



Consumers Power Company

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J. Kane
Rec'd. 1/20/84
from V. Head
10/137

Midland, January 19, 1984 -- Consumers Power Company today lifted part of a series of stop work orders that had halted construction at the Midland Nuclear Plant. The action clears the way for remedial soils work to resume at the plant. Work was stopped by the Company on October 22, 1983, by the Midland Project Quality Assurance Department (MPQAD) after the department became concerned about the process being used to make changes to plant drawings.

As a result of the lifting of the stop work order, plant contractors will begin the initial rehire of construction workers as work resumes over the next several days.

A series of stop work orders were imposed by MPQAD after an audit of the project's design documents resulted in concerns over how changes were made to the drawings. Since that time, some 50,000 change documents have been reviewed and analyzed for proper application to plant drawings. The review included potential impact of hardware and plant equipment to ensure it was built to the proper drawings. No significant construction problems were found in the review and the drawing change and review process has been changed to improve the processing of the engineering documents.

Project corrective actions were reviewed by Stone & Webster Engineering Corp., the independent assessment organization at the Midland Plant. The NRC has been informed of the lifting of the stop work order.

The construction workers to be rehired work for the Mergentime Corporation and Spencer, White & Prentis, two firms performing the foundation support work at the plant. Before construction resumes, workers will be retrained and recertified, if necessary, to the specific jobs they are performing at the Midland Nuclear Plant.

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

Kane
Rec'd 10/14/83
12/1/87

OCT 11 1983

MEMORANDUM FOR: D. G. Eisenhut, Director, Division of Licensing, NRR
FROM: R. F. Warnick, Director, Office of Special Cases
SUBJECT: NRC AUXILIARY BUILDING AUDIT

On September 14 and 15, 1983, an NRC team comprised of Messrs. J. Kane and F. Rinaldi of NRR; Mr. R. Landsman of RIII and Consultants S. Poulous and G. Harstead, audited the licensee reanalysis of the Midland Auxiliary Building. This audit was performed at the Bechtel Office in Ann Arbor, Michigan. As a result of the audit, the team identified several design concerns and issues requiring resolution. These are referred to the Office of Nuclear Reactor Regulation for action as appropriate.

- a. The design of the remedial soils slab fix at Elev. 659 (i.e. the eye bars) was performed to ACI 318 and not to ACI 349. The acceptability of the licensee's decision to use ACI 318 in lieu of ACI 349 needs to be evaluated.
- b. In view of the critical nature of the eye bars, the question arose as to the need for some type of monitoring on this fix (i.e. strain gages) due to the anticipated settlement over the life of the plant. Do monitoring requirements need to be imposed?
- c. Because of the anticipated differential settlement expected to occur during the life of the plant, the control tower will be pulling away from the main auxiliary building. Has the mechanical branch determined that equipment between the two buildings can withstand this elongation?
- GES d. The licensee performed an analysis on differential settlement of the buildings that was different from that which the NRC anticipated. The staff expected the differential settlement to be measured between the edge of the main auxiliary building and the edge of the control tower. In reality, the licensee performed an analysis using the center of the main auxiliary building as one point instead of the edge. Thus, for the requested 0.25" differential settlement analysis, the actual value was 0.17", and for the requested 0.50" differential, the actual value was 0.24". Is the licensee's analysis acceptable to NRR?
- GES e. There appears to be a lot of confusion as to what upward building movements the licensee and NRC staff should allow during underpinning. What are the allowable upward movements during jacking operations? Refer to SSW Rpt No. 48 dated 9/14/83, pg. 4. 15/83
- f. The licensee stated that existing structures were analyzed according to ACI 318 as agreed to with NRR. The SSER #2 states that the buildings have been checked against ACI 349. Is this acceptable to NRR?

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- g. The analysis of the existing structures has been performed by assuming that the existing settlement stresses will be removed during the permanent underpinning jacking. The audit team feels that the existing stresses cannot be jacked out in their entirety and must be included in the final analysis of the building. What is the NRC position in regards to including existing settlement stresses in the analysis?

Should you or members of your staff need additional information, please feel free to contact R. Landsman (388-5587).

RFWarnick

R. F. Warnick, Director
Office of Special Cases

cc: J. C. Stone, IE
E. G. Adensam, NRR
J. D. Kane, NRR
F. Rinaldi, NRR

* Check more recent submittals and review items for need to discuss with Region III. Determine best method of disposition (e.g. GEI's comments on specs for structural backfill), evaluation of latest monitoring data, better approach for measuring crack widths, unresolved issues of May site visit, etc.

Comments on Oct. 11, 1983 Memo

Identified concerns d., e. and g. would involve input from
GES and our consultant GEI

Suggest meeting or conference call (would include Region III, SES &
GES and Consultants) AFTER discussing w/ G. Lear & Section
Leaders of SES & GES

Item e. Allowable upward movement during jacking

Bottom Line - Pick up load

- Check for damage while jacking

$\frac{1}{16}$ " to $\frac{1}{8}$ " upward movement is intuitively felt to be OK

10/20/83

Docket Nos.: 50-329/330 OM, OL

D R A F T

MEMORANDUM FOR: Darrell G. Eisenhut, Director
 Division of Licensing

THRU: Thomas M. Novak, Assistant Director for
 Division of Licensing
 Division of Licensing

Elinor G. Adensam, Chief
 Licensing Branch No. 4
 Division of Licensing

FROM: Darl Hood, Project Manager
 Licensing Branch No. 4
 Division of Licensing

SUBJECT: RECOMMENDATION FOR BOARD NOTIFICATION REGARDING
 MIDLAND AUXILIARY BUILDING

REFERENCE: ~~(a)~~ Summary of May 11 and 12, 1983 Site Visit for
 Underpinning Pier Load Test, September 16, 1983

On September 14 and 15, 1983, the NRC and its consultants audited revised calculations for the design adequacy of the Midland Auxiliary Building reflecting the results of an underpinning pier load test (Reference a). The test results had indicated that the soil modules for the base of the underpinning ^w should be 1500 KSF rather than the 3000 KSF used in the original analysis; thus, Bechtel revised its structural analysis using 1/2" of settlement rather than 1/4". During the course of this audit, the NRC received additional information which calls into question the validity of the assumptions upon which the staff's acceptance of the underpinning design was based. The additional information is reflected in paragraphs d, e and g of R. W. Warnick's memorandum of October 11, 1983 (Enclosure 1). ~~As discussed below,~~ I recommend that information received by the staff on these issues during the audit, ^{as} and discussed below, ^{as well} addressed in Enclosure 1, be provided to the Midland Licensing Board as new information potentially material and relevant to safety issues in the OM-OL proceeding.

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¶ Paragraph of Enclosure 1 notes that the stress calculations for 1/4" of differential settlement at the southern edge of the Control Tower ~~had~~ *result from a* ~~applied~~ the settlement gradient ^{that} ~~beginning~~ ^s at the center of the main Auxiliary Building, rather than a point at the northern edge of the Control Tower. Application of the 1/4" gradient over this longer distance is inconsistent and non-conservative with respect to the prior review performed by the staff which lead to acceptance of the 1/4" differential settlement in Supplement 2 to the SER, page 2-40. *The Staff is presently evaluating the effects of this recent information and believes a solution can be reached by establishing a future differential settlement limit in the Technical Specifications that will be based on field monitoring records. The limit to be established will assure the integrity of the involved structures.*

Paragraphs e and g of Enclosure 1 call into question 1) what should be the upward movements of the structures during jacking operations and 2) whether or not the stresses due to settlements prior to and during underpinning construction can be completely jacked out of the completed structure. With respect to the upward movements, the staff understands that the east EPA is currently jacked to 91 mils of upward movement and the west EPA is currently jacked to 70 mils. Upward movement in excess of 30 mils has not been reviewed by the staff. On the issue of stresses due to settlement ^{and underpinning operations,} the allowable jacking loads are limited by a concern for redistribution of stresses following upward movement of the structures. The applicant's analysis, relied upon by the staff, assumed no significant residual stress due to earlier settlements for the completed ^{underpinned} structure; and, therefore, may not be sufficiently conservative. We understand that Region III has verbally imposed a hold on further jacking pending establishment of allowable jacking limits.

~~One~~ the staff has responded to the concerns addressed by Mr. Warnick in
Enclosure 1, the staff ^{will} provide the results of its review to the Board also.

The staff's response to Enclosure 1 will be provided to the Board for information.

Darl Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures:
As stated

OVERVIEW REPORT by S & W
 Gives summary of Underpinning Work Inspections
 by S & W for 1983

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STONE & WEBSTER MICHIGAN, INC.

P.O. Box 2325, BOSTON, MASSACHUSETTS 02107

PRINCIPAL STAFF		
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D/RA		DE
A/RA		CRISP
RC		DRMA
PAO		SCS
SGA		W
ENF		File ✓

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Mr. J. J. Harrison
 Nuclear Regulatory Commission
 799 Roosevelt Road
 Glen Ellyn, IL 60137

October 24, 1983
 J.O. No. 14509

RE: DOCKET NO. 50-329/330
 MIDLAND NUCLEAR COGENERATION PLANT
 MONTHLY THIRD PARTY ASSESSMENT MEETING

The protocol governing communications for the Remedial Soils and Construction Completion Programs at the Midland Plant, specifies a monthly meeting to discuss third party assessment activities and assigns preparation of the minutes of those meetings to Stone & Webster.

Enclosed are minutes of the meeting held on October 13, 1983.

A. P. Amoruso

A. P. Amoruso
 CIO Project Manager

Enclosure
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cc: JWCook, CPCo
 DLQuamme, CPCo

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MINUTES OF THE MEETING ON OCTOBER 13, 1983

STATUS OF INDEPENDENT ASSESSMENT OF UNDERPINNING AND REMEDIAL SOILS WORK

Purpose

To discuss Third Party Overview activities of Stone & Webster (S&W) and problems encountered regarding underpinning and remedial soils work.

Summary

Mr. A. S. Lucks, Project Manager for the Independent Assessment of Underpinning and Remedial Soils Work, presented a summary of the assessment program for the past year. Highlights follow:

- Assessment Team has been on site for over twelve months.
- The scope of work for the Assessment Team includes overseeing the construction of the underpinning and all remedial soils activities, the Quality Assurance activities associated with the underpinning and remedial soils activities, and reviewing the Work Activity Packages for completeness.
- The Assessment Team includes staff with expertise in Geotechnical Engineering, structural engineering, Quality Assurance, construction, and underpinning.
- The underpinning activities are proceeding on a 24 hour day, 7 days per week schedule and the Assessment Team operates as two units to provide 7 day coverage. One unit is headed up by W. E. Kilker, the second unit is headed up by P. J. Majeski.
- The Assessment Team submits weekly reports, Nonconformance Identification Reports (NCRs) and periodic summary reports directly to the NRC with copies to Consumers Power Company (CPCo).

- To-date 16 underpinning piers have been installed for the Auxiliary Building underpinning and the first set of grillages have been installed.
- Work at the Service Water Pump Structure (SWPS) has included installation of the soldier piles and dewatering systems in preparation for underpinning.
- Preparations are in progress for the extension of the Borated Water Storage Tank foundations.
- The Assessment Team has had the opportunity to see most of the operations necessary for the underpinning work.
- A total of 55 weekly reports, 15 NCRs and a 90-Day Summary report have been issued.

Based on activities during the past twelve months, the Assessment Team has the following observations:

- The underpinning that has been installed is of a very high quality.
- The Quality Assurance staff are performing as an effective quality organization.
- All of the organizations involved in the underpinning have demonstrated a positive attitude and concern towards quality.
- The instrumentation system installed to monitor building movements adds to the confidence in the success of the underpinning work.
- Both CPCo and Bechtel have been responsive to the requests and needs of the Assessment Team.
- Currently 14 of the 15 NIRs have been closed out. Seven of the NIRs were related to Specifications or Construction Procedures, six were related to QA Procedures, and two were hardware related.

- From time-to-time the Assessment Team has stated that the completions of underpinning piers, from excavation to load transfer, should be accomplished in a more timely manner. This item is still of concern to the Assessment Team, although some improvement has taken place and Quality has not been impacted.

Mr. W. E. Kilker presented a description of the major underpinning activities during the previous month. Highlights follow:

- The installation of the Pier 8 grillage beams on the east and west ends of the Auxiliary Building was the major underpinning activity during the month. They were installed in accordance with project procedures, and the Assessment Team was particularly impressed with the teamwork demonstrated during the load transfer to the beams.
- Progress was made in obtaining access for underpinning activities through the Utility Access Tunnels. The soil stabilization by grouting is being effectively accomplished. Grout takes are high.
- Outstanding NCRs on the reinforcing steel for the BWST foundations have been resolved and installation of the reinforcing steel has begun.
- At the SWPS the installation of the soldier piles is almost complete and initial tests of the dewatering systems suggest that it may be more effective than anticipated.
- Miscellaneous activities have included installation of cathodic protection systems, removal of two 36 inch casings, piezometer installation and soil investigation work.
- During the installation of a piezometer there was an incident of drilling into a beam that extends from the Auxiliary Building. A stop work order was issued on drilling and the occurrence was investigated. In the future, structural drawings will be reviewed, in addition to utility

drawings, before a drilling permit is issued.

- One NCR was issued during this period. It concerned certification of QC supervisors. This NCR has been closed.
- Five Work Activity Packages were reviewed and Assessment Team questions were satisfactorily resolved.

Questions and Answers

- Mr. J. J. Harrison (NRC) asked if Stone & Webster tracked commitments made by CPCo in closing open items from the daily meetings, for example, Item 52-14. A check by the NRC had shown that some six weeks after the commitment had been made the drawing had not been changed. Mr. W. E. Kilker (S&W) replied that Stone & Webster does not track an item after closing, but the item would be brought to CPCo attention if the drawing were to be used for construction without the change being made. R. A. Wells (CPCo) stated that if it is flagged on a formal quality document it would be tracked. J. A. Mooney (CPCo) stated that he will check on the CPCo tracking process.

Mr. R. Landsman (NRC) commented that a drawing with a detail noted as Non-Q had been identified and this also had not been corrected.
- Mr. J. J. Harrison (NRC) remarked that daily meeting notes indicated that an item on a drawing was only a suggested method and not a requirement and asked why it was shown on the drawing, if it is only a suggestion. Mr. W. E. Kilker (S&W) stated that the procedure associated with this item points out that it is a suggested method. Mr. J. A. Mooney (CPCo) stated that he will check on this item.
- Mr. J. J. Harrison (NRC) commented that in weekly report No. 49, the Assessment Team suggested a solution to possibly avoid problems with welding. This suggestion had also been made in weekly report No. 30.

He asked why had CPCo not acted sooner. J. A. Mooney (CPCo) stated that they had reviewed the situation and had thought that the existing procedure was adequate but that this was subsequently not the case and the suggested change had been implemented. Mr. W. E. Kilker (S&W) confirmed that the change was being made.

- Mr. R. B. Landsman (NRC) asked if the lagging spacing problems had been solved. He noted that it had appeared again in recent weekly reports. Mr. W. E. Kilker (S&W) stated that at the Auxiliary Building, the Contractor had opened up the lagging spacing as requested by the Assessment Team. The latest occurrence was at the SWPS and the problem has now been addressed.
- Mr. R. B. Landsman (NRC) asked what is being done to resolve the venting problems associated with the grouting of bearing plates. Mr. W. E. Kilker (S&W) stated that the Assessment Team was tracking this problem. It occurs when the foundation surface is very irregular, and the Assessment Team is aware that the Contractor is expending considerable effort to solve the problem. The inspection of the cured grout is being performed very carefully.
- Mrs. Sinclair, member of public, asked Mr. J. J. Harrison (NRC), if he was satisfied with the answer to the question on tracking commitments used in closing items from daily meetings. Mr. Harrison stated that CPCo had committed to tracking those items; however, the subject would have to be discussed further at the next monthly meeting.

Action Items

- CPCo will review the implementation of commitments made to close out daily meeting items.
- Stone & Webster Will refine the tracking system for open items.