

Wright
J. Kane
Rec'd 6/30/83
from N. Wright

May 13, 1983

Note to: Ross Landsman
Ron Cook
Darl Hood
Joe Kane

SUBJECT: ALLEGED VIOLATION OF THE BOARD ORDER

I am enclosing CPC's testimony on the alleged violation of the Board Order. An investigation of the alleged violation will be coming out in the future. However, CPC may present their testimony before that time. Accordingly, it is necessary for us to go through CPC's testimony and determine where cross-examination is appropriate.

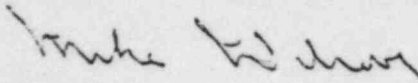
Please analyze the testimony and I will contact you shortly for your comment.

I am also providing a list of questions which should be addressed.

- (1) Does Ross agree that minor excavations did not need specific NRC approval so long as the paperwork could be reviewed during site visits? (CPC testimony, p. 3)
- (2) What is a fireline pipe?
- (3) Did the Staff ever indicate to CPC that the fireline and deep Q excavations were minor? (CPC testimony, pp. 3-5)
- (4) Did CPC have any reason to believe the excavations were minor? (CPC testimony, pp. 3-5)
- (5) Does anyone recall the May 21, 1982 meeting in which Ross said specific approval was needed before the deep Q duct bank excavation could begin? (CPC testimony, p. 5)
- (6) At the May 20 meeting, did NRC indicate that its technical concerns were with the backfill and not with the excavation? (CPC testimony, p. 8)
- (7) Does the May 25 letter constitute approval for the excavation below the deep Q duct bank? (CPC testimony, p. 9)

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- (8) Did CPC have any reason to believe the May 25 letter constituted approval for the excavation? (CPC testimony, p. 9)
- (9) Do we believe either the fireline or deep Q excavations were minor?



Michael N. Wilcove
Attorney, OELD

tained. The procedure authorizing work by letter was also continued for work falling under the April 30 Order, including excavations.

The use of letters was superseded on June 29, 1982, by a work permit system. The work permit system applied to all work covered by the April 30 Order. This system also made use of forms requiring sign-off by the Company, indicating that NRC approval had been obtained. After institution of the work authorization procedure, both an excavation permit and a work permit had to be secured before excavation work could proceed.

Between April 30 and early June, I took a number of specific excavation requests to Dr. Landsman for approval prior to Company sign-off of an excavation permit of work release. Included among them were excavations for a freeze-hole extending 54 feet below grade, excavation of a 72-inch diameter pond fill repair, slope layback and auxiliary building deepseated benchmarks. In the early part of June, I discussed with Dr. Landsman the excavation permit system and the manner in which the Staff was approving work under the Order. With the creation of an excavation permit process, we anticipated that the NRC Staff could eventually find sufficient controls were in place to justify a broad work release for routine excavations at the site. We believed

that such a work authorization was within the NRC Staff's powers under the April 30 Order.

On June 11, 1982, Dr. Landsman and I discussed the excavation permit procedure. Dr. Landsman, at that time, stated that he found the excavation permit procedure sufficient. He indicated that Region III did not find it necessary to specifically review and approve all minor excavations before work started, but that he would want to review the paperwork on all excavations permitted between his site visits. He also stated that the excavation permit procedure should be adhered to. Based on this discussion, I concluded that Dr. Landsman had given approval to go ahead with minor excavations, under the excavation permit procedures, and subject only to Staff review after-the-fact. We further understood that Dr. Landsman wanted to review major excavations, such as the excavation for the service water underpinning, before the work started.

The fireline excavation was carried out to relocate a fire protection line to an area where it would not be damaged by planned excavations to replace and rebed service water piping. The old fireline, located near the circulatory water structure, was abandoned in place and a new line was installed at a nearby location. The fireline was not a category I pipe.

The excavation below the deep-Q duct bank involved a crossing of the freezeway and an underground electrical duct bank, often referred to as the "deep-Q duct bank." To protect the duct bank, it was necessary to discontinue the freezeway where it crossed the duct bank. To prevent water from passing through this gap in the freezeway, a plug had to be installed below the duct bank. The excavation down to the duct bank was 32 feet deep. An additional excavation below the duct bank was necessary to install the plug.

While I do not recall specific discussions concerning the permits in operation here, our general practice was to hold internal discussions before sign-off on an excavation permit or work permit for the purpose of verifying that the work in question was authorized by the NRC. Both the fire-line excavation and the excavation below the deep-Q duct bank occurred after my June 11 discussion with Dr. Landsman. Both were minor excavations, which therefore did not require explicit NRC review and approval prior to commencement of the work, but which would be subject to NRC review at a later date. Accordingly, the Company signed off on the excavation permits and work permits for these two excavations in late July, 1982.

How deep?

At the time the Company signed off on these activities, I was unaware of Dr. Landsman's concern and desire that

these two activities not be treated as minor excavations but that explicit review and approval be obtained for them. Had I known of his concerns, I would not have allowed the sign-offs to occur and the excavations to proceed without his prior review and approval.

Since becoming aware of Dr. Landsman's concern about these excavations, I have learned that a Bechtel Remedial Soils Group Supervisor had personal meeting notes from a May 21, 1982, exit meeting with Dr. Landsman that suggest that Dr. Landsman had requested that further approvals be obtained before excavating under the deep-Q duct bank. I attended that meeting, but do not recall Dr. Landsman expressing such a concern. I was also unaware of the Bechtel Supervisor's notes until after this matter became an issue. The Bechtel Supervisor was not an individual responsible for determining if NRC authorization had been obtained.

Once I became aware that Dr. Landsman was concerned about the excavations proceeding without prior NRC approval, I had the approvals for the work permits withdrawn.

Q2. Mr. Mooney, do you have anything to add to Mr. Wheeler's testimony on this subject?

A2. Mr. Wheeler was operating on the theory that Region III, through Dr. Landsman, was the final approval point within the NRC Staff for this work. The Memorandum and Order memorializing a conference call on May 5, 1982, explicitly stated that either NRR or Region III could approve the work.

Quite frankly, it was not eminently clear which Branch of the Staff was exercising approval authority. Certainly, I believe that Mr. Wheeler's practice of seeking approval through Dr. Landsman was permissible and prudent since Dr. Landsman was the NRC inspector closest to the work.

Q3. Could you describe your recollection of the meetings referred to in Dr. Landsman's memo?

A3. With regard to the May 20, 1982 meeting referred to in Dr. Landsman's memo of August 24, 1982, I apparently had a different understanding of the nature of NRR's technical problems than did Dr. Landsman.

Q4. Could you explain?

A4. Yes. The so-called deep-Q electrical duct bank is a safety-related electrical duct bank located quite deep in the ground. The technical questions discussed at the May 20 meeting concerned the manner in which this duct bank would be protected from damage at the location where it crossed the freezeway and the requirements for backfilling the monitoring pits. I understand that the freezeway has been previously described to the Board, so I will not repeat a description here. It suffices to say that without protection, the freezeway could damage the duct bank by causing the soil beneath the duct bank to heave.

Initially, the Company intended to insert the freeze elements in a manner which would have frozen the soil directly beneath the duct bank. The Company proposed to protect the duct bank from any heaving which would have been caused by the freezeway by excavating the soil directly beneath the duct bank. However, the Company abandoned this plan when it discovered that the duct bank was deeper than previously expected. The depth of the duct bank precluded the insertion of freeze elements at locations which would have insured the freezing of the soil beneath the duct bank. At the May 20 meeting, the Company advised the Staff that the duct bank was deeper than expected and proposed an alternative plan, involving excavating the soils

below the duct bank and installing a plug, either of clay or concrete, which would serve in place of the freezeway at that location.

At the May 20 meeting, the NRR representatives expressed concern with the manner in which the Company would permanently backfill the excavation around the duct bank, as well as excavations made to monitor the heaving of soil at other locations. NRR was concerned that concrete would be harder than the surrounding soil and therefore might cause differential settlement if left there permanently. Discussions relating to this permanent backfill question were not completed at this meeting, but to my knowledge, no one from the Company understood NRR's concern as relating to the excavation, as opposed to the permanent backfill. This point is highly relevant, since the Company would not have permitted this excavation to proceed if we believed NRR had technical problems with it.

After this issue was raised in Dr. Landsman's memo, I was advised that Mr. John Fischer, a Bechtel employee, had personal notes of the May 20, 1982, meeting indicating that the Company would not proceed with excavating the pit below the duct bank "until NRC approval." I do not remember such a commitment being made at the meeting, nor do I recall anyone from the Staff requesting such a commitment. However, I do not dispute that the statement apparently was made at the meeting.

When I left the May 20 meeting, I understood the need for further contact from NRR on the backfill, but felt that the

Company and NRR were in agreement on the excavation itself. However, quite apart from my understanding of the meeting, NRR gave explicit approval for the excavation in a letter dated May 25, 1982, four days after the meeting. The May 25 letter states that excavations directly beneath the deep-Q duct bank had been approved. [The letter also makes a clear distinction between excavating and backfilling, which at the time served to confirm my understanding of NRR's concerns.]

✓ 11.24.25 (11.25.82)
from NRR to CPCo

I had further discussions with representatives of NRR on this matter at a soils audit held July 27-30, 1982, at Bechtel's Ann Arbor office. As my notes and the NRC meeting summary, dated November 12, 1982, indicate, discussion at this audit once again focused on the backfill and did not relate to the excavation itself. At the audit, NRR again advised the Company that a report was necessary prior to permanently backfilling any of the excavation pits. No such condition was placed on excavating soil.

Q5. Mr. Mooney, do you have anything to add on the fireline relocation question?

A5. Mr. Wheeler explains his basis for believing this work had been approved. The fireline relocation job, which clearly falling within the scope of the April 30 only ancillary to the soils remedial work. That

say that proper controls could be ignored or that NRC approval was unnecessary. Because the fireline relocation was essentially an ancillary task, I do not believe the Company had discussions with NRR concerning it.

Q6. Mr. Mooney, could you please describe your views of the so-called "cable-pulling incident" of March, 1982.

A6. Because I was personally involved in these discussions, I wish to explain my view of the "cable-pulling" incident referenced in the Attachments to Mr. Keeper's testimony. This incident has been the subject of a formal NRC investigation as to whether material false statements were made. I believe that the incident arose because of ineffective communication between the Company and the NRC Staff.

The Company proposed a quality assurance plan for the auxiliary building underpinning work to the NRC in a letter dated January 7, 1982, and at a meeting with Region III on January 12, 1982. Over the next two months, discussions between the Company and the Staff continued regarding which underpinning activities were to be Q-listed.

On March 10, 1982, there was a meeting between Company and NRR and Region III. At this meeting,

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Company sought to define those underpinning activities which were considered safety-related and subject to the quality assurance program and therefore needed to be Q-listed.

However, the NRC Staff did not accept the classifications proposed by the Company and took the position that all soils activities beginning with Phase 2 work should be Q-listed except for specific items for which it could be shown, in a fashion acceptable to the NRC, that there was a specific basis to justify non-Q treatment.

One area of misunderstanding between the NRC Staff and the Company was the question of whether the Company agreed to the Staff's position at the March 10 meeting. Apparently some NRC Staff members believed that the Company had committed at that meeting that all to-go underpinning work would be Q-listed unless specifically excepted. I and other Company employees believe no such commitment was made. I viewed this meeting as a chance to discuss the issue with the NRC Staff and not as one at which a commitment would be made. I can recall indicating to the NRC Staff that we understood the Staff's request for such a commitment and that we would "get back to them on it." The NRC Staff's meeting minutes do not indicate any such commitment, corroborating my recollection that no commitment was made.

A second area of misunderstanding arose because of the failure to define instrumentation installation as either a part of Phase 1 or Phase 2 of the underpinning work. The NRC Staff's position at the March 10 meeting was that they wanted all underpinning activities beginning with Phase 2 to be Q-listed unless specifically excepted. Since instrumentation had to be installed and functioning before the start of Phase 2 work, the Company believed that the NRC Staff did not require that the installation of underpinning instrumentation be covered by the quality assurance program. The Company had stated that calibration of instruments and checkout of the system would be Q-listed.

A third area of confusion related to the completion status of underpinning instrumentation on March 10 and 12, 1982. At the March 10 meeting, Region III inspectors formed the impression that underpinning instrumentation had been completed. The NRC investigation conducted to review this matter determined that statements made by the Company at the May 10 meeting were understood by several NRC personnel to mean "work had begun without giving a report on the status of completion."

On March 12, 1982, I and others from the Company initiated a telephone call to Region III Staff. During this call, the Company identified a list of items which we

believed could justifiably be treated non-Q. The Region III inspectors were provided a matrix which showed that instrumentation installation was one of the items that was to be non-Q. With no intent to mislead the NRC Staff, but meaning only to inform the Region III inspectors that underpinning instrumentation work had begun, Alan Boos of Bechtel stated, "Our instrumentation is essentially well underway. Wiring has been pulled -- raceway has been installed." The Region III inspectors apparently understood these statements to mean that all wiring for the underpinning instrumentation had been completed, an unintended inference.

The misunderstandings and poor communications of March 10 and 12, 1982 came to light during the March 17-19, 1982 Region III safety inspection. The NRC inspectors discovered that instrumentation installation was in progress, not completed. They then informed the Company that this activity was to be Q. In response, the Company suspended all underpinning instrumentation installation and reclassified the activities as Q.

Subsequent to these events, Mr. Cook had a number of discussions with the NRC Staff Management leading up to a March 30, 1982 meeting with Region III and NRR, at which time the Company committed to Q-listing essentially all of the to-go underpinning work. As a result of the March 30

commitment by Company Management, instrumentation installed and cables pulled without being covered by quality assurance requirements were upgraded to comply with all quality assurance requirements. Since March 30, 1982, all underpinning instrumentation has been installed pursuant to quality program requirements.



*Final Report to issue order following
Investigation of Violations of ASHB Order*

J. K. and

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

January 12, 1984

Docket Nos. 50-329, 50-330

(10 CFR 2.206)

Ms. Billie Pirner Garde
Government Accountability Project
Institute for Policy Studies
1091 Que Street, N.W.
Washington, D.C. 20009

Dear Ms. Garde:

On October 6, 1983, I issued a "Director's Decision under 10 CFR 2.206" (DD-83-16) granting in part and denying in part the relief you requested in your letter of June 13, 1983 on behalf of the Lone Tree Council and others with respect to the Midland project. In that decision I stated that I would not require a management audit at that time, but would continue to review information concerning the licensee's performance to determine whether an audit was required. For the reasons stated in the enclosed Confirmatory Order, Consumers Power Company will now be required to conduct a management appraisal of the Midland project. Accordingly, I have also issued the enclosed "Supplemental Director's Decision Under 10 CFR 2.206" (DD-84-2). For your information, I have also enclosed a copy of the notice filed with the Office of the Federal Register for publication.

With respect to your letter of November 26, 1983 to Mr. Keppler and myself, which raised a number of questions concerning an independent management audit of Consumers Power Company, you should be assured that the appraisal will be a broad-based one. The staff will examine the proposal for the appraisal, with due regard for the issues of competence and independence of the proposed reviewer, and will determine whether the proposal is satisfactory under the order. It is the intent of Region III to receive public comments with respect to the appraisal.

With respect to your question regarding the reference to a "plan of action" in Region III's memorandum concerning the October 25, 1983, meeting between

84-1234245 2pp.

NRC and Consumers Power Company, the "plan of action" was the staff's choice of words which was intended to convey Consumers Power Company's plans to improve management of the Midland project, a subject that was discussed at the October 25th meeting.

Sincerely,

**Original Signed By
R. C. DeYoung**

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Enclosures: as stated

cc w/encl.: James W. Cook
Consumers Power Co.
Michael Miller, Esq.

Distribution (DD-84-2)

SECY-----by bluebag
OGC-----with
J. Lieberman, OELD-----incoming petition
D. Eisenhut, NRR
R. Purple, NRR
J. Keppler, RIII
G. Cunningham, ELD
E. Christenbury, OELD
S. Lewis, RIII
R. Warnick, RIII
E. Adensam, NRR ✓
W. Paton, OELD
L. Cuoco, OELD
J. Resner, PPMB
J. Axelrad, IE
G. Klingler, IE
J. Stone, IE
J. Taylor, IE
R. DeYoung, IE

EDO 13229
J. Douglas, IE
RCPB Reading
ELD Reading
DCS
IE:ES File
IE:EA File

OELD	RIII	IE:ES <i>DRK</i>	D:ES <i>/</i>	DQASIP:IE	DQASIP:IE	DD: <i>[Signature]</i>	D: <i>[Signature]</i>
Lieberman	Keppler	GRKlingler	Axelrad	Heishman	Partlow	Taylor	DeYoung
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 12, 1984

Docket No. 50-329
Docket No. 50-330
EA 83-118

Consumers Power Company
ATTN: Mr. John D. Selby
President
212 West Michigan Avenue
Jackson, MI 49201

Gentlemen:

This refers to the investigation conducted by the Office of Investigations during the period January 3 through August 8, 1983, of activities at the Midland Nuclear Plant authorized by NRC Construction Permit Nos. CPPR-81 and CPPR-82. An enforcement conference was held with your staff regarding this matter on October 11, 1983.

This investigation revealed that Consumers Power Company (CPCo) had excavated soil material from below the deep "Q" duct bank and initiated fireline relocation activities in "Q" soils without prior NRC authorization. Further, the excavation of soil material below the deep "Q" duct bank was contrary to previous directives of the NRC staff which instructed the licensee that such excavation was not authorized. These actions violated paragraph 2.G of the Midland Construction Permits, as amended on May 26, 1982.

The violation described in the enclosed Confirmatory Order has been categorized as a Severity Level III violation as described in the General Policy and Procedure for NRC Enforcement Actions (Appendix C to 10 CFR Part 2). No civil penalty is being proposed for this violation. However, the attached Confirmatory Order is being issued.

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 enclosures will be placed in the NRC's Public Document Room.

The response directed by this Order is not subject to the clearance procedure of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Sincerely,

A handwritten signature in cursive script, appearing to read "R.C. DeYoung".

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Enclosure: Confirmatory Order

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

84-2-2-77 2 pp.

cc w/encl:

DMB/Document Control Desk (RIDS)

Resident Inspector, RIII

The Honorable Charles Bechhoefer, ASLB

The Honorable Jerry Harbour, ASLB

The Honorable Frederick P. Cowan, ASLB

The Honorable Ralph S. Decker, ASLB

William Paton, ELD

Michael Miller

Ronald Callen, Michigan

Public Service Commission

Myron M. Cherry

Barbara Stamiris

Mary Sinclair

Wendell Marshall

Colonel Steve J. Gadler (P.E.)

Howard Levin (TERA)

Billie P. Garde, Government

Accountability Project

Lynne Bernabei, Government

Accountability Project

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
) Docket Nos. 50-329
) 50-330
CONSUMERS POWER COMPANY)
(Midland Plant, Units 1 and 2))

CONFIRMATORY ORDER

I

Consumers Power Company (the licensee) is the holder of construction permits CPPR-81 and CPPR-82 issued by the Atomic Energy Commission (now the Nuclear Regulatory Commission (the Commission)), which authorize the construction of the Midland Plant, Units 1 and 2 (the facility). The facility is under construction in Midland, Michigan.

II

Since the start of construction, the facility has experienced significant quality assurance (QA) problems. Although the licensee took corrective actions in each case, problems continue to be experienced in the implementation of its QA program.

On October 6, 1983, the Director of Inspection and Enforcement issued a "Confirmatory Order for Modification of the Construction Permits" which required that the licensee adhere to the Construction Completion Program (CCP), dated August 26, 1983, for the duration of the construction of the facility. 48 FR 46673 (October 13, 1983). As more fully described in that order, the development of such a program was necessary to verify the adequacy of prior construction and to insure the adequacy of future construction in view of the identification of widespread QA problems in late 1982, the facility's history of QA problems, and the ineffectiveness of previous corrective actions to fully resolve these problems. An important aspect of the CCP is the third party overview by Stone and Webster Engineering Corporation which is required until the Regional Administrator, Region III, finds that the overview is no longer necessary to provide reasonable assurance that the facility can be constructed in accordance with Commission requirements. One element in any decision regarding the relaxation of the overview requirement will be a finding of confidence in the ability of the licensee's management to properly construct the facility in accordance with Commission requirements without a third party overview. Such a finding cannot now be made.

III

On December 6, 1979, the Director of the Office of Inspection and Enforcement and the Director of the Office of Nuclear Reactor Regulation issued jointly an Order Modifying Construction Permits for the Midland plant. The order was based in part on a breakdown in quality assurance related to soils work at the Midland plant which had led to excessive settlement of the facility's diesel generator building. The licensee demanded a hearing on the order, and the proceeding on the order was eventually consolidated with the proceeding on Consumers Power Company's application for operating licenses for the Midland plant. During the course of the proceeding, the Atomic Safety and Licensing Board issued an order that authorized the Director of the Office of Nuclear Reactor Regulation to amend the Midland construction permits to incorporate certain limitations on remedial soils work at Midland. See Consumers Power Co. (Midland Plant, Units 1 & 2), LBP-82-35, 15 NRC 1060, 1072-73 (April 30, 1982). In accordance with the Board's order, the construction permits were amended on May 26, 1982 to include the Board-ordered conditions.

Among the restrictions imposed by the Board's order and the permit amendment was a condition that the licensee "shall obtain explicit prior approval from the NRC staff...before proceeding with the following soils-related activities...: any placing, compacting, excavating, or drilling soil materials around safety-related structures and systems."

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Construction Permit Nos. CPPR-81 & CPPR-82, ¶ 2.G.(1) & 2.G.(1)a; compare LBP-82-35, supra, 15 NRC at 1072-73. On July 28, 1982, an NRC inspector discovered that the licensee had excavated soil from below the deep "Q" duct bank and had initiated relocation of the fireline in "Q" soils without prior NRC authorization. Excavation below the deep "Q" duct bank had begun on July 23rd and relocation of the fireline had begun on July 27th. Neither activity had received explicit prior approval from the NRC staff as required by the construction permits. In fact, excavation of soil material below the deep "Q" duct bank was contrary to prior directives of the NRC staff which instructed the licensee that such excavation was not authorized. Thus, excavation of the deep "Q" duct bank and relocation of the fireline by the licensee constituted violations of the construction permits.

IV

The history at this site demonstrates that management has not been effective in providing the attention to detail and high quality standards necessary to the proper construction of this facility. In view of this history, including the violation identified in section III of this order, I have determined that a management appraisal is required at this time. The licensee, in a meeting on October 25, 1983 with the Director of the Office of Inspection and Enforcement and the Regional Administrator, Region III, and in a subsequent meeting on January 4, 1984 with the

Regional Administrator, agreed to submit a management appraisal program to the Commission. It is appropriate to confirm the licensee's commitment by order.

V

In view of the foregoing, pursuant to Sections 103, 161(i), 161(o) and 182 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Part 2 and 10 CFR Part 50, IT IS HEREBY ORDERED THAT:

Within 30 days of the effective date of this Order, the licensee shall submit to the Region III Administrator for review and approval a plan for an independent appraisal of site and corporate management organizations and functions that would develop recommendations where necessary for improvements in management communications, controls, and oversight. Upon approval of the plan, the plan shall be implemented and the scheduled milestone completion dates shall not be extended without good cause and the concurrence of the Region III Administrator.

The plan shall include at least the elements itemized below:

- (1) An appraisal conducted by an independent management consultant organization retained by the licensee to evaluate the licensee's

current organizational responsibilities, management controls, communications systems and practices, both at the Midland site and between the corporate office and the site. The appraisal shall include a review of the licensee's site and corporate construction management and supervisory personnel involved in the Midland project to determine their capability and competency for managing construction activities consistent with regulatory requirements.

- (2) A description of the appraisal program, the qualifications of the appraisal team, a discussion of how the appraisal is to be documented, and a schedule with appropriate milestones.
- (3) The provision of recommendations for changes in the areas mentioned in Item 1 that will provide assurance that the licensee will implement NRC requirements.

The licensee shall direct the approved organization to submit to the Region III Administrator a copy of the report of the appraisal and recommendations resulting from the appraisal, and any drafts thereof, at the same time they are sent to the licensee or any of its employees or contractors. Prior notice shall be given the Administrator of any meeting between the licensee and the organization to discuss the results, recommendations, or progress made on the appraisal. In addition, the licensee shall consider the recommendations resulting from the appraisal.

and provide to the Region III Administrator an analysis of each such recommendation and the action to be taken in response to the recommendation. The licensee shall also provide a schedule for accomplishing these actions.

The Administrator of Region III may relax or terminate in writing any of the preceding conditions for good cause.

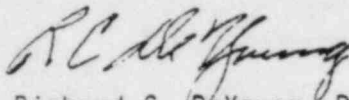
VI

The licensee may request a hearing on this Order. Any request for hearing shall be submitted to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 within 25 days of the date of this order. A copy of the request shall also be sent to the Executive Legal Director at the same address and to the Regional Administrator, NRC Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137.

If a hearing is to be held concerning this Order, the Commission will issue an order designating the time and place of hearing. If a hearing is held, the issue to be considered at such hearing shall be whether this Order should be sustained.

This Order shall become effective upon the licensee's consent or upon expiration of the time within which the licensee may request a hearing or, if a hearing is requested by the licensee, on the date specified in an order issued following further proceedings on this Order.

FOR THE NUCLEAR REGULATORY COMMISSION



Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this 12 day of January 1984.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
Richard C. DeYoung, Director

In the Matter of)	
)	Docket Nos. 50-329
CONSUMERS POWER COMPANY)	50-330
)	
(Midland Plant, Units 1 and 2))	(10 CFR 2.206)

SUPPLEMENTAL DIRECTOR'S DECISION UNDER 10 CFR 2.206

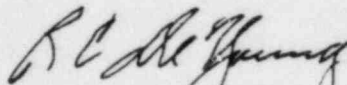
On October 6, 1983, I issued a "Director's Decision Under 10 CFR 2.206," DD-83-16, 18 NRC _____, which granted in part and denied in part a petition dated June 13, 1983, submitted by Billie Pirner Garde of the Government Accountability Project on behalf of the Lone Tree Council and others. The petitioners had requested that, among other relief, the Commission require a management audit of Consumers Power Company's performance on the Midland project. In my decision, I determined that a management audit was not necessary as a condition for going forward with the licensee's program to complete construction of the Midland project. However, I noted that the "staff [would] continue to review information concerning the licensee's performance in other areas to determine whether an audit is required." Slip op. at 12.

I have completed my review of information related to a violation of a condition of the Midland construction permits which was imposed by the Director of Licensing, Office of Nuclear Reactor Regulation in accordance with an order of the Atomic Safety and Licensing Board dated April 30, 1982.

~~8401230245~~
2 pp.

See Consumers Power Company (Midland Plant, Units 1 & 2), LBP-82-35, 15 NRC 1060, 1072-73 (1982). This violation is an addition to the history of quality assurance problems at the Midland site which demonstrates that the licensee's management has not been effective in providing the attention to detail and high quality standards necessary to assure the proper construction of this facility. In view of this history, and the recently identified violation of the Midland construction permits, I have now determined that an appraisal of Consumers Power Company's management of the Midland project is required. The reasons for this action are explained more fully in the Confirmatory Order that I have issued today. The order requires Consumers Power Company, within 30 days of its effective date, to submit to the Region III Administrator for review and approval, a plan for an independent appraisal of site and corporate management organizations and functions. The management appraisal is to develop recommendations where necessary for improvements in management communications, control and oversight. Upon its approval, the plan will be implemented in accordance with a schedule of milestone completion dates.

In view of the issuance of the Confirmatory Order, the petitioners' request pertaining to a management audit is granted.



Richard C. DeYoung, Director
Office of Inspection and Enforcement

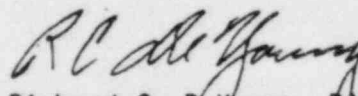
Dated at Bethesda, Maryland
this 12 day of January 1984

NUCLEAR REGULATORY COMMISSION
[Docket Nos. 50-329 and 50-330]
CONSUMERS POWER COMPANY
(Midland Plant, Units 1 and 2)

ISSUANCE OF SUPPLEMENTAL DIRECTOR'S DECISION UNDER 10 CFR 2.206

Notice is hereby given that the Director, Office of Inspection and Enforcement, has issued a supplemental decision concerning a petition dated June 13, 1983, submitted by Billie Pirner Garde of the Government Accountability Project on behalf of the Lone Tree Council and others. The petitioners had requested that the Commission, among other actions, require Consumers Power Company to conduct a management audit. In an October 6, 1983 decision (DD-83-16) which granted in part and denied in part other portions of the petitioners' requested relief, the Director noted that he would continue to consider the question of a management audit. The Director has now ordered the licensee to conduct a management appraisal of the Midland project. Accordingly, the Director has issued a "Supplemental Director's Decision Under 10 CFR 2.206" (DD-84-2). The decision is available for public inspection in the Commission's public document room, 1717 H Street, N.W., Washington, D.C., 20555, and in the local public document room for the Midland facility, located at the Grace Dow Memorial Library, 1910 W. St. Andrews Road, Midland, Michigan, 48640.

FOR THE NUCLEAR REGULATORY COMMISSION


Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this 12 day of January 1984

~~401240000~~ ~~8406040353~~ lp.



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

AUG 24 1982

MEMORANDUM FOR: W. D. Shafer, Chief, Midland Section
FROM: R. B. Landsman, Soil Specialist
SUBJECT: VIOLATION OF ASLB ORDER OF APRIL 30, 1982

When Darl Hood and Joe Kane were in Midland for an ACRS hearing, I asked for a meeting to be held on site between NRR, Bechtel, the licensee and myself. The meeting took place on a Thursday afternoon in the Remedial Soils Trailer (May 20, 1982). The purpose of the meeting was to discuss numerous concerns that I had about ongoing work and future work.

One of the concerns discussed was a monitoring pit for what has come to be known as the deep "Q" duct bank. During that meeting both NRR and I expressed our concerns that what the licensee was planning was not approved, that is: to excavate below the duct bank. NRR only approved an excavation down to a duct bank approximately 22 feet deep. This is documented in an NRC Tedesco to Cook letter dated February 12, 1982, which references a CPCo Mooney to Denton letter dated January 6, 1982.

Since the licensee usually does not know what is in the ground or where it is, as usual the 22 foot duct bank was found at approximately 35 feet. It also was not in the right location as evidenced by the monitoring pit sheet piling hitting one side of the duct. In addition, while drilling a nearby dewatering well, they inadvertently drilled into the duct bank, emptying the well drilling fluid into the turbine building through the duct.

I had no problem with the licensee taking the excavation pit down to 35 feet instead of the approved 22 feet, since the methodology of the approved excavation remained the same. NRR and I did have a problem with the licensee wanting to excavate below the duct bank to impervious clay in order to seal off the water flow, without first informing NRR of their plans and obtaining their prior approval.

All of the above was discussed during the meeting. The licensee was informed that they could not excavate below the deep "Q" duct bank. The licensee indicated that they would submit something formal to NRR for approval.

3-82-061-Attach. 2

~~8302480312~~
8pp.

AUG 24 1982

The following day, I warned them during the normal exit meeting and again during the summary at the end of that meeting that they did not have prior NRR approval. I asked if everyone understood what I was saying and they acknowledged.

The following week, during my inspection to allow the licensee to activate the freeze-wall, I warned them again that they could not dig below the deep "Q" duct bank because they did not have prior NRR approval.

Subsequently, after the activation of the freeze-wall, the licensee apparently decided that they had to seal off the water flow beneath the duct bank and proceeded to dig below the duct bank without NRR approval. I'm not sure when excavation began, but I was on site July 28 when I discovered the excavation in progress. The licensee, when informed of my concern, issued a Stop Work Order on July 29, 1982. I wondered why they were so agreeable until I found out that they already had the excavation down to where they wanted it (the clay).

I informed the licensee during my exit on July 30, 1982 that they were in direct violation of the Board Order and their Construction Permit. To make matters worse, the licensee during the exit, said that they discussed this with Messrs. Hood and Kane in Ann Arbor earlier that morning and had received "Approval concerning the technical adequacy" for what they were doing. I informed the licensee that they missed the point (basis of concern). My concern dealt not with the technical adequacy of what they were doing, but rather with their ASLB order requirement to notify and receive prior staff approval before proceeding below the duct bank. Subsequently, Mr. Kane indicated to me that they never even talked to him about this. Mr. Hood indicated that they talked to him about something concerning the deep "Q" duct bank, but he in no way had given approval.

Subsequent to my leaving the site, the licensee began what I consider to be another unapproved excavation in "Q" soils. This excavation, which involves the relocation of a fire line was discovered on August 4, 1982, during my next inspection. This excavation is along side the service water pump structure. I have not had time to look into this matter to better define the details, but as pointed out to you and Darl Hood, they have undermined a duct bank, an unidentified pipe thrust block, and appear to be along side a safety-related duct bank.

Ross Landsman

Ross Landsman,
Soils Specialist

cc: R. F. Warnick



James W Cook
Vice President - Projects, Engineering
and Construction

General Offices: 1948 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

May 10, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
MIDLAND DOCKET NO 50-329, 50-330
ASLB SOILS ORDER
FILE: 0485.16.1, 0485.16.5 SERIAL: 17138
ENCLOSURE: 7220 C-45 (Q) YARD-WORK CLASS 1
FILL MATERIAL AREAS

The Atomic Safety and Licensing Board issued an Order, dated April 30, 1982, imposing certain interim conditions on the remedial soils and related work at the Midland site. In accordance with the Order, Consumers Power Company stopped work at affected areas of the Midland site. Work which had previous NRC staff approval or which was otherwise not covered by the Order continues..

The Order covers remedial soils work, as well as "any placing, compacting, excavating, or drilling of soil materials around safety-related structures and systems." For a number of years, the Midland Project Drawing 7220-C-45 has been recognized as defining which soils at the Midland site are safety-related. The enclosed C-45 drawing is being reviewed for completeness relative to the Board Order. The next revision of the drawing will address the ultimate heat sink components and other appropriate areas. In a conference telephone call on May 5, 1982, the Board concurred that in the absence of disagreement from the NRC staff, the term "around safety-related structures and systems" as used in the Order may be interpreted as coextensive with safety-related soils as designated on the C-45 drawing.

Remedial soils work previously approved by the NRC is continuing. Concurrence as to the scope of this work was obtained from Mr Darl Hood, and is as defined below:

- I. a. phase I work (Auxiliary Building underpinning),
b. access shaft (Auxiliary Building underpinning),

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3-82-061-Attach. 3

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- c. freeze wall installation, underground utility protection, soil removal cribbing and related work in support of the freeze wall installation, freeze wall monitoring and freeze wall activation,
- d. installation and operation of the permanent site dewatering system,
- e. operation of existing construction dewatering wells,
- f. FIVP proof load test.

In addition to the above, NRR or Region III have specifically approved other work that is not presently underway. This work, as defined below, will be started at the appropriate time:

- II. a. installation and activation of dewatering system for the service water pump structure,
- b. the repair of cracks in the borated water storage tank ring wall,
- c. installation of Auxiliary Building monitoring system cable.

In addition to the above, when the Order was issued Consumers Power was proceeding with certain other soils remedial work with full awareness and concurrence of the Staff; however, explicit written approval for that work had not been obtained. This work, as defined below, has been stopped in accordance with the order:

- III. a. installation of deep-seated benchmarks,
- b. installation and operation of construction wells that were not previously operating (previously installed and operating wells are noted in Ie above),
- c. installation of monitoring system instruments and mounting.

Consumers Power Company believes it did have staff approval for this work because of the extensive review of the installation details of the systems and final agreement on the installation techniques. Accordingly, Consumers Power Company requests the staff to verify in accordance with the Order its earlier concurrence so that work in these areas can be reactivated.

Confirming recent telephone communications, we have increased from 9 to 12 the number of deep benchmarks for monitoring auxiliary building movements. Two of three additional benchmarks still need to be installed. These benchmarks will be installed in the same manner as the earlier nine, and the final system will be subject to final staff concurrence. Regarding benchmark installation, Consumers Power Company believes it had Staff concurrence following the auxiliary building audit, site visit and letter of March 22, 1982. The March 22, 1982 letter instructs the Applicant to have additional benchmarks installed before beginning Phase II work. Consumers now requests written confirmation of staff approval for the balance of this work.

When the Order was issued, additional area dewatering wells were being installed to dewater the site for activation of the freeze wall and resulting construction. These wells are needed to complete installation of the freeze wall and dewater construction areas. They were and will be installed to the acceptance criteria agreed upon by the Staff for installing and operating dewatering wells in a safe manner. Consumers Power Company believes the agreement reached with the Staff on acceptance criteria for construction dewatering, together with the authorization to install and operate the freeze wall, for which the dewatering is necessary, constitute previous staff approval of this work, and, therefore, requests explicit written confirmation at this time.

The work on the monitoring system instruments and mounting for the auxiliary building is presently stopped because the Region III concurrence has not been obtained. We understand the remaining proposed work in this area will be reviewed by Region III in the near future. Such work is on the critical path and will start as soon as approval is obtained.

The Order also requires that certain work specified therein be covered by a quality assurance plan approved by the NRC Staff. The "Quality Plan for Underpinning Activities" (MPQP-1) was written specifically to provide nuclear quality assurance coverage of certain subcontractors which did not themselves have nuclear QA programs (Mergentime, Spencer White & Prentiss and their subcontractors). MPQP-1 was approved by the Staff, subject to certain questions as to coverage, at a March 10 meeting with Consumers. Resolution of the coverage questions was achieved at meetings with the NRC Staff on March 30, 1982, as documented in a letter from J W Cook to Mr J G Keppler dated April 5, 1982. In the April 5 letter, Consumers agreed to place all to-go underpinning work, with certain specific exceptions, under the coverage of the quality plan for underpinning activities. The latest revisions of MPQP-1 encompass the installation and operation of the structural monitoring system, as performed by Wiss Janey, in addition to the auxiliary building and service water pump structure underpinning.

Activities being performed wholly by Consumers, Bechtel or specific subcontractors which have in-place nuclear quality assurance programs are not specifically subject to MPQP-1, (which was designed for subcontractors without nuclear QA programs). We interpret the existing quality assurance programs and procedures of those organizations not covered by MPQP-1 as meeting the Order's requirement of an approved QA "plan". Such quality assurance programs and procedures have been approved by the Staff previously or by CP Co under procedures normally used to review contractor QA programs. Of course, the specific construction implementing procedures for activities carried out under these QA programs are subject to review by the Staff to the extent it deems necessary.

With regard to the items listed under III, above, the installation of deepseated benchmarks is being carried out by Woodward Clyde, which is subject to its own quality assurance program and procedures approved by Consumers and previously subject to NRC Staff inspections. The construction dewatering wells under item III(b) are to be installed subject to the quality requirements agreed upon with the Staff. As indicated above, the installation

of monitoring systems for the auxiliary building underpinning as performed by Wiss Janey (item C, above) is covered by MPQP-1, and as performed by Bechtel is subject to the overall site quality assurance program.

In summary, after issuance of the April 30, 1982 Order, the Company stopped certain work pending written confirmation of NRC Staff approval, previously given, that such work could be completed. Consumers Power Company requests Staff confirmation on these work activities so that they can be resumed as soon as possible.

James W. Cook

JWC/JEB/dsb

- CC Atomic Safety and Licensing Appeal Board, w/o
- CBechhoefer, ASLB, w/o
- MMCherry, Esq, w/o
- FPCowan, ASLB, w/o
- RJCook, Midland Resident Inspector, w/o
- RSDecker, ASLB, w/o
- SGadler, w/o
- JHarbour, ASLB, w/o
- GHarstead, Harstead Engineering, w/a
- DSHood, NRC, w/a (2)
- DFJudd, B&W, w/o
- JDKane, NRC, w/a
- FJKelley, Esq, w/o
- RBLandsman, NRC Region III, w/a
- WHMarshall, w/o
- JPMatra, Naval Surface Weapons Center, w/a
- WOtto, Army Corps of Engineers, w/o
- WDPaton, Esq, w/o
- SJPoulos, Geotechnical Engineers, w/a
- FRinaldi, NRC, w/a
- HSingh, Army Corps of Engineers, w/a
- BStamiris, w/o

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 17138 Dated May 10, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits a summary of action it has taken in response to the ASLB order dated April 30, 1982. Furthermore we are requesting explicit written approval for continuation of certain construction activities.

CONSUMERS POWER COMPANY

By /s/ J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me 12th day of May 1982

 Barbara P Townsend
Notary Public
Jackson County, Michigan

My Commission Expires September 8, 1984



Consumers
Power
Company

James W Cook
Vice President - Projects, Engineering
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

January 6, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
MIDLAND DOCKET NOS 50-329, 50-330
AUXILIARY BUILDING UNDERPINNING FREEZE WALL - EFFECTS OF
THE FREEZE WALL ON UTILITIES AND STRUCTURES
FILE 0485.10 SERIAL 15424

REFERE CES: (1) JWCOOK LETTER TO HRDENTON, SERIAL 14318,
DATED OCTOBER 28, 1981
(2) JWCOOK LETTER TO HRDENTON, SERIAL 14869,
DATED NOVEMBER 16, 1981
(3) JWCOOK LETTER TO HRDENTON, SERIAL 14874,
DATED NOVEMBER 24, 1981

ENCLOSURE: EFFECTS AND MONITORING PROCEDURES FOR
INSTALLATION OF FREEZE WALL DEWATERING AT
MIDLAND UNITS 1 AND 2

In the referenced correspondence of October 28, 1981 (Reference 1) and during an October 1, 1981 meeting with the Staff, we presented a freeze wall concept for groundwater control under consideration for the underpinning of the auxiliary building. During a subsequent telephone discussion with the Staff on December 21, 1981, we proposed an approach for establishing protective measures for underground utilities and structures in the affected area of the freeze wall.

In response to a Staff request made during the December 21, 1981 telecommunication, we are providing the enclosed summary of measures that we are planning for the protection of underground utilities and structures. The enclosed document contains: (a) the plans and elevations of the excavations at the affected utilities; (b) a cross-sectional view showing how the freeze wall is tied to the containment; and (c) reasons for using this approach. Using this approach for protection of underground facilities isolates them from the effects of heave due to freezing.

With reference to the NRC's testimony on the remedial measures for the auxiliary building, transmitted to the ASLB in the NRC's correspondence of

oc0182-0001a100

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November 20, 1981, the enclosed report responds to the special licensing conditions identified in Table A.20, Parts 2a and 2b, and to Question 4 of Attachment 21 to this testimony. Regarding the special licensing conditions from Table A.20, Parts 2c and 2d for activation of the freeze wall, Question 3 of Attachment 21 to the NRC's testimony has been answered in Reference 2 of this letter. Our response to Questions 14 and 17 of Attachment 21 were provided in References 2 and 3 above and in the testimony of JPGould.

This completes our response to all parts of Item 2 of Table A.20.

J A Mooney
 J A Mooney
 Executive Manager
 Midland Project Office

For J W Cook

JWC/RLT/dsb

CC Atomic Safety and Licensing Appeal Board, w/o
 CBechhoefer, ASLB, w/o
 MMCherry, Esq, w/o
 FPCowan, ASLB, w/o
 RJCook, Midland Resident Inspector, w/o
 RSDecker, ASLB, w/o
 SGadler, w/o
 JHarbour, ASLB, w/o
 DSHood, NRC, w/a (2)
 DFJudd, B&W, w/o
 JDKane, NRC, w/a
 FJKelley, Esq, w/o
 [REDACTED]
 WHMarshall, w/o
 JPMatra, Naval Surface Weapons Center, w/a
 WOtto, Army Corps of Engineers, w/a
 WDPaton, Esq, w/o
 FRinaldi, NRC, w/a
 HSingh, Army Corps of Engineers, w/a
 BStamiris, w/o

EFFECTS AND MONITORING
PROCEDURES FOR INSTALLATION
OF FREEZEWALL DEWATERING
AT
MIDLAND UNITS 1 AND 2

Consumers Power Company
January 5, 1982

~~82-8112-440~~

1300.

This is a reply to the special licensing conditions outlined in Table A.20, Part 2 (2a and 2b).

2A DOCUMENTATION OF DEFLECTIONS FROM EXISTING INSTALLATIONS

This report contains results of an investigation requested by the NRC. The purpose of the investigation was to compile documentation demonstrating that the freezewayall, when activated, will not adversely affect Seismic Category I structures, conduit, and pipes by causing ground heave or resettlement upon thawing.

Available information was reviewed from projects for which ground freezing was used and ground movement documented. Of the cases reviewed, none are similar to this situation. Most documented cases either provided documentation during only one segment of the project, or were in completely different soil conditions, frozen to the surface with no overburden, or for tunnel application where construction-induced settlement was monitored. No documentation of utility monitoring was found.

Because of the high-permeability soil, as proven by numerous dewatering pump tests conducted at the site, the actual pressure on these utilities is expected to be small. However, because no documented evidence of heave for similar installations is available and the expected movement of the soil and resultant stresses in the utilities cannot be calculated at this time, the response to Section 2B outlines the areas of concern and preventive measures proposed to eliminate any stresses on safety-related utilities.

2B MONITORING AND STRESS PREVENTION PROGRAM

As stated in Part 2A, no known guidelines can be found or calculated at this time to determine a projected movement to safety-related utilities; therefore, historically proven acceptance criteria for monitoring cannot be established. In lieu of the NRC request to provide a field monitoring program to detect movement to safety-related utilities and structures, the following alternative is proposed to eliminate the possibility of stress to these utilities.

AREAS OF CONCERN

Figure 1 indicates the location of the freezeway, area of Q-fill, and crossings of safety-related utilities. As indicated on this figure, the freezeway does not cross under or influence any safety-related structures. Although the freezeway will abut the containment building, it will not extend under it, therefore precluding any possibility of heave for this structure. Most of the freezeway is installed in non-Q areas. It only extends into the Q area to form closure at the containment and, where required, to cross utilities on the southeast corner and east side of the power block. The utilities included at these crossings are: two sets of 26-inch service water lines, two electrical duct banks, and two sets of diesel fuel oil lines.

PREVENTATIVE MEASURES

The diesel fuel oil lines are 1-1/2- and 2-inch diameter steel pipes. No preventive action will be necessary or taken to prevent movement of these lines, because these lines are in the top 4 feet of the ground surface and are therefore susceptible to normal ground frost movement. Because of their small diameter they are more flexible and can tolerate movement due to frost heave.

To eliminate any possibility of stress on the service water lines or electrical duct bank during the freeze cycle, these utilities will be excavated within the projected influence area of the freeze wall. The utilities will be excavated in a crib to provide a gap between the utility and the soil during the freeze cycle. After the freezeway has stabilized, the utilities will be rebedded and backfilled. A description of the three crossing areas follows.

Crossing 1

Crossing 1 is composed of: (a) One group of diesel fuel lines in the top 4 feet of the ground surface; and (b) the duct bank supply to the diesel fuel tanks. Figures 2 and 3 indicate the utilities and crib excavation to be used in this area. The diesel fuel lines as explained above require no preventive action.

Crossing 2

Crossing 2 is composed of: (a) four diesel fuel lines in the top 4 feet of the surface; and (b) two sets of two identical 26-inch service water lines. The diesel fuel lines as explained above need no preventive action. The two sets of service water lines will be excavated as shown in Figures 4 and 5.

Crossing 3

Crossing 3 is limited to one duct bank. This duct bank is 22 feet deep and is the only safety-related utility line in the freeze zone. This duct bank will be excavated as shown in Figure 6 and 7.

CONTAINMENT BUILDING

Figure 8 shows the interface of the freezeway at the containment building. As shown, the freezeway does not extend under the structure. The containment is backfilled with clean sand. Clean, free-draining sand and high permeability materials are generally unsusceptible to frost expansion. During freezing, water is forced out of the soil at the same rate as the freezing process, which results in a lower frozen water content without volume changes. Also given the approximate stiffness and mass of this structure (120-foot diameter, at 10 ksf or 115,000 kips), it is evident that the influence of an approximately 3-foot-wide freeze section abutting the wall at the base of this structure will not adversely affect its stability.

MONITORING

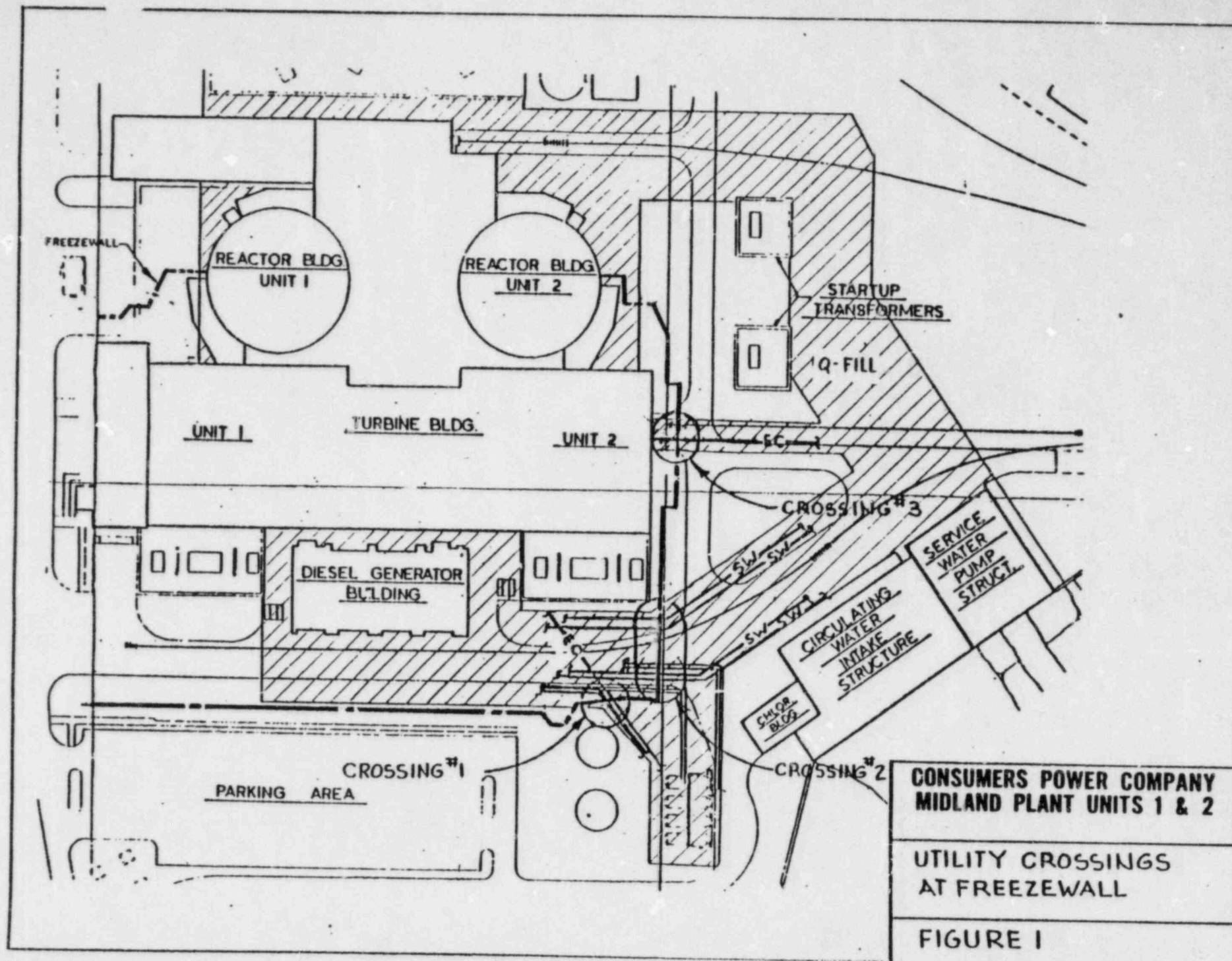
Utilities

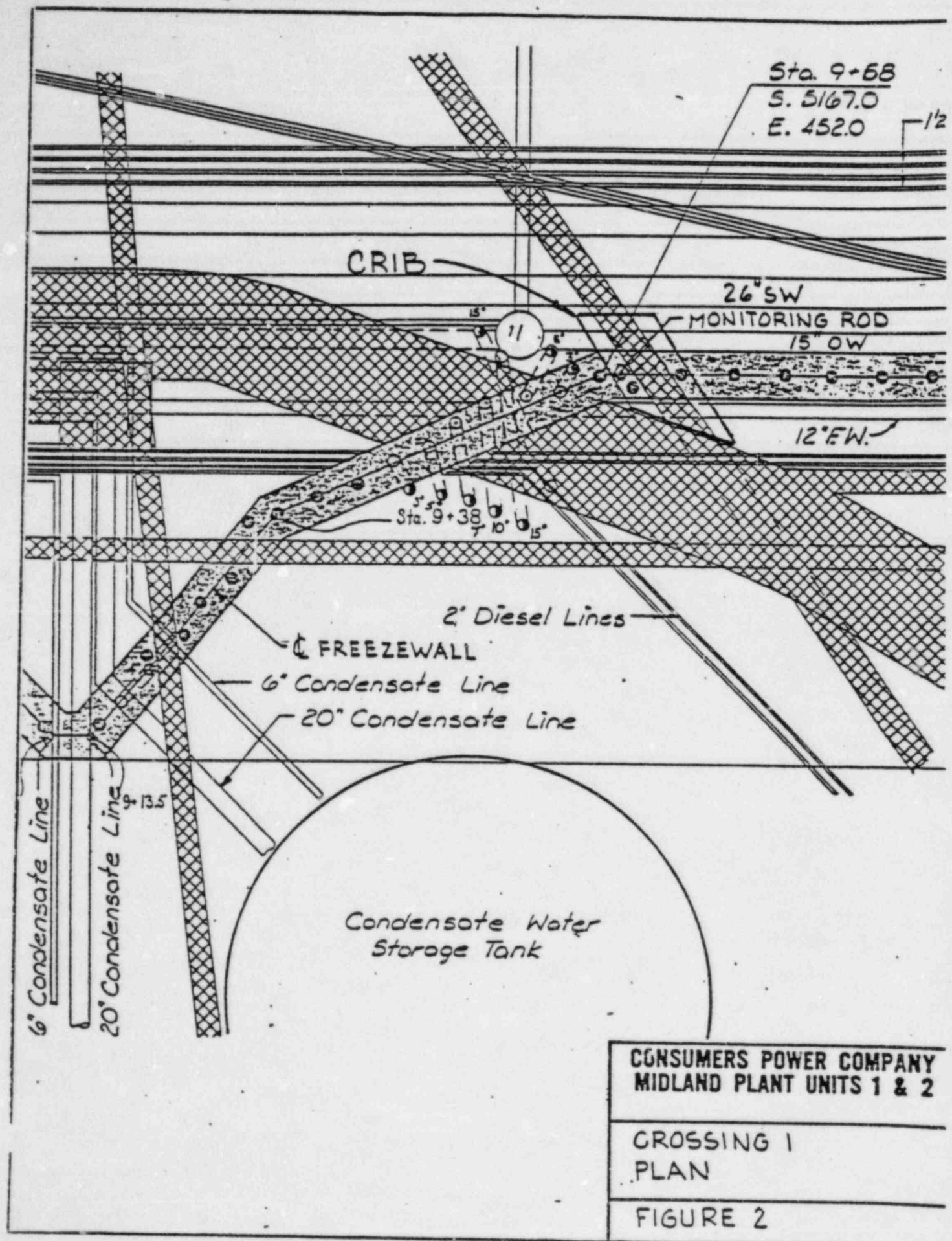
A monitoring rod will be installed in the ground at each crib excavation and monitored to determine if ground movement occurs during the freeze cycle. The monitoring will be for information only because the utilities will not be affected even if heaving occurs.

Containment

The existing settlement monitoring program, which includes monitoring the containment building, will be modified to include additional settlement readings at various phases of freezeway operation as follows:

- a. Before formation of the freezeway
- b. Just after the wall has frozen
- c. Just after the wall has unfrozen

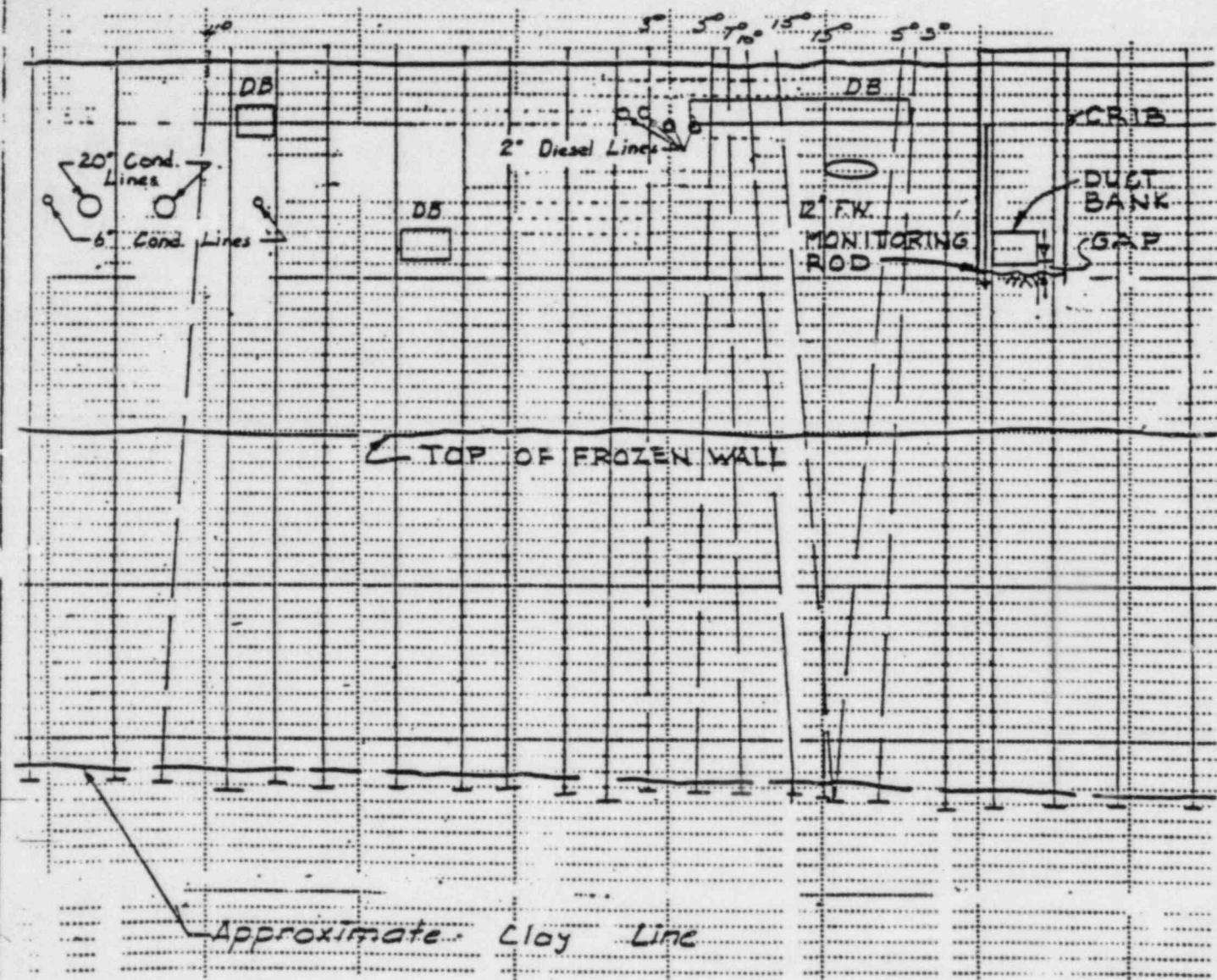




CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2

CROSSING 1
PLAN

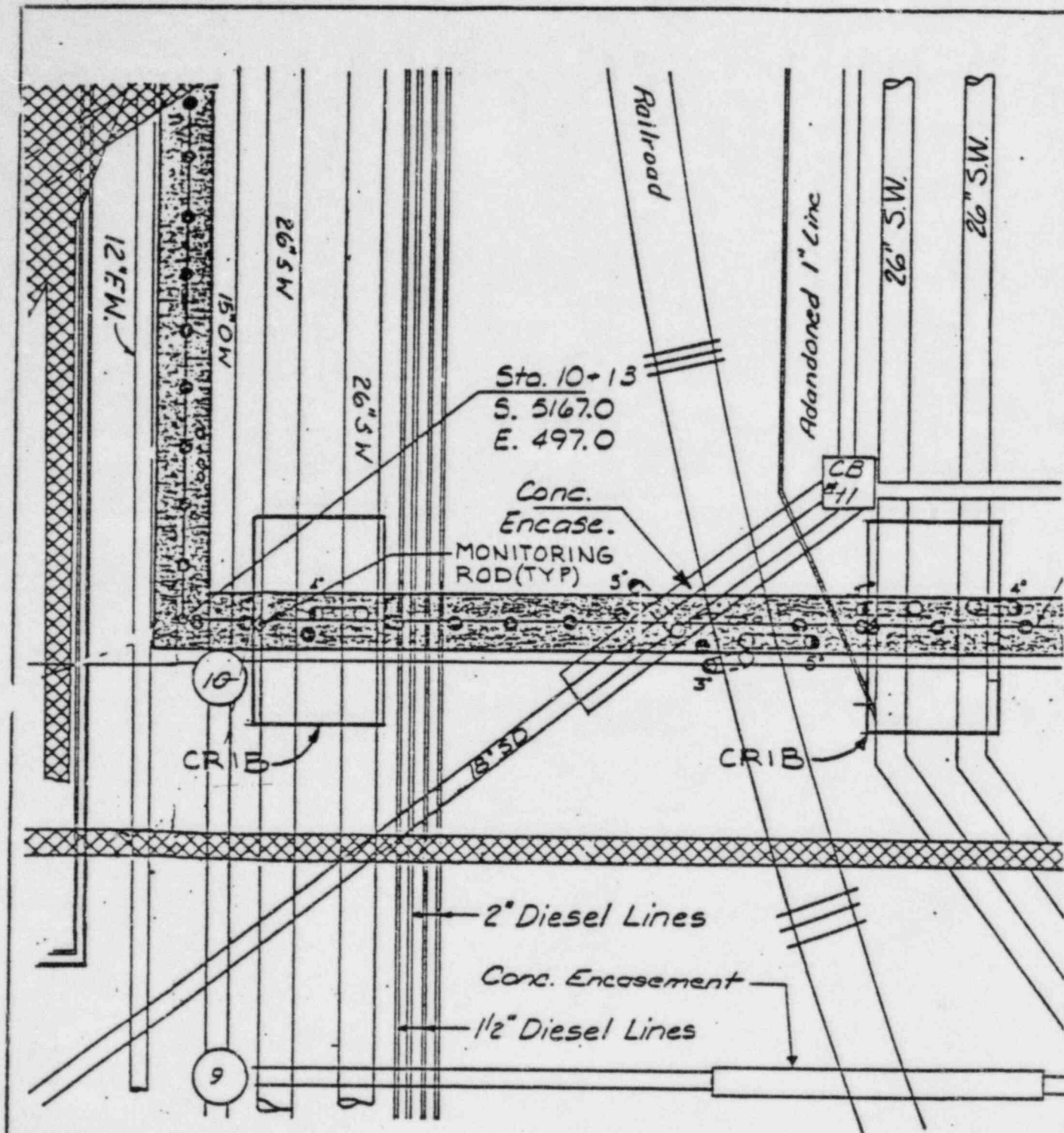
FIGURE 2



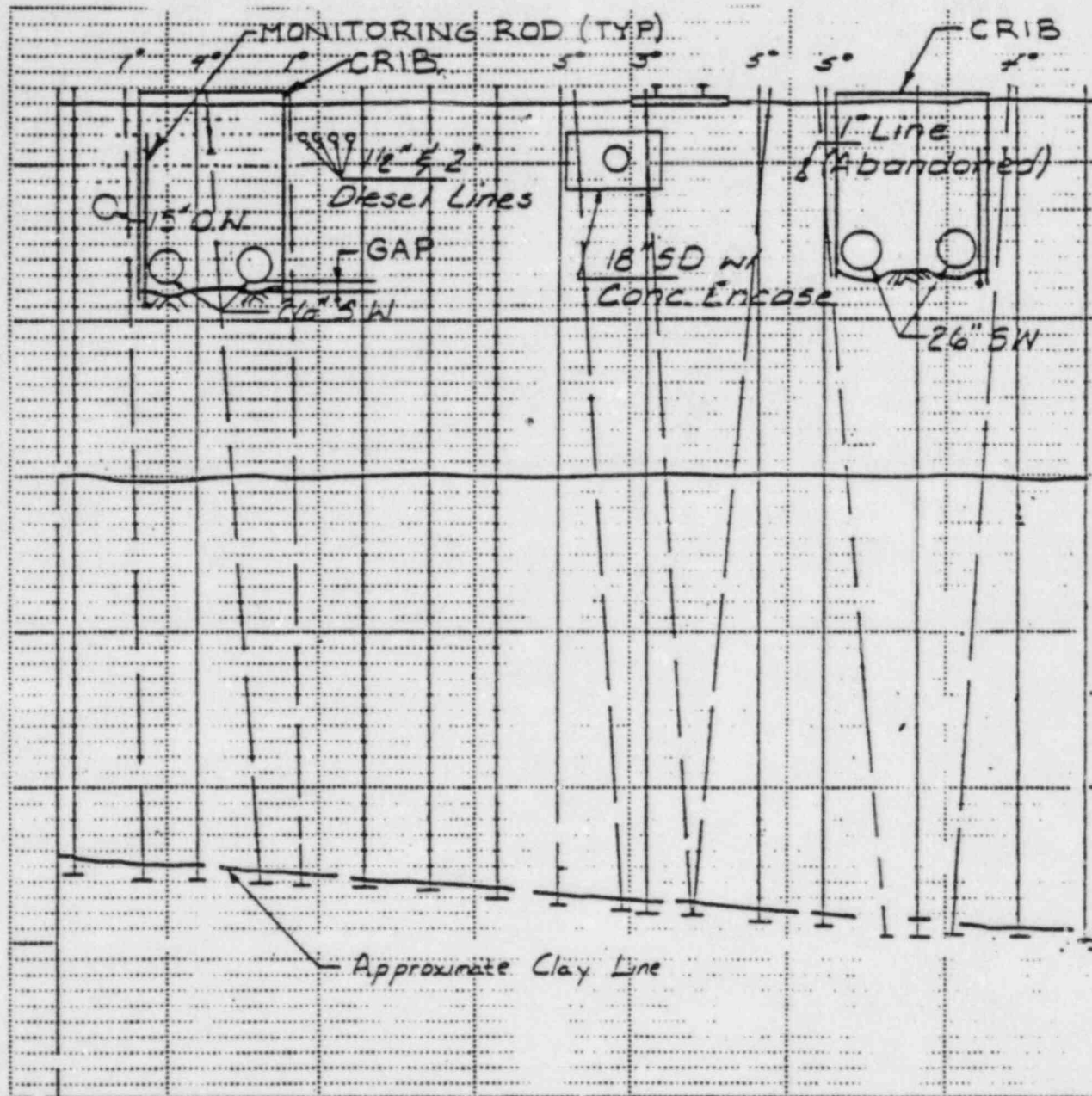
CONSUMERS POWER COMPANY
 MIDLAND PLANT UNITS 1 & 2

CROSSING!
 PROFILE

FIGURE 3



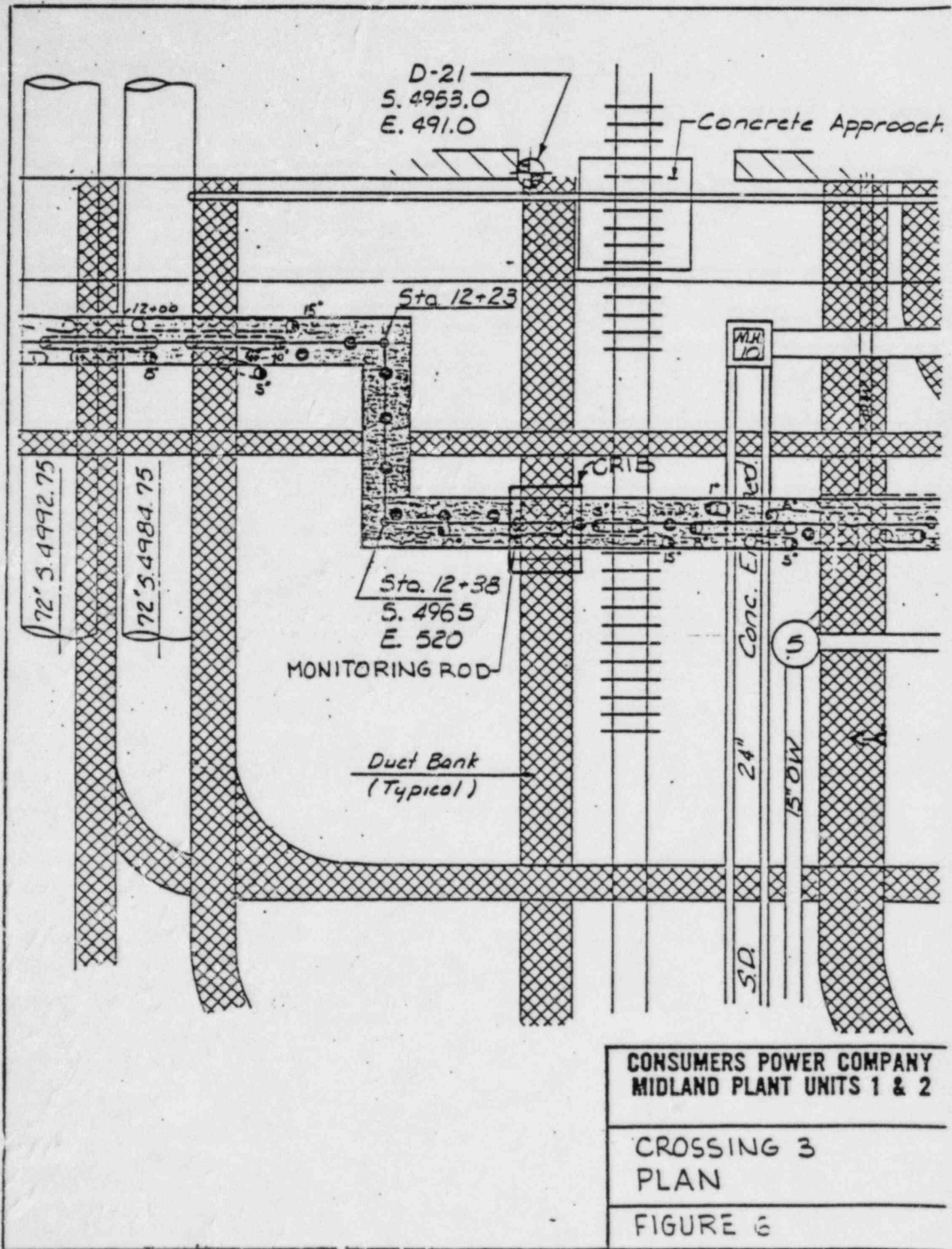
<p>CONSUMERS POWER COMPANY MIDLAND PLANT UNITS 1 & 2</p>
<p>CROSSING 2 PLAN</p>
<p>FIGURE 4</p>

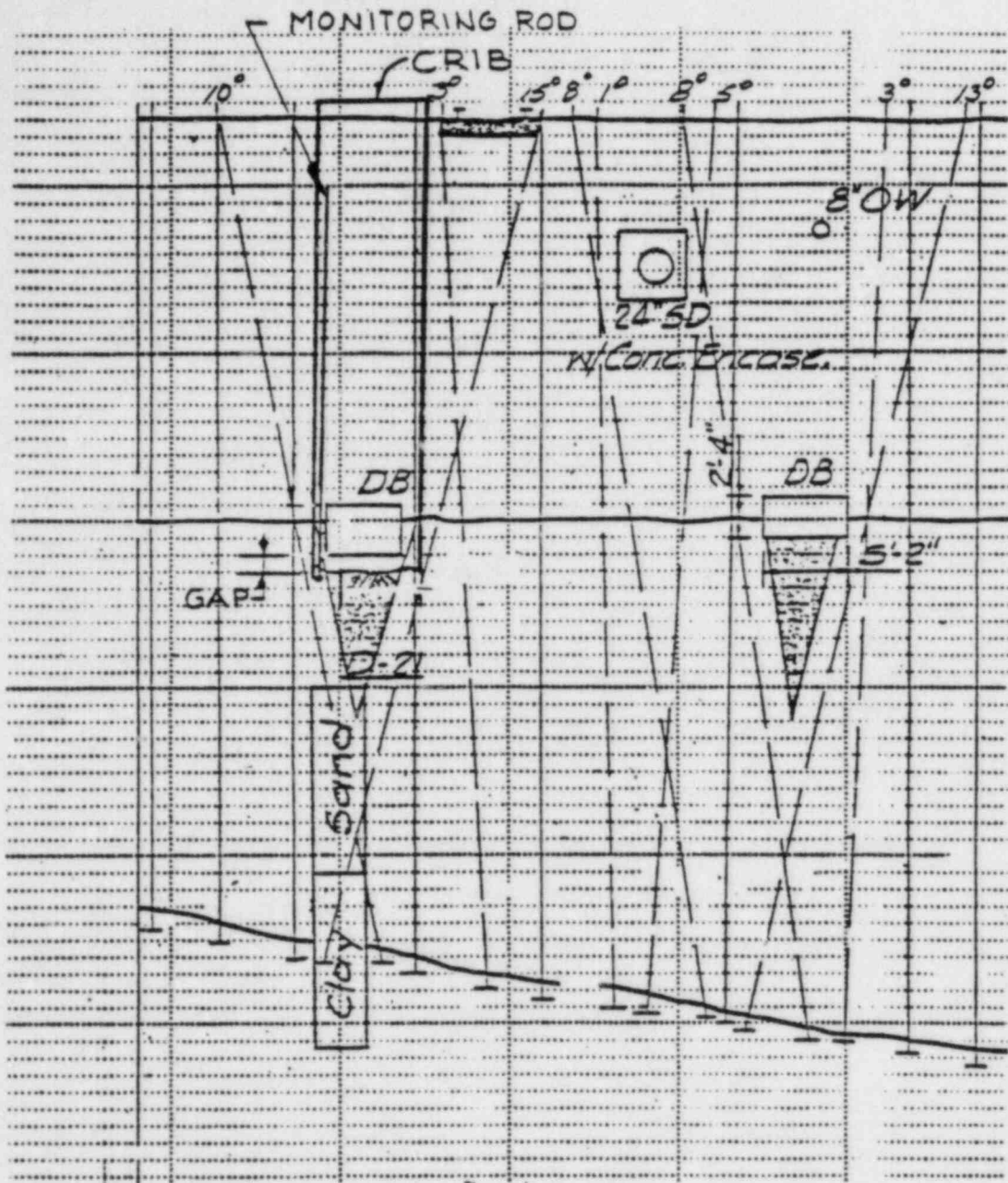


CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2

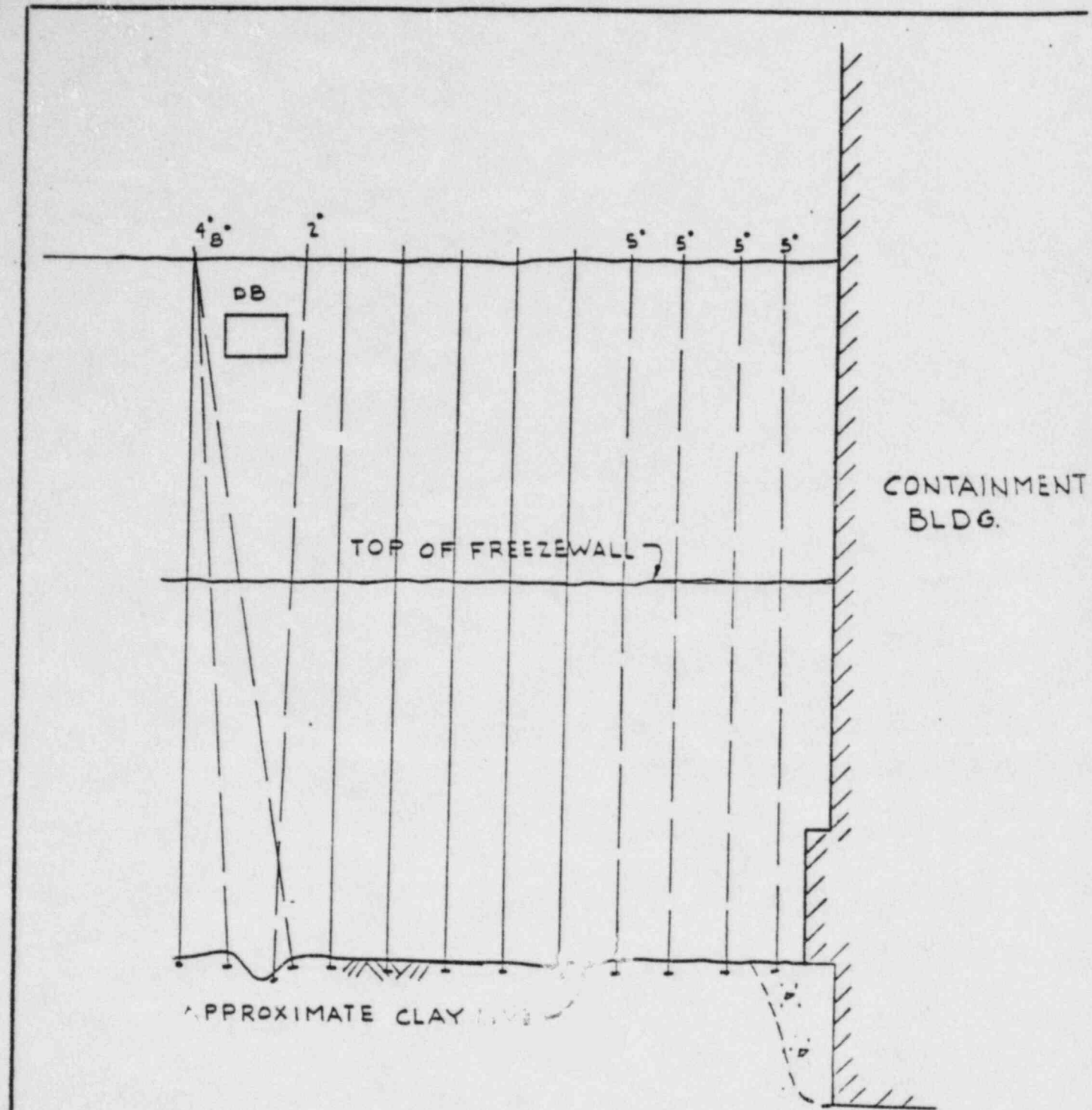
CROSSING 2
PROFILE

FIGURE 5





<p>CONSUMERS POWER COMPANY MIDLAND PLANT UNITS 1 & 2</p>
<p>CROSSING 3 PROFILE</p>
<p>FIGURE 7</p>



CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2

CONTAINMENT BLDG
PROFILE

FIGURE 8



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

Page 6

NOV 12 1982

Docket Nos: 50-329 OM, OL
and 50-330 OM, OL

APPLICANT: Consumers Power Company
FACILITY: Midland Plant, Units 1 and 2
SUBJECT: SUMMARY OF JULY 27 - 30, 1982, AUDIT ON
SOILS REMEDIAL ACTIVITIES

On July 27-30, 1982, the NRC staff and its consultants met in Ann Arbor, Michigan with Consumers Power Company (the Applicant), Bechtel and their consultants to audit analyses, designs and preparations for remedial measures to correct the foundations and utilities on inadequately compacted fill soils at the Midland site. Meeting attendees are listed by Enclosure 1.

On July 19, 1982, the staff issued a draft of the second supplement for the Midland SER which primarily addresses the soils settlement review. A listing of the outstanding review items in this draft SSER was prepared by the applicant and served as the meeting agenda. The list was updated at the conclusion of the meeting to indicate which of those items had been included in the staff's audit. Enclosure 2 is the resulting agenda. The same-numbered items from Enclosure 2 are discussed below in this summary. Selected handouts provided during the meeting are shown as attachments within Enclosure 3.

General Items

- 1 - 5. Not included in Audit
6. NRC input into the final SSER will cover range of applied bearing pressures' static and dynamic loading

A draft of FSAR Table 2.5-14, including bearing pressure data for the Auxiliary Building (AB), was provided (Attachment 1). The staff reviewed the table, noted that the information was acceptable and that once provided for the docket and verified, this item would be technically closed.

- 7 & 8. The applicant was requested to determine that 1.5 x FSAR seismic response spectra analyses are conservative for the auxiliary building (AB), service water pump structure (SWPS), and borated water storage tank (BWST) in comparison to site-specific response spectra (SSRS).

The applicant has not provided comparative plots of floor response spectra that were requested by the staff for all buildings (seismic margin review).

The NRC structural engineering staff reviewed calculations at 5 points of elevation for the AB to determine if 1.5 x FSAR response

3-82-061-Attach 16

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spectra enveloped the results obtained by using the SSRS. For these five points, the floor response spectra generated by the use of 1.5 times the FSAR spectra enveloped the respective floor response spectra developed from SSRS. Additional locations in this and other structures will be addressed as part of the seismic margin study.

The applicant also noted that the use of the floor response spectra derived from the seismic margin earthquake would be according to the seismic margin review criteria submitted to the staff by letter of September 25, 1981. The results of the seismic margin review will be submitted to the staff during the first quarter of 1983.

9. Test data on #9 and #10 Fox-Howlett rebar splices with up to 2% strain

Copies of test data up to 2% strain for #9 and #10 Fox-Howlett rebar splices were provided to the NRC during the audit. Copies were also sent to the NRC consultant, Science Applications Institute by letter dated July 16, 1982.

The NRC found the information acceptable after preliminary review. Pending subsequent NRC discussions with its consultant, this item may be closed.

10. Identification, inspection, and repair procedures for concrete crack repair

Criteria for concrete cracks were agreed upon and will be documented by the applicant in a letter in early August 1982 (Post script: see applicant's letter of August 2, 1982).

The crack repair program applies to the DGB, SWPS, Control Tower and Electrical Penetrations Areas of the Auxiliary Building and Feedwater Isolation Pits, which will be completed prior to the first refueling of the plant. It consists of the following three points:

- (1) Repair by epoxy injection any cracks in the structures which are below the permanent ground water table and which exhibit weeping characteristic. This repair will be performed from the inside of the structures.
- (2) Coat the splash zone of the exterior surface of the south wall of the Service Water Pump Structure which is in contact with cooling pond water with waterproofing compounds. The waterproofing compound will be one of the three compounds recommended by consultants in their report "Effects of Cracks on Serviceability of Structures in the Plant".

- (3) Repair by epoxy injection existing cracks which are 20 mils and larger and apply a sealant to the surfaces of the concrete walls in the following accessible areas (i.e. areas where removal of soil or installed equipment or installed components is not necessary to perform the repair). The extent (length) of the crack that will be injected with epoxy will include at least that portion with crack width of 10 mils or larger.

Prior to the initiation of repairs, all cracks 20 mils and larger and weeping cracks in the applicable areas will be identified. A verification of this identification to a tolerance of +5 mils will be performed. This verification and subsequent will be in accordance with the quality program. The material for structural epoxy adhesive will be "congresive-1380" manufactured by Adhesive Engineering Company, or equivalent.

The areas to be repaired for each applicable building are as follows:

DGB

- (a) All accessible interior reinforced concrete walls.
- (b) All accessible exterior concrete walls.

CT&EPAs

- (a) All accessible exterior concrete walls.

SWPS

- (a) All accessible exterior walls.

11 & 12. Not included in audit.

Auxiliary Building

1. Resolution of allowable vertical differential settlement and strain that will stop underpinning construction and require installation of temporary supports

The NRC staff reviewed the allowable settlement calculation resulting from analysis of the construction condition using a subgrade modulus of 70 KCF and analysis of reduced support along the EPA due to tunneling (Attachment 4).

Attachment 2 provides definitions of "alert", "action" and "requalify" levels which were agreed upon for underpinning activities. Attachment 3 provides numerical values which were agreed upon. The levels apply to Phases II, III, and IV.

This item was accepted by the staff.

2. Compaction control specification for granular fill beneath feedwater isolation valve pits (FIVPs)

It was agreed that the fill beneath the FIVP will be tested using the procedures outlined in the Seabrook FSAR. A copy of a similar FSAR section was provided by the NRC. It was also agreed that the fines portion of the fill shall be non-plastic. This will be verified by the resident geotechnical engineer by appropriate testing (hydrometer or Atterberg limits). The backfill will be properly moisture conditioned by soaking immediately prior to compaction. The soaking means will be approved by the resident geotechnical engineer. Compaction acceptance criteria will be 95% modified proctor or 85% relative density (whichever testing standard results in the maximum dry density) based on tests performed prior to placement. The applicant also committed to performing a laboratory compaction or relative density test to establish maximum dry density on soil material taken from each field density test location. Bechtel compaction control specification will be revised.

Additional compaction equipment (e.g. self propelled double drum compactor) will be qualified by the test fill method.

3. Methodology for transferring final loads to permanent underpinning wall

Preliminary copies of Mergentime/Hanson Drawings S-74 and S-74a (see SSER #2, Appendix I) not yet reviewed by Bechtel, were provided for staff review. Analysis of the permanent wall and preliminary design details were also reviewed. The review included methodology, rebar stresses in critical areas, and connection to existing structure. The staff found these items to be acceptable.

The transfer of loads will be accomplished by the use of hydraulically actuated steel jacks that are incrementally increased to the specific loads determined by the structural analyses. When the predetermined loads have been developed by the jacks, the loads will be maintained and locked off provided that the following criteria are met:

- (1) The pier will be loaded to 125% of its specified jacking load and continued at the load until the relative movement between the top of the pier and the underpinning structure is less than 0.01 in. in a continuous 1 hour period. When this condition is satisfied,

- (2) The pier load will be reduced to 110% of its specified jacking load and continued at that load until the relative movement between the top of the pier and the underpinning structure is less than 0.01 in. for a continuous 24-hour period. When this condition is satisfied, the pier will be locked off.
- (3) Jacking loads for the permanent underpinning will be maintained at the specified value for at least 30 days.
- (4) A semilogarithmic plot of settlement versus time will be developed to allow determination of when secondary consolidation has been reached.
- (5) The settlement increment in the last 30 days of sustained load will not exceed 0.05 in.
- (6) The settlement in the last 10 days of sustained load will not exceed 0.01 in.
- (7) Wedges to be used for the permanent wall will be driven tight and permanently welded in place. In case a predicted jacking load is not obtained (when a 0.03-in. upward movement of the existing structure occurs) jacking loads should be reduced to 80% of the load at which the movement occurred and this load will be used in the analyses to determine subsequent jacking loads.

4. Updated scope of construction for Phases III and IV

The plan which describes the construction scope (Drawing 7220-SK-C-0101) (see SSER #2, Appendix I) was reviewed. A discussion was also held regarding construction sequence. The staff found these matters to be acceptable.

5. Resolution of pier and plate load test details on maximum test load, locations, and time for performing test

The load test will be performed on Pier W-11. The proposed load sequence is to jack the load from 0 to 50% of the bearing pressure allowed for the seismic loading combination, then decrease the load to 25%, and then increase the load to 130%. The staff agreed that no additional plate load test is required. The staff found these details to be acceptable.

6. Long-term settlement monitoring plan during plant operation

This is a technical specifications item. The information will be provided to the NRC as part of the FSAR technical specification submittal in October 1982.

7. FSAR documentation on as-built conditions

This is a confirmatory item which will provide the level of construction information typical of an FSAR. The information will be provided to the NRC once the appropriate construction stage has been achieved.

→ 8. Design modification at freezeway crossing with duct banks

The applicant had previously committed to provide a report addressing the installed surcharge loading program, monitoring results and backfill techniques. The proposed method for backfilling monitoring pits will be provided prior to accomplishing the work. This carryover item from earlier meetings continues as a confirmatory issue.

9. Resolution of required depths of construction dewatering wells

The applicant agrees with a staff position that, when excavating in cohesionless (natural or fill) soils, the groundwater will be maintained 2 feet below the advance of excavation.

In addition, a probing program will be used in selected piers. As a minimum, these piers include E12, W12, E10, W10, E7, W7, E4, W4, CT1, CT6, and CT12. Test holes between 1 in. and 4 in. in diameter will be advanced to a depth of 5 ft beneath the proposed bearing level (from a level 5 ft above the bearing level) in these 11 selected piers to determine whether groundwater under pressure exists in sufficient volume to require special pier dewatering. If water pressures are low, excavation to the bearing level will continue. If water pressures are shown to be high in the test holes, special dewatering (e.g., wellpoint or other suitable means) will be used to lower the water table at that pier to at least 2 ft below the bearing level. The hole beneath the final bearing level will be grouted. Although the available information indicates that the bearing stratum is a fairly homogeneous hard clay, it is possible that special pier dewatering will be needed. These holes will be used

by the applicant as a conservative measure to confirm subsurface conditions before the bearing level is reached. Interpretation will be done by the resident geotechnical engineer. This item is acceptable to the staff on this basis.

10. Monitoring matrix showing allowable settlements and strains

An updated copy of the monitoring matrix (Bechtel Drawing 7220 C-1493(Q), Rev. 1) (Attachment 7) was provided. Alert, action and requalify levels will be added as agreed above (AB Item 1).

The staff agreed that no alert or action level needs to be established for monitoring strain. However, the strain data are considered supplementary to understand the behavior of the building and strain levels greater than 0.0010 in/in. are a factor to be considered in the raising of the alert and action settlement levels. This item is acceptable to the staff on this basis.

11. Electrical penetration area (EPA) and control tower (CT) relative horizontal movement criteria

The NRC staff reviewed drawings showing the gap detail between the EPA/CT and the turbine building (TB). The minimum gap between structural members of the CT and TB is 8 in.; the minimum gap between structural members of the EPA and TB is 6 in.

The staff agreed that no acceptance criteria will be required for horizontal movement during underpinning. Data from the horizontal instrumentation measurements will be recorded and used as supplementary information to the differential settlement records in the overall evaluation of structure movement during underpinning work.

12. Changes in pier configuration

The applicant has determined that piers CT4X and CT9X located along Column line K_c at 5.9 and 7.2 will not be required. Piers will be required at H_v and 5, and at H_k and 8. The NRC staff reviewed Bechtel Drawing 7720-SK C-0101 (Rev. 0) and Mergentime/Hanson drawing S-74 (Rev. 2) showing the details of these piers (see SSER #2, Appendix I). This is acceptable to the staff.

13. Details on stiffened bulkhead during drift excavation

The NRC staff reviewed and agreed with the calculations of the drift/stiffened bulkhead design. The staff also

agreed to constructing the drift support system in 2-foot increments, with lagging and tight backpacking completed up to the bottom of the EPA foundation slab and with an excavation bench on the FIVP side.

14. As-built plan for deep-seated benchmarks

The NRC staff reviewed Bechtel Drawings 7220-C-1490 and C-1491 (Attachment 7) showing as-built locations of the AB deep-seated benchmarks and found them to be technically acceptable.

15. Review of Specification 7220-C-200, Emergency Actions

The flow charts for the emergency actions of Specification 7220-C-200 were reviewed in detail. The staff found the flow charts to be acceptable.

Service Water Pump Structure

1. Complete staff review of sliding and lateral soil pressure calculation under dynamic loading

The NRC staff completed review of the sliding and lateral soil pressure calculation. Seismic loads equal to 1.5 times the FSAR SSE loads were used and were found to exceed SSRS loads. Factors of safety against sliding were 1.45 (N-S direction) and 1.50 (E-W direction), which exceed the staff's minimum requirement of 1.1. This technical item is closed.

2. Resolution of pier and plate load test details on maximum test load, locations, and time for performing test

The load test will be performed on Pier 1 (east side). The proposed load sequence is to jack the load from 0 to 50% of the bearing pressure allowed for the seismic loading combination, then decrease the load to 25%, and then increase the load to 130%. The staff agreed that no plate load test will be required. This technical item is closed.

3. Resolution of required depths of construction dewatering wells

For monitoring of construction dewatering at the SWPS, 12 piezometers will be provided. Six will be sealed in the zone from el 570' to el 590'. Soil sampling will be continuous from el 570' to el 585' in borings at the location of the six perimeter piezometers. The other six will be installed at the subcontractor's discretion.

The water surface will be maintained 2 feet below the bottom of pier excavations if sand is present within 8 ft of the pier foundations as indicated by the continuous sampling in the six perimeter piezometers. If sand layers are identified in the exploratory borings for the piezometer installations, the wells will be lowered to maintain the 2 foot requirement. The results of the explorations and the final installation depths of the dewatering wells are to be provided to the NRC staff when available. This technical item is closed.

4. Methodology for transferring loads from jacks to permanent wall and locking off

Drawing 7220-C-2035-Q Rev. 2, with the relevant parts of Specification 7220-C-194 showing final load transfer procedures, were reviewed by the NRC staff and found to be acceptable. This technical item is closed.

5. Long-term settlement monitoring plan during plant operation

This is a technical specification issue. The information will be provided to the NRC as part of the FSAR technical specification submittal in October 1982.

6. FSAR documentation on as-built conditions

This is a confirmatory item with technical issues resolved. The information will be provided to the NRC once the appropriate construction stage has been achieved.

- 6a. Strain monitoring to measure acceptable allowable strain

The NRC staff's evaluation of the applicant's June 14, 1982, submittal indicated the proposed 5/16 inch displacement (extension) criterion over a single 20-foot gage length was not acceptable and the staff recommended that several gages of shorter length be installed to permit identification of the more highly stressed sections. In the meeting of June 25, 1982, the applicant committed to using four 5-foot long gages in place of or in addition to the single 20-foot gage. The action and alert limits for the 5-foot long gages will be based on the yield strain of the reinforcing steel.

7. Staff input into the final SSER will describe computed earth pressures under both static and dynamic loading and design methods

Review of computed earth pressures was completed. This technical item is closed.

8. The NRC staff is to review and evaluate the applicant's analysis as identified in response to Request 2.8 of Enclosure 8, NRC letter dated 5/25/82 (interaction of circulating water and SWPS wall).

The NRC staff reviewed the drawing showing the structural gap between the circulating water intake structure (CWIS) and the SWPS, and compared this gap with the predicted deflections for each structure under earthquake loads. The 1 in. minimum gap is sufficient to accommodate the relative calculated gap of 0.518 in. Similarly, the 1 in. gap between the SWPS and the cooling pond retaining wall accommodates the calculated relative gap of 0.25 in. during a SSE. This item is closed.

9. Check dowels for shear and tension capability

The staff reviewed the design calculations, discussed the design methodology, and determined the shear and tension capability of connections for the underpinning to the existing structure. The items were found to be acceptable. This item is closed.

Borated Water Storage Tank

1. Long-term settlement monitoring plan during plant operation

This is a technical specification issue. The information will be provided to the NRC as part of the FSAR technical specification submittal in October 1982.

2. FSAR documentation on as-built conditions

This is a confirmatory item with technical issues resolved. This information will be provided to the NRC once the appropriate construction stage is achieved.

3. Staff calculational review for governing loading combinations in structural design

The NRC staff reviewed the calculation for design of the new ring beam foundation for applicable load combinations. The governing load combination is:

$$U = 1.4D + 1.4T + 1.4F + 1.7L + 1.7H + 1.9E$$

where component loads are identified by FSAR Section 3.8.6.3.1.

The staff also reviewed the methodology used for design of a typical section considering forces and moments and found it to be acceptable. Additional information of a confirmatory nature will be provided as part of the seismic margin study to demonstrate the adequacy of use of 1.5 times the FSAR response spectra relative to use of SSRS.

Underground Piping

1. Staff evaluation of previously submitted reports on underground piping not completed

The NRC staff and its consultant from ETEC reviewed the calculations for stresses due to seismic and settlement effects. The staff agreed with the assumptions, methodology, and results of the analyses.

The staff completed its geotechnical review of previously submitted reports. The applicant agreed to add five additional settlement and strain monitoring stations as requested, plus settlement markers at each end of transition zones of replaced/rebedded pipes as shown on Drawing 7220-SK-C-745 (see SSER #2, Figure 2.11). The five additional settlement and strain marker locations are station 1 + 32 and 3 + 15 for line 26"-OHBC-15; station 1 + 55 for line 26"-OHBC-20; station 0 + 80 for line 26"-OHBC-55 and station 3 + 00 for line 26"-OHBC-54. The applicant also agreed to change the monitoring frequency to once per month for the first 6 months of plant operation. The frequency of readings will be lengthened to the 90 day interval following the initial six month period if the settlement readings have stabilized (not larger than 0.10 inch change from the previous reading). This will be written into the technical specifications. This item is closed.

2. The applicant's proposed reinstallation of 26-inch and 36-inch diameter pipes including review of analysis, properties of backfill, extent of excavation, details of transition, and controls during construction

The staff consultant visited the site and observed the arrangement of the service water piping in the SWPS.

The design approach for reinstallation of the service water pipe was reviewed and approved. The applicant provided a preliminary stress summary table for the piping to be reinstalled. The final table will be provided by August 20, 1982. Drawing 7220-SK-C-745 was marked to show the settlement and strain monitoring locations that were agreed upon.

Properties of the proposed backfill were provided for review. It is planned to use a mixture of sand, cement, and fly ash. The commercial name of this product is "K-Krete" (Attachment 6).

The next FSAR revision will document the design for the reinstalled piping, properties of the backfill material, and the stress summary table. This item is closed.

- 3 & 5. Plant control restricting placement of heavy loads over buried piping and conduits

Technical specification proposal by applicant for long-term settlement and strain monitoring plan during plant operation

These are technical specification items. The information will be provided to the NRC as part of the FSAR technical specification submittal.

4. FSAR documentation on as-built conditions

This is a confirmatory item with all technical issues resolved. The information will be provided to the NRC once the appropriate construction stage is achieved.

Diesel Generator Building Analysis

1. Resolution of assumptions (structural rigidity) and completion of analysis that uses correct settlement values; documentation of these results with comparison to recorded and predicted settlements

The NRC staff reviewed calculations for the diesel generator building which included settlement effects prior to, during, and after surcharge, including predicted values for the life of the plant.

The maximum calculated stress for the period March 28, 1978, to August 18, 1978, is approximately 11 ksi.

The NRC staff expressed the need to further review the results of calculations on the effects of settlement on the DGB including the method used by the applicant to characterize the shape of the structure resulting from actually recorded settlements and predicted settlement values.

Bearing pressures were reviewed and found to be acceptable.

2. Long-term settlement monitoring plan during plant operation

This is a technical specification item. The information will be provided to the NRC as part of the FSAR technical specification submittal.

Permanent Dewatering

1. Resolve availability of 60-day period in view of recharge rate in wells in AB railroad bay area

The applicant reviewed with the NRC staff the events related to the rupture of a construction water pipe which affected the recharge response in the railroad bay area.

Information in response to written questions by NRC Hydraulic Engineering Section were provided for future review in Bethesda and included information on the period to initiate shutdown. This period will be documented in the technical specifications. A report will be submitted after system installation to document the water contours developed by the permanent dewatering system. This report will provide verification of any water source in the railroad bay area.

2. Requirements of permanent dewatering system during plant operation

This is a technical specification item. The information will be provided to the NRC as part of the FSAR technical specification submittal.

3. Results of typical well fines monitoring

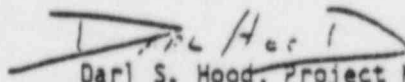
The applicant provided typical results from the July fines monitoring of the AB construction dewatering wells.

<u>Well</u>	<u>5 micron (ppm)</u>	<u>50 micron (ppm)</u>
ME-7	0.5	0.2
ME-8	1.1	0.4
ME-9	0.5	0.3
ME-46	0.6	1.0

This item is closed.

Other Items

A presentation was given on the project organization and consultants for the soils work (Attachment 5).


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

Enclosures:
As stated

cc: See next page

ENCLOSURE 1

Midland Audit
Attendees
7/27/82

NAME

ORGANIZATION

James K. Meisenheimer	CPCo.
T. R. Thiruvengadam	CPCo.
K. Razdan	CPCo.
J. A. Mooney	CPCo.
John Schaub	CPCo.
Bill Cloutier	CPCo.
Dennis Budzik	CPCo.
N. Ramanujam	CPCo.
Frank Rinaldi	NRR:DL:SEB
Darl Hood	NRR:DL:LB #4
Joseph Kane	NRR:DE:HGEB
Steve J. Poulos	NRC: Geotechnical Engineers, Inc.
Pao C. Huang	NRC Consultant
Gunnar Harstead	NRC Consultant
John P. Matra Jr.	NRC Consultant
Hari N. Singh	U. S. Corps of Engineers Chicago
Ribe Samuels	GEI/Crimmins Samuels
Edmund M. Burke	MRJD (Bechtel Consultant)
Neal Swanberg	Bechtel
Gordon Tuveson	Bechtel
B. Dhar	Bechtel
John E. Anderson	Bechtel
S. S. Afifi	Bechtel
S. J. Rys	Bechtel
V. Veyma	Bechtel
M. Dasgupta	Bechtel
N. Rawson	Bechtel
T. Dabrowiak	Bechtel
D. Reeves	Bechtel
C. Knifton	Bechtel
R. Tulloch	Bechtel
R. L. Rixford (Part time)	Bechtel L&S
L. McElweo (Part time)	Bechtel
M. Henry	Bechtel
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ENCLOSURE 1 (Con't)

Midland Audit
Attendees
7/28/82

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Lyman Heller	NRR/HGEB
Steve J. Poulos	NRC: Geotechnical Engineers, Inc.
Gunnar Harstead	NRC Consultant
John P. Matra Jr.	NRC Consultant
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W. Paul Chen	ETEC

ENCLOSURE 1 (Con't)

Midland Audit
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7/29/82

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Enc 1142

7/30/8

- O - Open Item
- CON - Confirmatory Item
- TS - Operating License Technical Specification
- R - Technical Resolution Staff Input Pending
- C - Closed Item

HIGHLAND PLANTS UNIT 1 AND 2
REVIEW OF DRAFT SER, SUPPLEMENT NO 2

	<u>SSER</u> <u>STATUS</u>	<u>AUDIT</u> <u>ITEM</u>
<u>GENERAL ITEMS</u>		
1. Staff's input for the final SSER will include summary of subsurface investigations.	R	No
2. Staff's input into final SSER will describe laboratory and field testing.	R	No
3. Staff's input into the final SSER will include staff evaluation of pertinent soil profiles sectional views.	R	No
4. Summarize the settlement history of Category I structures other than the AB & SWPS.	R	No
5. Long term settlement monitoring plans during plant operation for other structures.	TS	No
6. HRC's input into the final SSER will cover range of applied bearing pressures static and dynamic loading.	R	Yes
7. Applicant was requested to determine that 1.5 x FSAR seismic response spectra analyses are conservative for the auxiliary building, SWPS, and BWST in comparison to site specific response spectra.	CON	Yes
8. Applicant has not provided comparative plots of floor response requested by the staff for all buildings (seismic margin review).	O	Yes

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
9.	CON	Yes
10.	CON	Yes
11.	0	No
12.	R	No

9. Test data on #9 and #10 Fox Howlett with up to 2% strain.

10. Identification, inspection and repair procedures for concrete crack repair.

11. Use of concrete expansion anchors to attach piping, and equipment to masonry walls is disallowed by Staff criteria (non-soils).

12. Staff's input into the final SSER will summarize geotechnical engineering review efforts and SHAKE computer code studies.

AUXILIARY BUILDING

	<u>SSER</u> <u>STATUS</u>	<u>AUDIT</u> <u>ITEM</u>
1. Resolution of allowable vertical differential settlement and strain that will stop underpinning construction and require installation of temporary supports.	0	Yes
2. Compaction control specification for granular fill beneath FIVP's.	0	Yes
3. Methodology for transferring final loads to permanent underpinning wall.	0	Yes
4. Updated scope of construction for Phases 3 and 4.	0	Yes
5. Resolution of pier and pile load test details on maximum test load, locations and time for performing test.	0	Yes
6. Long term settlement and strain monitoring plan during plant operation.	TS	Yes
7. FSAR documentation on as-built conditions.	CON	No
8. Design modification at freeze wall crossing with duct banks.	CON	No
9. Resolution of required depths of construction dewatering wells.	CON	Yes
10. Monitoring matrix showing allowable settlements and strains	CON	Yes
11. EPA and CT relative horizontal movement criteria	CON	Yes
12. Changes in pier configuration	CON	Yes
13. Details on stiffened bulkhead during drift excavation	CON	Yes
14. As built plan for deep seated benchmarks	CON	Yes
15. Review of emergency actions C-200	CON	Yes

SERVICE WATER PUMP STRUCTURE

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Complete Staff review of sliding and lateral soil pressure calculations under dynamic loading.	CON	Yes
2. Resolution of pier and plate load test details on maximum test load, locations, and time for performing test.	CON	Yes
3. Resolution of required depths of construction dewatering wells.	O	Yes
4. Methodology for transferring loads from jacks to permanent wall and locking-off.	O	Yes
5. Long term settlement and strain monitoring plan during plant operation and program for monitoring horizontal movement.	TS	Yes
6. FSAR documentation on as-built conditions.	CON	No
6a. Strain monitoring to measure acceptable allowable strain.	CON	Yes
7. Staff's input into final SSER will describe computed earth pressures under both static and dynamic loading and design methods.	R	Yes
8. Staff to review and evaluate Applicant's analysis as identified in response to Request 2.8 of Enclosure 8, NRC letter dated 5/25/82. (interaction of circ water & SWPS walk)	CON	Yes
9. Check dowels for shear and tension capability.	CON	Yes

BORATED WATER STORAGE TANK

	<u>SSER</u> <u>STATUS</u>	<u>AUDIT</u> <u>ITEM</u>
1. Long term settlement monitoring plan during plant operation.	TS	No
2. FSAR documentation on as-built conditions.	CON	No
3. Staff calculational review for governing loading combinations in structural design.	CON	Yes

UNDERGROUND PIPING

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Staff's evaluation of previously submitted reports on underground piping not completed.	R	Yes
2. Applicant's proposed reinstallation of 26-inch 36-inch diameter pipes including review of analysis, properties of backfill, extent of excavation details of transition, controls during construction.	O	Yes
3. Plant control restricting placement of heavy loads over buried piping and conduits.	TS	No
4. FSAR documentation on as-built conditions.	CON	No
5. Tech Spec proposal by Applicant for long term settlement and strain monitoring plan during plant operation.	TS	No

SSER
STATUS

AUDIT
ITEM

DIESEL GENERATOR BUILDING ANALYSIS

1. Resolution of assumptions (structural rigidity) and completion of analysis that uses correct settlement values. Documentation of these results with comparison to recorded and predicted settlements.
2. Long term settlement monitoring plan during plant operation.

0

Yes

TS

No

PERMANENT DEWATERING

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Resolve availability of 60 day period in view of recharge rate in wells in railroad bay area of Auxiliary Building.	O	Yes
2. Requirements on permanent dewatering system during plant operation.	TS	No
3. Results of typical well fines monitoring	CON	Yes ,

Return to:
KBRazdan

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PROJECTS, ENGINEERING AND CONSTRUCTION
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Comment Information	Separate Copy to:	Initial and Date	Comment Information	Routing Copy to:	Initial and Date
X	JAMooney, P-14-115A				
X	JRSchaub, P-14-305				
X	TRThiruvengadam, H-14-400				
X	DMBudzik, P-24-517A				
X	NRamanujam, P-14-208				

*Review the following documents. Mark the appropriate comment box and initial, date and return this form to indicate completion of review.

Documents

Previous Review
Rev Date

Meeting Notes for NRC Audit of Soils Remedial Activities Held July 27-30, 1982.	---	---
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Comments _____

NOTE PAGE 6A

Comments Attached

No Comments

**Date Comments Transmitted to Originator _____

**Review Complete _____

**For Project Use

Date _____

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106



~~April 20, 1992~~

BLC- ~~1000~~

Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Attention: Mr. R.C. Bauman
Design Production Manager

Subject: Midland Plant Units 1 and 2
Consumers Power Company
Bechtel Job 7220
Meeting Notes No. ~~1000~~

Meeting Notes No. ~~1000~~ for the NRC audit of the ~~soils remedial action~~ ^{soils remedial action} ~~structure underpinning held March 16 through 19, 1992~~, are attached for your information and use. held July 27
July 27/30

Very truly yours,

~~E.M. Hughes~~
~~E.M. Hughes~~

E.M. Hughes
Ann Arbor
Project Engineer

NS/cs
3/25/12

Attachment: Meeting Notes No. ~~1000~~

cc (all w/a):

D.B. Miller
T.J. Sullivan
R.A. Wells

bcc (all w/a):

B. Dhar
D. Fallgren
T. Johnson
D. Lewis
A Boos
R. Tulloch

Written Response Requested: No

Com Use: NA

Meetings Notes No. _____

Midland plant Units 1 and 2
Consumers Power Company
Bechtel Job 7220

Date: July 27 through 30, 1982
Place: Bechtel Ann Arbor Office
Subject: Nuclear Regulatory Commission Audit of
Soils Remedial Activities

Attendees:

Nuclear Regulatory Commission

- D. Hood
- J. Kane
- J. Knight*
- F. Rinaldi
- L. Heller*

Consumers Power Co.

- T. Thiruvengadam
- K. Razdan
- J. Mooney
- J. Schaub
- N. Ramanujam
- W. Cloutier
- D. Budzik
- J. Weisenheimer

Bechtel

Consultants

- P. Huang*
- J. Matra
- G. Horstead
- H. Singh*
- R. Samuels
- S. Poulos
- E. Burke*
- W. Chen*

- N. Swanberg
- G. Tuveson*
- B. Dhar
- J.E. Anderson
- S. Afifi*
- S. Rys*
- V. Verma*
- M. DasGupta*
- M. Rawson*
- T. Dabrowski*
- J. Peers*
- R. Tuller*
- J. LeGette*
- R. ...
- L. McElwee*
- N. Henry*
- P. Strauss
- B. Klien*
- D. Lewis*
- C. ...
- L. Young*
- D. Griffith
- D. Z...

* Part-time

PURPOSES:

- 1) To perform an NRC audit of the design and calculations for Midland soils remedial work
- 2) To provide information for ~~the~~ the preparation of the Safety Evaluation Report
- 3) To permit release of soils remedial work for construction.

PRINCIPAL AGREEMENTS:

1. Items under review by the ^{NRC} staff are listed in Attachment 1. The status of each item with respect to the Supplemental Safety Evaluation Report is indicated. Also indicated are items which were discussed during the audit.
2. Agreements on specific items are listed below.

GENERAL ITEMS

6. NRC's input into the final SSER will cover range of applied bearing pressures, static and dynamic loading.

A draft of FSAR Table 2.5-1A was provided for NRC use. ^{with bearing pressure data for Duv. 3.1.4 includes}

7. Applicant was requested to determine that 1.5 x FSAR seismic response spectra analyses are conservative for the auxiliary building, SWPS, and BWST in comparison to site specific response spectra.

The NRC staff reviewed calculations verifying that 1.5 x FSAR response spectra envelope the results obtained from using the site specific response spectra + the FSAR response spectra for the auxiliary building, service water pump structure and berated water storage tanks.

8. Applicant has not provided comparative plots of floor response requested by the staff for all buildings (seismic margin review).

Comparative plots of floor response spectra for the site specific response spectra will be developed as part of the seismic margin review.

9. Test data on #9 and #10 Fox Howlett with up to 2% strain.

Copies of test data ^{up to 2% strain} for #9 and #10 Fox-Howlett rebar splices were provided to the NRC

~~Serial 18371~~
~~Letter from H. Denton 8/2/82~~

(4)

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A. Identification, inspection and repair procedures for concrete crack repair.

Procedures for concrete crack were agreed upon and are documented in a letter from J Cook to H. Denton dated 8/2/82 (serial 18371)

AUXILIARY BUILDING

Resolution of allowable vertical differential settlement and strain that will stop underpinning construction and require installation of temporary supports

The NRC staff reviewed the ^{allowable settlement} ~~calculations~~ ~~for~~ ~~the~~ ~~allowable~~ ~~settlement~~ supporting the response to NRC review concern No. 8. Items discussed included assumptions, methodology and results.

Attachment 2 provides definitions of alert ~~thresholds~~ and action levels which were agreed upon for ~~the~~ underpinning activities. Attachment 3 provides agreed upon numerical values for use during phases II, III and IV.

~~Calc for allowable settlement supporting response~~
~~reviewed and approved assumptions~~
~~calculations results~~

2. Compaction control specification for granular fill beneath FIVP's.

It was agreed that the fill beneath the FIVP will be tested using the procedures outlined in the Seabrook FSAR. A copy of this FSAR section was provided by the NRC. The fines portion of the fill will be non plastic. This will be verified by the resident geotechnical engineer with appropriate testing (hydrometer or Atterberg limits). The backfill will be properly moisture conditioned by

3. Methodology for transferring final loads to permanent underpinning wall.

Mergentime/Hanson drawings S-74 and S-74a were reviewed and found acceptable

Soaking immediately prior to compaction. The soaking means will be approved by the resident geotechnical engineer.

3D 4. Updated scope of construction for Phases 3 and 4.

The Construction Sequence Plan and Logic drawing SK-C-0101 was reviewed. A copy of this drawing is included as attachment 4

with particular emphasis on the construction steps.

- 5. Resolution of pier and plate load test details on maximum test load, locations and time for performing test.

~~The load test pier will~~
 The load test will be performed on pier W-11.
 The load sequence will be 50% to 25% to 130% of
~~load to ultimate load seismic load,~~
 the bearing pressure allowed for the seismic
 loading combination.

- 6. Long term settlement and strain monitoring plan during plant operation.

Technical Specifications for the FSAR will include the settlement monitoring program during plant operation

- 8. Design modification at freezeway crossing with duct banks.

Consumers will provide a report addressing backfill techniques and slab removal.

(7a)

9. Resolution of required depths of construction dewatering wells.

The depths of construction dewatering wells are acceptable. When excavating in cohesionless (natural or fill) soils, the groundwater will be maintained 2 feet below the advance of excavation.

In addition, a probing program will be used in selected piers. These piers are E12, W13, CT1 and CT12 plus an additional 7 piers selected by the applicant. At least one of these additional piers will be in the control tower. The probing will be with a 4 inch maximum auger from 5 feet above to 5 feet below the design bearing elevation. If water is encountered while drilling, the stratum will be sufficiently dewatered to provide a stable bearing condition. Interpretation will be by the resident geotechnical engineer.

3D 10. Monitoring matrix showing allowable settlements and strains

~~update version of criteria for~~
~~update version of criteria for~~

An updated copy of the monitoring matrix was provided. Alert and Action levels will be added as agreed upon (see auxiliary building item 1)

11. EPA and CT relative horizontal movement criteria

The NRC staff reviewed drawings showing the gap detail between the EPA/CT and the turbine building.

No acceptance criteria will be required for horizontal movement during underpinning. Data from the instrumentation measurements will be recorded for information.

12. Changes in pier configuration

Piers CT9X and CT9X located along Kc at 5.9 and 7.2 will not be required. Piers will be required at Hx and 5, and at Hx and 9. The NRC staff reviewed Mergentime/Hanson drawings showing the details of these piers.

13. Details on stiffened bulkhead during drift excavation

The NRC staff agreed with the drift/stiffened bulkhead design. The ^{staff} further recommended that the drift portion of construction be eliminated and that the bulkhead be constructed in 2 foot increments with a benched slope on the FIVP side.

14. As built plan for deep seated benchmarks

The NRC staff reviewed drawings C-1490 and C-1491 showing as built locations of the auxiliary building deep seated benchmarks ~~was reviewed. Because of changes in the final locations of these benchmarks, the differential settlement equation will require revision~~

15. Review of emergency actions C-200

The flowcharts of specification C-200 were reviewed in detail. There ~~are~~ are no open items

SERVICE WATER PUMP STRUCTURE

1. Complete Staff review of sliding and lateral soil pressure calculations under dynamic loading.

The NRC staff completed review of the sliding and lateral soil pressure calculations. All questions were resolved.

SERVICE PIER 2 AND STRUCTURE

11/15/81

2. Resolution of pier and plate load test details on maximum test load, locations, and time for performing test.

The load test will be performed on pier 1 (east side). The load sequence will be 50% to 25% to 130% of ~~load~~ the bearing pressure allowed for the seismic loading combination.

3. Resolution of required depths of construction dewatering wells.

For construction dewatering at the SWPS, 12 piezometers will be provided. Six will be sealed in the zone from Elevation 570' to Elevation 590'. Soil sampling will be continuous from Elevation 570' to Elevation 585'. The other six will be installed at the sub-contractor's discretion.

The water surface will be maintained 2-feet below the excavation if sand is present. All wells will be lowered to Elevation 570' or exploratory information from the six deep piezometers will be provided to determine the existence of sand layers. If sand layers are identified by the piezometer installation, the wells will be lowered.

4. Methodology for transferring loads from jacks to permanent wall and locking-off.

Showing final load transfer procedure
E Burke reviewed drawing C-2035-A with the NRC staff. All questions were resolved.

6a. Strain monitoring to measure acceptable allowable strain.

7. Staff's input into final SSER will describe computed earth pressures under both static and dynamic loading and design methods.

Review of computed earth pressures was completed. All questions were resolved.

8. Staff to review and evaluate Applicant's analysis as identified in response to Request 2.8 of Enclosure 8, NRC letter dated 5/25/82.
• (interaction of circ water & SWPS wall)

The NRC staff reviewed ^{the} drawing showing the gap between the circ water purchase and the service water pump structure and compared this gap with the predicted deflections of each structure. The gap is considered acceptable to accommodate the expected movements.

- BD 9. Check dowels for shear and tension capability.

BORATED WATER STORAGE TANK

- 3. Staff calculational review for governing loading combinations in structural design.

The NRC staff reviewed the calculation for design of the new ring beam foundation. The governing load combination is:

$$U = 1.4D + 1.4T + 1.4F + 1.7L + 1.7H + 1.9E$$

UNDERGROUND PIPING

1. Staff's evaluation of previously submitted reports on underground piping not completed.

The NRC staff reviewed in depth calculations for stresses due to seismic and settlement effects. The staff also visited the site to review the arrangement of the service water piping in the service water pump structure. The staff agreed with the assumptions, methodology, and results of the analysis.

2. Applicant's proposed reinstallation of 26-inch 36-inch diameter pipes including review of analysis, properties of backfill, extent of excavation details of transition, controls during construction.

The design approach for reinstallation of the service water pipe was reviewed and approved. The applicant provided a preliminary stress summary table for the piping to be reinstalled. The final table will be provided by August 20. Drawing SK-C-745 was marked up to show the agreed upon settlement and strain monitoring locations. A copy of this marked up drawing is included as Attachment 5.

Properties of the proposed backfill were provided for review. It is presently planned to use a mixture of sand, cement and flyash. A proprietary product of this type is "K-Krete".

The next revision to the FSAR will document the design for the reinstalled piping, properties of the backfill material, and the stress summary table.

✓

DIESEL GENERATOR BUILDING ANALYSIS

1. Resolution of assumptions (structural rigidity) and completion of analysis that uses correct settlement values. Documentation of these results with comparison to recorded and predicted settlements.

The NRC staff reviewed calculations for the diesel generator building which included settlement effects prior to, during, and after surcharge including predicted values for the life of the plant.

The maximum ^{calculated} stress for the period of 3-28-79 to 8-18-79 is approximately 11 Ksi.

Bearing pressures were reviewed and found to be acceptable. ~~Also reviewed are calculations for~~

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PERMANENT DEWATERING

1. Resolve availability of 60 day period in view of recharge rate in wells in railroad bay area of Auxiliary Building.

The applicant reviewed with the NRC staff the ~~history of~~ events related to the rupture of a construction water pipe which affected the recharge response in the railroad bay area.

A detailed discussion was also provided regarding the 8 1/2 day period to initiate shutdown. This period will be documented in the Technical Specification. A report will be submitted after system installation which will document the water contours developed by the permanent dewatering system. This report will provide final verification of any water source in the railroad bay area.

3. Results of typical well fines monitoring

The applicant provided typical results from the July fines monitoring of the auxiliary building construction dewatering wells.

<u>Well Number</u>	<u>5 micron</u>	<u>50 micron</u>
ME-7	0.5 ppm	0.2 ppm
ME-B	1.1 ppm	0.4 ppm
ME-9	0.5 ppm	0.3 ppm
ME-46	0.6 ppm	1.0 ppm

- O - Open Item
- CON - Confirmatory Item
- TS - Operating License Technical Specification
- R - Technical Resolution Staff Input Pending
- C - Closed Item

MIDLAND PLANTS UNIT 1 AND 2
REVIEW OF DRAFT SSER, SUPPLEMENT NO 2

<u>GENERAL ITEMS</u>	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Staff's input for the final SSER will include summary of subsurface investigations.	R	No
2. Staff's input into final SSER will describe laboratory and field testing.	R	No
3. Staff's input into the final SSER will include staff evaluation of pertinent soil profiles sectional views.	R	No
4. Summarize the settlement history of Category I structures other than the AB & SWPS.	R	No
5. Long term settlement monitoring plans during plant operation for other structures.	TS	No
6. NRC's input into the final SSER will cover range of applied bearing pressures static and dynamic loading.	R	Yes
7. Applicant was requested to determine that 1.5 x FSAR seismic response spectra analyses are conservative for the auxiliary building, SWPS, and BWST in comparison to site specific response spectra.	CONC	Yes
8. Applicant has not provided comparative plots of floor response requested by the staff for all buildings (seismic margin review).	AC	Yes

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
9. Test data on #9 and #10 Fox Howlett with up to 2% strain.	CON C	Yes
10. Identification, inspection and repair procedures for concrete crack repair.	CON C	Yes
11. Use of concrete expansion anchors to attach piping and equipment to masonry walls is disallowed by Staff criteria (non-soils).	O	No
11 12. Staff's input into the final SSER will summarize geotechnical engineering review efforts and SHAKE computer code studies.	R	No

AUXILIARY BUILDING

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Resolution of allowable vertical differential settlement and strain that will stop underpinning construction and require installation of temporary supports.	AC	Yes
2. Compaction control specification for granular fill beneath FIVP's.	AC	Yes
3. Methodology for transferring final loads to permanent underpinning wall.	AC	Yes
4. Updated scope of construction for Phases 3 and 4.	AC	Yes
5. Resolution of pier and plate load test details on maximum test load, locations and time for performing test.	AC	Yes
6. Long term settlement and strain monitoring plan during plant operation.	TS	Yes
7. FSAR documentation on as-built conditions.	CON	No
→ 8. Design modification at freeze wall crossing with duct banks.	CON	No
9. Resolution of required depths of construction dewatering wells.	CON C	Yes
10. Monitoring matrix showing allowable settlements and strains	CON C	Yes
11. EPA and CT relative horizontal movement criteria	CON C	Yes
12. Changes in pier configuration	CON C	Yes
13. Details on stiffened bulkhead during drift excavation	CON C	Yes
14. As built plan for deep seated benchmarks	CON C	Yes
15. Review of emergency actions C-200	CON C	Yes

SERVICE WATER PUMP STRUCTURE

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Complete Staff review of sliding and lateral soil pressure calculations under dynamic loading.	CON C	Yes
2. Resolution of pier and plate load test details on maximum test load, locations, and time for performing test.	CON C	Yes
3. Resolution of required depths of construction dewatering wells.	RC	Yes
4. Methodology for transferring loads from jacks to permanent wall and locking-off.	RC	Yes
5. Long term settlement and strain monitoring plan during plant operation, and program for monitoring horizontal movement.	TS	Yes
6. FSAR documentation on as-built conditions.	CON	No
6a. Strain monitoring to measure acceptable allowable strain.	CON C	Yes
7. Staff's input into final SSER will describe computed earth pressures under both static and dynamic loading and design methods.	RC	Yes
8. Staff to review and evaluate Applicant's analysis as identified in response to Request 2.8 of Enclosure 8, NRC letter dated 5/25/82. (interaction of circ water & SWPS wall)	CON C	Yes
9. Check dowels for shear and tension capability.	CON C	Yes

BORATED WATER STORAGE TANK

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Long term settlement monitoring plan during plant operation.	TS	No
2. FSAR documentation on as-built conditions.	CON	No
3. Staff calculational review for governing loading combinations in structural design.	CON C	Yes

SSER
STATUS AUDIT
 ITEM

UNDERGROUND PIPING

- | | | |
|--|-----|-----|
| 1. Staff's evaluation of previously submitted reports on underground piping not completed. | RC | Yes |
| 2. Applicant's proposed reinstallation of 26-inch 36-inch diameter pipes including review of analysis, properties of backfill, extent of excavation details of transition, controls during construction. | RC | Yes |
| 3. Plant control restricting placement of heavy loads over buried piping and conduits. | TS | No |
| 4. FSAR documentation on as-built conditions. | CON | No |
| 5. Tech Spec proposal by Applicant for long term settlement and strain monitoring plan during plant operation. | TS | No |

DIESEL GENERATOR BUILDING ANALYSIS

1. Resolution of assumptions (structural rigidity) and completion of analysis that uses correct settlement values. Documentation of these results with comparison to recorded and predicted settlements.
2. Long term settlement monitoring plan during plant operation.

SSER
STATUS

AUDIT
ITEM

SC

Yes

TS

No

PERMANENT DEWATERING

	<u>SSER STATUS</u>	<u>AUDIT ITEM</u>
1. Resolve availability of 60 day period in view of recharge rate in wells in railroad bay area of Auxiliary Building.	0	Yes
2. Requirements on permanent dewatering system during plant operation.	TS	No
3. Results of typical well fines monitoring	CONC	Yes

Final report 5

Alert Level

All values up to the alert level are considered to be within normal working ranges.

Settlement readings should be reviewed by the resident structural engineer daily. In general, for readings below the alert level, attention should be focused on the value of the readings versus the construction progress and any indication of trends that would indicate the alert level will be exceeded.

Once the alert level is exceeded, the site resident engineer must inform engineering in Ann Arbor of the situation. The data including information from the other appropriate data mechanisms should be evaluated in total. Where trends exist that indicate the action level is likely to be reached, plans should be evaluated to remedy the situation. (Note: It is recognized that the evaluation may well conclude that no changes are warranted.)

Action Levels*

Values in excess of the action level must be reviewed by the resident structural engineer and as soon as possible by engineering in Ann Arbor.

Plans should be initiated to modify the condition that caused the settlement reading to exceed the action level. Consumers Power Company must be informed of the revised plan so that the NRC can be advised of the situation. The revised plan shall be initiated immediately upon verbal notification by the resident structural engineer. (Note: It is recognized that the evaluation may well conclude that no changes are warranted.) If continuous movement beyond action level occurs, immediate action shall be taken per Specification C-200.

* - Cracking levels correspond to these definitions for Alert and Action.

/dj

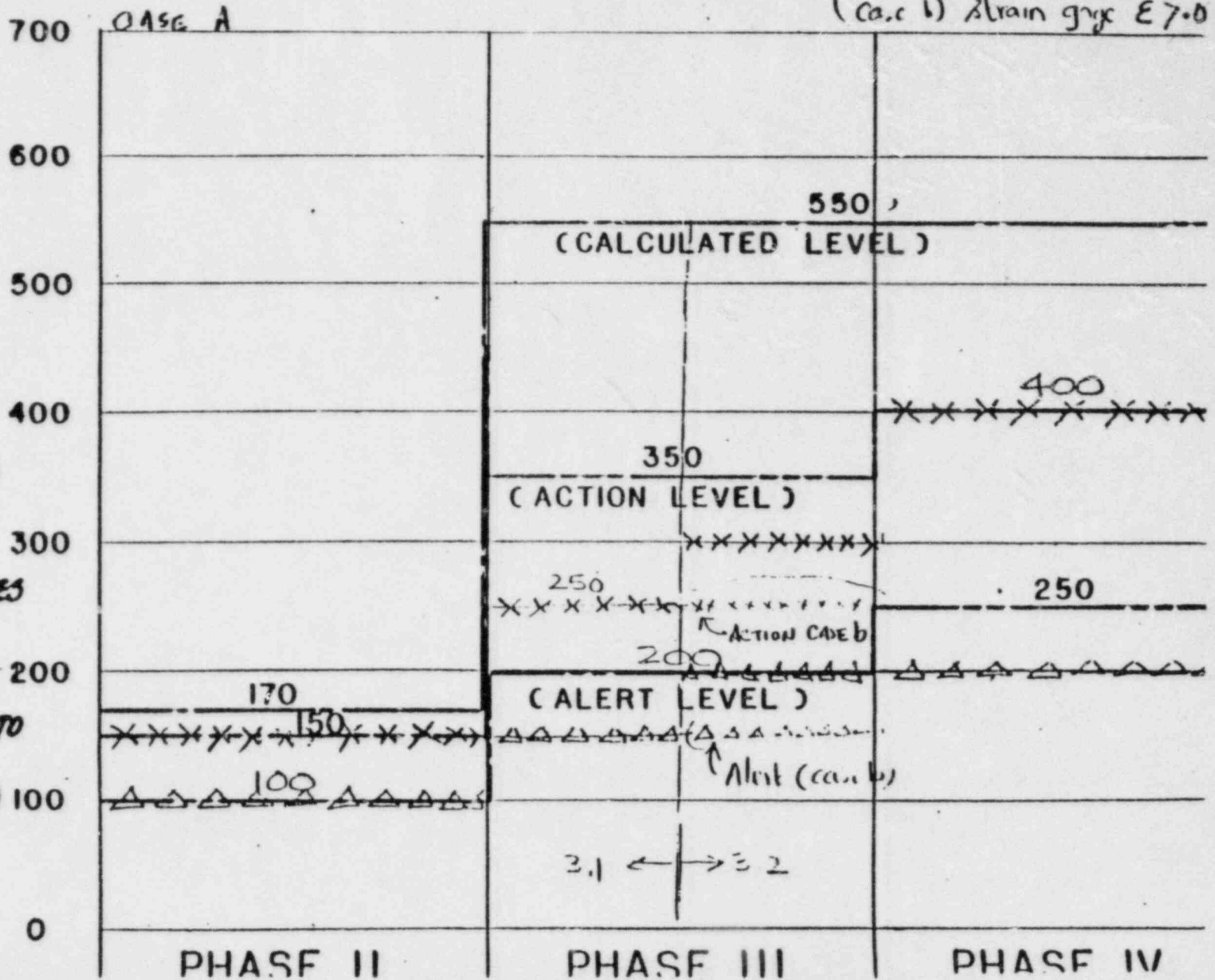
072801

REMEDIATION SOILS

SETTLEMENT MONITORING MATRIX

ATTN: [unclear]

(Case a) Strain gauge $\epsilon < 0.001$
 (Case b) Strain gauge $\epsilon 7.0$



Δ
 RELATIVE
 SETTLEMENT
 DUE TO BENDING
 IN MILS

NOTE:
 PHASE II ALLOWABLES
 APPLY ONLY UNTIL
 CONNECTIONS ARE
 UPGRADED AS REQ'D
 CONNECTIONS WERE TO
 BE VERIFIED PER
 JUNE 14 SUBMITTAL)

ACTION CASE b

Alert (case b)

3.1 ← → 3.2