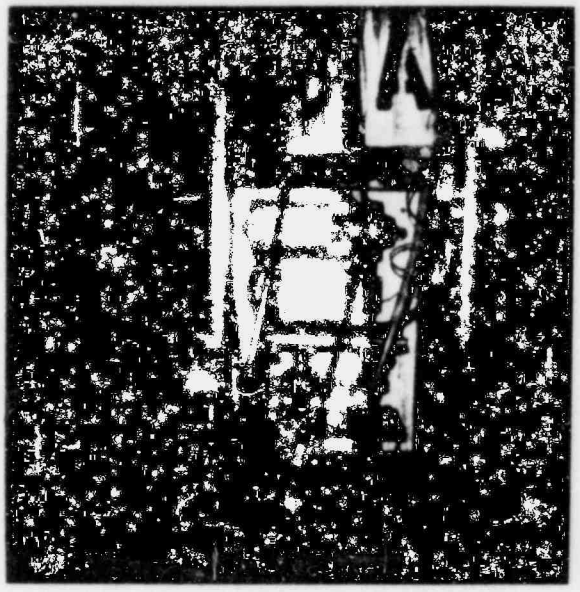
1000 ml. cylinder no. 574 Cal. Due Date 2-23-84 (185 psi)
500 ml. cylinder no. 744 Cal. Due Date 2-23-84 (185 psi)

RATIO TEST		Volume	±5% deviation	Ratio 2:1
0 psi	component A	1005*ml.	satisfactory	satisfactory
	component B	503*ml.		
	(photograph No. 4)			
185 psi	component A	1000*ml.	satisfactory	satisfactory
	component B	503*ml.		
	(photograph No. 6)			

*Estimated Volume using calibration marks on cylinders.

MIXING GUN AND PRESSURE LINE TESTS	PHOTO NO.
1. Mixing gun and nozzle with pressure gauges mounted	7
2. Valve on nozzle open - pressure both lines ~28 psi	8
3. Valve closed to maintain pressure at 98-100 psi - both lines same	9
4. Valve closed to maintain pressure at ~160 psi - both lines same	10

Note: Both gauges raise and drop together with pressure adjustment.



STRUCTURAL BONDING CO EQUIPMENT

PHOTO 1 2-24-83

Photograph 1
Grout Pumping Equipment

EPOXY PUMP FROM STRUCTURAL BONDING CO EQUIPMENT

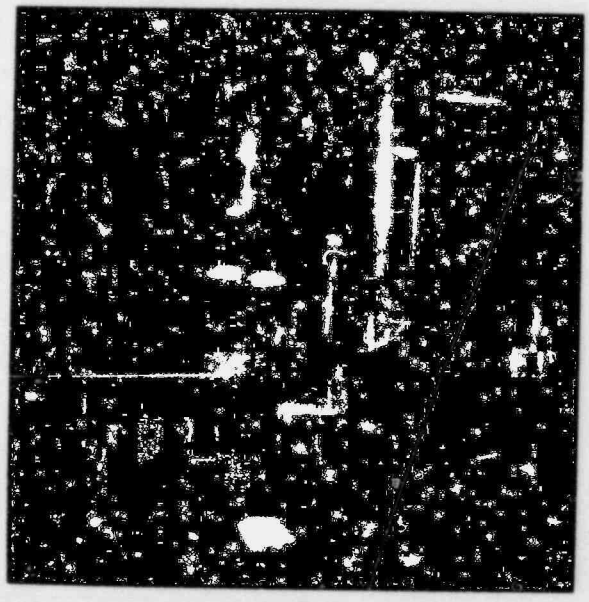
PHOTO 2 2-24-83

Photograph 2
Positive Displacement
Grout Pump

CALIBRATING PUMPING EQUIPMENT AT 0 PSI BACKPRESSURE

(STRUCTURAL BONDING CO SHOP) 2-24-83
PHOTO 3

Photograph 3
Pumping Equipment
Calibration at 0 psi



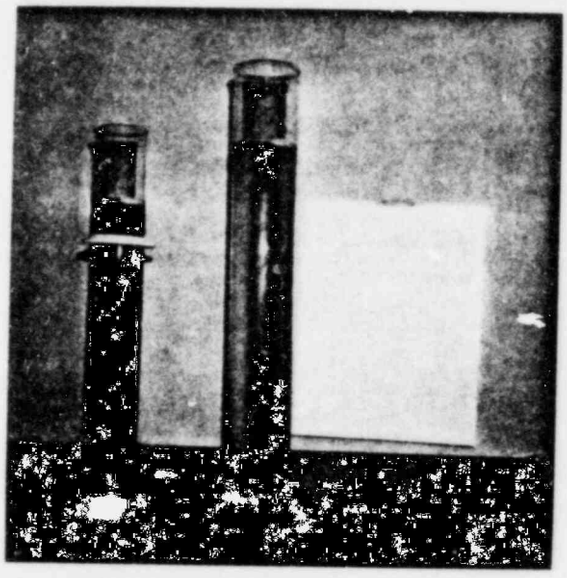
BEAKER LEVELS AFTER CALIBRATING EQUIPMENT AT 0 PSI BACKPRESSURE

(STRUCTURAL BONDING CO SHOP) 2-24-83
Photo 4

Photograph 4
Calibration Results at 0 psi

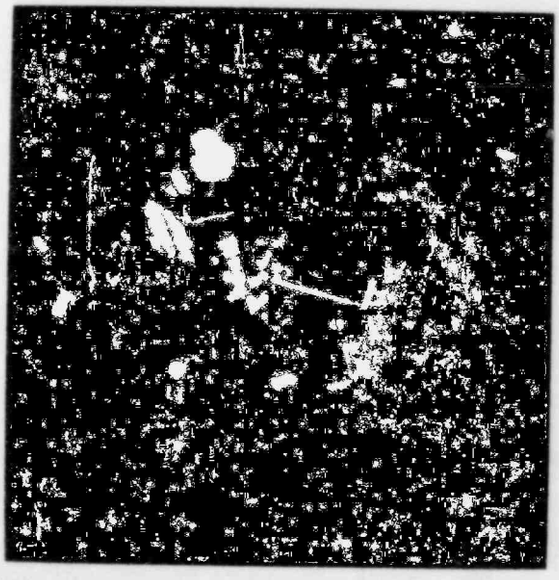
CALIBRATING PUMPING EQUIPMENT AT ~185 PSI BACKPRESSURE (STRUCTURAL BONDING CO. SHOP) 2-24-83
Photo 5

Photograph 5
Pumping Equipment
Calibration at 185 psi



BEAKER LEVELS AFTER CALIBRATING EQUIPMENT AT ~185 PSI BACKPRESSURE (STRUCTURAL BONDING CO SHOP) 2-24-83
Photo 6

Photograph 6
Calibration Results at 185 psi



EPOXY INJECTION NOZZLE WITH LINE GAUGES INSTALLED (STRUCTURAL BONDING CO. SHOP) 2-24-83
Photo 7

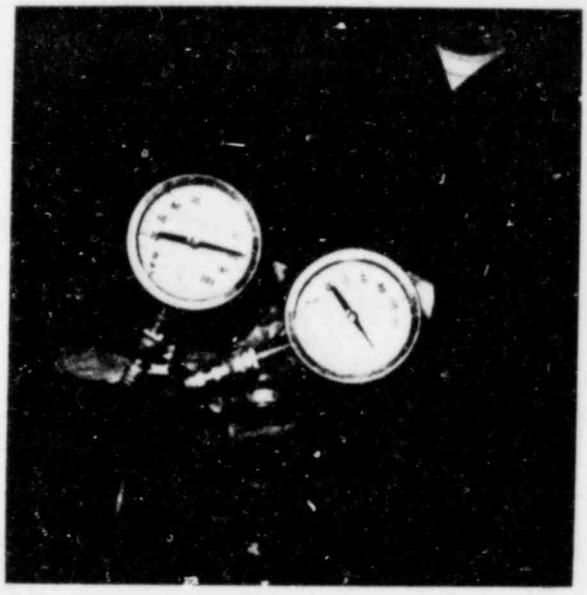
Photograph 7
Mixing gun and injection
nozzle with calibrated pressure
gauges

INJECTING EPOXY THRU NOZZLE AGAINST 0 BACKPRESSURE - ~28 PSI IN EACH LINE (STRUCTURAL BONDING CO SHOP) 2-24-83
Photo 8

Photograph 8
Line pressures operating
with open nozzle valve

INJECTING EPOXY THRU NOZZLE AT
100 PSI BACKPRESSURE IN EACH LINE
(STRUCTURAL BONDING CO. SHOP) 2-24-83
PHOTO 9

Photograph 9
Line pressures operating
at 100 psi



INJECTING EPOXY THRU NOZZLE AT
160 PSI IN EACH LINE
(STRUCTURAL BONDING CO. SHOP) 2-24-83
PHOTO 10

Photograph 10
Line pressures operating
at 160 psi