



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

JUN 10 1977

MEMORANDUM FOR: Richard K. Hoefling, Office of the Executive Legal Director

FROM: G. W. Reinmuth, Assistant Director, Division of Reactor Construction Inspection, IE

SUBJECT: CONCURRENCE ON RESPONSE TO LETTER FROM M. CHERRY DATED APRIL 27, 1977

We have a few problems in concurring with the proposed answer as noted by the detailed comments provided in the Enclosure. Please consider a redraft. R. E. Shewmaker (27421) should be contacted for the details if you have questions.

G. W. Reinmuth

G. W. Reinmuth, Assistant Director
Division of Reactor Construction
Inspection, IE

Enclosure: Comments

cc: B. H. Grier, IE
R. E. Shewmaker, IE ✓
R. Powell, DPM

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PDR FOIA
RICE84-96 PDR

rec'd 9:17 7/5/77 jh

COMMENTS ON REPLY TO CHERRY LTR. 4/27/77

I. Note - On page 2, the B&W Topical Report BAW-10096A, Rev. 3 is not approved for Midland.

II. On page 3 - 1st paragraph.

The fact there were meetings between IE and CP and Bechtel is correct, but needed repairs to maintain a safely constructed facility did not require removal of concrete. The minor corrections which were needed, were made by drilling into existing concrete and grouting in reinforcing steel. This is not an unusual procedure during construction. In other words we need to point out that the margins which were provided that were in excess of those the NRC requires as a minimum were sufficient to absorb the reductions in safety resulting from the error. This in fact means that the QA/QC requirements are set at such a high level in this particular area of construction activity that rather significant errors or problems must be in evidence before minimum safety is degraded.

Also in this paragraph the statement is made that the "overview program" by CPC "has been successful in that all errors have been identified by the program and corrected prior to concrete placement". I disagree with this in two respects.

- (1) We cannot attest that all errors have been identified; we can however, state that all significant errors have been identified and corrected by the QC program so that any errors remaining which are now embedded in concrete would have no significant effect on the safety of the structures.
- (2) The paragraph, I believe, leads the uninformed reader to the conclusion that our goal and requirements are that all errors must be eliminated. If my belief is correct the NRC will be continually chasing reported errors which in fact have little or no safety significance.

I suggest revisions; Replacement for paragraph 1 on Page 3.

"A series of meetings were held by the Office of Inspection and Enforcement with Bechtel and Consumers Power Company in regard to these rebar errors, starting in January 1975. As a result of the technical meetings held it was determined that the errors did not require removal of concrete, but entailed drilling in existing concrete to grout in reinforcing steel which is accepted construction practice. The margins of structural safety that had been provided were so much in excess of the minimum requirements that the error induced reductions were not significant from a safety standpoint. It was determined that the errors were significant with regard to the required quality program so that the meetings culminated in a top management meeting in May 1976. During this May 1976 meeting,

also
re-evaluations

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with
Clem make

Consumers Power Company committed to an "overview" program (i.e., 2nd QC inspection) of rebar placement for safety-related structures, in addition to other corrective actions. This "overview" program has been successful in that all significant errors with regard to structural safety have been identified by the program and corrected prior to concrete placement. The above description serves to indicate to you the steps which are taken by the Staff and Licensee to provide immediate corrective actions when quality assurance or quality control deficiencies are discovered. We recognize that reinforcement placement errors, reinforcement omissions and others related to concrete structures will occur at Midland as well as at other facilities. Detection by the QA/QC program is our goal, so that those errors which on examination have a detrimental effect on structural safety, such that the minimum requirements cannot be met, will be corrected.

III. Page 3, 4th paragraph - ^{proposed} Insert the underlined portion.

"..... this letter contains six items requiring immediate action by the Licensee. On May 4, 1977 a Headquarters structural engineering specialist was at the site to review the problem and the proposed corrective action. The actions require no removal of concrete and entail relocation of three tendon sheaths, relocation and repairs to a few pieces of reinforcing steel and some changes to a portion of the two penetration assemblies involved. These inspections and decisions will be documented in future IE reports. In addition,"

IV. Page 4 - End the last sentence of paragraph 1 at "procedures". If not, it indicates we have as a required goal and requirement, no placement errors.

V. Because of the delay in issuance of this letter, the special quality assurance inspection discussed at the bottom of Page 3 has already been conducted. We suggest that the language be revised to read generally as follows: "In this regard...has conducted a special..." and add the following: "A report of this inspection is now in preparation, and will be forwarded to you on completion".

Removal
out
6/21/77

Report
issued
6/21/77

can be released after review by M. Chen -
PDR
Proprietary
CP



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

*Will be sent out
new letter to
be drafted by
IE + RIII
to have comments
on new letter
JWH*

Myron M. Cherry, Esq.
One IBM Plaza
Chicago, Illinois 60611

In the Matter of
Consumers Power Company
(Midland Plant, Units 1 and 2)
Docket Nos. 50-329 and 50-337

Dear Mr. Cherry:

This letter is in response to your letter dated April 27, 1977 relating your concerns regarding the adequacy of the quality assurance and quality control applicable to the construction of the Midland Plant of Consumers Power Company (Licensee) and the adequacy of the Regulatory Staff's actions regarding a recently reported construction error.

The Nuclear Regulatory Commission considers quality assurance and quality control programs for construction and operation of nuclear power plants to be essential to provide adequate protection of the health and safety of the public. In June 1970, the Commission issued Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." The criteria established in this Appendix formed the nucleus upon which all quality assurance programs for nuclear power plants under construction or in operation must comply. In addition, in the years since Appendix B was issued, the Commission and industry have expended a large effort to develop regulatory guides, codes and standards, and procedures for implementing good quality assurance and quality control practices. These efforts relied upon the experience gained from nuclear power plants which were under construction or in operation.

A quality assurance program which has been approved by the NRC has inherent in its requirements the capability for self-policing (audits), reporting, and correction of deficiencies. In addition, the NRC Office of Inspection and Enforcement provides an independent inspection audit function to assure that the quality assurance program is being implemented properly.

The Midland Plant is being constructed at the present time in accordance with a Consumers Power Company Quality Assurance Program, Topical Report CPC-1, Revision 5, which was approved by the Staff on November 26, 1976. This topical report CPC-1, Revision 5, describes the quality assurance program which the Licensee applies to those design, procurement, construction, and operation of safety-related structures, systems, and components for the Midland Plant. This quality assurance program satisfies the requirements of Appendix B to 10 CFR Part 50 and follows the guidance provided by the NRC in:

1. "Guidance on Quality Assurance Requirements during Design and Procurement Phase of Nuclear Power Plants," WASH-1283, Rev. 1, May 24, 1974.
2. "Guidance on Quality Assurance Requirements During the Construction Phase of Nuclear Power Plants," WASH-1309, May 10, 1974.
3. "Guidance on Quality Assurance Requirements During Operations Phase of Nuclear Power Plants," WASH-1284, October 26, 1973.

In addition to the CPC quality assurance program, the architect-engineer (Bechtel) and nuclear steam system supplier (Babcock & Wilcox) have NRC approved Quality Assurance Programs. The approved architect-engineer program is the Bechtel Quality Assurance Program for Nuclear Power Plants (Topical Report No. BQ-TOP-1, Revision 1A) and the approved nuclear steam system supplier program is the Babcock & Wilcox N.P.G.D. Quality Assurance Program for Nuclear Equipment (Topical Report No. BAW-10096A, Revision 3).

About 3 years ago a series of rebar placement errors occurred at the Midland Plant. The errors in a few cases involved improper spacing but most concerned omission of steel reinforcement bars. Following a review of this matter by the Office of Inspection and Enforcement, the following were identified as possible factors which might have led to the rebar placement errors:

1. Failure of QC Engineers to use source documents.
2. Inadequate inspection procedure.
3. Inadequate inspection plans.
4. Poor communication between design and building engineers.
5. Lack of understanding by QC and field engineers of ^{design requirements} equipment.
6. Errors in vendor fabrication drawings.
7. Incomplete QC inspections.

CP's QA program identified these errors but failed to take corrective measures

A series of meetings were held by the Office of Inspection and Enforcement with Bechtel and Consumers Power Company in regard to these rebar errors, starting in January 1975 and culminating in a top management meeting in May 1976. During this May 1976 meeting, Consumers Power Company committed to an "overview" program (i.e., 2nd QC inspection) of rebar placement for safety-related structures, in addition to other corrective actions. This "overview" program has been successful in that all errors have been identified by the program and corrected prior to concrete placement. The above description serves to indicate to you the steps which are taken by the Staff and Licensee to provide immediate corrective actions when quality assurance or quality control deficiencies are discovered.

Agree
with
comments

The factors leading to the April 19, 1977 tendon sheath placement error at the Midland Plant are similar to those that led to the rebar error discussed above. As a result, Consumers Power Company has extended the "overview" inspection program to include all embedments in safety-related structures.

The Staff's Region III Office of Inspection and Enforcement was notified of the Midland containment tendon sheath placement error on April 19, 1977. A description of this placement error is contained in the attached "Preliminary Notification" dated April 20, 1977.

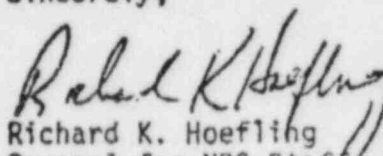
Upon receipt of this information by the Region III Office of Inspection and Enforcement, an inspector was dispatched to the Midland site to review the circumstances and provide additional information on which to base a decision regarding further actions. As a result of this inspection, discussions with the Licensee and internal discussions, an "Immediate Action Letter" was issued to the Licensee on April 29, 1977. A copy of this letter to the Licensee is enclosed. This letter contains six items requiring immediate action by the Licensee. In addition, a meeting was conducted by the Office of Inspection and Enforcement with the President of Consumers Power Company on May 5, 1977, at the Consumers Power Company corporate office in Jackson, Michigan. During this meeting, the detailed implementing methods for corrective actions described in the "Immediate Action Letter" were discussed in detail, along with the need for the Licensee to assure that the problems identified were not indicative of a broader problem with their overall QA program.

Although the tendon sheath placement error is the first instance of a lack of quality control in nearly a year, the Staff considers it important to take steps to independently verify the soundness of the Midland Plant quality assurance and quality control program. In this regard, the Region III Office of Inspection and Enforcement will conduct a special quality assurance inspection at the Midland site during the week of May 23, 1977, which will be conducted by a team of inspectors. This inspection team

will consist of personnel from Region III, Headquarters, and another Region of the Office of Inspection and Enforcement. Findings which result from this inspection may require additional modification of implementing procedures to prevent the reoccurrence of embedment placement errors.

The Staff feels that the actions taken by Licensee and the Staff regarding these matters provide reasonable assurance that the Midland Plant, Units 1 and 2, will continue to be constructed and will be operated in a manner to assure protection of the health and safety of the public.

Sincerely,


Richard K. Hoefling
Counsel for NRC Staff

Enclosure

cc (w/ encl.):

Frederic J. Coufal, Esq.
Dr. J. Venn Leeds, Jr.
Dr. Emmeth A. Luebke
Myron M. Cherry, Esq.
Judd L. Bacon, Esq.
Honorable Curt T. Schneider
Ms. Mary Sinclair
Harold F. Reis, Esq.
L. F. Nute, Esq.
Mr. Steve Gadler
R. Rex Renfrow, III, Esq.
Atomic Safety and Licensing Board Panel
Atomic Safety and Licensing Appeal Panel
Docketing and Service Section

Bill — Ohmsted

MAR 15 1979

Docket No. 50-129

Docket No. 50-330

Consumers Power Company
ATTN: Mr. Stephen H. Howell
Vice President
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This refers to the meetings conducted on February 23, 1979, and March 5, 1979, between Consumers Power Company, Bechtel Corporation and NRC representatives held at the Region III office. Listing of attendees to the meetings are enclosed as Attachment No. 4. The meetings, conducted in connection with the investigation of the settlement of the Midland diesel generator building and plant area fill, represent a continuation of that effort.

A separate report of the investigation conducted during December 11-13, 18-20, 1978, and January 4-5, 9-11, 22-25, 1979, by Messrs. E. J. Callagher, G. A. Phillip and G. F. Maxwell of this office will be issued in the near future.

During the meeting of February 23, 1979, the NRC summarized their preliminary investigation findings. These summary findings are provided in Attachment No. 1. That meeting was subsequently followed by a second meeting held on March 5, 1979, during which Consumers Power Company representatives responded to the preliminary investigation findings identified in Attachment No. 1. Those responses, which include a revised "Consumers Power Company Discussion of NRC Inspection Facts" report, are provided in Attachments No. 2 and No. 3.

Based on our investigation, review of your responses, as well as discussions during the March 5, 1979, meeting, our findings are as follows:

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MAR 15 1979

- a. The quality assurance program for obtaining proper soil compaction of the Midland Site was deficient in a number of areas.
- b. Soil of the type used in the foundation of the diesel generator building is also located, to varying degrees, under other Class I structures and plant area piping.
- c. Several inaccurate statements are contained in the FSAR with respect to the soil foundations.

In addition to the above findings, we continue to be concerned with the following matters:

- a. Although you have stated that inadequate soil compaction contributed to the settlement of the D/G building, you have not determined what other factors contributed to the settlement.
- b. Because similar foundation materials were placed under other Class I structures, identified on page 3 of Attachment No. 3, we have concerns regarding the ability of the structures and components to fulfill their intended design functions under all required design bases for the life of the plant.
- c. We are concerned whether your current course of action on the settlement, which consists of preloading and consolidating the underlying supporting materials, will resolve the problem on a long term basis.

As you are aware, the March 5, 1979, meeting was concluded with your informing us that within two weeks you would provide additional soils exploratory information that might account for the differences between the fill supporting the diesel generator building and that of the other Class I structures. You also stated that in the event the available information is insufficient to demonstrate resolution of the settlement problem, a further course of action would be provided.

In that this matter is related to plant design, we are forwarding it to our NRC Headquarters staff for further review and evaluation. We will keep you informed of their action in this matter.

Consumers Power
Company

- 3 -

MAR 15 1979

Based on a March 9, 1979, telephone conversation with a member of your staff who informed us that the report contains no proprietary information, this report will be placed in the NRC's Public Document Room.

Sincerely,

James G. Keppler
Director

Attachments:

1. NRC Presentation of Investigation Findings of the settlement of the Diesel Generator Building and Plant Area Fill dtd 2/23/79
2. Consumers Power Company Discussion of NRC Inspection Facts Resulting from the NRC Investigation of the Diesel Generator Building Settlement (revised 3/9/79)
3. Consumers Power Company Response to NRC Question on the Condition of Soils Under All Other Plant Areas dtd 3/5/79
4. Attendance List at 2/23/79 and 3/5/79 Meetings

cc w/attachments:

Central Files
Reproduction Unit NRC 20b
FDR
Local FDR
MSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Dr. Wayne E. North
Myron M. Cherry, Chicago

RIII

RIII

RIII

RIII

RIII

RIII

Phillip/sr

Gallagher

Hayes

Fiorelli

Norelius

Keppler

3/15/79

Cook

February 20, 1979

Consumers Power Company
Attention: Mr. S. H. Howell
Vice President
1945 W. Parnall Road
Jackson, MI 49201

Dear Mr. Howell:

This confirms our plans arranged between you and G. Fiorelli of our office to meet with you at 9:30 a.m. on February 23, 1979, and 9:30 a.m. on March 5, 1979, at our regional office in Glen Ellyn, IL. The purpose of the meetings are to discuss with you and members of your staff circumstances associated with the settlement of the diesel generator building and plant area fill.

Should you have any questions regarding this meeting, we will be glad to discuss them with you.

Sincerely,

James G. Kappler
Director

cc: Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Myron M. Cherry, Chicago
Dr. Wayne E. North

OFFICE	RIII				
SURNAMES	Fiorelli/ch	Kappler			
DATE	2/20/79	2/20/79			

7903130115

Items to send to P. Kelly
on 50,55(c) Generator Fdn

1. BACKFILL Spec.
2. BORING LOGS OF AREA (soils)
3. Sections of AREA i.e. ground water level; dewatering or recharge program (if any)
4. SETTLEMENT DATA to date.
5. Generator Bldg Foundations details.
6. Any other info on investigation of probable cause.
7. INFO ^{on} MATERIALS used for BACKFILL & compaction.
8. SITE drainage ^{dwg's} including pipe lines under generator bldg.



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

April 30, 1980

MEMORANDUM FOR: G. Fiorelli, Chief, Reactor Construction
and Engineering Support Branch

THRU: D. W. Hayes, Chief, Engineering Support Section 1 *H/loc*

FROM: E. J. Gallagher, Reactor Inspector

SUBJECT: CONSUMERS POWER COMPANY MIDLAND UNITS 1 AND 2
ANSWER TO NOTICE OF HEARING

Ref: (1) NRC Order Modifying Construction Permits
dated December 6, 1979

(2) Consumers Power Company Answer to Notice of
Hearing

As per your request, the following are comments to Consumers Power Company (CPCO) submittal entitled "Answer to Notice of Hearing" regarding the Midland Unit 1 and 2 construction project:

1. CPCO response (pages 2-3) denies the statements made in the NRC order (pages 1-2) which states,"This investigation revealed a breakdown in quality assurance related to soil construction activities under and around safety-related structures and systems in that (1) certain design and construction specifications related to foundation-type material properties and compaction requirements were not followed; (2) there was a lack of clear direction and support between the contractor's engineering office and construction site as well as within the contractor's engineering office; (3) there was a lack of control and supervision of plant fill placement activities which contributed to inadequate compaction of foundation material; (4) corrective action regarding nonconformances related to plant fill was insufficient or inadequate as evidenced by repeated deviations from specification requirements; and (5) the FSAR contains inconsistent, incorrect, and unsupported statements with respect to foundation type, soil properties, and settlement values".

Comment:

A "breakdown in quality assurance" did substantially occur in the soil construction activities and the list of five items above were contributing factors to the failure of the licensee to control the backfill and its placement and compaction at the Midland site.

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2. CPCO response (Appendix, page 2) denies the findings with respect to the Borated Water Storage Tanks and states that, ..."The assumptions used for the borated tank settlement calculations are appropriate for the type of design utilized".

Comment:

A uniform rigid mat foundation will not behave in the same manner as a flexible circular ring wall foundation. The inspection finding indicated the lack of design control interface and verification between the geotechnical group who performed settlement calculations under the assumption of a uniform rigid mat foundation while the civil/structural group performed a design and analysis of the BWST using a flexible ring wall foundation.

3. CPCO response (Appendix, page 3) states, in part, that the .. "Licensee denies that instructions provided to field construction for substituting lean concrete for Zone 2 material were contrary to 10 CFR 50, Appendix B, Criterion V".

Comment:

Lean concrete material was permitted to be used indiscriminately by the Bechtel letter dated December 27, 1974 which states, "lean concrete backfill is considered acceptable for replacement of Zone 1 and 2". This instruction was given without proper consideration and coordination, and its effect on other design basis, i.e. settlement effects. The instruction which was implemented was therefore inadequate and contrary to Criterion V.

4. CPCO response (Appendix, page 4) states, in part, ..."Licensee denies that Quality Control Instruction C-1.02 is contrary to 10 CFR 50, Appendix B, Criterion X, CPCO Topical Report CPC 1-A, Policy No. 10, Section 3.1 or ANSI N45.2 (1971)".

Comment:

QCI 1.02 (quality control instruction for soil placement) did not provide a comprehensive and adequate program of inspection of activities affecting the quality of safety-related structures. The QCI permitted a random surveillance of an activity which required 100% inspection in order to verify soils material was placed and compacted to design requirements.

5. CPCO response (Appendix, page 4) states, in part, that the... "Licensee denies the general allegation that "measures did not assure that soils conditions of adverse quality were promptly corrected to preclude repetition". Licensee denies that its actions and measures were contrary to 10 CFR 50, Appendix B, Criterion XVI".

Comment:

Adequate measures were not taken by the licensee to preclude repetitive nonconforming condition adverse to quality by virtue of recurring deviations of moisture control and the erroneous selection of laboratory standard used in attempting to achieve the required compaction.

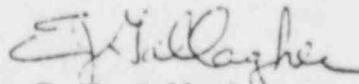
6. CPCO response (Appendix, page 8) states, in part, that the .."Licensee admits that "materials other than controlled compacted cohesive fill were used to support the Diesel Generator Building". Licensee alleges that only controlled and compacted fill was used to support the Diesel Generator Building".

Comment:

Material other than cohesive fill was used to support the Diesel Generator Building. The material was random fill, which was of any classification and consistency. However, controlled and compacted fill was not used. The compaction of material was not controlled by either its consistency or by the method of compaction. The equipment used in attempting to compact the fill was not qualified to a particular method of compaction, i.e., lift thickness, material type, and equipment used, and therefore not placed under controlled conditions. It was later determined that the method used could not be qualified to achieve the required density of the fill.

CPCO's response to the NRC order admits to a number of technical details of Appendix A of the order. The items admitted to are consistent with previous NRC findings.

If there are any questions regarding the above, please let me know.


E. J. Gallagher

cc:

J. G. Keppler
D. W. Hayes
R. C. Knop
T. Vandel
R. Cook



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

Chick

March 5, 1980

MEMORANDUM FOR: Harold D. Thornburg, Director, Division of Reactor Operations
 Inspection, IE

FROM: James G. Keppler, Director

SUBJECT: MIDLAND SOIL SETTLEMENT

Enclosed is a memorandum from Mr. Gallagher, Region III Inspector, concerning the soil settlement problem at Midland. This memorandum should be forwarded to appropriate ASLB members once the Board has been appointed.

Our inspector is of the view that further construction should not be permitted until a technical review of the problem by NRC has been completed. We recognize that the licensee is proceeding at its own risk pending completion of the Hearing; however, we are concerned that the actual Hearing may not be conducted for several months. Prolonging this issue is neither in the best interest of the NRC or the licensee. We suggest, therefore, that a memorandum be sent to the Commission encouraging that they expedite the Hearing.

If you desire additional information concerning this matter, please let me know.

Gen W. Roy
 James G. Keppler
 Director

Enclosure:
 Memo from E. J. Gallagher to
 G. Fiorelli, dtd 1/21/80

cc w/o enclosure:
 G. Fiorelli

Commi
Plz give copies
to
ACK
KOPK
1/17/80
Tom J
Gene
T.R.

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