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

EXHIBIT
CPCo 2
11-18-80 MJ

October 27, 1980

MEMORANDUM FOR: Ray Sutphin, Reactor Inspector

FROM: E. J. Gallagher, Reactor Inspector

SUBJECT: INPUT FOR SALP APPRAISAL ON MIDLAND 1 AND 2

The following is to inform you of the inspector's input for the SALP appraisal on the Midland 1 and 2 project. The inspector has been associated with the Midland project since October 1978 to the present in the civil/structural area. The following items have been designated for SALP appraisals:

1. Adequacy of management controls

   Consumers Power Co. has not provided adequate management control for the construction of the Midland project. Management has not been properly informed or involved in significant construction items.

2. Communication within functional group providing technical support

   Communication and technical support between CPCo and design organization has been poor. The design organization (Bechtel) has not provided clear technical direction.

3. Adequacy of committee and supervisory reviews and audits

   Audit findings have been made with CPCo management not directing attention to the "root cause" of the deficiency. Improvements are needed in this area.

4. Adequacy of records and record control systems

   In-process inspection records have not been maintained adequately. Findings have been made where in-process inspection records have been determined to be incorrect. Final review of these records have been taking place too far into the work activities to prevent poor records throughout a work activity.

5. Qualification and training of licensee personnel

Findings were made where the licensee did not adequately control the qualifications of the contractor's quality control personnel for the post-tensioning work activity. In general, CPCo performance in the area has not been adequate. The civil QA supervisor for CPCo has been in need of more staff to control the civil work activities for some time. Management has not supplied this personnel as of this appraisal.

6. Overall effectiveness and attitudes

CPCo in conjunction with their contractor has a poor attitude in compliance. In addition, CPCo has been reluctant to give the NRC requested documents without first clearing it with upper CPCo management. This has been considered as an inhibiting factor in our inspection program.

E. J. Gallagher

cc:
G. Fiorelli
D.W. Hayes
R.C. Knop

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EXHIBIT
CPCo 3
11-18-80 MJ

February 15, 1979

MEMORANDUM FOR: H. D. Thornburg, Director, Division of Reactor Construction Inspection, IE

FROM: James G. Keppler, Director

SUBJECT: MIDLAND SUMMARY REPORT

The attached report, which represents Region III's overall assessment of the Midland construction project to date from a regulatory standpoint, was discussed with you and representatives from your staff, NRR, and OELD during our meeting at HQ's on February 6, 1979. During that meeting, it was concluded that this report should be provided to OELD for transmittal to the Licensing Board and the various parties to the Hearing. As such, this information is being forwarded for your action.

We believe the meeting was quite useful in receiving feedback from the various NRC people involved relative to our position on the status of this facility.

Please contact me if you have any questions regarding this matter.

James G. Keppler
Director

Attachment:
Midland Summary Report

7903190190 5pp

MIDLAND SUMMARY REPORT

Facility Data

Docket Numbers	- 50-329 and 50-330
Construction Permits	- CPPR-81 and CPPR-82
Permits Issued	- December 14, 1972
Type Reactor	- PWR; Unit 1, 492 MWe*; Unit 2, 818 MWe
NSSS Supplier	- Babcox & Wilcox
Design/Constructor	- Bechtel Power Corporation
Fuel Load Dates	- Unit 1, 11/81; Unit 2, 11/80
Status of Construction	- Unit 1, 52%, Unit 2, 56%; Engineering 80%

*Approximately one-half the steam production for Unit 1 is dedicated, by contract, to be supplied to Dow Chemical Corporation, through appropriate isolation heat exchangers. Capability exists to alternate to Unit 2 for the steam source upon demand.

Chronological Listing of Major Events

July 1970	Start of Construction under exemption
9/29-30 & 10/1/70	Site inspection, four items of noncompliance identified, extensive review during CP hearings
1971 - 1972	Plant in mothballs pending CP
12/14/72	CP issued
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3/12/75	RIII held management meeting with CP

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4/19/77	Tendon sheath omissions of Unit 1 reported
4/29/77	IAL issued relative to tendon sheath placement errors
5/5/77	Management meeting at CP Corporate Office relative to IAL regarding tendon sheath problem

5/24-27/77	Special inspection by RIII, RI and HQ personnel to determine adequacy of QA program implementation at Midland site
6/75 - 7/77	Series of meetings and letters between CP and NRR on applicability of Regulatory Guides to Midland. Commitments by CP to the guides was responsive
7/24/78	Construction resident inspection assigned
8/21/78	Measurements by Bechtel indicate excessive settlement of Diesel Generator Building. Officially reported to RIII on September 7, 1978
12/78 - 1/79	Special investigation/inspection conducted at Midland sites Bechtel Ann Arbor Engineering offices and at CP corporate offices relative to Midland plant fill and Diesel Generator building settlement problem

Selected Major Events

Past Problems

1. Cadweld Splicing Problem and Show Cause Order

A routine inspection, conducted on November 6-8, 1973, as a result of intervenor information, identified eleven examples of four noncompliance items relative to rebar Cadwelding operations. These items were summarized as: (1) untrained Cadweld inspectors; (2) rejectable Cadwelds accepted by QC inspectors; (3) records inadequate to establish cadwelds met requirements; and (4) inadequate procedures.

As a result, the licensee stopped work on cadweld operations on November 9, 1973 which in turn stopped rebar installation. The licensee agreed not to resume work until the NRC reviewed and accepted their corrective action. However, Show Cause Order was issued on December 3, 1973, suspending Cadwelding operations. On December 6-7, 1973 RIII and HQ personnel conducted a special inspection and determined that construction activity could be resumed in a manner consistent with quality criteria. The show cause order was modified on December 17, 1973, allowing resumption of Cadwelding operations based on the inspection results.

and concrete placement work

The licensee answered the Show Cause Order on December 29, 1973, committing to revise and improve the QA manuals and procedures and make QA/QC personnel changes.

Prehearing conferences were held on March 28 and May 30, 1974, and the hearing began on July 16, 1974. On September 25, 1974, the Hearing Board found that the licensee was implementing its QA program in compliance with regulations and that construction should not be stopped.

2. Rebar Omission/Placements Errors Leading to IAL

Initial identification and report of rebar nonconformances occurred during an NRC inspection conducted on December 11-13, 1974. The licensee informed the inspector that an audit, had identified rebar spacing problems at elevations 642' - 7" to 652' - 9" of Unit 2 containment. This item was subsequently reported per 10 CFR 50.55(e) and was identified as a item of noncompliance in report Nos. 50-329/74-11 and 50-330/74-11.

Additional rebar deviations and omissions were identified in March and August 1975 and in April, May and June 1976. Inspection report Nos. 50-329/76-04 and 50-330/76-04 identified five noncompliance items regarding reinforcement steel deficiencies.

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Licensee response dated June 18, 1976, listed 21 separate items (commitments) for corrective action. A June 24, 1976 letter provided a plan of action schedule for implementing the 21 items. The licensee committed not to resume concrete placement work until the items addressed in licensee's June 24 letter were resolved or implemented. This commitment was documented in a RIII letter to the licensee dated June 25, 1976. Although not stamped as an IAL, in-house memos referred to it as such.

Rebar installation and concrete placement activities were resumed in early July 1976, following completion of the items and verification by RIII.

Additional action taken is as follows:

a. By the NRC

(1) Assignment of an inspector full-time on site for five weeks to observe civil work in progress

(2) IE management meetings with the licensee at their corporate offices

(3) Inspection and evaluation by Headquarter personnel

b. By the Licensee

(1) June 18, 1976 letter committing to 21 items of corrective action

(2) Establishment of an overview inspection program to provide 100% reinspection of embedments by the licensee following acceptance by the contractor QC personnel

c. By the Contractor

(1) Personnel changes and retraining of personnel

(2) Prepared technical evaluation for acceptability of each identified construction deficiency

(3) Improvement in their QA/QC program coverage of civil work (this was imposed by the licensee)

3. Tendon Sheath Placement Errors and Resulting Immediate Action Letter (IAL)

On April 19, 1977, the licensee reported, as a Part 50, Section 50.55(e) item, the inadvertent omission of two hoop tendon sheaths from a Unit 1 containment concrete placement at

elevation 703' - 7". The tendon sheaths were, for the most part, located at an elevation in the next higher concrete placement lift, except that they were diverted to the lower placement lift to pass under a steam line penetration and it was where they were omitted. Failure to rely on the proper source documents by construction and inspection personnel, contributed to the omission.

An IAL was issued to the licensee on April 29, 1977, which spelled out six licensee commitments for correction which included: (1) repairs and cause corrective action; (2) expansion of the licensee's QC over view program; (3) revisions to procedures and training of construction and inspection personnel.

A special QA program inspection was conducted in early May 1977. The inspection team was made up of personnel from RI, RIII, and HQ. Although five items of noncompliance were identified, it was the concensous of the inspectors that the licensee's program was an acceptable program and that the Midland construction activities were comparable to most other construction projects.

The licensee issued its final report on August 12, 1977. Final review on site was conducted and documented in report No. 50-329/77-08.

Current Problems

1. Plant Fill - Diesel Generator Building Settlement

The licensee informed the RIII office on September 8, 1978, of per requirements of 10 CFR 50.55(e) that settlement of the diesel generator foundations and structures were greater than expected.

Fill material in this area was placed between 1975 and 1977, with construction starting on diesel generator building in mid-1977. Filling of the cooling pond began in early 1978 with the spring run-off water. Over the year the water level has increased approximately 21 feet and in turn increasing the site gound water level. It is not known at this time what effect (if any) the higher site ground water level has had on the plan fill and excessive settlement of the Diesel Generator Building. It is interesting to note however, that initially the PSAR indicated an underdrain system would be installed to maintain the ground water at its normal (pre pond) level but that it later was deleted.

The NRC activities, to date, include:

a. Transfer of lead responsibility to NRR from IE by memo dated November 17, 1978

b. Site meeting on December 3-4, 1978, between NRR, IE, Consumers Power and Bechtel to discuss the plant fill problem and proposed corrective action relative to the Diesel Generator Building settlement

c. RIII conducted an investigation/inspection relative to the plant fill and Diesel Generator Building settlement

The Constructor/Designer activities include:

a. Issued NCR-1482 (August 21, 1978)

b. Issued Management Corrective Action Report (MCAR) No. 24 (September 7, 1978)

c. Prepared a proposed corrective action option regarding placement of sand overburden surcharge to accelerate and achieve proper compaction of diesel generator building sub soils

Preliminary review of the results of the RIII investigation/inspection into the plant fill/Diesel Generator Building settlement problem indicate many events occurred between late 1973 and early 1978 which should have alerted Bechtel and the licensee to the pending problem. The events included nonconformance reports, audit findings, field memos to engineering and problems with the administration building fill which caused modification and replacement of the already poured footing and replacement of the fill material with lean concrete.

2. Inspection and Quality Documentation to Establish Acceptability of Equipment

This problem consists of two parts and has just recently been identified by RIII inspectors relative to Midland. The scope and depth of the problem has not been determined.

The first part concerns the adequacy of engineering evaluation of quality documentation (test reports, etc.) to determine if the documentation establishes that the equipment meets specification and environmental requirements. The licensee,

by the Licensee's QA review program

on November 13, 1978, issued a construction deficiency report (10 CFR 50.55(e)) relative to this matter. Whether the report was triggered by RIII inspector inquiries for by IE Circular or Bulletin is not known. An interim report dated November 28, 1978 was received and stated Consumers Power was pursuing this matter not only for Bechtel procured equipment but also for NSS supplied equipment.

The second part of the problem concerns the adequacy of equipment acceptance inspection by Bechtel shop inspectors. Examples of this problem include: (1) Decay Heat Removal Pumps released by the shop inspector and shipped to the site with one pump assembled backwards, (2) electrical penetrations inspected and released by the shop inspector for shipment to the site. Site inspections to date indicate about 25% of the vendor wire terminations were improperly crimped.

Inspection History

The construction inspection program for Midland Units 1 and 2 is approximately 50% complete. This is consistent with status of construction of the two units. (Unit 1 - 52%; Unit 2 - 56%) In terms of required inspection procedures approximately 25 have been completed, 33 are in progress and 36 have not been initiated.

The routine inspection program has not identified an unusual number of enforcement items. Of the selected major events described above, only one is directly attributable to RIII enforcement activity (Cadweld splicing). The other were identified by the licensee and reported through the deficiency report system (50.55(e)). The Midland data for 1976 - 78 is tabulated below.

Year	Number of Noncompliances	Number of Inspections	Inspector Hours On Site
1976	14	9	646
1977	5	12	648
1978	11	18	706

A resident inspector was assigned to the Midland site in July 1978. The on site inspection hours shown above does not include his inspection time.

The licensee's QA program has repeatedly been subject to in-depth review by IE inspectors. Included are:

1. July 23-26 and August 8-10, 1973, inspection report Nos. 50-329/73-06 and 50-330/73-06: A detailed review was conducted relative to the implementation of the Consumers Power Company's QA manual and Bechtel Corporation's QA program for design activities at the Bechtel Ann Arbor office. The identified concerns were reported as discrepancies relative to the Part 50, Appendix B, criteria requirements.

2. September 10-11, 1973, report Nos. 50-329/73-08 and 50-330/73-08: A detailed review of the Bechtel Power Corporation QA program for Midland was performed. Noncompliances involving three separate Appendix B criteria with five different examples, were identified.

3. February 6-7, 1974, reports No. 50-329/74-03 and 50-330/74-03: A followup inspection at the licensee's corporate office, relative to the items identified during the September 1973 inspection (above) along with other followup.

4. June 16-17, 1975, report Nos. 50-329/75-05 and 50-330/75-05: Special inspection conducted at the licensee's corporate office to review the new corporate QA program manual.

5. August 9 through September 9, 1976, report Nos. 50-329/76-08 and 50-330/76-08: Special five-week inspection regarding QA program implementation on site primarily for rebar installation and other civil engineering work.

6. May 24-27, 1977, report Nos. 50-329/77-05 and 50-330/77-08: Special inspection conducted at the site by RIII, IE and RI personnel to examine the QA program implementation on site by Consumers Power Company and by Bechtel Corporation. Although five examples of noncompliance to Appendix B, Criterion V, were identified, the consensus of the inspectors involved was that the program and its implementation for Midland was considered to be adequate.

Although the licensee's Quality Assurance program has under gone a number of revisions to strengthen its provisions, no current concern exist regarding its adequacy. Their Topical QA Plan has been reviewed and accepted by NRR through revision 7. Implementation of the program has been and continues to be subject to further review with the mid-construction program review presently scheduled for March or April 1979.

Consumers Power Company expanded their QA/QC auditing and surveillance coverage to provide extensive overview inspection coverage. This began in 1975 with a commitment early in their experience with rebar installation problems and was further committed by the licensee in his letter of June 18, 1976, responding to report Nos. 50-329/76-04 and 50-330/76-04. This overview inspection activity by the licensee has been very effective as a supplement to the constructor's own program. Currently, this program is functioning across all significant activities at the site.

Enfotcement History

Approximately 6 months after restart of construction activities (11 months after CP issuance) an inspection identified four noncompliance items regarding cadwelding activities. This resulted in a show cause order being issued on December 3, 1973. This enforcement action was aired publicly during hearings held by the Atomic Safety Licensing Board in May 1974. The hearing board issued its decision in September 1974

that concluded that construction could proceed with adequate assurance of quality.

Identification of reinforcing bar problems began in December of 1974 with the licensee reporting improper spacing of rebar in the Unit 2 containment wall. Further reinforcing bar spacing and/or omission of rebar was identified in August 1975 and again in May 1976 with the citations of 5 noncompliances in an inspection report. An IE:HQ notice of violation was issued regarding the citations in addition to the licensee issuing a stop work order. The licensee issued a response letter dated June 18, 1976 committing to 21 items of corrective action. A Bechtel prepared technical assessment for each instance of rebar deficiency was submitted to and review by IE:HQ who concluded that the structures involved will satisfy the SAR criteria and that the function of these structures will be maintained during all design conditions. The RIII office of NRC performed a special five week inspection to assess the corrective action implementation without further citation.

The licensee reported that two hoop tendon sheaths were omitted in concrete placements of Unit 2 containment wall in April 1977. An Immediate Action Letter was issued to the licensee on April 29, 1977 listing six items of licensee commitments to be completed. A special inspection was performed on May 24-27, 1977 with four NRC inspectors (1-HQ, 1-RI, and 2-RIII). Although five items of noncompliance were identified, it was the consensus of the inspectors that the QA/QC program in effect was adequate. The constructors nonconformance report provided an alternate method of installation for the tendon sheaths that was accepted.

The RIII office of inspection and enforcement instituted an augmented on site inspection coverage program during 1974, this program has continued in effect ever since and is still in effect. It is noted that the noncompliance history with this program is essentially the same as the history of other RIII facilities with a comparable status of construction. Further on site inspection augmentations was accomplished with the assignment of a full time resident inspector in August, 1978.

The noncompliance history for the Midland Project is provided in the following table.

ENFORCEMENT ACTIONS

Noncompliances

	Criteria (10 CFR 50 Appendix B) ( ) Number of Occurrances
	V, X, XI, XVI
	Construction haulted pending CP
II	V(5) XIII, XV, XVII
	V(2) XVI
	V(4) X, XII, XV, XVI, XVII, XVIII
	V(5) 10 CFR 50.55(e) item
	V(4) VI(2), VII, IX(3), XVI

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ENFORCEMENT ACTIONS

Noncompliances

Year	# Total	Criteria (10 CFR 50 Appendix B) ( ) Number of Occurrances
1970	4	V, X, XI, XVI
1971-1972	0	Construction haulted pending CP
1973	9	II V(5) XIII, XV, XVII
1974	3	V(2) XVI
1975	0	
1976	10	V(4) X, XII, XV, XVI, XVII, XVIII
1977	5	V(5) 10 CFR 50.55(e) item
1978	11	V(4) VI(2), VII, IX(3), XVI

Criteria

II	QA Program
V	Instructions Procedures Drawing Control Work
VI	Document Control
VII	Control of Purchased Material
IX	Control of Special Processes
X	Inspection
XII	Control Measuring - Test Equipment
XIII	Handling - Storage
XV	Nonconforming Parts
XVI	Corrective Actions
XVII	QA Records
XVIII	Audits

Summary and Conclusions

Since the start of construction Midland has experienced some significant problems resulting in enforcement action. In evaluating these problems they have occurred in clumps: (1) in September 1970 relative to improper placement, sampling and testing of concrete and failure of QA/QC to act on identified deficiencies; (2) in September 1973 relative to drawing control and lack of or inadequate procedures for control of design and procurement activities at the Bechtel Engineering offices: (3) in November 1973 relative to inadequate training, procedures and inspection of cadweld activities; (4) in April, May and June 1976 resulting from a series of RIII in-depth QA inspections and meetings to identify underlying causes of weakness in the Midland QA program implementation relative to embedments. (The noncompliance items identified involved inadequate quality inspection, corrective action, procedures and documentation, all primarily concerned with installation of reinforcement steel); (5) in April 1977 relative to tendon sheath omissions; and (6) in August 1978 concerning plant soil foundations and excessive settlement of the Diesel Generator Building.

Following each of these problem periods (excluding the last which is still under investigation), the licensee has been responsive and has taken extensive action to evaluate and correct the problem and to upgrade his QA program and QA/QC staff. The most effective of these licensee actions has been an overview program which has been steadly expanded to cover almost all safety related activities.

The evaluation both by the licensee and IE of the structures and equipment affected by these problems (again except the last) has established that they fully meet design requirements.

Since 1974 these problems have either been identified by the licensee's quality program or provided direction to our inspectors.

Looking at the underlying causes of these problems two common threads emerge: (1) Consumers Power historically has tended to over rely on Bechtel, and (2) insensitivity on the part of both Bechtel and Consumers Power to recognize the significance of isolated events or failure to adequately evaluate possible generic application of these events either of which would have led to early identification and avoidance of the problem including the last on plant fill and diesel generator building settlement.

Notwithstanding the above, it is our conclusion that the problems experienced are not indicative of a broadbreakdown in the overall quality assurance program. Admittedly, deficiencies have occurred which should have been identified earlier by quality control personnel, but the licensee's program has been effective in the ultimate identification and subsequent correction of these deficiencies. While we cannot dismiss the possibility that problems may have gone undetected by the licensee's overall quality assurance program, our inspection program has not identified significant problems overlooked by the licensee --- and this inspection effort has utilized many different inspectors.

The RIII project inspectors believe that continuation of: (1) resident site coverage, (2) the licensee overview program including its recent expansion into engineering design/review activities, and (3) a continuing inspection program by regional inspectors will provide adequate assurance that construction will be performed in accordance with requirements and that any significant errors and deficiencies will be identified and corrected.

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

EXHIBIT
CPCo 4
11-15-80 MJ

October 18, 1979

MEMORANDUM FOR:

R. C. Knop	R. Cook
D. W. Hayes	T. Vandel
D. H. Danielson	F. Jablonski
K. Naidu	E. Lee
G. Maxwell	G. Gallagher
W. Hansen	K. Ward
P. Barrett	I. Yin

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

SUBJECT: MIDLAND CONSTRUCTION STATUS REPORT AS OF OCTOBER 1, 1979

The attached report was finalized based on your feedback requested in my memo of October 5, 1979. If you still feel adjustments are necessary please contact me. If you consider the report characterizes your current assessment of the Midland project, please concur and pass it along promptly.

G. Fiorelli

G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Enclosure: As stated

cc: J. G. Keppler

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MIDLAND SUMMARY REPORT UPDATE

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5/24/77	Special inspection by RIII, RI and HQ personnel to determine adequacy of QA program implementation at Midland site.
6/75 - 7/77	Series of meetings and letters between CP and NRR on applicability of Regulatory Guides to Midland. Commitments by CP to the guides was responsive.
7/24/78	Construction resident inspection assigned.
8/21/78	Measurements by Bechtel indicate excessive settlement of Diesel Generator Building. Officially reported to RIII on September 7, 1978.
12/78 - 1/79	Special investigation/inspection conducted at Midland sites, Bechtel Ann Arbor Engineering offices and at CP corporate offices relative to Midland plant fill and Diesel Generator building settlement problem.
2/7/79	Corporate meeting between RIII and CPC to discuss project status and future inspection activities. CPC informed construction performance on track with exception of diesel/fill problem.
2/23/79	Meeting held in RIII with Consumers Power to discuss diesel generator building and plant area fill problems.
3/5/79	Meeting held with CPC to discuss diesel generator building and plant area fill problems.
3/21/79	10 CFR 50.54 request for information regarding plant fill sent to CPC by NRR.
5/5/79	Congressman Albosta and aides visited Midland site to discuss TMI effect on Midland.
5/8-11/79	Mid-QA inspection conducted.

Significant Major Events

Past Problems

1. Cadweld Splicing Problem and Show Cause Order

A routine inspection, conducted on November 6-8, 1973, as a result of intervenor information, identified eleven examples of four noncompliance items relative to rebar Cadwelding operations. These items were summarized as: (1) untrained Cadweld inspectors; (2) rejectable Cadwelds accepted by QC inspectors; (3) records inadequate to establish cadwelds met requirements; and (4) inadequate procedures.

As a result, the licensee stopped work on cadweld operations on November 9, 1973 which in turn stopped rebar installation and concrete placement work. The licensee agreed not to resume work until the NRC reviewed and accepted their corrective action. However, Show Cause Order was issued on December 3, 1973, suspending Cadwelding operations. On December 6-7, 1973, RIII and HQ personnel conducted a special inspection and determined that construction activity could be resumed in a manner consistent with quality criteria. The Show Cause Order was modified on December 17, 1973, allowing resumption of Cadwelding operations based on the inspection results.

The licensee answered the Show Cause Order on December 29, 1973, committing to revise and improve the QA manuals and procedures and make QA/QC personnel changes.

Prehearing conferences were held on March 28 and May 30, 1974, and the hearing began on July 16, 1974. On September 25, 1974, the Hearing Board found that the licensee was implementing its QA program in compliance with regulations and that construction should not be stopped.

2. Rebar Omission/Placements Errors Leading to IAL

Initial identification and report of rebar nonconformances occurred during an NRC inspection conducted on December 11-13, 1974. The licensee informed the inspector that an audit, had identified rebar spacing problems at elevations 642' - 7" to 652' - 9" of Unit 2 containment. This item was subsequently reported per 10 CFR 50.55(e) and was identified as a item of noncompliance in reports Nos. 50-329/74-11 and 50-330/74-11.

Additional rebar deviations and omissions were identified in March and August 1975 and in April, May and June 1976. Inspection report Nos. 50-329/76-04 and 50-330/76-04 identified five noncompliance items regarding reinforcement steel deficiencies.

Licensee response dated June 18, 1976, listed 21 separate items (commitments) for corrective action. A June 24, 1976 letter provided a plan of action schedule for implementing the 21 items. The licensee suspended concrete placement work until the items addressed in licensee's June 24 letter were resolved or implemented. This commitment was documented in a RIII letter to the licensee dated June 25, 1976. Although not stamped as an IAL, in-house memos referred to it as such.

Rebar installation and concrete placement activities were satisfactorily resumed in early July 1976, following completion of the items and verification by RIII.

Additional action taken is as follows:

a. By the NRC

(1) Assignment of an inspector full-time onsite for five weeks to observe civil work in progress.

(2) IE management meetings with the licensee at their corporate offices

(3) Inspection and evaluation by Headquarters personnel

b. By the Licensee

(1) June 18, 1976 letter committing to 21 items of corrective action.

(2) Establishment of an overview inspection program to provide 100% reinspection of embedments by the licensee following acceptance by the contractor QC personnel.

c. By the Contractor

(1) Personnel changes and retraining of personnel.

(2) Prepared technical evaluation for acceptability of each identified construction deficiency.

(3) Improvement in their QA/QC program coverage of civil work (this was imposed by the licensee).

3. Tendon Sheath Placement Errors and Resulting Immediate Action Letter (IAL)

On April 19, 1977, the licensee reported, as a Part 50, Section 50.55(e) item, the inadvertent omission of two hoop tendon sheaths

from a Unit 1 containment concrete placement at elevation 703' - 7" due to having already poured concrete in an area where the tendons were to be directed under a steam line. The tendons were subsequently rerouted in the next higher concrete lift.

An IAL was issued to the licensee on April 29, 1977, which spelled out six licensee commitments for correction which included: (1) repairs and cause corrective action; (2) expansion of the licensee's QC overview program; (3) revisions to procedures and training of construction and inspection personnel.

A special QA program inspection was conducted in early May 1977. The inspection team was made up of personnel from RI, RIII and HQ. Although five items of noncompliance were identified, it was the concensus of the inspectors that the licensee's program was an acceptable program.

The licensee issued it's final report on August 12, 1977. Final review onsite was conducted and documented in report No. 50-329/77-08.

Current Problems

1. The licensee informed the RIII office on September 8, 1978, per requirements of 10 CFR 50.55(e) that settlement of the diesel generator foundations and structures were greater than expected.

   Fill material in this area was placed between 1975 and 1977, with construction starting on the diesel generator building in mid-1977. Review of the results of the RIII investigation/inspection into the plant fill/Diesel Generator Building settlement problem indicate many events occurred between late 1973 and early 1978 which should have alerted Bechtel and the licensee to the pending problem. These events included nonconformance reports, audit findings, field memos to engineering and problems with the administration building fill which caused modification and replacement of the already poured footing and replacement of the fill material with lean concrete.

   Causes of the excessive settlement include: (1) inadequate placement method - unqualified compaction equipment and excessive lift thickness; (2) inadequate testing of the soil material; (3) inadequate QC inspection procedures; (4) unqualified quality control inspectors and field engineers; (5) over reliance on inadequate test results.

The proposed remedial work and corrective action are as follows:

(1) Diesel Generator Building - apply surcharge load in and around building to preconsolidate the foundation material. Continue to monitor soil response to predict long-term settlement.

(2) Service Water Pump Structure - Install piles to hard glacial till to support that portion of the structure founded on plant fill material.

(3) Tank Farm - Fill has been determined to be suitable for the support of Borated Water Storage Tanks. Tanks are to be constructed and hydro tested while monitoring soil response to confirm support of structures.

(4) Diesel Oil Tanks - No remedial measure; backfill is considered adequate.

(5) Underground Facilities - No remedial work is anticipated with regards to buried piping.

(6) Auxiliary Building and F. W. Isolation Valve Pits - Installed a number of caissons to glacial till material and replace soil material with concrete material under valve pits.

(7) Dewatering System - Installed site dewatering system to provide assurance against soil liquidification during a seismic event.

The above remedial measures were proposed to the NRC staff on July 18, 1979. No endorsement of the proposed actions have been issued to the licensee to date. The licensee is proceeding with the above plans.

The NRC activities, to date, include:

a. Lead technical responsibility and program review was transferred to NRR from IE by memo dated November 17, 1978.

b. Site meeting on December 3-4, 1978, between NRR, IE, Consumers Power and Bechtel to discuss the plant fill problem and proposed corrective action related to the Diesel Generator Building settlement.

c. RIII conducted an investigation/inspection relative to the plant fill and Diesel Generator Building settlement. Findings are contained in Report 50-329/78-20; 330/78-20 dated March 1979.

d. NRC/Consumers Power Company/Bechtel meetings held in RIII office to discuss finding of investigation/inspection of site settlement (February 23, 1979 and March 5, 1979).

e. NRC issue of 10 CFR 50.54(f) regarding plant fill dated March 21, 1979.

f. Several inspections of Midland site settlement have been performed.

The Constructor/Designer activities include:

a. Issued NCR-1482 (August 21, 1978)

b. Issued Management Corrective Action Report (MCAR) No. 24 (September 7, 1978)

c. Prepared a proposed corrective action option regarding placement of sand overburden surcharge to accelerate and achieve proper compaction of diesel generator building sub-soils.

d. Issued 10 CFR 50.55(e) interim report number 1 dated September 29, 1978.

e. Issued interim report No. 2 dated November 7, 1978.

f. Issued interim report No. 3 dated June 5, 1979.

g. Issued interim report No. 4 dated February 23, 1979

h. Issued interim report No. 5 dated April 30, 1979

i. Responded to NRC 10 CFR 50.54(f) request for information onsite settlement dated April 24, 1979. Subsequent revision 1 dated May 31, 1979, revision 2 dated July 9, 1979 and revision 3 dated September 13, 1979.

j. Meeting with NRC to discuss site settlement causes and proposed resolution and corrective action taken dated July 18, 1979. Information discussed at this meeting is documented in letter from CPCo to NRC dated August 10, 1979.

k. Issued interim report No. 6 dated August 10, 1979

l. Issued interim report No. 7 dated September 5, 1979

2. Review of Quality Documentation to Establish Acceptability of Equipment

The adequacy of engineering evaluation of quality documentation (test reports, etc.) to determine if the documentation establishes that the equipment meets specification and environmental requirements is of concern. The licensee, on November 13, 1978, issued a construction deficiency report (10 CFR 50.55(e)) relative to this matter. An interim report dated November 18, 1978 was received

and stated Consumers Power was pursuing this matter not only for Bechtel procured equipment but also for NSS supplied equipment.

3. Source Inspection to Confirm Conformance to Specifications

The adequacy of equipment acceptance inspection by Bechtel shop inspectors has been the subject of several noncompliance/nonconformance reports. Consumers Power has put heavy reliance on the creditability of the Bechtel vendor inspection program to insure that only quality equipment has been sent to the site. However, the referenced nonconformance reports raise questions that the Bechtel vendor inspection program may not be effectively working in all disciplines for supplied equipment. Some significant examples are as follows:

(1) Decay heat removal pump being received with inadequate radiography. The pumps were returned to the vendor for re-radiography and repair. The pumps were returned to the site with one pump assembled backwards. This pump was again shipped to the vendor for reassembly. CPCo witnessed a portion of this reassembly and noted in their audit that some questionable techniques for establishing reference geometry were employed by the vendor. The pumps had been shop inspected by Bechtel.

(2) Containment personnel air lock hatches were received and installed with vendor supplied structural weld geometry which does not agree with manufacturing drawings. The personnel air lock doors had been vendor inspected.

(3) Containment electrical penetrations were received and installed with approximately 25% of the vendor installed terminations showing blatant signs of inadequate crimping. These penetrations were shop inspected by 3 or 4 Bechtel supplier quality representatives (vendor inspectors).

(4) 350 MCM, 3 phase power cable was received and installed in some safety related circuits with water being emitted from one phase.

(5) A primary coolant pump casing was received and installed without all the threads in one casing stud hole being intact. The casings were vendor inspected by both Bechtel and B&W.

Additional IE inspections will be conducted to determine if CP has thoroughly completed an overview of the Bechtel shop inspector's function and that equipment already purchased has been reviewed to confirm it meets requirements.

4. "Q" List Equipment

There have been instances wherein safety related construction components and their installation activities have not ~~been~~ identified on the "Q" list.

This shortcoming could have affected the quality of work performed during fabrication due to the absence of quality controls identified with "Q" list items. Examples of non-"Q" list activities identified which should be "Q" listed include:

Cable Trays
Components of Heating and Ventilation System

The licensee will be advised to review past as well as future construction activities to confirm that they were properly defined as "Q" list work or components.

5. Management Controls

a. Throughout the construction period CPCo has identified some of the problems that have occurred and reported them under the requirements of 10 CFR 50.55(e). Management has demonstrated an openness by promptly identifying these problems. However, CPCo has on repeated occasions not reviewed problems to the depth required for full and timely resolution. Examples are:

Rebar omissions (1974)
Tendon sheath location error (1977)
Diesel generator building settlement (1978)
Containment personnel access hatches (1978)

In each of the cases listed above the NRC in it's investigation has determined that the problem was of greater significance than first reported or the problem was more generic than identified by CPCo.

This incomplete wringing out of problems identified has been discussed with CPCo on numerous occasions in connection with CPCo's management of the Midland project.

b. There have been many cases wherein nonconformances have been identified, reviewed and accepted "as is." The extent of review given by the licensee prior to resolving problems is currently in progress. In one case dealing with the repair of airlock hatches, a determination was made that an incomplete engineering review was given the matter.

Inspection History

The construction inspection program for Midland Units 1 and 2 is approximately 60% complete. This is consistent with status of construction of the two units. (Unit 1 - 54%; Unit 2 - 61%). The licensee's QA program has repeatedly been subject to in-depth review by IE inspectors. The following highlight these inspections.

1. July 23-26 and August 8-10, 1973, inspection report Nos. 50-329/73-06 and 50-330/73-06: A detailed review was conducted relative to the implementation of the Consumers Power Company's QA manual and Bechtel Corporation's QA program for design activities at the Bechtel Ann Arbor office. The identified concerns were reported as discrepancies relative to the Part 50, Appendix B, criteria requirements.

2. September 10-11, 1973 report Nos. 50-329/73-08 and 50-330/73-08: A detailed review of the Bechtel Power Corporation QA program for Midland was performed. Noncompliances involving three separate Appendix B criteria with five different examples, were identified.

3. February 6-7, 1974, report Nos. 50-329/74-03 and 50-330/74-03: A followup inspection at the licensee's corporate office, relative to the items identified during the September 1973 inspection (above) along with other followup.

4. June 16-17, 1975, report Nos. 50-329/75-05 and 50-330/75-05: Special inspection conducted at the licensee's corporate office to review the new corporate QA program manual.

5. August 9 through September 9, 1976, report Nos. 50-329/76-08 and 50-330/76-08: Special five-week inspection regarding QA program implementation onsite primarily for rebar installation and other civil engineering work.

6. May 24-27, 1977, report Nos. 50-329/77-05 and 50-330/77-08: Special inspection conducted at the site by RIII, IE AND RI personnel to examine the QA program implementation onsite by Consumers Power Company and by Bechtel Corporation. Although five examples of noncompliance to Appendix B, Criterion V, were identified, the consensus of the inspectors involved was that the program and its implementation for Midland was considered to be adequate.

7. May 8-11, 1979, a mid-construction QA inspection covering purchase control and inspection of received materials design control and site auditing and surveillance activities was conducted by a team of inspectors. While some items will require resolution, it was concluded the program was adequate.

The licensee's Quality Assurance program has undergone a number of revisions to strengthen it's provisions. The company has expanded it's QA/QC auditing and surveillance coverage to provide extensive overview inspection coverage. This was done in 1975 with a commitment early in their experience with rebar installation problems and was further committed by the licensee in his letter of June 18, 1976, responding to report Nos. 50-329/76-04 and 50-330/76-04. This overview inspection activity by the licensee has been a positive supplement to the constructor's own program, however, currently our inspectors perceive the overview activities cover a small pe centage of the work in some disciplines. This has been brought to the licensee's attention who has responded with a revised overview plan. RIII inspectors are reviewing the plan as well as determining it's effectiveness through observation of construction work. A specific area brought to the attention of the licensee was the lack of overview in the instrumentation installation area. The licensee has responded to this matter with increased staff and this item is under review by RIII inspectors.

The RIII office of inspection and enforcement instituted an augmented onsite inspection coverage program during 1974, this program has continued in effect until the installation of the resident inspector in July 1978.

Enforcement History

a. Noncompliance Statistics

Year	Number of Noncompliances	Number of Inspections	Inspector Hours Onsite
1976	14	9	646
1977	5	12	648
1978	18	23	1180
*1979 to date	7	18	429

A resident inspector was assigned to the Midland site in July 1978. The onsite inspection hours shown above does not include his inspection time.

*Through August 1979

b. An investigation of the current soils placement/diesel generator building settlement problem has revealed the existence of a material false statement. Issuance of a Civil Penalty is currently being contemplated.

Summary and Conclusions

Since the start of construction Midland has experienced some significant problems resulting in enforcement action. These actions are related (1) to improper placement, sampling and testing of concrete and failure of QA/QC to act on identified deficiencies in September 1970; (2) to drawing control and lack of or inadequate procedures for control of design and procurement activities at the Bechtel Engineering offices in September 1973; (3) to inadequate training, procedures and inspection of cadweld activities in November 1973; (4) to a series of RIII in-depth QA inspections and meetings which identified underlying causes of weakness in the Midland QA program implementation relative to embedments in April, May and June 1976. (The noncompliance items identified involved inadequate quality inspection, corrective action, procedures and documentation, all primarily concerned with installation of reinforcement steel); (5) to tendon sheath omissions in April 1977; and (6) to plant soil foundations and excessive settlement of the Diesel Generator Building relative to inadequate compacted soil and inspection activities in August 1978 through 1979.

Following each of these problem periods, the licensee has taken action to correct the problems and to upgrade his QA program and QA/QC staff. The most prominent action has been an overview program which has been steadly expanded to cover safety related activities.

The evaluation both by the licensee and IE of the structures and equipment affected by these problems (again except the last) has established that they fully meet design requirements.

Looking at the underlying causes of these problems two common threads emerge: (1) utilities historically have tended to over rely on A-E's (in this case, Bechtel) and (2) insensitivity on the part of both Bechtel and Consumers Power to recognize the significance of isolated events or failure to adequately evaluate possible generic application of these events either of which would have led to early identification and avoidance of the problem.

Admittedly construction deficiencies have occurred which should have been identified earlier but the licensee's QA program has ultimately identified and subsequently, corrected or in process of correcting these deficienc

The RIII inspectors believe that continuation of (1) resident site coverage, (2) the licensee overview program, (3) the licensee's attention and resolution of identified problems in this report, (4) ceasing to permit work to continue when quality related problems are identified with construction activities and (5) a continuing inspection program by regional inspectors will provide adequate assurance that construction will be performed in accordance with requirements and that any significant errors and deficiencies will be identified and corrected.

Gallagher

EXHIBIT
CPCo 5
11-15-79 MP

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

OCT 1 1979

Docket No. 50-329
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 inspection conducted by Mr. E. J. Gallagher of this office on September 11-14, 1979, of activities at the Midland Nuclear Power Plant construction site authorized by NRC Construction Permits No. CPPR-81 and No. CPPR-82 and to the discussion of our findings with Mr. B. J. Marguglio and others of your staff, and others of the Midland site staff at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

During this inspection, certain of your activities appeared to be in noncompliance with NRC requirements, as described in the enclosed Appendix A.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office within thirty days of your receipt of this notice a written statement or explanation in reply, including for each item of noncompliance: (1) corrective action taken and the results achieved; (2) corrective action to be taken to avoid further noncompliance; and (3) the date when full compliance will be achieved.

Based on our telephone discussion with you on September 21, 1979, it is our understanding that the personnel performing inspections of the prestressing system whose qualifications we consider do not meet the provisions of Regulatory Guide 1.58 and ANSI N45.2.6 have been relieved from such duties until further evaluation of the requirements and further discussion with the Region III office. Please include in your response your plans to reconfirm the qualifications of other personnel performing quality control inspections on the Midland project.

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In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter, the enclosures, and your response to this letter will be placed in the NRC's Public Document Room, except as follows. If the enclosures contain information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

Gaston Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Enclosures:
1. Appendix A, Notice of Violation
2. IE Inspection Reports No. 50-329/79-19 and No. 50-330/79-19

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

RIII	RIII	RIII	RIII	RIII
Gallagher/bk	Hayes	Fiorelli	Cook	Vandel
9/24/79				

Appendix A

NOTICE OF VIOLATION

Consumers Power Company

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

Based on the results of an NRC inspection conducted on September 11-14, 1979, it appears that certain of your activities were not conducted in full compliance with NRC requirements as noted below. These items are infractions.

1. 10 CFR 50, Appendix B, Criterion III requires, in part, that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

   CPCO Quality Assurance Program Policy No. 3 states, in part, that "the assigned lead design group or organization assures that the design and material are suitable and that they comply with design criteria and regulatory requirements."

   Closed 80-04

   Contrary to the above, Specification C-211, sections 8.1.2 and 8.2.4 permits the use of lean concrete as a substitute of safety-related structural backfill and compacted sand material while stating that "lean concrete shall be made of non-Q material and workmanship". This permits the use and installation of non-Q (non-safety related) material in safety-related areas without benefit of the licensee's quality assurance program. Non-Q (non-quality) lean concrete has been used in various areas of the plant fill including observed areas in the safety-related tank farm area.

2. 10 CFR 50, Appendix B, Criterion II requires, in part, that the quality assurance program provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained.

   CPCO Quality Assurance Program Policy No. 2 complies with the requirements of Regulatory Guide 1.58 and ANSI N45.2.6, "Qualification of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants". In addition, the licensee's contractor, Bechtel Power Corporation, procedure G-8.1, section 5.2, requires specific education and experience requirements to be satisfied to be considered for certification as a Level I inspector. Those requirements include: Two years related experience or high school graduate plus one year related experience or college level work leading to associates degree in related discipline plus six months of related experience

in equivalent testing, examination or inspection activities associated with power plants, heavy industrial facilities or other similar facilities.

Contrary to the above, five QC inspection personnel performing measurings, tests and examination of the containment prestressing system were not qualified in accordance with the above prerequisites in that they had no prior related education nor prior related work experience in equivalent testing or inspection activities.

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-329/79-19; 50-330/79-19

Docket No. 50-329; 50-330 License No. CPPR-81; CPPR-82

Licensee: Comsumer Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Power Plant, Units 1 and 2

Inspection At: Midland Site, Midland, Michigan

Inspection Conducted: September 11-14, 1979

Inspector: E. J. Gallagher E J Gallagher 9/25/79

Approved By: D. W. Hayes, Chief D W Hayes 9/25/79
Engineering Support Section 1

Inspection Summary

Inspection on September 11-14, 1979 (Report No. 50-329/79-19; 50-330/79-19)
Areas Inspected: Containment prestressing system work procedures, work activities and quality records (units 1 and 2); QC inspector qualifications; status of soils work activities and 50.55(e) reports relative to containment prestressing system and concrete expansion anchors. The inspection involved a total of 27 inspector-hours by one NRC inspector.
Results: Three areas were inspected. Two items of noncompliance were identified in the areas inspected. (Infraction - inadequate design control - Paragraph 2.a; Infraction - inadequate QC personnel qualifications - Paragraph 1.c).

DETAILS

Persons Contacted

Principal Licensee Employees (CPCO)

*B. W. Marguglio, Director Quality Assurance
*D. M. Miller, Site Manager
*T. C. Cooke, Project Superintendent
*G. T. Black, Quality Assurance Engineer
*R. Wheeler, Staff Engineer
*J. L. Corley, Section Head - IE & TV
*D. Horn, Civil QA Supervisor

Bechtel Power Company

*J. A. Rutgers, Project Manager
*W. L. Barclay, Project Quality Control Engineer
*A. J. Boos, Project Field Engineer
*W. J. Creel, Quality Assurance Engineer
*L. A. Breisback, Project Quality Assurance Engineer

*Denotes those in attendance at exit meeting.

Licensee Action on Previously Identified Items

(Closed) Noncompliance (329/79-10-01; 330/79-10-01): Inadequate control of design interfaces; (a) Specification C-2 specified material for prestressing system sheathing to conform to ASTM A-366-66 or 68 while FSAR Section 3.8.1.6.3 required ASTM A-513, type 1, Grade 1010-1020 or A-53 type E or S, Grade B. FSAR Section 3.8.1.6.3 has been revised via amendment 22 to be compatible with specification C-2 requirements. (b) Specification C-49, Section 6.2.2 specified the chemical limitations for prestressing system corrosion protective grease to be a maximum of 5 ppm chlorides, nitrates and sulphides while FSAR table 3.8-25 required 2ppm (chloride), 4ppm (nitrates) and 2ppm (sulphide). Specification C-49 has been revised via change notice 9004 to meet the commitments in the FSAR.

(Open) Unresolved (329/79-10-02; 330/79-10-02): Unavailable quality records relative to performance tests on prestressing system; items 1 and 2 of the unresolved items remains unresolved since the quality records are being researched. Item 3 relative to buttonhead rupture tests quality records were made available and reviewed for tendon V-79, V-77, V-82, V-83 and found acceptable. Items 1 and 2 will be pursued during subsequent inspections.

Functional or Program Areas Inspected

During this inspection the containment prestressing system procedures, work activities, quality records, and inspection and testing personnel qualifications were inspected. In addition, significant construction deficiencies reportable in accordance with 10 CFR 50.55( ) relative to containment prestressing system, concrete expansion anchors for component supports and site soils and settlement were reviewed.

1. Containment Prestressing System (Unit 2)

a. Procedures

The inspector reviewed the following procedures for containment prestressing work activities:

(1) C-2, Revision 12 (May 10, 1979) including FCR C-1986 (revised stressing sequence), FCR C-2046 (calibration of stressing jacks and gauge). INRYCO had approved the changes.

(2) C-2-146-9, Field Installation Manual, including FCR Nos. 2062, 2049, 2048, 2047, 2041, 2042, and 2020.

(3) PQCI-9.10, Inspection of Post-Tensioning System

(4) C-49, Revision 2, Tendon Sheathing Filler Material and FCR 2069 SCN 9003, and SCN 9004.

The inspector indicated to the licensee at the exit meeting that PQCI-9.10 had not been revised to the revised requirements of C-2-146-9. The licensee informed the inspector that the changes would be incorporated and that the QC inspectors are aware of the field changes in effect.

b. Reportable 10 CFR 50.55(e) on Prestressing Tendons

Notification in accordance with 10 CFR 50.55(e) was made by licensee on July 26, 1979 that a number of containment prestressing tendons were fabricated and shipped to the site with indeterminant wire lengths and in violation of the 1/8 inch maximum wire differential. MCAR 33 was issued on July 27, 1979 documenting the deficiency. NCR 2373 was also issued placing the 7 vertical tendons already installed in the Unit 2 containment and 10 horizontals received in storage at the site on hold.

Inspections by the licensee at INRYCO's Melrose Park, Illinois facility and Wiremill facility in Florida were performed to

investigate the cause and which facility is responsible for the fabrication of the deficient tendons. It was determined that the tendons fabricated at the Wiremill facility produced the tendon with differentiated wire due to the following reasons: (1) back tension device was switched off and not operating resulting in varying wire lengths, (2) catcher clamp was found to be damaged due to weld fatigue, and (3) limit switch had excessive travel. These three mechanical deficiencies contributed to the production of differential wires in the tendons fabricated.

A total of 38 tendons have been fabricated at the newly opened Wiremill facility. Tendons traced were as follows:

Seven vericals installed (on-hold)

Ten horizontals on-site in storage (rejected and shipped back to INRYCO)

Seven verticals (on-hold at Wiremill)

Ten horizontals (on-hold at Wiremill)

INRYCO has submitted a salvage procedure for the seven verticals installed in Unit 2. Procedure F-365-9.2 Revision 1, was currently under review and comment which proposes a method to field cut and modify to satisfy requirements.

Bechtel has performed two quality program verification surveys of the INRYCO facilities. Results are documented in QPVS No. 9Q and 10Q. In addition, a Bechtel inspector is stationed at the Wiremill facility to perform continued inspection of the tendon fabrication.

The NRC regional office will review the final 50.55(e) report upon receipt.

c. Qualifications of QC Inspectors for Prestressing Work Activity

During a May 14-17, 1979 inspection (report No. 329/79-10; 330/79-10; page 4) the NRC inspector had indicated to the licensee that none of the Bechtel QC inspectors to be assigned the inspection and testing of the containment prestressing system has any prior related work experience on prestressing systems nor construction of power facilities. At this time no work had begun on the installation of the prestressing system. The inspector, indicated that this matter would be reviewed during followup inspections.

During this inspection the matter of qualification of quality control inspection and testing personnel was once again reviewed.

The personnel qualification and training records of eleven quality control personnel were reviewed and compared to the requirements of Regulatory Guide 1.58 and ANSI N45.2.6. It was concluded that five of the individuals certified as level I inspectors were not qualified in accordance with the above standards as well as Bechtel program requirements contained in PSP-G-8.1, Qualification, Evaluation, Examination, Training and Certification of Construction Quality Control Personnel.

Section 5.2 (Education and Experience Requirements) of G-8.1 requires that one of the following requirements be satisfied in order for an individual to be considered for certification as a level I inspector:

(1) Two years related experience in equivalent testing, examination or inspection activities associated with power plants, heavy industrial facilities or other similar facilities.

(2) High school graduate and one year of related experience in equivalent testing, examination or inspection activities associated with power plants. . .

(3) Completion of college level work leading to an Associate Degree in a related discipline plus six months of related experience in equivalent testing, examination or inspection activities associated with power plants. . .

It is important to note that the above requirements are also included in Regulatory Guide 1.58 and ANSI N45.2.6 and requires education in a related discipline (i.e. technical, engineering, etc.) and prior work experience in a related field of testing, examination or inspection activities (i.e. concrete, soils, prestressing, etc.)

The personnel qualifications of five of the QC inspectors certified as level I indicated no prior related education nor prior related work experience nor prior related construction experience. A summary of the individuals qualifications are contained in Appendix I. These individuals have performed various QC inspections on the Unit 2 containment prestressing system. It is important to note that the remaining six QC inspectors have not had any prior experience with prestressing systems, however, they have had prior construction experience.

Discussions with the licensee's contractor Project Quality Control Engineer (PQCE) indicated that an attempt was made to secure fully qualified personnel through the corporate office. However, that office was unable to supply the requested personnel based on comments by the PQCE.

The licensee's contractor (Bechtel) informed the NRC inspector that Section 5.1.2 of program G-8.1 states, "The education and experience requirements specified below shall not be treated as absolute. These requirements may be altered when other factors provided reasonable assurances to the supervisor responsible for certifying a lower level candidate that the person can competently perform a particular task." The license indicated relaxation of the education and experience requirements was exercised based on the above provisions.

The inspector informed the licensee that while it was fully recognized that the requirements for education and experience are not absolute, the intent of the Regulatory Guide 1.58 and ANSI N45.2.6 was that the individual has prior related education and related experience while perhaps not the exact length of time.

The inspector indicated to the licensee that the liberal interpretation of the requirements were unacceptable and considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion II. (329/79-19-01; 330/79-19-01)

d. Observation of Prestressing System Work Activities (Unit 2)

The inspector observed selected work activities relative to the Unit 2 prestressing system. The following specific items were observed:

(1) Tendon D124 stressing using calibrated Jack No. 1 and Gauge No. 191; Bushing ID MW-303, Beaning Plate GM-257; lock off load and tendon elongation were within predicated range.

(2) Grease tank temperature 152°F; required temperature is 140° to 210°F.

(3) Tendon D-112 stressing; Field Anchor ID MQ-120; Bearing Plate GS-136.

(4) Completed Tendon D-124 and D-312

The above work was observed to be performed according to the prescribed work procedures.

e. Quality Records for Prestressing System (Unit 2)

The following prestressing system qyality records were reviewed:

(1) Nonconformance Reports

NCR-2205 (Open) Lack of acceptance/rejection criteria for rust and bent wires on tendons H13-252 and H13-24.

NCR-2505 (Open) Tendon D-301-2 had 5 wires broken during stressing.

NCR-2372 (Open) Issued 50.55(e) on differential wire lengths.

NCR-2382 (Closed) One wire on shop-end buttonheaded but sent to site - wire repaired.

NCR-2383 (Open) Tendon H21-234 and H21-236 inspected with "E" rust status - unacceptable rust - wires pulled for testing.

The above NCR's will be reviewed when fully dispositioned by the licensee.

(2) Buttonhead Repair Log

This log tracks the buttonheads inspected and indicates the number defective and repaired in order to meet specification requirements on permissible number of buttonheads defective. Tendon V-90 indicated six buttonheads were defective after repairs made. Specification C-2 permits only four. The licensee indicated V-90 is being reviewed and repairs to be recommended by engineering.

(3) Stressing Gauge Dial Comparison

The stressing gauges are compared to a master gauge once daily. If the gauge is determined to be out of calibration the last tendon stressed is completely restressed with a calibrated gauge. The new stressing valves are then compared to the work performed with the uncalibrated gauges and evaluated to determine if other tendons require work.

Tendon D-321, V-28 and D-121 were restressed due to gauges being out-of-calibration.

(4) Field Buttonhead Records - Tendons V2-2, V3-2, V13-2, V14-2 and V54-2 were reviewed and found acceptable.

The inspector indicated to the licensee that the quality for the tendons completed to date have not been completely assembled in order to perform a complete review of each tendon. Various inspection and quality documentation is located in various files without a complete review of an individual package as required by the Field Inspection report.

The licensee indicated the completed tendon package would be assembled and reviewed prior to final acceptance of the work.

2. Review of Site Soils and Settlement

a. Backfilling Procedure

Specification C-211(Q), Revision 7, Structural Backfill, Section 8.1.2 and 8.2.4 permits the use of lean concrete in lieu of structural backfill and sand backfill material. This specification is used for placement of safety-related soils. The above sections state, "Lean concrete shall be made of non-Q (non-safety related) material and workmanship."

The inspector observed lean concrete material placed adjacent to the borated water storage tanks in the tank farm area which is designated as a safety-related "Q" area. The licensee informed the inspector that previously placed lean concrete material in safety-related areas were also designated and placed as non-safety related material.

Closed report 80-04

10 CFR 50, Appendix B, Criteria III requires that appropriate quality standards are specified and that deviations from such standards are controlled. Contrary to the above, materials being used in safety-related structures were specified and permitted to be of non-safety related material and workmanship. The quality assurance program has not provided control over this safety-related work activity.

This is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (329/79-19-02; 330/79-19-02)

b. Placement of Soils

Specification C-211, Section 8.5.1 requires that equipment being used to compact soils be qualified prior to use. Quality control initiated NCR 2492 on August 30, 1979 due to Bechtel

construction use of an unqualified type of handheld compaction equipment ("po-go stick") in safety-related "Q" areas. The Bechtel project field engineer dispositioned the NCR as not being valid while being aware of the specification requirement.

The "po-go stick" was again later used in safety-related areas. Bechtel QA department subsequently issued Stop work report No. 6 for use of such equipment until such time that the nonconformance was resolved.

The licensee has indicated that Bechtel Geotech has directed the field to qualify the equipment as required prior to any further use.

The NRC inspector questioned the licensee why the project field engineer was permitted to disposition the NCR as invalid and again permit the use of the equipment in violation of the requirements. The licensee indicated that the quality management personnel would take appropriate action to preclude such events and that QA acted promptly in issuing the stop work report.

c. Status of Site Settlement

The surcharge load in and around the diesel generator building has been removed as of the end of August, 1979. Soil response to the removal of the surcharge is being monitored. Discussion with the licensee, Bechtel Geotech and DR. Dunnicliff indicated that the soil has rebound approximately 3/16 of an inch; expected rebound is predicted to be on the order of 1/2 inch or less.

Temporary dewatering system in the vicinity of the Unit 1 and 2 valve pits have been installed, however no pumping or drawdown of the ground water had begun at the time of this inspection.

Pile tests are being planned in the vicinity of the service water pumphouse structure. Tests are to begin in early October by Bechtel Consultants.

Excavation of soft-material in the borated water storage tank farm was in progress with placement of sand material inside and around the tank foundations. Sand was being placed using qualified handheld compaction equipment to 85% relative density for support of structures and 80% relative density for areas other than under structures.

3. Review of 50.55(e) on Concrete Expansion Anchors

Specification C-305, Revision 9, Section 6.2.2 requires shell type expansion anchors to be tension tested to the specified loads. In

addition, in-process inspection is required. Because in-process inspection had not always been performed it was requested to randomly select 60 anchors to verify adequacy of past installations.

After testing 32 of the anchors, the results indicated nine failures where the anchor slipped prior to achieving the test load. At this time NCAR 34 was issued on August 21, 2979. Results are documented on NCR-2461 and NCR-2481.

Engineering requested another 100 anchors to be inspected (TWX-5383 dated August 24, 1979) for proper setting and tension tests. The results of the additional tests are documented on QCFM-6560/AI-667 dated September 6, 1979. Visual results indicate 20 acceptable and 82 unacceptable (i.e. not fully set). Twenty-three (23) could be reset. Sixty (60) 3/8 inch anchors were tension tested of which two failed while 37 1/2 inch and five 5/8 inch were tensioned and found acceptable.

The licensee indicated that approximately 900 of the shell type anchors have been installed prior to identifying the deficiency. Because of the above information the licensee reported the deficiency in accordance with the requirements of 10 CFR 50.55(e).

The licensee is continuing to evaluate the results of the testing and what corrective action is required to resolve the deficiency. The final 50.55(e) report will be reviewed upon receipt by the NRC.

Exit Interview

The inspector met with the licensee representatives (denoted under Persons Contacted) on September 14, 1979. The inspector summarized the scope and findings of the inspection. The findings were also discussed via telephone with Mr. B. Marguglio and management of RIII NRC on September 17, 1979. The licensee acknowledged the findings as reported.

Attachment: Appendix I

APPENDIX I

PRESTRESSING SYSTEM QC PERSONNEL QUALIFICATIONS

Individual	Bechtel Employee	Certified Level 1	Related Education	Related Experience	On-Site Training	Areas of Inspection
A	7-12-79	8-6-79	none-high school	none-janitor, cook, IGA	25 hours	Tendon insertion, buttonheading, stressing, greasing (1st shift)
B	7-12-79	8-6-79	none-high school	none-Ramada Inn, printer	23 hours	Tendon insertion, buttonheading, stressing, greasing (1st shift)
C	7-17-79	8-6-79	none-3 year college	none-student last	26 hours	Tendon insertion, buttonheading, stressing, greasing(2nd shift)
D	7-16-79	8-6-79	none-B. A. Business	none-student last	26 hours	Tendon insertion, buttonheading, stressing, greasing (1st shift)
E	7-12-79	8-6-79	none-high school	none-bar tender	28 hours	Terminated on 8-10-79

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

SEP 15 1980

EXHIBIT
CPCo 6
11-18-80 MG

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

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

Gentlemen:

This refers to the inspection conducted by Messrs. E. T. Gallagher and R. B. Landsman of this office on August 27-29, 1980, of activities at the Midland Nuclear Plant, Units 1 and 2, authorized by NRC Construction Permit Nos. CPPR-81 and CPPR-82 and to the discussion of our findings with Mr. J. L. Corely at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

No items of noncompliance with NRC requirements were identified during the course of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

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We will gladly discuss any questions you have concerning this inspection.

Sincerely,

G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Enclosure: IE Inspection
Reports No. 50-329/80-25
and No. 50-330/80-26

cc w/encl:
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan
Public Service Commission
Myron M. Cherry, Chicago

RIII	RIII	RIII	RIII	RIII	RIII	RIII
Gallagher/cw	Hayes	Cook	Sutphin	Knop	Fiorelli	Landsman
9/11/80	9/12/80					9-12-80

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report Nos. 50-329/80-25; 50-330/80-26

Docket Nos. 50-329; 50-330 License Nos. CPPR-81; CPPR-82

Licensee: Consumers Power Company
1945 Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Power Plant, Units 1 and 2

Inspection At: Midland Site, Midland, MI

Inspection Conducted: August 27-29, 1980

Inspectors: E. J. Gallagher D W Hayes/for 9/12/80

R. B. Landsman R B Landsman 9/12/80

Approved By: D. W. Hayes, Chief D W Hayes 9/12/80
Engineering Support Section 1

Inspection Summary

Inspection on August 27-29, 1980 (Report Nos. 50-329/80-25; 50-330/80-26).
Areas Inspected: Containment prestressing system work activities, procedures, and quality records; meeting held on August 29, 1980 regarding Midland soil issues. The inspection involved a total of 40 inspector hours by two NRC inspectors.
Results: No items of noncompliance or deviations were identified in the areas inspected.

8011240330 SPP

DETAILS

Persons Contacted

Principal Licensee Personnel (CPCo)

*J. L. Corley, Site Quality Assurance Superintendent
*D. J. Vokal, Supervisory Engineer, PMO

Bechtel Power Company

*R. Sevo, Quality Assurance Engineer
*E. Smith, Project Field QC Engineer
*P. Corcoran, Resident Ass't. Project Engineer
*J. L. Hoekwater, Resident Civil Engineer
*J. Betts, Field Civil Engineer
*J. E. Russell, Ass'T. Project Field QC Engineer
*P. Van der Veer, Quality Control

NRC Resident

R. Cook

*Denotes those in attendance at the exit meeting held on August 29, 1980.

Licensee Action on Previously Identified Items

(Closed) Unresolved Item (329/80-01-07; 330/80-01-08); Inryco had not included complete calibration records for prestressing system jacks. Inryco has now supplied the required calibration records for Prescon jacks #1 and #3 and Dugdeon jack #'s 8780, 8778, 8783, and 8784. In addition, Bechtel letter LAD-1551 states that the jacks are considered "Q" equipment and records are required to be maintained in permanent QC files. Spec C2-146, Section 12.1 has been revised to specify the jack calibration as "Q" and records reviewed accordingly. This item is considered closed.

(Closed) Unresolved Item (330/80-09-01); Tendon H-21-234 had 2 button-headed wires that had not seated upon restressing. NCR No. 2964 was issued and required the tendon to be removed and replaced. It was verified that tendon H-21-234 had been replaced. This item is considered closed.

(Closed) Unresolved Item (329/80-04-01; 330/80-04-01); Unit 2 prestressing system quality control records were found to be inaccurate in a number of cases where incorrect anchor head identification was noted and incorrect tendon elongation calculated. A review of the completed Unit 2 stressing cards was performed and correction has been completed. This item is considered closed.

Functional or Program Areas Inspected

During this inspection, the containment prestressing system procedures, work activities and quality records were reviewed. In addition, the inspectors attended a public meeting held at Consumers Power Company offices in Midland, MI. The meeting concerned CPCo's appeal the NRC staff's request for additional soil borings in the plant fill and cooling lake dike. The appeal was made to the Director and Assistant Director of Engineering in the office of Nuclear Reactor Regulatory (NRR).

1. Containment Prestressing System

a. Prestressing System Work Activities (Unit 1)

The inspector observed selected work activities relative to the tendon insertion and buttonheading on the Unit 1 containment. The following specific items were observed:

(1) Tendon Insertion: Tendons V-34-1, V-107-1, V-105-1, V-28-1, V-83-1 and V-85-1 were observed being installed. The tendons were in acceptable condition with no signs or corrosion along the tendon lengths.

(2) Tendon Buttonheading - Tendon V-14-1 was observed being buttonheaded in the Unit 1 tendon access tunnel. Bechtel QC inspector was present and was performing 100% buttonhead inspection with calibrated GO-NO-GO gauge, dial indicator, and optical comparator.

Tendon stressing and greasing operations were not in progress during the inspection.

b. Prestressing System Material Records (Unit 1)

Material certification records for Unit 1 vertical tendons observed being installed were reviewed and compared to the material requirements of ASTMA-421 BA wire. The following tendon records were reviewed:

V-84-1 thru V-89
V-80-1 thru V-83-1
V-107-1 thru V-110-1

The material records were found to be in accordance with requirements.

c. Review of Nonconformance Reports (Unit 1)

The following nonconformance reports were reviewed in order to verify adequate resolution of each identified deviation:

NCR NO.	Status
2933	Closed
2974	"
2979	"
2981	"
2984	"
2994	"
3032	"
3035	"
3081	"
3093	"
3100	"

Open nonconformance reports are to be reviewed during a subsequent inspection. The NCR's closed were identified and resolved in an acceptable manner.

d. Stressing Sequence - Inryco drawing C-2-170, Revision 4b was reviewed. It was noted that the stressing sequence has been modified a number of times to accommodate field installation due to availability of tendons. FSAR Section 3.8.1.6.3.2 states, "a detailted sequence of tensioning each tendon is developed by the tendon supplier". The prestressing system supplied at Midland is Inryco. FCR 2412 requrested engineering to revise the stressing sequence. Bechtel letter dated May 19, 1980 requested Inryco concurrence on the change. Inryco responded on July 7, 1980 with acceptance of the revised sequence. In addition, Bechtel had available the supporting documentation in evaluating the revised stressing sequence with reference to the original design guide.

e. Review of Quality Records (Units 1 and 2)

The inspector reviewed the quality records relative to containment prestressing system for Units 1 and 2. The records contained completed inspection report, tendon pulling card, buttonheading card, stressing records and greasing card. The following specific records were reviewed:

(1) Unit 1 - Dome tendons D-301-1 thru D-306-1, D-201-1, D-202-1, D-309-1, D-311-1 and D-312-1.

(2) Unit 2 - Tendons D-212-2, D-209-2, V-74, 75, 82, 78, 79, and 109, V-80, V-85, and V-77.

The above records were complete and in satisfactory condition.

No items of noncompliance were identified in the above areas inspected.

2. Meeting on Soils Issue at CPCo Office

A meeting was held between Consumers Power Company and NRC staff on August 29, 1980 to provide CPCo the opportunity to appeal to the NRC Division Director of Engineering a staff position requiring additional exploration and testing of soils at the Midland plant site. The CPCo consultants provided a statement to the NRC staff which indicated that further soil exploration would not be necessary since the engineering properties of the fill material have been identified since the surcharge in the Diesel generator building area. The NRC staff also made a presentation indicating the reasons for requesting the additional tests. After the two presentations were completed, the NRC Division Director indicated that a final decision would be made after the licensee submitted additional information that had not yet bebeen submitted to the NRC staff for review. This information would be made available by September 15, 1980 at which time a final decision regarding the licensee request not to take any additional soil borings or tests would be made.

Exit Interview

The inspectors met with licensee representatives (denoted in the Persons Contacted paragraph) at various times during their inspection activities. The scope and purpose of the inspections were outlined along with the findings of the inspection. The licensee representatives acknowledged the indicated results.