

**STONE & WEBSTER MICHIGAN, INC.**

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United States Nuclear Regulatory Commission  
Midland Site Resident Inspection Office  
Route 7  
Midland, MI 48640

March 16, 1983

J.O. No. 14358  
Ref. NPF 25

Attention Mr. R. Cook

RE: DOCKET NO. 50-329/330  
MIDLAND PLANT - UNITS 1 and 2  
INDEPENDENT ASSESSMENT OF AUXILIARY BUILDING UNDERPINNING  
REPORT NO. 25

A copy of the Independent Assessment of the Auxiliary Building Underpinning Weekly Report No. 25 for the period March 6, 1983 through March 12, 1983, is enclosed with this letter. Included as attachments, are the minutes of the Assessment Team and Site Engineering, Construction and Quality Assurance personnel.

If you have any questions with respect to this report, please contact me at (617) 589-2067.

Very truly yours,

*A. Stanley Lucks*  
A. Stanley Lucks BFB  
Project Manager

Enclosures

ASL/ka

MAR 18 1983

J.O. NO. 14358  
Midland Plant  
Units 1 and 2  
Independent Assessment  
Auxiliary Building Underpinning

Weekly Report No. 25

March 6, 1983 through March 12, 1983

Personnel on Site

Stone & Webster Michigan Inc.

W. Kilker	3/6 - 3/12
P. Barry	3/6 - 3/9
A. Scott	3/6 - 3/9
L. Rouen	3/6 - 3/8

Parsons, Brinckerhoff Michigan, Inc.

J. Ratner	3/6 - 3/11
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Meetings Attended

<u>Date</u>	<u>Represented</u>	<u>Purpose</u>
3/7 through 3/11	Stone & Webster Bechtel Consumers Power Parsons	Daily Meetings
3/10	Stone & Webster Consumers Power	Discussion of Work Package Submittals
3/11	Stone & Webster Bechtel Consumers Power	Weekly Soils Review

Activities

Construction - Pier W12: The jackstands were completed and installed. The load transfer was initiated around noon on March 11. Within 2½ hours the proof test load of 1375 kips (125 percent of specified load) had been applied through two 565 ton jacks. Some 2 hours later the proof test load settlement criteria was satisfied, less than .01 inch for a continuous 1 hour period, and the load was reduced to 110% of specified load. This time the pier had moved downward approximately 0.19 inches with respect to the turbine mat while the bottom of the pier had moved 0.03 inches with respect to the top of the pier. As of March 13, the 110% load had been maintained for 36 hours. The pier deflection criteria of less than 0.01 inches for 24 hours had not yet been satisfied. Total pier settlement was approximately 0.23 inches. The actual movement of the building, as measured by a benchmark approximately 55 ft. away, was less than .005 inches.

Pier W9: The 9 ft. long N-S drift at right angles to the previously completed 20 ft. long E-W drift was excavated and supported. The excavated material was similar to that in the E-W drift - unreinforced concrete underlain by a thin layer of sand and 6 ft. to 7 ft. of clay. The unreinforced concrete was located both above and below the turbine mat membrane. No groundwater seepage entered the excavation. Three steel drift sets were installed and wood lagging was placed between the sets along the sides of the drift and at the end of the drift.

The pier excavation was completed from El. 600 to El. 582. The excavated material consisted of approximately 15 ft. of a mixture of clay, sand and gravel fill underlain by 3 ft. of natural gray clay. No groundwater seepage entered the excavation. Sixteen levels of steel lagging were installed and backpacked.

Pier W11: Once the load transfer to pier W12 was complete, excavation and support of the N-S 8 ft. x 8 ft. access drift to pier W11 was initiated and completed to a distance of 4 ft. under the turbine building. The excavated material consisted of approximately 2 ft. of unreinforced concrete and 6 ft. of clay fill. One steel set was installed in the drift.

Pier E12: Installation of the upper and lower bearing plates and the tell-tale bearing plate was completed.

Pier E9: The construction activities and progress on this drift and pier were similar to those at pier W9. The excavated materials in the drift were unreinforced concrete (above and below the turbine building mat), thin layers of sand fill and about 7 ft. of clay fill. The soil excavated from the pier to El. 581 consisted of 13 ft. of clay fill underlain by natural gray clay. No groundwater seepage entered the excavation. Seventeen levels of steel lagging were installed and backpacked.

#### Quality Control, Documentation and Records

1. Verified the completion of the jack record, loading schedule and calibration forms prior to initiating load transfer to pier W12.
2. Verified that the procedural criteria was met for load reduction during load transfer at pier W12.
3. Witnessed the implementation of the QC hold-point on the RGE determination of the natural clay-fill interface at pier W9.
4. Witnessed the probe for groundwater near El. 589 in a zone of granular fill at pier W9.
5. Verified the completion of the QC welding inspection report for pier W12 Jackstands.

#### Observations

Construction - The load transfer to pier W12 was being accomplished according to the project documents. Downward movement of the pier has been small - less than one-quarter inch over a period of 36 hours. Deflection of the turbine building as measured by nearby benchmarks has been less than .005 inch.

The construction of the N-S drifts to piers E/W9 and W11 was in accordance with the project documents and good underpinning practice. The lagging was securely installed behind the drift sets and backpacking was generally adequate.



A few spacer blocks were located so close to the set supports that good back-packing was difficult to achieve in these areas. Future lagging work should avoid this condition. The use of excelsior was avoided since no groundwater seepage was present. Previously installed excelsior in the N-S drift to pier 9E was removed.

Pier excavation and support at piers E/W9 was for the most part well done. However, narrow lagging set spacers of 1 inch or slightly less in the upper 8-10 ft. of the pier excavations makes proper backpacking and inspection extremely difficult. The Team does not agree with the use of the nominal 1 inch spacers to separate lagging sets. This separation does not provide sufficient space to adequately backpack or inspect behind the lagging. A 1½ inch minimum spacing should be maintained (unless ground conditions require closing the gap) to allow proper backpacking and inspection.  
Quality Control, Documentation and Records - The quality-related procedures observed or verified by the Team were properly implemented.

#### Quality Assurance Overview of MPQAD-Soils Requalification and Certification Program

The Assessment Team has completed an overview of the classroom training and examination portions of the process required for MPQAD certification.

MPQAD has established a training group specifically charged with developing and presenting the required information as well as overseeing the testing of the comprehension of the classroom information. Basically, the procedure initially requires all personnel to complete courses in (1) Quality Assurance Indoc-trination; (2) Midland Plant Quality Procedures (MPQP) 1 and 2; and 3) Field Soils Organization (FSO) procedures on work and excavation permits, coordination forms, and emergency plans. The QA Indoc-trination course discusses such topics as the site QA program and its goals, Federal regulations, general QA organization and procedures, and the role of the NRC. MPQP 1 and 2 cover the specific soils related procedures to be implemented. The FSO training on work permits, excavation permits, and coordination forms explains the need for and proper use of the respective forms. The emergency plan training addresses the identification of an emergency condition and the defines responsibilities in responding to a given emergency. The Team reviewed the above referenced basic material and is satisfied that this training provides the proper framework to initiate specific technical and procedural training of the organization personnel.

The QA personnel subsequently receive programmatic QA and QC training and are required to pass examinations on these subjects. QC personnel are required to receive training in and pass an exam on the QC programmatic portion only. The Team reviewed the content of these courses and exams and has concluded that the necessary programmatic criteria have been met. Personnel having completed these courses should have an adequate understanding of the goals and procedures of Quality Assurance and the purpose and goals of quality control inspections.

The training for a specific technical procedure-Project Quality Control Instruction (PQCI) - is required for all QC personnel and QA personnel below Level III who will perform inspections on work covered by procedure. The format for the training to a specific PQCI consists of the preparation of a lesson plan and corresponding exam bank of questions by the training group. Prior to presentation, this material is reviewed by a Soils Level III QA Engineer (QAE). Once the comments of the QAE are resolved, the classroom training is scheduled and presented. The content of the courses is a combination of procedural and technical information with emphasis depending upon the subject material. Courses can last from minimum of a few hours to several days. Closed book exams, generally involving some 20 questions, are then given to the personnel. Those who receive a score of at least 80 percent proceed to the on-the-job training for that particular PQCI. In all cases, incorrectly answered questions are reviewed with the applicant to assure a proper understanding. For those who fail, retesting is required after review of the material with the course instructor.

The Team specifically reviewed numerous lesson plans and more than a dozen PQCI exam banks. These lesson plans and subsequent exams should result in MPQAD staff with a good understanding of the procedural and technical requirements of a particular PQCI. The lesson plans, exam banks, and the training records were kept well-organized. There is a security system in effect that keeps the exam questions from leaving the training room.

After completion of the on-the-job training, the final step in the certification process is a proficiency demonstration that is a "hand-on" test of the applicant's understanding of the inspection procedure. The portion of the certification process does not involve the speciality training group but is conducted by engineers from the Soils QA group. The Assessment Team did not witness any proficiency demonstrations this past week but have in the past been present at several (refer to Weekly Reports Nos. 13, 14, 17 and 18) and found these sessions to be thorough.

A Level III QA Engineer must give final approval for certification of the applicant.

The Team feels that the above approach to QA/QC training results in personnel who have a good understanding of the subject materials and who have the knowledge to carry out their duties correctly and thoroughly.

Future Assessment Team activities will include surveillance of classroom training, QC proficiency demonstrations, and training records.

Quality Assurance Overview of Training of FSO Personnel (Excluding MPQAD Personnel)

The Assessment Team reviewed the administrative guideline on Field Soils Organization Training. The guideline dictates that QA Indoctrination and MPQP 1 and 2 be presented to all FSO personnel and that Emergency Plans, Bechtel Field procedures and Subcontractor procedures are required for selected personnel in the organization. An organization chart is included in the guideline. The guideline identifies that a FSO Training Coordinator be named to coordinate activities and maintain training records. The Team feels that the training stipulated in the guideline adequately prepares the FSO personnel to perform in the soils remedial work effort. The Team also reviewed the training matrices for Resident Engineering, and two Subcontractors - Mergentime and Spencer, White and Prentise. It is the opinion of the Team that the training fulfills the procedural requirements of the Midland Plant Quality Plan and that the individuals are adequately trained for their particular level of responsibility. A follow-up Review of the training records indicated that implementation of the procedures is being accomplished.

Future Assessment Team effort in this area will consist of observation of the classroom training sessions and random surveillances of personnel records to insure adequate training is being obtained.

Overview of Design Work Packages

The Assessment Team reviewed the design work package on Rebar Mapping and Core Drilling for Instrumentation Raceways in the SWPS. The Team found the package was generally complete with the following exceptions - (1) Drill permits were not stamped with the rebar mapping stamp required by an administrative guideline, (2) Final Project Engineering approval of a Field Change Request had not been obtained, and (3) The referenced PCR was difficult to understand dimensionally. Understanding could only be gained through indirect reference to an architectural drawing. A meeting was held with the SMO groups of CPCo to discuss this package and how future work package overviews by the Team would be implemented.

Non-Conformance Identification Reports

Status of previous issues: (NIR numbers on longer listed have been closed-out.)

<u>NIR NO.</u>	<u>Description</u>	(Opened)	<u>Date</u> (Closed)
5	Concrete Mix Qualification	2/10/83	

W E Kilker PFB  
Project Engineer

A. S. Zuck PFB  
Project Manager



INDEPENDENT ASSESSMENT TEAM MEETING WITH BECHTEL

Date: March 7, 1983

Attendees:	<u>Bechtel</u>	<u>Stone/Webster</u>	<u>MPQAD</u>	<u>CPCo</u>
	E. Cvikl	A. Lucks	R. Sevo	R. Visser
	J. Fisher	W. Kilker		J. Moran
	J. Gaydos	L. Rouen		
		<u>Parsons</u>		
		J. Ratner		

1. E. Cvikl advised that trial mix preparation of the proposed concrete mix design had been completed. Results will be forwarded to Project Engineering for analysis.
2. J. Fisher reported that Quality Control release of the jackstands for pier W12 had not been obtained. However, dress rehearsal for load transfer is still scheduled for March 8, 1983.
3. J. Gaydos reported that a study of concrete placement records indicated that the FIVP mat was done monolithically eliminating the concern to core for a "cold joint" in the concrete.
4. J. Ratner will discuss the procedure for calibrating the FIVP load check jacks with L. Morris of Bechtel.
5. P. Barry described review of work activity request package on core drilling in the SWPS. Will meet with CPCo on March 8, 1983.
6. J. Ratner asked for a clarification on unique requirements for grout strength on the top and bottom leveling plates for pier W12. J. Fisher will respond.
7. P. Barry discussed the general applicability of a drawing detail on welding re-shore channels to drift sets.

INDEPENDENT ASSESSMENT TEAM MEETING WITH BECHTEL

Date: March 8, 1983

Attendees:	<u>Bechtel</u>	<u>Stone/Webster</u>	<u>MPQAD</u>	<u>CPCo</u>
	J. Fisher	Paul Berry	R. Visser	D. Puhalla
	J. Gaydos	W. Kilker	J. Moran	
		A. Scott		
		<u>Parsons</u>		
		J. Ratner		

1. E. Cvikl will respond to the request for clarification of the strength requirements for grout behind the leveling plates.
2. Dress-rehearsal for the load transfer at pier W12 is March 9, 1983.
3. J. Fisher said coring of the FIVP will not be required. However, a "mud-mat" approximately 4 inches thick has been encountered above the membrane and is being removed in the N-S access to piers E/W 9.
4. J. Fisher provided a copy of a Field Instruction on "Construction Aids."
5. J. Fisher discussed the use of excelsior between lagging in areas with no groundwater seepage with resident geotechnical engineering. Generally such usage of excelsior will be avoided in the future.



INDEPENDENT ASSESSMENT TEAM MEETING WITH BECHTEL

Date: March 9, 1983

Attendees:	<u>Bechtel</u>	<u>Stone/Webster</u>	<u>MPQAD</u>	<u>CPCo</u>
	J. Fisher	P. Barry	R. Visser	G. Murray
	J. Gaydos	W. Kilker		
		A. Scott		
		<u>Parsons</u>		
		J. Ratner		

1. J. Fisher informed the meeting that beginning March 14, 1983 Mike Blendy of the Constructability group and L. Weight the area Superintendent will also attend the daily meetings.
2. J. Fisher advised that the telltale linkage between the pier and turbine mat on pier W12 is located in such away that installation of the wedges will be difficult. Resident engineering will resolve.
3. In response to earlier discussions, J. Fisher said the NCR on grout at pier W12 applies to grouted care holes not to dry-pack grouting of the leveling plates.
4. W. Kilker stated that the Team is overviewing the design work packages that CPCo will submit to the NRC. FSO will offer support for this effort as necessary.

INDEPENDENT ASSESSMENT TEAM MEETING WITH BECHTEL

Date: March 10, 1983

Attendees:	<u>Bechtel</u>	<u>Stone/Webster</u>	<u>MPQAD</u>	<u>CPCo</u>
	J. Fisher	W. Kilker	R. Visser	G. Murray
	J. Gaydos			
		<u>Parsons</u>		
		J. Ratner		

1. J. Fisher provided the response from E. Cviki describing the reasons for unique grout strength requirements on different piers. Basically, it relates to the pier design and the loads on the pier.
2. "Dress-rehearsal" for the load transfer was held March 9, 1983. However, the monitoring telltale was not installed last night. Plan is to complete the installation this morning and load transfer starting in the PM.
3. J. Fisher said a material availability matrix is being introduced into their word processor to allow better planning.
4. W. Kilker said an interim report covering the September thru March period will be issued by the Assessment Team by the end of March.

INDEPENDENT ASSESSMENT TEAM MEETING WITH BECTHEL

Date: March 11, 1983

Attendees:

Becthel

J. Fisher  
J. Gaydos  
E. Cvikl

Stone/Webster

W. Kilker

MPQAD

R. Visser

CPCo

G. Murray

Parsons

J. Ratner

1. J. Fisher stated the FCRs on the telltale installations have been dispositioned. Load transfer will be today.
2. J. Fisher reported there is a welding NCR on one of the jackstands for E12 that is impacting the schedule.
3. The decision has been made that NPS will perform long-term fabrication of embeds, beams and jackstands. On-site fabrication will continue for lagging and drift sets.
4. J. Fisher stated that in response to a concern of J. Ratner, spacers on pier lagging will generally be by  $1\frac{1}{2}$ " (inch) thickness to permit back-packing and inspection.