11-10-83 Public Meeting SQN

Stan-SOILS

tracking open items - new procedure

Oct 9 - Nov 5

work

1) BWST Reinforcing

2) 36" casing

3) weekly meetings

4) struts between W12 & W14

5) crack monitoring

6) # 30-57 review for open items

7) overview on documents

8) Stop work on FCR incorporation

ALSO: # FCR's & Timeliness of final approval of FCR's

OUR TURN

#55 - Observations kept on separate list

because not affecting work

U.S. Testing

Item 55-23 Dewatering sumps — Joe Call "
when to start baseline monitoring settlement

55-32 concrete truck turning
"formal procedure change"

57-10 formal lessons learned on aux build
to sumps — "HOLD on sumps
underpinning" (actual under the building)

57-70 Preheat - major item on Balance of plant 82-22 report; time

"construction aids"

temporary welds - non structural welds

Field engineer inspecting
QC verifying

QUALIFICATIONS

58-12 number of FCR's on drawing

p. 1 / 59-5 / 59-18 crack monitoring

" HOLD on lifting or Stop Work

Consumers Power Company

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

PRINCIPAL STAFF

A		DPRP	
/RA		DE	
/RA		DRMSP	
RC		DRMA	
PAO		SCS	
GA		ML	
F		File	

Dean L Quamme
Site Manager
Midland Project

November 4, 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
SERVICE WATER PUMP STRUCTURE LOAD TRANSFER
File: 0485.16.2 UFI: 42*05*22*04 Serial: CSC-6978

The following item is not addressed in the Midland Safety Evaluation Report (including Supplements 1 and 2) concerning the service water pump structure load transfer (Section 3.8.3.2).

Before excavating pier pits 7 and 7A, piers 1 through 6 and 1A through 6A will be loaded to 125 percent of the Stage I loads (unless otherwise directed by the resident structural engineer). This will be done to maintain structure elevation during the excavation of pier pits 7 and 7A. These loads will be decreased as the jacking of piers 7 and 7A progresses so that when piers 7 and 7A are jacked above the Stage I loads, the temporary increase will be eliminated and piers 1 through 6 and 1A through 6A will again be at 100% of the Stage I loads. This will not adversely affect the structure because it simply redistributes the loads in the vicinity of the excavation to the other piers until piers 7 and 7A can be jacked. Other conditions more critical than this have already been analyzed.

If you have any concerns or comments regarding this subject, please contact this office.

DLQ/DES/klm

8311210380

NOV 16 1983

Nov 1st

J.O.No. 14358

EVALUATION OF CHANGE AND NONCONFORMANCE DOCUMENTS
INDEPENDENT ASSESSMENT OF UNDERPINNING

MIDLAND PLANT - UNITS 1 AND 2
CONSUMERS POWER COMPANY
OCTOBER 1983

What other reports have you written

Prepared By
STONE & WEBSTER MICHIGAN, INC.
BOSTON, MASSACHUSETTS

INDEX	PAGE

APPENDIX

INTRODUCTION

The evaluation of the change and nonconformance documents and their impact on the progress of the underpinning work was initiated as a result of concerns discussed in the Independent Assessment of Underpinning Weekly Reports. Report No. 40, dated June 27, 1983, indicated the Assessment Team's concern to limit the exposure time of the structures to unsupported conditions. It was demonstrated that piers could be constructed and loaded in about 25 to 30 days. However, this target is not being regularly achieved. Report No. 43, dated July 20, 1983, expressed the Assessment Team's concern that load transfer onto completed piers should be able to be accomplished in a much shorter time period. Report No. 46, dated August 10, 1983, indicates that the Assessment Team believes that the Engineering, Quality Control, and Construction organizations must initiate an evaluation of performance to date in an effort to identify actions that could reduce the completion time without compromising quality. The report also indicated that it was the opinion of the Assessment Team that such a goal is obtainable.

At the request of Consumers Power Company, an independent evaluation was performed on the influence that the various change and nonconformance documents had on accomplishing the underpinning work and to determine if specific recommendations can be made in this area to reduce the amount of time the building is exposed in an unsupported condition. The circumstances at the Midland Plant and the type of structure involved are considerably different from the type of structure that has classically employed this method of remedial work to solve foundation problems. The major difference is that, typically, structures which are underpinned are of much lighter construction, designed for less severe conditions, and may be near impending collapse. The structures being underpinned at the Midland Plant are not facing impending structural failure.

The basic thrust of this evaluation is directed at the critical path activities associated with the underpinning work for the Auxiliary Building. The remedial soils work for the Diesel Generator Building has been completed. The corrective work associated with the Borated Water Storage Tanks is underway and should be completed by the first of the year. The underpinning work associated with the Service Water Pump Structure is just beginning, but this structure has better access for the performance of the work and is smaller in size.

Trip notes covering the periods of August 24 through August 26 and August 30 through September 2, 1983, are attached to provide additional background information on the evaluation and subsequent recommendations.

EXECUTIVE SUMMARY

This evaluation of the change and nonconformance documents and their influence on the quality and progress of the work has identified four basic areas where additional applied effort could result in faster completion of the underpinning effort and a reduction in the risk associated with the unsupported portions of the building during construction. These recommendations are listed in order of importance and a reference is given to the

3 RECOMMENDATIONS

section of the report which provides more detailed discussion in support of the recommendation. The recommendations are as follows:

1. The program which was recently implemented to review both existing and new Construction Procedures, Project Quality Control Instructions (PQCI), and Project Specifications should receive a high priority effort in order to define the important quality attributes consistent with the intent of the specifications. This will result in a clear definition of the quality requirements and the utilization of technical resources in achieving these quality goals. This effort will require considerable technical support by Bechtel's Ann Arbor Power Division (AAPD) Project Engineering Group. For additional discussion refer to the section entitled "Attendance at Meetings."

2. The completion of the design work associated with the underpinning should be expedited so that the design calculations and drawings may be transmitted to the jobsite along with necessary technical support. This will expand the ability of the Resident Engineer to approve the change and nonconformance documents in the shortest time possible. The problems encountered in the conduct of the underpinning work and the very nature of this type of work make it preferable to have maximum engineering support at the jobsite. For additional discussion refer to the section entitled "Organizational Structures."

3. The Field Change Request (FCR) should receive final approval by the Project Engineer shortly after interim approval has been granted. This will require Bechtel to revise its procedures. Updating of drawings for the changes indicated on FCRs cannot take place until final approval occurs. This will permit more rapid updating of the design drawings for FCRs and will make the application of the recent revised procedure for updating drawings after five FCRs have been issued more meaningful. For additional discussion refer to the section entitled "Evaluation of Field Change Requests (FCR)."

Now MUST five changes no matter what kind

4. The Nonconformance Reports (NCR) should have trend analysis performed which relates the number of NCRs to the level of construction effort. Also the NCRs should be classified by subject and this distribution reviewed to assist in providing an indicator to problem areas. For additional discussion refer to section entitled "Evaluation of Nonconformance Reports (NCR)."

5. It is important that Bechtel continues to strive to reduce the response time on critical NCRs that could delay the work. For additional discussion refer to the section entitled "Evaluation of Nonconformance Reports."

The intent of the first two recommendations is currently being implemented at the jobsite or is part of current plans for the underpinning work.

METHODOLOGY

The approach used in the Evaluation of Change and Nonconformance Documents was performed using a structured methodology. The initial concern was with the influence of these documents on the progress of the underpinning work, but as the evaluation evolved, peripheral issues developed which expanded the initial scope. The methodology used was broad enough to allow for orderly expansion of the evaluation if findings warranted such broadening. The initial methodology used for the evaluation follows:

1. Establish the scope and complexity of the remedial soils work by review of design drawings and visits to the various work areas on the site.

2. Attend all regularly held meetings related to the underpinning work.

3. Establish the spectrum of engineering and quality assurance change and nonconformance documents that could impact the progress of the work.

4. Evaluate the documents established by Step 3 for subject matter, approvals, and response times.

   Initial subject classifications are:

   a. Tolerances
   b. Materials
   c. Welding
   d. Construction
   e. Testing
   f. Fabrication

5. Review any existing trend analysis that has been performed for the change and nonconformance documents.

6. Review the existing procedures covering the various change and nonconformance documents.

7. Determine the organizational structure of the responsible engineering/construction organization, and determine its influence on change and nonconformance documents.

This programmed approach proved to be adequate for the task, but the attendance at meetings (Item 2), review of existing trend analysis (Item 5), and review of organizational structures (Item 7) resulted in identifying peripheral issues that form the basis of the recommendations contained in this report.

ORGANIZATIONAL STRUCTURES

The organization selected for evaluation was Bechtel Power Corporation since it has the basic responsibility for the engineering and construction management of the underpinning work. The engineering consultants and contractors

for the underpinning work under Bechtel's overall direction are covered by Bechtel's Quality Assurance Plan. Even though the engineering consultants and contractors may originate various types of change and nonconformance documents, it is the Bechtel organization that tracks, processes, and resolves all such documents. The purpose of this evalution is to determine if these documents are being adequately processed from an organizational standpoint.

For purposes of additional reference, copies of the following organizational charts have been attached to the trip notes for August 24, 1983, and are as follows:

Project Soils Organization
Project Engineering Organization
Resident Engineering Soils Organization
Field Soils Organization (FSO)

The overall Bechtel organization, both engineering and construction, is very large and complex and typical of organizations associated with large nuclear power plant projects. Two key organizations are the Project Engineering Organization with its separate group for the remedial soils work and the Field Soils Organization. Both of these groups must interrelate to the larger Bechtel organization for proper overall coordination and integration.

The important subgroups in this structure are the Resident Engineering Soils Organization which is on site and an extension of the Ann Arbor Power Division (AAPD) Project Engineering and the Field Engineering Group of the FSO. Both of these groups are actively involved in the generation and processing of Field Change Requests (FCR) and Nonconformance Reports (NCR). These two organizations have clearly defined written responsibilities which are well understood by the Resident Assistant Project Engineer (Resident Engineer), Mr. E. Cvikl and the Assistant Project Field Engineer (Field Engineer), Mr. M. M. Blendy. There is a distinct separation of responsibilities between engineering and construction.

Currently, the ability of these two groups to resolve change and nonconformance documents on site is very limited. Due to the ongoing design effort by the AAPD Project Engineering, the scope of responsibility of the Resident Engineer can only be expanded when the design calculations and drawings are completed and delivered to the jobsite. Currently, the Resident Engineer can only approve changes and resolve nonconformances that do not involve design calculations. It is expected that calculations covering the Borated Water Storage Tank (BWST) and the Service Water Pump Structure (SWPS) will be transmitted to the jobsite about October 1, 1983.

The relationship between the Resident Discipline Engineer and the Resident Engineer was also reviewed. For example, the on-site delegation of responsibility to the Resident Structural Engineer covers the ability to approve FCRs for such items as minor changes to reinforcing steel, embedments, tack welds, fabrication, minor weld details, drift sets, vendor fabrication, construction procedures, and instrumentation drawings. Any change request which affects the detail design and involves review or alteration of existing calculations must be approved by AAPD. Conversely, the Resident Engineer is authorized to approve all NCRs and FCRs which the Resident Discipline Engineer has prepared dispositions for.

The relationship of the Underpinnng Contractor Manager to both the Field Engineering Group and the Resident Engineering Group was examined. It was suggested that certain decisions could have contract cost implications and, therefore, the resolution of items such as acceptability of material based on decisions to scrap or rework an item might involve contract management in the decision-making process. The Resident Engineering Group indicated that the Field Engineering Group makes the decision on whether or not the resolution of a problem is through the scrapping, refabrication, or reworking of a given item until it is acceptable. Such items could be covered, either by an FCR or an NCR.

While the relationship of the Resident Discipline Engineer to the Resident Engineer and their respective relationships to their counterparts in AAPD Project Engineering is complex, the organization functions effectively in the administration of the change and nonconformance documents and, therefore, no recommendations are made concerning changes to the organizational structure.

The major recommendation with regards to the organizational structure is to provide, in the shortest time possible, the design calculations and drawings to the jobsite complete with the necessary technical support so that the role and responsibility of the Resident Engineer can be expanded to handle more of the resolution of the change and nonconformance documents at the jobsite. This step will minimize the amount of delay that can occur due to the processing of these documents. It is also important that adequate technical resources be assigned to the jobsite to support the ongoing technical effort. The engineering consultants must participate in the on-site technical effort. Bechtel has advised that Hanson Engineering, Inc., Spencer, White & Prentis, Inc., and Mueser, Rutledge, Johnston and DeSimone will provide technical support at the jobsite.

REVIEW OF PROCEDURES

The following Bechtel procedures were reviewed as part of the determination to identify the significant change and nonconformance documents that could influence the work and to assist in an understanding of the responsible organization structure and the various responsibilities of key participants:

- FPD-2.000, Rev. 9, July 15, 1983 -
  Field Change Request/Field Change Notice Procedure
- 7220-G-34(Q), Rev. 16, February 9, 1983 -
  General Specifications for Field Change Notice
- MED 4.62-O, Rev. No. 21, November 3, 1982 -
  Field Change Request/Field Change Notice
- EDP-4.62, Rev. No. 3, December 21, 1976 -
  Field Change Request/Field Change Notice
- MED 4.47-O, Rev. No. 23, April 13, 1982 -
  Drawing Change Notice
- PEP No. 4.47.2, Rev. No. 2, June 20, 1983 -
  Drawing Change Notices (DCNs)

- AADP/PSP G-3.2, Rev. 7, June 1, 1981 - Control of Nonconforming Items
- MED 4.61-O, Rev. No. 9, October 8, 1982 - Nonconformance Reports (NCRs)
- PEP No. 2.14.1, Rev. No. 0, October 22, 1982 - Resident Engineer for Midland

IDENTIFICATION OF CRITICAL CHANGE AND NONCONFORMANCE DOCUMENTS

Based on Bechtel procedures and conversation with the Field Soils Organization (FSO) staff, the following change and nonconformance documents were identified:

- Field Change Request (FCR)
- Field Change Notice (FCN)
- Drawing Change Notice (DCN)
- Specification Change Notice (SCN)
- Nonconformance Report (NCR)

The FCR and the NCR are the documents that can most influence the progress of the work on a day-to-day basis. The FCR frequently identifies previously unknown existing field conditions and addresses day-to-day problems related to materials, welding, fabrication, and construction. The NCR often limits continued construction by placing holds on materials and completed construction until the nonconformance is corrected or technically resolved. For these reasons, these two documents were selected for evaluation, using the most currently issued documents. The sample size was large enough to provide simple statistical validity to the evaluation for the period covered by the documents evaluated.

The FCN is a seldom-used document and is very limited in scope and application. The purpose of the FCN is to document changes that Project Engineering has designated and authorized the Project Field Engineer to approve for change implementation. The application of FCNs is described in Specification 7220-G-34(Q), Revision 16, dated February 9, 1983, entitled "General Specification for Field Change Notice." The categories where FCNs are approved for use are described in Section 3.0.

The DCN is a document which is initiated by the AAPD. A DCN is used to make and document changes to drawings without immediately issuing a revision to the drawings. A DCN is used to initiate or release a hold on a drawing; and it can be used by Project Engineering to supersede, void, or correct an approved FCR or FCN written against the drawing. The SCN is a similar document relating to specifications and is issued by AAPD. It would be impossible to trace the influence of DCN and SCNs on the progress of the work since there is no recording procedure that would provide this type of information. The only way that this information could be collected is through personal recollection of the people directly involved with the work. It is important to note that the design of the underpinning operation is still in progress and that the design changes, using the DCN system, are being received at the jobsite.

ATTENDANCE AT MEETINGS

The Independent Assessment Team meets daily with Bechtel to review the progress of the work and to discuss the Assessment Team's evaluation and concerns. These structured meetings, including the documentation of the daily meetings, are part of the Assessment Team's formal program for its activities. These meetings are typically attended by representatives from the following organizations:

Consumers Power Company
Bechtel Power Corporation
Midland Plant Quality Assurance Department (MPQAD)
Stone & Webster Michigan, Inc.
Parsons, Brinckerhoff, Michigan, Inc.

The meetings are conducted by the Bechtel Contract Manager for underpinning. The full spectra of subjects related to this work are discussed, covering such topics as engineering, purchasing, scheduling, quality problems, construction progress, priority NCRs and FCRs, and future considerations for continued improved quality and progress. These meetings are beneficial.

During this evaluation, participation in these meetings provided insights into the Assessment Team's concerns as expressed in the weekly reports about limiting the building exposure due to unsupported conditions. As discussed in the Trip Notes, the problems associated with Pier Kc10 are representative of the Assessment Team's concerns. The unexpected existing conditions that are encountered during construction, such as the concrete fill which had to be excavated for the construction of Pier Kc3, cause frequent delays. Also another factor identified at these meetings is the imposition of Q quality standards applied to all aspects of the work, including temporary construction materials and procedures, which increases the level of inspections, and affects the progress accordingly.

The weekly Engineering - Construction meeting provides a working basis for coordination between Bechtel's AAPD Project Engineering group and the FSO organization, including the Resident and Field Engineering groups. These meetings also include representatives from Consumers Power Company groups such as MPQAD, and the Site Management Office (SMO), and the Independent Assessment Team (Stone & Webster). The subjects covered by these meetings include the review of critical FCRs and NCRs, status of critical vendor submittals, discussion of objectives of quality assurance plans, and review of the Action Item List. The Action Item List covers a broad spectrum of subjects, such as cutting in-place reinforcing steel, coordination with consultants, tolerances, Hilti bolts, and revised construction approaches to expedite progress. These meetings demonstrate that Bechtel is endeavoring to benefit and improve quality through better definition of the procedures for construction and required inspections to provide the quality needed to meet the intent of the specifications. The subject of construction procedures and inspection plans warrants high priority. The construction of one pier has required 450 signoffs.

Bechtel plans to prepare an evaluation of the lessons learned on the design, fabrication, and installation of the grillage beams. It is planned that this evaluation will be presented during the week of September 5, 1983.

There has been a continuing dialogue between Bechtel's Field Engineering and Project Engineering groups to establish a method to review specifications, contract work procedures, and Project Quality Control Instruction (PQCI) to better determine what inspections are required for the work. An earlier review, performed by two independent groups within Bechtel, resulted in a similar conclusion concerning what were the important quality attributes of an existing work procedure. It has been agreed that the FSO will proceed to develop a plan for the implementation of this activity and submit it to Consumers Power Company for consideration. Such an effort may require revisions to the specifications and considerable technical support from the AAPD Project Engineering group. This effort deserves the highest priority since it will result in better-defined quality requirements and consequently should expedite the completion of the work. The following are two typically similar observations made at the construction site where quality inspections were either inappropriate or excessive because of lack of definition concerning the important quality attributes:

1. A concrete mud mat has been placed around the existing ring beam for the BWST. This concrete was unreinforced and its purpose was simply to provide a working surface for the construction of the forms and the placement of the additional concrete for these foundations. An NCR had been issued for the cracks in the unreinforced concrete mud mat. The cracking was perfectly normal, and there was no technical reason to reinforce this temporary construction work surface.

2. Considerable effort is being expended in inspecting the structural welds which are being performed in accordance with AWS D1.1. On the metal lagging used for temporary construction of the temporary jacking piers, welds which were used to attach some structural nuts for the purposes of simply holding them in place and welds associated with cover plates, neither of which had any structural requirements, had been inspected.

Specifications and related PQCIs should have defined the necessary inspections.

Considerable benefit can be obtained by properly defining the quality requirements, resulting in the conservation of technical resources, and improved productivity without any compromise to the overall quality required for the work.

EVALUATION OF FIELD CHANGE REQUEST (FCR)

The primary purpose of the FCR is to document construction-generated/project engineering approved changes identified by the project as necessary prior to the start of work on the affected items(s). FCRs can also be used to disposition Nonconformance Reports (NCR) and with timely application effectively minimize the number of NCRs by solving problems prior to the start of the work. However, FCRs may not be used in lieu of NCRs.

A group of the most recently issued FCRs were evaluated. The subject classifications used for this analysis follows:

Construction - Includes such items as as-built conditions, clearances, work access for assembly, and changes to improve construction.

Welding - Includes materials, size, construction problems, warping, fabrication, and procedures.

Tolerances - Includes materials, fabrication, and field construction.

Fabrication - Includes both shop and field work.

Materials - Includes availability and substitution problems.

Hilti Bolts - Includes documentation, testing, and procedures.

Testing - Includes all on-site testing problems.

Percent of FCRs in each subject classification is as follows:

Construction:	34 percent
Materials:	18 percent
Tolerances:	16 percent
Welding:	15 percent
Fabrication:	11 Percent
Testing:	3 percent
Hilti Bolts:	3 percent
Total	100 percent

Eighty-three percent of all FCRs are covered by construction, materials, tolerances, and welding problems.

The response time for an FCR is the duration from the date of initiation to the date of interim approval. An FCR is released for construction when interim approval is obtained. The overall mean response time is 2.1 days. However, if three of the FCRs with the longest response times are excluded, the mean response time becomes 1.5 days. About 3 percent of all FCRs are rejected.

All FCRs were properly approved through the interim stage, but only 17 percent had final approval by the Project Engineer or his designee. The age of an FCR does not seem to relate to whether or not it contains final approval by the Project Engineer.

The FCR is being used effectively. The subject classifications are typical for nuclear work, and problems such as tolerances and welding are always present and deserving of special attention. The rejection rate is very low, indicating proper application of the document. The mean response time is very low and indicates that adequate technical support is available to process the FCRs through the interim approval stage, and this portion of the activity is being well-managed.

The fact that about 83 percent of the FCRs did not include final approval by the Project Engineer is a matter of some concern. PEP No. 4.6.2.1, Rev. No. 0, dated November 15, 1982, indicates in Section 4.1.1 that incorporation of FCRs cannot occur until final approval by the Project Engineer. This document

does not specify the elapsed time from either initiation or interim approval to final approval by the Project Engineer.

However, this document does state some lengthy times for incorporation of FCRs into the affected design documents (30 to 45 days). Bechtel indicates that it intends to incorporate change documents when a total of five have been posted against an individual drawing and that the drawing will be revised within 60 days.

A number of the drawings have an extensive number of change documents attached to them. In order to properly understand the content of the drawing, it is necessary to look at both the drawing and all of the change documents attached in order to determine the correct information necessary for construction. Timely updating is very important in terms of maintaining drawing legibility for construction. Since an FCR contains both provisions for interim approval and final approval, there is an implication of a certain degree of incompleteness associated with two stages of approval. It is therefore important that the Project Engineer's approval of FCRs be timely so that incorporation can take place promptly. The Bechtel procedures should be revised to establish more timely requirements for final approval of FCRs by the Project Engineer and updating of drawings.

EVALUATION OF NONCONFORMANCE REPORTS (NCR)

The primary purpose of a Nonconformance Report is to document a deficiency in characteristic, documentation, or procedure which renders the quality of an item unacceptable or indeterminate. Examples of a nonconformance include physical defects, test failure, incorrect or inadequate documentation, or deviation from prescribed processing, inspection, or test procedures. NCRs may be originated by the Bechtel organization, subcontractors, suppliers, client organizations, the Nuclear Regulatory Commission, and other regulatory agencies.

A group of the most recently issued NCRs were evaluated. The subject classifications used for this analysis follow:

Construction - Includes such items as work not conforming to the drawings or specifications.

Welding - Includes both field and shop welding, including nonconformances to the drawings, specifications, or procedures.

Fabrication - Includes both shop and field work.

Testing - Includes all on and offsite testing related problems.

Concrete - Includes surface preparation, grouting, concrete placement, bonding, reinforcement, and demolition.

Procedures - Includes all noncompliances that relate to project procedures and basically concerns the administrative aspects of the procedures.

Hilti Bolts - Includes all problems associated with expansion type anchors.

The percent of NCRs in each subject classification is as follows:

Welding	22 percent
Concrete	19 percent
Testing	18 percent
Procedures	13 percent
Fabrication	13 percent
Construction	10 percent
Hilti Bolts	5 percent
Total	100 percent

About 60 percent of all NCRs are covered by problems associated with welding, concrete, and testing; and this is reflected in the additional effort that has been made at the jobsite in the areas of these activities.

Two mean response times were calculated for the NCRs. The first response time is the duration from the date of the report to the date of disposition. If two dispositions were indicated on the NCR form, the one which gave the longest duration was used. The second response time is the duration from the date of the report to closure acceptance by MPQAD. The mean response time to the date of disposition is 5.6 days, and the mean response time to the date of MPQAD closure acceptance is 8.1 days.

All of the NCRs were properly approved. There is no indication on the older NCR form of the priority requirements, but the new NCR form does have a place to designate a priority code.

The Midland Plant Quality Assurance Department (MPQAD) prepared quality trend graphs for the remedial soils work and updates these on a monthly basis. The most recent update of the quality trend graphs revised the occurrence rate from the number of NCRs issued monthly to the number of items affected. The quality trend graphs also segregate the NCRs into a group of subject headings quite similar to those used in the above analysis.

A study was also performed by MPQAD to evaluate the mean closure time for NCRs; and for the period from May 13 to June 13, 1983, the average number of days was 24 for reject/rework items and 30.3 days for repair/use as-is items. For the period from June 13 to July 13, 1983, the mean number of days was 8.7 for reject/rework and 8.8 days for repair/use as-is.

Based on experience from other nuclear projects, the mean response times of 5.6 days from the date of the report to the date of disposition and the mean response time of 8.1 days from the date of the report to the date of closure acceptance by MPQAD are considered to be very good on an overall basis. However, this conclusion can be misleading because this document can have a very direct impact on the day-to-day progress. There have been instances where NCRs have resulted in no work for more than one shift. Observations at the jobsite indicate that a variety of techniques have been developed by Bechtel to expedite the critical NCRs so as to minimize delays in the progress of the work. This is done through direct coordination with Bechtel's Field and Resident Engineering Groups, through the weekly Construction-Engineering

meetings, and through coordination with MPQAD. It is important that Bechtel continues to strive to reduce the response time on critical NCRs that could delay the work.

There does not seem to be any system currently in effect which attempts to measure, on an overall basis, trends related to the quality of the work as reflected by NCRs which is based on the level of effort. As the level of effort expands, so typically do the number of NCRs. However, if the number of NCRs issued is not some way related to the number of construction manhours being expended or some other equivalent measurement, there is no way to ascertain if there is a trend concerning the quality of the work. It becomes difficult to try to associate construction manhours to the subject classification, but the distribution of the NCRs by subject classification does provide an indicator to areas that might require special attention. Observations at the jobsite have indicated that the onsite organizations have responded to the problems associated with welding procedures and concrete. It is recommended that some method of evaluating the NCRs against the level of effort be developed so that meaningful trend analysis can be developed.

APPENDIX

Sept. 16, 1983

TRIP NOTES
INDEPENDENT ASSESSMENT FOR UNDERPINNING
MIDLAND PLANTS 1 & 2
CONSUMER POWER COMPANY

August 24, 1983

Arrived at the jobsite at 11:00 a.m. and proceeded to discuss with W. E. Kilker, Project Engineer, the proposed plan of activities associated with the Midland Plant. The weekly reports, the 90-Day Report, and the Summary of Soils-Related Issues concerning the underpinning work were reviewed. It was agreed that my activities will be limited to a review of the effects of the documents associated with the underpinning operation and their possible influence on the progress of the work.

The following is the proposed course of action:

1. Determine the organizational structure of the Bechtel Power Corporation for the underpinning operation.

2. Identify all the documents associated with change and nonconformance activities that would influence the work.

3. Review the procedures that have been established for change and nonconformance documents.

4. Establish the organizational relationship between the Bechtel Ann Arbor Power Division and the resident engineering group at the plant site.

5. Review a selected number of the change and nonconformance documents identified by Item 3 to determine the response time required for each type of document and to attempt to categorize the documents in terms of the following group of problems:

    a. Materials
    b. Welding
    c. Tolerances
    d. Construction
    e. Information

The objective of the initial part of the program is to determine if there are organizational problems that are inhibiting the orderly progress of the underpinning effort. The second part of the program consisting of the review of the documents is to provide a statistical analysis, to determine the response time, and to classify by problem identification. This will assist in identifying whether or not the processing of the change and nonconformance documents are influencing the progress of the work.

It was agreed that Mr. W. E. Kilker would introduce me to the various organizations associated with the underpinning effort.

I took the short 10 minute course required for a temporary access to confined spaces. Mr. P. Barry provided an orientation tour of the plant site after which we attended the daily meeting which was held at 3:00 pm. The following personnel were in attendance at the meeting:

Bechtel - J. Fischer
J. Gaydos
E. Cvikl

Stone & Webster -

W. E. Kilker
A. Scott
J. Springer
P. Barry
W. C. Craig

Parsons Brinckerhoff

F. Balsamo

Consumer Power Corporation -

D. Puhalla

The basic purpose of the meeting is to inform the assessment team of current activities and to answer team questions about the underpinning effort. None of the outstanding activities on the list were resolved. A copy of the Independent Assessment Meeting dated August 23, 1983 is attached to these notes.

After the meeting, Mr. J. Fisher introduced me to P. Vanderveer who is responsible for the Nonconformance Reports (NCR), J. Kelleher who is responsible for the Field Change Request (FCR) and M. Blendy who will assist with information regarding procedures. I was also introduced to R. Sevo of Midland Plant Quality Assurance Department (MPQAD) and was advised that D. Horn of MPQAD had performed some trend analysis of NCRs.

After the meeting, P. Barry conducted a tour into the east and west shafts along the interface between the turbine building and the auxiliary building. I was able to observe the underpinning operation in terms of the number of piers that have been completed to date, the setting of large grillage beams and excavation of Pier Kc-10. The work is proceeding in a perfectly symmetrical fashion from both the east and west ends of the auxiliary building. The effort is largely being performed by manual labor and is currently operating on a 2-shift basis.

We also toured the area of the tank farm containing the Borated Water Storage Tanks (BWST) where the addition of a reinforced concrete to the existing ring beams is in progress. A mud mat had been placed and the majority of the Hilti bolts had been grouted into the existing ring beam.

MPQAD had issued an NCR for the cracks in the unreinforced mud mat and for small Hilti bolts that were used to attach supports for holding the larger bolts in place while they were being grouted.

August 25, 1983

Reviewed a number of Bechtel drawings relating to the design of the underpinning for the auxiliary building. Attached to a number of these drawings were two documents, Field Change Request (FCR) and Drawing Change Notice (DCN). The DCN originates out of the Ann Arbor Power Division (AAPD) while the FCRs originate at the jobsite in the Field Soils Organization (FSO) office. The final design of the permanent wall system to support the auxiliary building and control tower is still in progress and this is typified by the recent issue of drawings and the large number of DCNs. Several drawings had so many DCNs and FCRs attached to the back that it made it extremely difficult to effectively interpret the drawings.

Obtained permanent photo badge from the Security Operations Building.

Attended the daily 9:30 meeting and again reviewed the same list of items that had been previously reviewed on August 24. During the second and third shifts, the bell for Pier Kc-10 had been completed and it was expected that during either the second or third shift on August 25, that concrete placement would begin since the hold on concrete mixes would be resolved. Mr. A. Scott of Stone & Webster requested that the notes reflect that a vent must be added to the shear key above the grillage/beams as was suggested on August 24. No significant progress was made concerning the other items on the agenda.

Visited the underpinning contractors welding shop and examined the cause for rejection of a number of structural welds performed in accordance with AWS D1.1. The practice is to inspect a lot of material and if any portion of the material has a hold tag placed on it, the entire lot is held until the NCR is resolved. The welding viewed was the highest quality structural welding that I have ever seen and the cause for rejection was such things as the weld length being 1/16 of an inch too short, slightly undersized fillet welds, a crater in the surface of the fillet weld that was barely 1/64 of an inch in diameter and weld cracking at the root. These inspections were performed by MPQAD. These materials, which were inspected and rejected, were part of the temporary construction materials used to case the excavations for the construction of the temporary jacking piers that are used to support the turbine building and auxiliary building during the construction of the underpinning permanent walls.

I toured the site area looking at the work being performed in association with the Service Water Pumphouse noting the posttensioning devices that have been installed at each corner of the building. This operation is perhaps the most straightforward of the underpinning being performed at the site. I also visited the tank farm and again looked at the concrete cracking in the mud mat, the installation of the shear connectors, and the sandblasting of the existing concrete ring beam that supports the BWST.

I again entered the excavation area, both from the east and west side of the underpinning operation for the auxiliary building and examined in more detail the work associated with the first set of grillage beams that will support the turbine and auxiliary building by bearing on piers placed just below the edge of the turbine building and which also rests on the edge of the containment mat. I also entered the utilities access tunnel that is to be used to start the construction of the drift for the underpinning of the control tower. This work space is very confined and very limited. The in-place steel pipe that forms the shaft has been reinforced with ring stiffeners in preparation of cutting away the plate. There is some reason to believe that the area behind this circular steel pipe may contain fill concrete making the excavation extremely slow and costly.

The NRC is on site to review the allegations of structural defects associated with the Diesel Generator Building.

Visited the FSO and collected organization charts and written procedures which define the responsibilities for the processing of FCRs and NCRs and define the responsibility of various organizational groups. Bechtel provided the following organization charts, copies of which are attached;

Project Engineering Organization
Resident Engineering Soils Organization
Project Soils Organization
Field Soils Organization

Copies of the following written procedures were provided:

FPD-2.0 - Rev. 9, July 15, 1983	-	Field Change Request/Field Change Notice Procedure
7220-G-34 - Rev. 16, February 9, 1983	-	General Specification for Field Change Notice
AADP/PSP G-3.2 - Rev. 7, June 1, 1981	-	Project Special Provision to Supersede G-3 of the Thermal Power Organization Field Inspection Manual for the Midland Plant entitled "Control of Nonconforming Items"
MED-4.62-0 - Rev. 21, November 3, 1983	-	Field Change Notice/Field Change Request
MED-4.61-0 - Rev. 9, October 8, 1982	-	Nonconformance Reports (NCRs)

Bechtel provided copies of the last 100 NCRs and FCRs. Mr. Kelleher agreed with my assessment that the Field Change Notice (FCN) is not a significant change document.

I also met with the Assistant Resident Project Engineer, Mr. E. Cvikl and requested copies of written procedures that define his responsibilites and

relationship to the AAPD. Mr. Cvikl indicated that he did not believe the Specification Change Notice (SCN), a document which is issued by the AAPD and the Drawing Change Notice (DCN) were change documents that had influenced progress. He did indicate that procedural changes have been made that now require Bechtel to update each drawing after five DCNs or FCRs have been issued against a drawing. A meeting was scheduled for August 26 to discuss the relationship between the Resident Project Engineer and AAPD and to discuss a number of related items with Mr. J. Darby who is the Resident Structural Engineer.

At the end of the day, it was determined that Bechtel would be unable to place concrete for Pier Kc-10 due to unresolved quality problems.

An initial observation, based on a day and a half at the jobsite is that the operating organization and the number of change documents associated with Bechtel's work, is extremely complex. This work appears to be about 6 months behind schedule even though the current Bechtel network indicates that the project is on schedule. The work of underpinning the auxiliary building is very time-consuming and labor intensive. There appears to be a constant array of quality problems that impede the orderly progress of the work. The schedule and sequencing of the performance of the work is such that Step C cannot be started until Step B is completed, if this is the way in which the work was sequenced. The imposition of Q Category to all temporary construction work and sequencing further complicates this problem. It is very easy to be overly judgmental of the underpinning work being performed at Midland without totally appreciating the enormous importance of quality control, schedule commitments, and capital investments that are involved with the execution of this work.

August 26, 1983

Met with E. Cvikl of Bechtel to discuss the DCN system and to obtain copies of written procedures that define the relationship of the FSO Resident Engineer to Project Engineering at AAPD. Mr. Cvikl provided copies of the following documents:

PEP 2.14.9, Rev. 1 Resident Structural Engineer for Remedial Soils Activity

PEP 2.14.1 - Resident Engineer for Midland

Discussed with Mr. Cvikl the significance of the DCN to the progress of the work. As indicated on August 25, this document is originated by AAPD and to date has had very little impact on the progress of the work. It would be impossible to trace such an influence since there is no recording procedure that would provide this type of information. The only way that this information could be collected is through personal recollection of the people directly involved with the work. It is important to note that the design of th underpinning operation is still in progress and that the design changes, using the DCN system, is being received at the jobsite.

The organization chart for project engineering was revieved and Mr Cvikl provided some clarification of the various reporting responsibilities.

Mr. J. Darby reports technically to Mr. B. Dhar and administratively to Mr. Cvikl. Mr. Cvikl reports directly to Mr. N. Swanberg. Mr. Swanberg is the Project Engineer for the Project Soils Organization and reports to the overall project engineer for the plant.

Mr. Cvikl also indicated that the FSO must interface with the Resident Engineering Organization, which is across the site, and handles all of the balance of plant work. It can, therefore, be concluded that the engineering operation is extremely complex involving the AAPD, the total plant project, the Project Soils Organization, the Field Soils Organization, two resident engineering organizations, and two field engineering organizations. This does not include the other engineering subcontractors.

Mr. Cvikl also indicated that the FSO is influenced by the actions of the general construction organization at the jobsite and depends on this organization for such things as inspection, testing, detection of rebar, support with regard to welding inspection and other unique support services. In effect, they must be scheduled and/or compete with other project construction needs.

My schedule for the continuation of this work with the independent assessment team is as follows:

1. Return to the Midland Plant site on August 30, 1983 and remain through to September 2.

2. Meet with MPQAD to collect information concerning the NCR trending studies that may have been performed.

3. Evaluate, classify, and determine response times for 100 of the most recent FCRs and NCRs.

4.. Prepare a preliminary assessment for review by the Project Manager.

5. During the week of September 11, determine if additional evaluation and further site visits are required prior to preparing the final report.

W C Craig

W. C. Craig
Senior Structural Engineer

Independent Assessment of Underpinning
Midland Plant Units 1 & 2
Consumers Power Company

Held at Midland Site Location
Midland, Michigan
August 23, 1983

Present For:

Consumers Power	Bechtel	MPQAD	Stone & Webster
G. Murray	J. Fisher	R. Sevo	A. Scott
J. Schaub	J. Gaydos		W. Kilker
	E. Cvikl		B. Holsinger
			J. Springer
			Parsons
			F. Balsamo

Purpose

This meeting is held each day to discuss items regarding the Independent Soils Assessment at the Midland Plant, Units 1 & 2.

Discussion

Item 49-8 - Impact of Welding Nonconformance on E/W8 Grillage Installation.

J. Fisher reported that on the drop pit column cap beam a non-qualified weld had been installed. The Contractor is coordinating the issuance of a Conditional Release with CPCo to allow the work to proceed while the welding issue is resolved. G. Murray said CPCo will approve the use of the Conditional Release only in situations where no procedural changes are anticipated. J. Fisher replied that this case will not invoke procedural changes. J. Schaub recommended FSO evaluate if similiar situations exist for other weld sizes. (OPEN ITEM)

Item 49-9 - Grillage Stabilizer Plate Hole Tolerances.

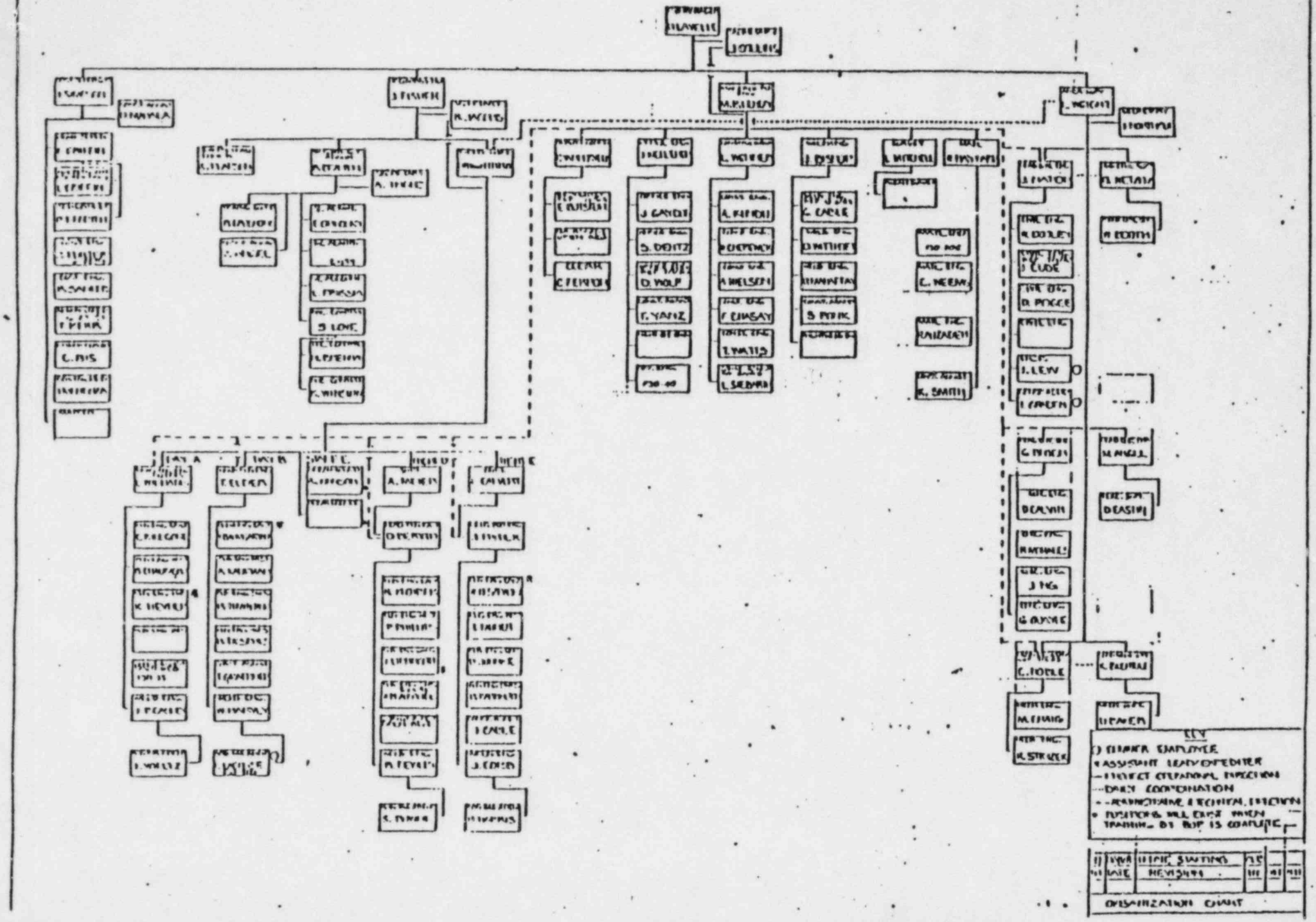
A. Scott questioned if the stabilizer plates were unique from the other grillage leveling plates in terms of hole tolerances. J. Fisher will respond. (OPEN ITEM)

Item 49-10 - QC Coverage of Proposed Grouting Activity.

A. Scott questioned if QC would be able to support the grouting activity proposed for the west access shaft waler pit. R. Sevo explained that the inspection of this grouting could be covered under the existing PQCI but inspection of CT pier grouting required retraining to a revised PQCI. (CLOSED ITEM)

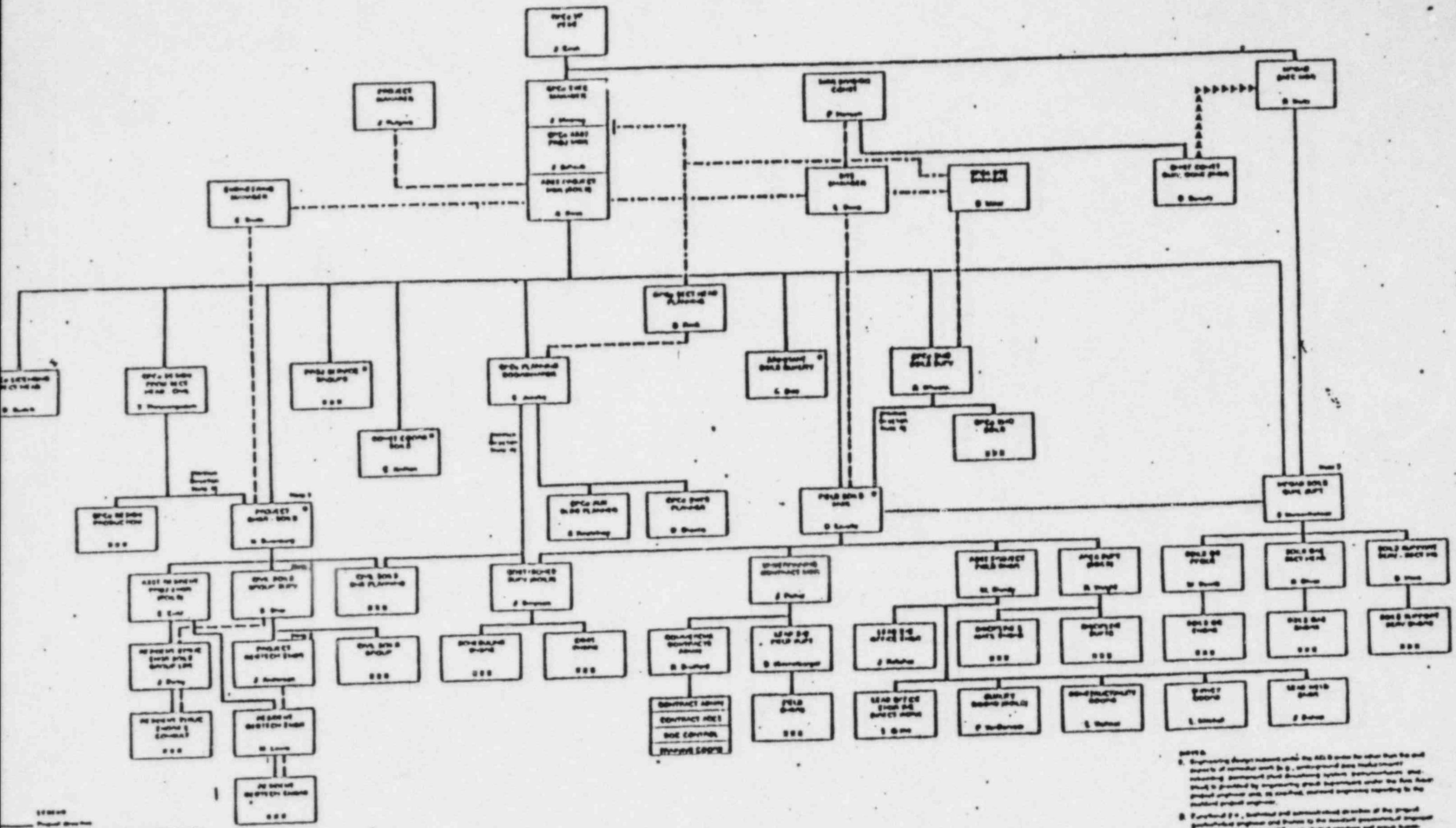
Item 49-11 - E/W8 Grillage Lower Bearing Plates/Cap Beam Fit-up

A. Scott noted that the bearing plates resting on the cap beams do not bear uniformly. E. Cvikl will review the requirement. (OPEN ITEM)



MIDLAND UNITS 1 AND 2
PROJECT SOILS ORGANIZATION
(Responsive to April 30, 1982 Order)

Revised ________



NOTES

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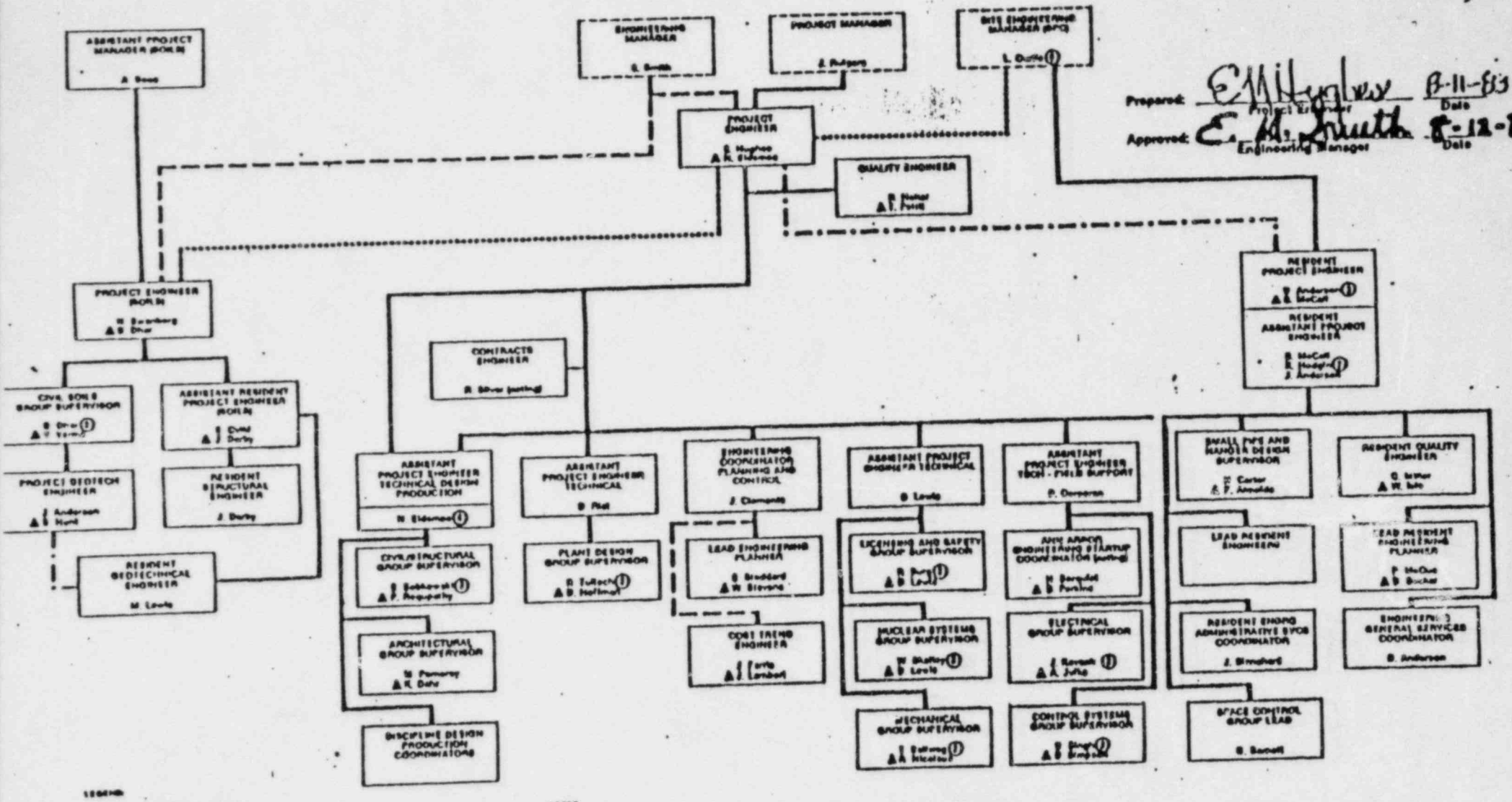
MIDLAND UNITS 1 AND 2
PROJECT ENGINEERING ORGANIZATION



Prepared: E M Hughes 8-11-83
Project Engineer — Date

Approved: E. M. Smith 8-12-83
Engineering Manager — Date

LEGEND

- Project line to dept direction
- Technical direction
- Coordination
- Functional direction (Technical and Administrative)
- Startup

NOTES

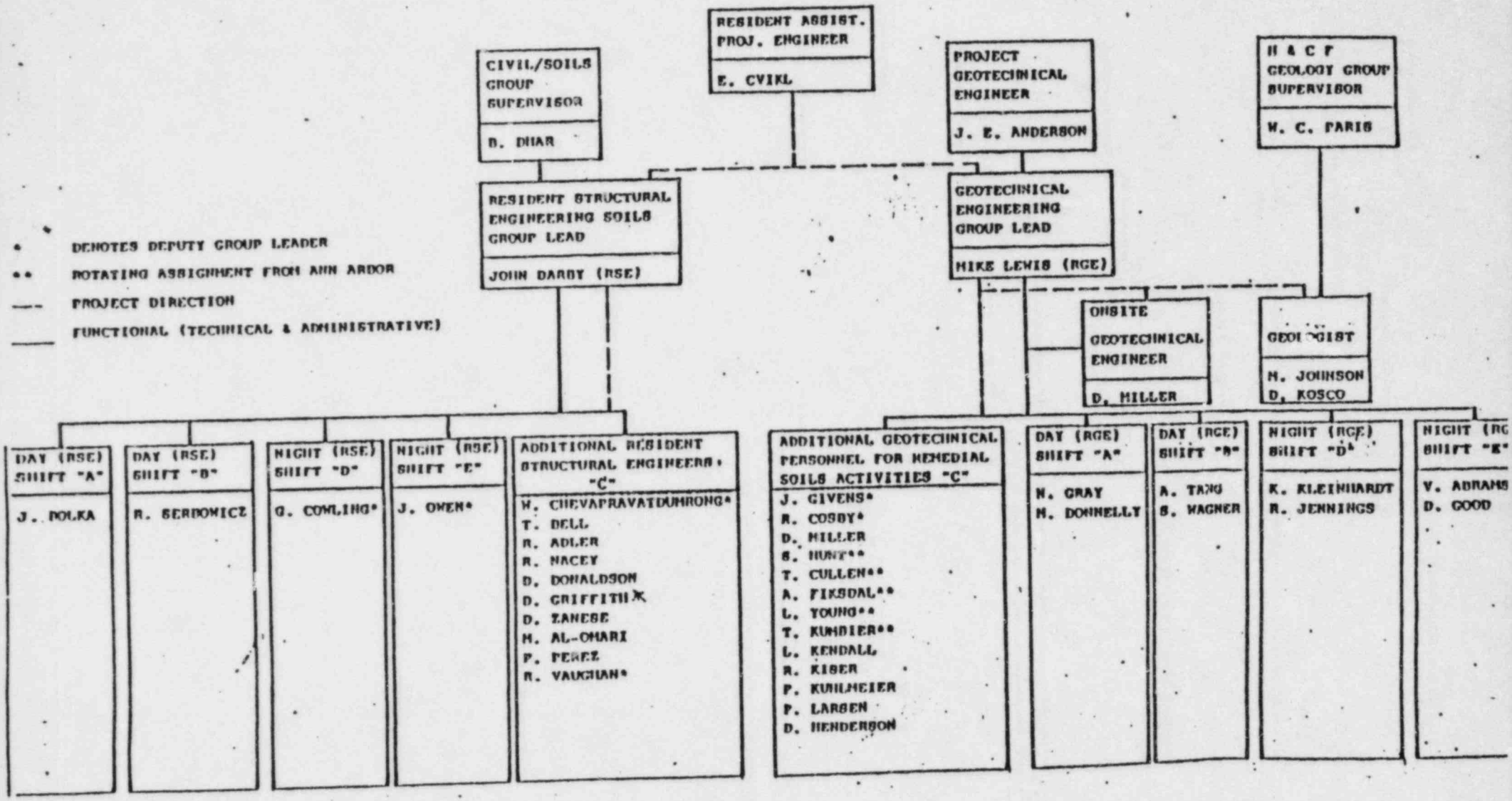
1. The small pipe and hanger supervisor receives his technical direction from the chief plant design engineer
2. Engineering group supervisors receive their technical direction from their respective chief engineers
3. See Resident Engineering Organization Chart for details of resident organization
4. N. Eidemiller is also assigned as the APE for General Services coordination for Ann Arbor engineering, reporting to the project engineer, and is designated as deputy to the project engineer
5. E-1, E-2, etc. refer to numbering of group organization charts in the binder entitled "Midland Engineering Work Process Flowcharts"
6. Coordination on matters affecting resident engineering staffing, schedule accomplishments
7. R. Hedges is also designated as the project engineering startup coordinator

JOB	CHART	APVL	DATE
7220	E-1 Project Engineering		

BG-3048

UPDATE: 8/9/83

MIDLAND UNITS 1 & 2
JOB NO. 7220
RESIDENT ENGINEERING
SOILS ORGANIZATION



TRIP NOTES
INDEPENDENT ASSESSMENT FOR UNDERPINNING
MIDLAND PLANT - UNITS 1 AND 2
CONSUMERS POWER COMPANY

J.O. No. 14358
September 26, 1983

August 30, 1983

Attended the daily meeting on the underpinning effort. The concrete for pier Kc10 had not been placed. The bell had been excavated and shored. The mud mat had been placed and reinforcing steel installation was complete.

After the daily meeting we reviewed the design of the grillage beams and discussed the problem of a scratch on the spherical bearings. This problem was being reviewed with the bearing vendor and the final resolution was to accept the bearings as satisfactory.

Continued discussion with Messrs. E. Cvikl and J. Darby concerning the Resident Engineering organization and its relationship to Ann Arbor Power Division (AAPD). Bechtel indicated that the resident discipline engineering group which is an onsite extension of the AAPD Project Engineering Group can only approve items that do not affect design calculations. After the design for the underpinning has been finalized, the calculations will be transmitted to the jobsite and additional onsite resident engineering personnel will be added to provide support to the ongoing construction effort. It is expected that the first of these calculations covering the Borated Water Storage Tank (BWST) and the Service Water Pump Structure (SWPS) will be transmitted to the jobsite about October 1, 1983.

We also discussed the relationship of the underpinning Contract Manager to both the Field Engineering group and the Resident Engineering group. It was suggested that certain decisions could have contract cost implications and therefore the resolutions of items such as acceptability of materials or decisions to scrap or rework an item might involve contract management in the decision making process. The Resident Engineering group indicated that the Field Engineering makes the decision on whether or not the resolution of a problem is through the scraping and refabrication of an item or reworking a given item until it is acceptable. Such items could be covered both by a Field Change Request (FCR) or a Nonconformance Report (NCR).

Completed the review and editing of the trip notes for August 24, through August 27, 1983.

August 31, 1983

Began the review of the package of the latest FCRs obtained from the Field Soils Organization. The response time for an FCR is defined as the duration from the date of initiation to the date of interim approval since this is the point at which the FCR is released for implementation. The classification system will be developed as the FCRs are reviewed, but in general the initial concept is to consider the following broad categories:

1. Construction—which will include a broad spectrum of problems relating to existing site conditions and their influence on the work.

2. Welding—as it pertains both to fabrication and construction activities.

3. Tolerances—as it pertains both to fabrication and construction activities.

4. Materials—as it relates to substitutions, availability, or other conditions.

5. Hilti Bolts—as it relates to size, location, and installation.

6. Testing—as it relates to both shop and field work.

7. Fabrication—as it relates to shop work.

The evaluation will determine the percentage of FCRs in each of the above categories and the mean response time will be computed.

Attended the Engineering-Construction meeting at 10:00 a.m. This meeting is attended by AAPD Project Engineering, Resident Engineering, Field Engineering, MPQAD, and the Site Management Office. This meeting consists of a review of a list of action items, review of critical FCRs, review of critical NCRs, a review of the status of vendor submittals and a review of QAP Task Force items.

A discussion was held concerning the holds on the Hanson Engineering drawings for piers C_t-3 and C_t-10. These drawings were submitted as part of a work package to Consumer Power for review and had to be withdrawn when the holds were discovered. Many of the jackstands still have holds on them and Field Engineering requested that every effort be made to release these holds.

It was indicated that an evaluation of the lessons learned on the installation of the grillage beams and their design for future work is in progress. This evaluation will be presented during the week of September 5, 1983.

There was a discussion between Field Engineering and Project Engineering to establish a method to review specifications and/or associated work procedures to better determine what must be inspected. An earlier review which was performed by two independent groups within Bechtel basically resulted in the same conclusions concerning the preparation of work procedures. It was agreed that the FSO would proceed to develop a plan for the implementation of this activity and submit it to Consumer Power for consideration. It was pointed out that this review would require the participation of Project Engineering.

The following firms are also providing designs and drawings for the underpinning effort:

Hanson Engineering, Inc.
Spencer White & Prentis, Inc.
Mueser, Rutledge, Johnston and DeSimone

Discussed with both the Field Engineering and Resident Engineering why so many of the FCRs which I had obtained for review purposes did not contain final approval signature of the Project Engineer. I was assured that I had the

current and valid copies of the FCRs. I continued my evaluation of the FCRs and completed about 50 percent of the review of these documents.

Toured the site looking at the progress of the underpinning effort for the SWPS, the repairs to the ring beams on the BWST and the completed concrete work on pier Kc10 under the turbine building. I also looked at the work associated with replacing the grillage beams between the containment mat and pier E8.

September 1, 1983

Completed the review of 62 FCRs. The overall mean response time is 2.1 days. However, if three of the FCRs with the longest response times, mainly 16, 13, and 12 days are not included in the calculated mean, the mean response time then becomes 1.5 days. This indicates that the document is being processed efficiently and the review indicates also that the document is being used in a meaningful manner. Out of the 62 FCRs reviewed only two were not accepted. Only 8 of the 62 FCRs contained final approval of the Project Engineer.

Attended the daily meeting and was advised that pier Kc10 had been poured and that an NCR had been filed against the last portion of the pour around the anchor bolts because the slump of the concrete prior to the addition of the plasticizer was less than 3 inches plus or minus 1 inch.

This pour continued because of the criticality of not having a cold joint close to the bottom of the anchor bolt embedment.

Requested copies of the documentation from AAPD which defines the responsibilities of the FSO Resident Project Engineer and the Resident Structural Engineer. I was advised that this information is contained on Bechtel interoffice memorandums and it is company policy not to release information in this form. However, I was permitted to review the documents. For the Resident Structural Engineer authority to approve to FCRs covers such items as minor changes to reinforcing steel, embedments, tackwelds, fabrication, minor weld details, driftsets, vendor fabrication, construction procedures and instrumentation drawings. Any change requests which affect the detailed design and involve review or alteration of existing calculations or the preparation of new calculations must be approved by AAPD.

The Resident Project Engineer is authorized to approve all NCRs and FCRs which the resident discipline engineering group has prepared dispositions for.

I again requested an explanation as to why so many of the FCRs were not signed in the final approval block by the Project Engineer or his designee. I was advised that the signature had not been included in the FCRs because they had not been submitted for signature.

I was also advised that in confirming my previous understanding, FCRs would be incorporated onto the design drawings when more than five had accumulated against an individual drawing. However, no written procedure has been issued to confirm this action.

While I was assured that the Project Engineer's signature was not important since the work could proceed on an interim approval basis, I consider it

important from a quality standpoint that the FCRs contain the Project Engineers signature and that this review be completed as promptly as possible following the interim review.

I consider it important that the following events occur:

1. All FCRs promptly receive the review and approval by the Project Engineer or his onsite designee.

2. That the design drawings be updated for the criteria of five or more FCRs against a single drawing. The matter of drawing legibility is an important quality issue.

Reviewed a Consumer Power Company letter dated July 19, 1983, concerning a quality assurance trend analysis for NCRs and a document undated entitled "Status Remedial Soils Inspection" which provided an assessment of the closure time for NCRs. These documents may assist in the review of the response time for the most recently issued NCR.

As a result of my two visits to the Midland Plant site, there are two major activities that should be implemented and will improve the overall quality of the work by reducing the time it takes to complete the construction of the piers and apply the jacking loads. These conclusions are as follows:

1. To the extent possible maximum engineering support should be provided at the jobsite. The design calculations, including those prepared by the consultants, should be transferred to the jobsite with appropriate engineering and design support as soon as possible.

2. Existing construction procedures and all future procedures which will be developed should define the necessary levels of inspection consistent with the requirements of the specifications. Unnecessary levels of inspection do not improve the quality of the work but do impede progress. An example of such an unnecessary inspection is the inspection performed on the tack welding which attaches nuts to the inside of the steel tube walers used for lagging of pier shaft excavations. Welds which are important to strength should be inspected. Those which have no principal strength requirements should not be inspected. This effort will have to include the participation of AAPD Project Engineering and may, for consistency purposes, require revisions to the existing specifications.

September 2, 1983

Attended the daily meeting at 8:00 am. Pier Kc3 had been excavated and it is expected the concrete will be placed on September 3. MPQAD and the independent assessment team were advised that the super plasticizer concrete mix would not be used. The problem regarding this mix has to do with the minimum slump limit both at the truck and at the point of delivery. Until these technical issues with the mix are resolved, a regular concrete mix will be used and 3 days will be required before the pier obtains sufficient strength for the application of the jacking loads.

Two NCRs were issued on the concrete placement for Kc10. The first NCR was for a faulty thermometer to measure concrete temperatures being used by US Testing. The second NCR was written against the concrete concerning the minimum slump at the point of delivery to the concrete pump. Both of these NCRs are expected to be successfully resolved.

Met with Mr. S. DiPillo of MPQAD to discuss what information is currently available relative to trend and analysis of NCRs. I was given by MPQAD the Phase III Quality Trend Graph for Remedial Soils Charts R, R1 through R8 updated through June 1983. MPQAD advised that they have no permanent tracking system that either relates NCRs to manhour of work or some other equally acceptable yard stick and that no analysis on a regular basis is made concerning the response time for NCRs. They indicated that they are not aware of any formal priority system, but are advised by Bechtel on a case-by-case basis which NCRs are critical in terms of the review of the responses. MPQAD indicated that a one time analysis for response times to NCRs had been prepared, and I acknowledged that I had a copy of this particular study along with the Phase III Quality Trend Graphs for Charts R through R7 updated through May 1983. Mr. DiPillo advised that the occurrence rates that show on the quality trend graphs are not the number of NCRs issued but the number of parts, pieces or items that are affected by the NCRs issued.

The quality trend graph provides both information concerning the total number of deficiencies, as well as individual graphs for the following classifications:

R - Total Number of Deficiencies

R1 - Incomplete

R2 - Tolerances Exceeded

R3 - Not per Drawing/Specification

R4 - Workmanship

R5 - Procedural Problems

R7 - Purchased Equipment

R8 - Miscellaneous

The grillage beams are being placed into their final location. This is the first set of grillage beams which run from pier E8 to the containment mat and will support both a portion of the turbine building and two support points under the Auxiliary Building.

After the daily meeting I met with Mr. E. Cvikl and requested that he confirm my understanding during the Engineering-Construction meeting that the

various subcontracting engineering firms performing design work on the underpinning will deliver their computations to the jobsite and provide the necessary engineering support during the construction phase.

W. C. Craig
Senior Structural Engineer

Consumers Power Company

J A Mooney
Executive Manager
Midland Project Office

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

PRINCIPAL STAFF			
RA		PEP	
D/RA		DE	
		SCS	
		File	

letter only
orig + 3 letter
letter only
attachments sent to SCS

October 24, 1983

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

Subject: Midland Energy Center GWO7020
Auxiliary Building Underpinning
NRC Audit of September 14-15, 1983
and Subsequent Discussions
File: 0485.16 UFI: 42*05*22*04 12*32 Serial: CSC-6960

This letter summarizes the discussions during the subject audit. It also includes the applicants' responses to the open items resulting from the subject audit and the subsequent discussions.

Audit

During the NRC audit of September 14-15, 1983, the capacity of the Auxiliary Building for a soil modulus of 1500 ksf and differential settlement of one-half inch was reviewed and it was concluded that the building is structurally adequate. never

During this audit, presentations were made and exhibits provided to the NRC. These exhibits are included as Attachment 1. Also, updated settlement plots of the Diesel Generator Building were provided and are included as Attachment 2.

The NRC also reviewed the design and details of the slab fix at Elevation 659 feet. Consumers will provide the final drawings of this fix as a work package to NRC Region III prior to implementation of this work.

Included in the audit were four additional points of discussion. These points and their responses are listed below.

1. Building stresses after lock-off of the permanent wall with regard to residual stresses and upward building movements during underpinning.

   Response: Attachment 3 provides response and concludes that the assumptions made, regarding existing stress, in the analytical models are justified and the calculated stresses resulting from these models are reasonable.

~~8312060263~~

NOV 4 1983

2. Request for an alteration to the soil consolidation acceptance criteria for the permanent underpinning wall included in our letter of June 9, 1983.

   Response: This request is withdrawn, the criteria will be as referenced in SSER Section 3.8.3.1, Pages 3-9.

3. Results of a local stress analysis of the EPA/Control Tower connection at Elevation 704.

   Response: The connection at Elevation 704 is being reviewed. The results of this review will be submitted to the NRC before removal of the temporary prestressing strands in the EPA.

4. Long term settlement values as defined in the previously submitted Technical Specifications.

   Response: These values are being reviewed and if necessary revised values will be submitted to the NRC by revision to the Technical Specifications.

Subsequent Discussion

1. Approximately how much upward movement of the existing structure (EPA and Control Tower) will be allowed during jacking operations?

2. How was the value (and conditions related to value) in Answer No. 1 determined?

   Response to Questions 1 and 2 is provided in Attachment 4 wherein it is concluded that the structure will be allowed to move upward as necessary to accommodate the design jacking loads during temporary underpinning for EPA and the initial support piers for the Control Tower.

3. In what sequence will the remaining underpinning and associated jacking work be performed?

   Response: The sequence for jacking (temporary and permanent) is consistent with the SSER (Appendix I) except that during the initial jacking of Control Tower piers, CT 3/10 will be completed prior to CT 2/11. This information was provided to the NRC in the March 7-8, 1983, telephone conversation regarding access from the UAT.

4. When initial jacking of an independent pier or pier/grillage system is performed, what evaluations are made if AUM occurs?

   Response: Attachment 5 provides this response and shows that an adequate evaluation of the structure is performed prior to proceeding with further jacking.

not crack mapping

5. Provide an explanation for jacking 160% of the specified load into the grillage at 8, as the reserve capacity load.

   Response: Sometime after jacking grillage at Pier 8, excavation for the grillage at Pier 5 will be performed. The loss of building support due to this excavation can result in additional load being transferred passively to the grillage at 8. This additional load can cause additional building movement due to pier settlement, grillage deflection, etc. In order to minimize this building movement, a reserve capacity load (RCL) in increments of 5% will be jacked into the grillage at 8 prior to excavation for grillage at 5. The load which is based on estimated loss of building support at 5 has been calculated to result in an increase in the load of 50% of the specified load (S.L.) at grillage 8. The S.L. is the design force defined in Paragraph 6.3.4b of Specification 7220-C-195. The building has been checked for, and found to be adequate, for 160% S.L. i.e., the total load in grillage at 8 when the grillage 5 area is undermined.

   Similarly a RCL will be jacked into the grillage at 5 before excavation for the grillage at 2. At this time the load at the grillage 8 will be maintained at 160% S.L. While loading the grillage at 2, the loads at grillages 5 and 8 are reduced to the S.L.

6. For grillage jacking at Pier 8, why was the 24 hour acceptance criteria changed to 125% of specified load instead of 110% of specified load.

   Response: Since it is planned to go to RCL, which is higher than 110% S.L., it was considered more conservative and prudent to satisfy the 24 hour acceptance criteria at 125% S.L., instead of reducing the load to 110% S.L. The 24 hour criteria will be again met when the RCL is jacked.

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ATTACHMENT #1

AUDIT EXHIBITS

SUMMARY OF SOILS DATA FOR AUXILIARY
BUILDING UNDERPINNING ANALYSES

	EPA				CONTROL TOWER				MAIN AUX.		
Case	E (KSF)	Total Settl. (IN)	After Lockoff Settl. (IN)	Unit Soil Spring (KCF)	E (KSF)	Total Settl. (IN)	After Lockoff Settl. (IN)	Unit Soil Spring (KCF)	After Lockoff Settl. (IN)	Unit Soil Spring (KCF)	Comments
I	3000	0.6	0.2	410	3000	0.9	0.3	350	0.1	1160	Based on Bechtel Testimony
II	1333	1.35	0.45	180	2000	1.35	0.45	240	0.2	580	NRC
III	857	2.1	0.7	128	1286	2.1	0.7	175	0.2	580	0.5 inch differential