

MAY 2 5 1982

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

Mr. J. W. Cook  
Vice President  
Consumers Power Company  
1945 West Parnall Road  
Jackson, Michigan 49201

Dear Mr. Cook:

Subject: Completion of Soils Remedial Activities Review

DISTRIBUTION:

Docket Nos. 50-329/330 OM, OL

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JSaltzman, AIG

I&E

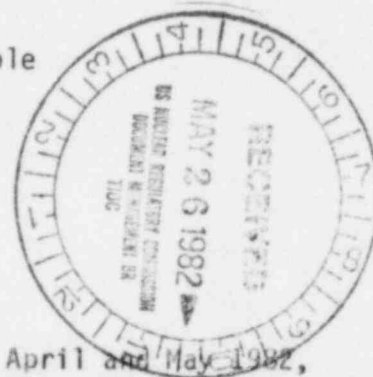
Attorney, OELD

ABrauner, NRR

BPCotter, ASLBP

ACRS (16)

CMiles, OPA



In several meetings and discussions held during the months of April and May 1982, you were informed by the staff of the approach to be used for the review of the soils remedial activities at Midland Plant, Units 1 and 2. This approach is intended to make the review process more consistent with that followed by the staff for license applications and improve the efficiency of the staff review. Specifically, the previous staff practice of approving each individual construction step for each remedial measure as the review progresses will generally be discontinued by the staff. The staff intends to complete the entire review of the soils remedial activities and related matters as an integrated package and then proceed with ACRS meetings and hearing sessions in the normal fashion.

Although no activities directed to remedial actions for the soils deficiencies are expected to be approved prior to completion of the staff's integrated review, those for which staff review was substantially completed as of April 1, 1982, are, however, approved. These are discussed below.

On the basis of the staff technical review of documents listed in Enclosure 1, the staff concurs with your plan to proceed with Phase 2 underpinning activities (which involve excavation under the feedwater isolation valve pit and the turbine building) subject to the successful completion of conditions listed in Enclosure 2. Accomplishment of these conditions should be documented and Region III notified. Enclosure 3 provides a definition of Phase 2 on which the staff's approval is based, and further discusses the staff's understanding of approved quality assurance plans for this and other soils work.

We are further responding to your letter of May 10, 1982, which addresses certain soils construction work you believe had staff approval prior to the Licensing Board's Memorandum and Order of April 30, 1982. Staff comments and conclusions on Paragraphs I and II are provided in Enclosure 4.

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PDR ADOCK 05000329  
A PDR

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With respect to your Paragraph III, you note you are continuing with certain soils remedial work with full awareness and concurrence of the staff for which explicit written approval had not been obtained. You also noted that this work has been stopped in accordance with the Order and requested that the staff verify its concurrence so that the work can be reactivated. The three work items you identified in this category are:

- (1) installation of deep-seated benchmarks,
- (2) installation and operation of construction dewatering wells that were not previously operating, and
- (3) installation of monitoring system instruments and mounting.

Items (1) and (2) are conditionally approved as addressed by Enclosure 5 and 6, respectively. With respect to item (3), your letter notes that work on the monitoring system instruments and mounting for the auxiliary building is presently stopped because Region III concurrence has not been obtained. We are advised that Region III will provide explicit written confirmation of NRC approval following resolution of existing QA deficiencies.

Your letter of May 10, 1982, also forwarded Drawing 7220-C-45 for purposes of defining which soils at the Midland site are safety related (i.e., are considered to be under and around safety-related structures and systems). During a May 5, 1982, conference telephone call with the Licensing Board and hearing parties, Consumers proposed to use this drawing to define the bounds for the term "around" in Sections VI(1)(a), (b) and (c) of the Board's April 30, 1982, Memorandum and Order. The Board's subsequent Memorandum and Order of May 7, 1982, requested the staff to advise the Board of the results of its review of Drawing 7220-C-45. The results of our review are presented in Enclosure 7; and, on the basis of your commitments to modify the drawing, we find this drawing to be acceptable for the purpose of defining areas around safety-related structures and systems.

In addition, Enclosure 8 lists the information required by the staff to conclude its review of the soils remedial work. This list is based upon staff review of information provided by your letter of March 31, 1982, and earlier submittals. Certain of the information needs may already have been transmitted by you. You are requested to provide your response schedule within seven (7) days of receipt of this letter. Once your schedule is received, the staff will develop the review completion schedule for this effort.

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Mr. J. W. Cook

- 3 -

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by  
Darrell G. Eisenhower

Darrell G. Eisenhower, Director  
Division of Licensing

Enclosures:  
As stated

cc: See next page

OFFICE	DL:LB #4	LA:DL:LB #4	DL:LB #4	AD:DL	DIR:DL		CELD
SURNAME	DHood/hmc	MDuncan	EAdensam	RTedesco	DEisenhut		WDP
DATE	5/24/82	5/24/82	5/24/82	5/24/82	5/24/82	5/24/82	5/24/82

MIDLAND

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- 2 -

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LISTING OF ENCLOSURES

- Enclosure 1 - "Basis for Staff Concurrence for Start of Phase 2"
- Enclosure 2 - "Conditions for Staff Acceptance of Phase 2"
- Enclosure 3 - "Definition of Phase 2 Underpinning Activities and Quality Assurance Plans for Soils Activities"
- Enclosure 4 - "Staff Comments on Continuing or Planned Soils Activities Previously Approved by the Staff"
- Enclosure 5 - "Installation of Deep Seated Benchmarks"
- Enclosure 6 - "Construction Dewatering Wells"
- Enclosure 7 - "Staff Evaluation of Drawing 7220-C-45"
- Enclosure 8 - "Additional Information Required to Complete Staff Review of Soils Remedial Work"

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ENCLOSURE 1

BASIS FOR STAFF CONCURRENCE FOR START OF PHASE 2

1. Letter to R. Vollmer from R. T. Hamilton, dated July 8, 1975, transmitting Bechtel quality assurance topical BQ-TOP-1, Revision 1A
2. Letter to H. R. Denton from J. W. Cook, dated September 30, 1981, Submitting the Auxiliary Building Dynamic Model, Technical Report on Underpinning the Auxiliary Building and Feedwater Isolation Valve Pits
3. Letter to H. R. Denton from J. W. Cook, dated November 16, 1981, on Response to the NRC Staff Request for Additional Information Pertaining to the Proposed Underpinning of the Auxiliary Building and Feedwater Isolation Valve Pits
4. Hearing testimony by CPC witnesses (Johnson, Burke, Gould, Corley and Sozen) on remedial underpinning work for the Midland Auxiliary Building, November 19, 1981
5. Hearing testimony of D. Hood, J. Kane and H. Singh concerning the Remedial Underpinning of the Auxiliary Building Area, dated 11/20/81
6. Hearing testimony of F. Rinaldi, dated 11/20/81
7. Letter to H. R. Denton from J. W. Cook, dated 11/24/81 on Test Results, Auxiliary Building, Part 2, Soil Boring and Testing Program
8. Letter to H. R. Denton from J. W. Cook, dated December 3, 1981, with Addendum to Technical Report On Underpinning the Auxiliary Building and Feedwater Isolation Valve Pits
9. Letter to H. R. Denton from J. W. Cook, dated January 6, 1982, on Auxiliary Building Underpinning - Freezwall; Effects of Freezwall on Utilities and Structures
10. Letter to H. Denton and J. Keppler from J. W. Cook, dated January 7, 1982, transmitting general Quality Plan for underpinning activities and Quality Plans and Q-Listed activities for SWPS and Auxiliary Building Underpinning
11. Design audits of January 18-20, 1982 (Summary dated March 10, 1982); February 1-5, 1982; March 16-19, 1982; and meeting of February 23-26, 1982, (Summary dated March 12, 1982)
12. Letter to H. R. Denton from J. W. Cook, dated February 4, 1982, on Auxiliary Building Access Shaft - Augering Method for Soldier Pile Holes

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13. Letter to J. W. Cook from R. L. Tedesco, dated February 12, 1982, on Staff Concurrence for Activation of Freezewall
14. Letter to H. R. Denton from J. W. Cook, dated March 10, 1982, on Protection of Excavation Face - Auxiliary Building Underpinning Shaft
15. Summary of March 8, 1982 Telephone Conversation Regarding Soil Spring Stiffnesses for Auxiliary Building Underpinning and Phase II Construction, dated March 11, 1982
16. Letter to H. R. Denton from J. W. Cook, dated March 31, 1982, on Response to the NRC Staff Request for Additional Information Required for Completion of Staff review of Phases 2 and 3 of the Underpinning of the Auxiliary Building and Feedwater Isolation Valve Pits
17. Letter to J. Keppler from J. W. Cook, dated April 5, 1982, describing Quality Assurance for Remedial Foundation Work
18. Letter to H. Denton from J. W. Cook, dated April 26, 1982, transmitting quality assurance topical CPC-1-A, Revision 12

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Enclosure 2

CONDITIONS FOR STAFF ACCEPTANCE OF PHASE 2

1. Deep-seated bench marks DSB-AS1 and DSB-AS2. DSB-AS1 and DSB-AS2 shall be installed at a distance not to exceed 5-feet from the wall of the main auxiliary building which is founded at Elevation 562. Actual locations of these installed bench marks and any modifications in tolerance criteria required on Drawing C-1493(Q) due to changes from the original DSB-AS locations shall be documented.
2. Monitoring instrumentation required to be installed. The following deep seated benchmarks and relative-absolute measurement devices identified on audited drawings shall be properly installed and operating for at least 7 days prior to drifting under the turbine building or Feedwater Isolation Valve Pit (FIVP):

Deep-Seated Benchmarks

Relative-Absolute  
Measurement Devices

DSB-1W  
DSB-1E  
DSB-2W  
DSB-2E  
DSB-3W  
DSB-3E

DSB-AS1  
DSB-AS2  
DSB-AN

DMD-1W  
DMD-1E  
DMD-11  
DMD-12  
DMD-13

3. Strain gauge installation. Revisions shall be made to the proposed instrumentation shown in drawing C-1495, "Instrumentation - Elevation 695 - 0 5/16" for Building Settlement Monitoring". On the sectional view at the wall at Column Lines 7.4 and 7.8, change the orientation of proposed lower strain gauges between Elevations 584 to 614 to be perpendicular to the orientation shown on Drawing C-1495, Figure 3 in the March 31, 1982 submittal. On this same sectional view, add an additional strain gauge between Elevations 646 to 659 at an inclination similar to the above recommended orientation. Also, correct the labeling of column lines H and G which is reversed on the copy of the sectional view submitted to the staff.
4. Pier load test procedures. The following modifications and additions shall be made to the pier load test procedures provided by the April 22, 1982 submittal from J. Cook to H. Denton, "Response to the NRC Staff Request for Additional Information Required for Completion of Staff Review of the Borated Water Storage Tank and Underpinning of the Service Water Pump Structure." (Consumers Power Company (GPCo) stated that, although the procedures were submitted for underpinning work for the service water pump structure, the procedures are applicable to the pier load test to be conducted during Phase 2 underpinning work for the auxiliary building.)

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- a. The maximum required test load should be equal to 1.3 times the maximum anticipated design load. As an alternative, should there be structural difficulties in developing the required reaction load for the prior test, the staff would accept a procedure where the maximum test load for the pier load test was equal to 90 percent the maximum anticipated design load and a plate load test (ASTM D1194) was performed to a maximum test load equal to 130 percent of the maximum anticipated design load. (See Page 12 of submittal).
  - b. Significant modifications to the specified ASTM D1143-81 test procedures, as may be appropriate, require advanced notification and approval of the Region III Office. (See Page 12 of submittal.)
  - c. The rate of settlement shall not exceed 0.005 inch per hour when controlling the length of time that the 90% test load increment is to be maintained. (See Page 12 of submittal).
  - d. In order to provide a more positive reduction of skin friction, plywood sheeting coated with 1/8-inch thick bitumen (or equivalent) shall be installed on all test pier sides prior to performing the pier load test as a replacement for the plastic sheeting proposed by CPCo. (See Page 12 of submittal).
  - e. To permit correlation with the previously approved measures proposed by CPCo to demonstrate the adequate foundation capacity of the other installed piers, a minimum of two in situ density tests and five cone penetrometer tests shall be performed on the soil at the bottom of the pier selected for test loading.
5. Construction dewatering. During underpinning of the auxiliary building area, the upper phreatic surface shall be maintained a minimum of 2 feet in depth below the bottom of any underpinning excavation at any given time. The final plan for the dewatering system shall be established and implemented in advance of drifting under the turbine building or FIVP. The dewatering plan should include the locations and depths of the dewatering wells and piezometers (observation wells). Criteria for monitoring loss of soil particles due to pumping shall be the same as those previously approved by the staff for the construction dewatering of the service water pump structure (R. Tedesco letter of April 2, 1982) or for the permanent dewatering wells (R. Tedesco letters of June 18, September 2, and October 22, 1981).
6. Monitoring movement of FIVPs. Jacking of the FIVP back to its original position shall be required if the relative settlement between the reactor containment and the FIVP reaches a total settlement of 3/8-inches since the time piping connections were made.

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ENCLOSURE 3

DEFINITION OF PHASE 2 UNDERPINNING ACTIVITIES AND QUALITY ASSURANCE PLAN  
FOR SOILS ACTIVITIES

Phase 2 construction activities for the Midland auxiliary building underpinning are defined by Bechtel drawing C-1418-1(Q) Revision A, "Auxiliary Building - Underpinning Construction Sequence", and associated plan and logic drawing C-1418(Q), Revision A, both issued for information 3/19/82 and provided to the staff during an audit meeting on that date.

With respect to quality assurance requirements for Phase 2 work, CPCo's letter to H. Denton/J. Keppler dated January 7, 1982, transmitted a general Quality Plan for underpinning activities along with quality plans for the service water pump structure underpinning system and for the auxiliary building underpinning system and FIVPs. These plans describe the basic QA program controls to be applied to items and activities associated with the soils remedial work. We find these plans, including the QA programs described in Revision 12 of Consumer's QA Topical Report CPC-1A and Bechtel's QA Topical Report BQ-TOP-1, Rev. 1A, acceptable for the soils remedial work. However, a condition for this finding is that these quality assurance plans and programs are to apply to 1) all items and activities identified in the ASLB Memorandum and Order of April 30, 1982, and 2) all of the to-go underpinning Q-listed and non Q-listed work described in your April 5, 1982 letter to J. Keppler, except that work stated in attachment 1 of that letter. We interpret these plans and program to mean that the Midland Project Quality Assurance Department will be actively involved in reviewing contractor's, sub-contractor's, and consultant's quality assurance capabilities and assuring thorough review of procedures and verifications that hardware is built and work is performed in accordance with design, specification, and procedural requirements. Accordingly, we conclude that the above referenced Quality Plan is acceptable for implementation as described above. Since the foregoing conforms to the April 30, 1982, Board Order, any deviations must be reported to the staff.

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ENCLOSURE 4

STAFF COMMENTS ON CONTINUING OR PLANNED SOILS ACTIVITIES PREVIOUSLY  
APPROVED BY THE STAFF

The following comments are provided to clarify the staff's prior approvals of remedial soils activities at the Midland Plant. Each listed item in paragraphs I and II of CPCo's May 10, 1982, letter is presented and addressed.

"I.a. Phase I Work (Auxiliary Building Underpinning)"

The specific activities for Phase I work referred to in our letter of concurrence (Reference 5) for installation of the vertical access shafts were those defined by Consumer's Drawing "Underpinning Auxiliary Building Construction Sequence Logic" dated January 20, 1982.

"I.b. Access Shaft (Auxiliary Building Underpinning)"

This item is included in the staff's definition of "Phase I work" and is discussed under paragraph I.a. above.

"I.c. FreezeWall Installation, Underground Utility Protection, Soil Removal Cribbing and Related Work in Support of the FreezeWall Installation, FreezeWall monitoring and FreezeWall activation"

References 5 and 7 provided staff concurrences for freezeWall installation and activation, respectively. These approvals were based upon CPCo's plan to eliminate the inducement of stresses to the conduits and piping because of heaving by excavating the soil directly beneath affected utilities within the projected area of influence of the freezeWall before ground freezing begins. The approvals also recognized your commitments (1) to demonstrate to the staff's satisfaction that recompression of the foundation soils beneath the piping or ducts has been completed before backfilling the excavation, and (2) to notify Region III personnel prior to drilling near seismic Category I underground utilities and structures. The approval was further contingent upon the successful audit by the NRC Regional Office III of the implementation procedures for excavation and monitoring.

The information which provided the basis for staff review and approval was provided by CPCo's letters of November 16 and 24, 1981, and January 6, 1982, and by hearing testimony of your consultant, J. P. Gould.

Consequently, the staff agrees that prior explicit concurrence for the activities listed by paragraph I.c. of CPCo's letter, May 10, 1982 had been obtained from the staff prior to the April 30, 1982 Order, except for the ambiguous phase you included "and related work in support of...". Therefore, the staff did not approve "related work" in its letters of concurrence or other records.

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"I.d. Installation and Operation of the Permanent Site Dewatering System"

The identity and location of the 65 permanent dewatering wells approved by the staff are given in References (1), (2) and (4). Installation and monitoring aspects of the permanent site dewatering system, excluding seismic aspects, was to be performed as Q-listed activities following staff review and approval of associated quality assurance and quality control documents.

"I.e. Operation of Existing Construction Dewatering Wells"

The only construction dewatering wells approved by the staff are those identified by References (6) and (10). This item is further discussed in Enclosure 6. As noted therein, however, construction wells installed and monitored to procedures equivalent to those for permanent wells may be considered acceptable.

"I.f. FIVP Proof Load Test"

The staff has no record or recollection of concurrence for a FIVP proof load test. Therefore, this test is not approved.

"II.a. Installation and Activation of Dewatering System for the Service Water Pump Structure"

Staff approval was indicated by Reference (10), subject to certain committed changes specified therein.

"II.b. The Repair of Cracks in the Borated Water Storage Tank Ring Wall"

Staff approval was indicated by Reference (9), which noted your commitment to pressure grout at least all cracks with widths in excess of 10 mils. This activity follows the completion of the valve pit surcharge programs which were also the subjects of prior staff approvals (References (3) and (8)).

In summary, ambiguity associated with CPCo's use of the terms "Phase I work" and "related [freeze wall] work" preclude confirmation of specific prior approval of these activities. Similarly, failure by CPCo to identify the particular existing construction dewatering wells precludes us from determining whether previous staff concurrence had been indicated. No description or discussion is provided for a "FIVP proof load test" and no record of prior staff approval can be located. Consequently, continuation of these activities in conformance with the foregoing staff comments will be in accordance with the Board Memorandum and Order of April 30, 1982. Any deviations must be reported and approved by the staff.

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- References:
- (1) R. Tedesco letter of June 18, 1981, "Staff Concurrence on Installation of Twelve Backup Dewatering Wells"
  - (2) R. Tedesco letter of September 2, 1981, "Staff Concurrence on Installation of Eight Backup Dewatering Wells"
  - (3) R. Tedesco letter of September 25, 1981, "Staff Concurrence on Surcharging of Valve Pits for Borated Water Storage Tank Foundations"
  - (4) R. Tedesco letter on October 22, 1981, "Staff Concurrence on Installation of Permanent Dewatering Wells and Request for Additional Information"
  - (5) R. Tedesco letter of November 24, 1981, "Staff Concurrence for Construction of Access Shafts and Freezeway in Preparation for Underpinning the Auxiliary Building and Feedwater Isolation Valve Pits"
  - (6) R. Tedesco letter of December 28, 1981, "Staff Concurrence for Five Temporary Dewatering Wells"
  - (7) R. Tedesco letter of February 12, 1982, "Staff Concurrence for Activation of Freezeway"
  - (8) R. Tedesco letter of February 26, 1982, "Staff Concurrence on Removal of Surcharge from Borated Water Storage Tank Valve Pits"
  - (9) R. Tedesco letter of March 26, 1982, "Staff Concurrence for Grouting of Cracks in Concrete Foundations of Borated Water Storage Tanks"
  - (10) R. Tedesco letter of April 2, 1982, "Staff Concurrence for Installation and Operation of Construction Dewatering and Observation Wells for the Service Water Pump Structure"

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ENCLOSURE 5

STAFF CONCURRENCE ON INSTALLATION OF DEEP SEATED BENCHMARKS

CPCo's letter of May 10, 1982 states that installation of deep-seated benchmarks is being carried out by Woodward Clyde Consultants, which is subject to its own quality assurance program and procedures approved by Consumers and previously subject to staff inspections. We are advised that these NRC inspections have resulted in a finding that these activities are being conducted to an acceptable quality assurance program.

CPCo has also provided the staff with information on the installation of deep-seated benchmarks and relative-absolute instrumentation beginning with the design audit of January 18-19, 1982 and continuing through the submittal of March 31, 1982 (Letter from J. Cook to H. Denton, Response to the NRC Staff Request for Additional Information Required for Completion of Staff Review of Phases 2 and 3 of the Underpinning of the Auxiliary Building and Feedwater Isolation Valve Pits). The information for the auxiliary building underpinning work which has been provided includes locations, depths, elevations, instrumentation accuracy and typical installation details of the proposed instruments. This information is contained in the following documentation:

- a. Technical Specification for Monitoring Instrumentation for Underpinning Construction, Specification 7220-C-198(Q), January 18, 1982 Rev. 0 (Provided at the February 3, 1982 Design Audit)
- b. Drawings C-1490(Q) and C-1491(Q), Auxiliary Building, Instrumentation Location for Underpinning, January 20, 1982; Revision 1 (Provided at the February 3, 1982 Design Audit)
- c. Drawing C-1493(Q), Auxiliary Building and F.I.V.P., Instrumentation System and Monitoring Matrix, May 29, 1982, Rev. A (Provided by applicant's letter of March 31, 1982)
- d. Sketches of Carlson Stress Meter and Telltale Installations, Midland Plant Instruments for Pier Measurements, January 15, 1982

On the basis of the technical review by the Staff and its consultants of the information in the above documents, including the quality assurance program, the staff concurs with Consumer's proceeding with the installation of the deep-seated benchmarks and relative-absolute instrumentation for monitoring the auxiliary building underpinning work.

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ENCLOSURE 6

CONSTRUCTION DEWATERING WELLS

In the past Consumer's position with respect to temporary or construction dewatering has been that this work was not permanent, it was being conducted to enable performance of construction activities and, therefore, the work did not require staff approval. Consumers did not provide the details of the construction dewatering design and installation and did not seek staff approval for these activities.

More recently the staff has concluded that certain aspects of construction dewatering activities related to underpinning the service water pump structure (SWPS) and auxiliary building could potentially affect the foundation stability of these nearly completed structures. The staff has actively reviewed the temporary construction dewatering plan for the SWPS and has reached agreement with CPCo on an acceptable plan (April 2, 1982 letter with enclosures from R. Todesco to J. Cook, Staff Concurrence for Installation and Operation of Construction Dewatering and Observation Wells for the Service Water Pump Structure). The staff has not presently obtained or evaluated the final plan for construction dewatering during auxiliary building underpinning but has specified conditions for Phase 2 concurrence (Enclosure 3).

It is the staff's position, with respect to the remaining construction dewatering wells that are already installed and operating, that these wells be monitored for the loss of soil particles due to pumping similar to the requirements agreed upon and recorded in Enclosure 3 to the April 2, 1982 letter.

The specifications for a construction dewatering well are dependent upon the specific application. Consequently, approval for typical field practices, on other than a case-by-case basis is not meaningful. Therefore, for the future, the design and installation details of construction dewatering wells that have not yet been operated or installed should be addressed on a case-by-case basis following appropriate notification of the staff by the CPCo. This procedure will permit an assessment of the safety significance of the proposed well. However, any construction well for which the procedures for installing and monitoring the loss of soil particles are equivalent to those previously approved for permanent dewatering wells (which was in accord with a staff approved quality assurance plan) may be considered acceptable, provided also that the upper phreatic surface is maintained two feet below the bottom of any excavation or as otherwise approved in advance by Region III.

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ENCLOSURE 7

STAFF EVALUATION OF DRAWING 7220-C-45

Staff requirements for this drawing were provided by the staff on May 7, 1982, to Messrs J. Mooney, J. Schaub and others of CPCo. These were:

- (1) The seismic Category I retaining wall to the east of the service water pump structure is shown to be located in the non-Q zone. CPCo should revise the drawing to provide for Q-listed control in the vicinity of this wall.
- (2) The drawing should be revised to provide for Q control of soils activities for the emergency cooling water reservoir (ECWR), the concrete service water discharge lines, and the perimeter and baffle dikes adjacent to the ECWR.
- (3) CPCo should implement Q controls for certain aspects of work outside the Q zone of Drawing 7220-C-45 which could impact safety related structures and systems. Examples include potential removal of fines by dewatering wells, improper location of borings near the Q boundary, and soil excavations at the boundary involving both Q and non-Q areas.
- (4) CPCo should re-confirm that no seismic Category I underground utilities extend beyond the Q area bounds of the drawing.

CPCo's letter of May 10, 1982 notes the intent to revise the drawing to address the ECWR components and other appropriate areas. CPCo has also identified during the May 7 telephone discussion additional measures being implemented to assure proper location for drillings.

On the basis of CPCo's commitment to extend the controls of soils activities to incorporate these staff requirements, the staff approves the use of Drawing 7220-C-45 for defining the areas around safety-related structures and systems within which the restrictions and requirements of the April 30, 1982, Memorandum and Order shall apply.

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ENCLOSURE 8

ADDITION INFORMATION REQUIRED TO COMPLETE STAFF REVIEW OF  
SOILS REMEDIAL WORK

1. Provide the following information regarding the Auxiliary Building and Feedwater Isolation Valve Pits:

- 1.1 redesign of stiffened bulkhead against earth pressures during drift excavation to install needle beam assembly
- 1.2 revise report on crack evaluation to include consideration of the effects of multiple cracks
- 1.3 analysis of the construction condition using a subgrade modulus of 70 KCF and provide results
- 1.4 allowable differential settlements for Phase 3 (based on 1.3 above)
- 1.5 horizontal movement acceptance criteria for Phase 3 for instruments at top of EPAs and control tower
- 1.6 as-built report with confirmatory detail on underpinning in FSAR upon completion of construction
- 1.7 acceptance criteria for strain monitors for Phase 3
- 1.8 acceptability of 1.5 FSAR SSE versus SSRS as bounding design
- 1.9 method to be followed for transfer of jacking load into permanent wall
- 1.10 complete design analyses of permanent underpinning wall
- 1.11 updated construction sequence for Phases 3 and 4
- 1.12 settlement monitoring program to be required during plant operation with action levels and remedial measures identified (Tech. Spec.). Include RBA, EPA and Control Tower
- 1.13 plans and details for permanently backfilling underpinning excavations including compaction specifications for granular fill under FIVP
- 1.14 procedure to be required for detecting extent of planar openings uncovered in drift excavations and controls to minimize their effects.

2. Provide the following information regarding the Service Water Pump Structure:

- 2.1 acceptability of 1.5 FSAR SSE versus SSRS as bounding design
- 2.2 sliding calculation using site-specific response spectra (SSRS) seismic loads and provide results with basis for assumed soil input parameters
- 2.3 stress condition for existing parts of structure:
  - (a) Maximum stresses
  - (b) Critical combinations
  - (c) Identify true critical elements based on actual rebar

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- 2.4 calculation for determining lateral earth pressures under dynamic loading
- 2.5 settlement monitoring program to be required during plant operation with action levels and remedial measures identified (Tech. Spec.)
- 2.6 as-built report with confirmatory data on underpinning in FSAR upon completion of construction
- 2.7 report on crack evaluation to include consideration of the effects of multiple cracks.

3. Provide the following information regarding the Borated Water Storage Tanks:

- 3.1 adequacy of governing load combination used in design
- 3.2 acceptability of 1.5 FSAR SSE versus SSRS as bounding design
- 3.3 settlement monitoring program to be required during plant operation with action levels and remedial measures identified (Tech. Spec.)
- 3.4 as-built report with confirmatory data in FSAR on completed construction

4. Provide the following information regarding underground pipes:

- 4.1 basis for modeling of the piping inside the building in the terminal end analyses
- 4.2 controls to be required during plant operation to prevent placement of heavy loads over buried piping and conduits
- 4.3 as-built report with confirmatory data in FSAR on completed construction
- 4.4 justification why the BWST lines are not to be rebudded from the tank farm dike to the auxiliary building
- 4.5 a list of all penetrations for underground seismic Category I piping. Revise and submit your pipe monitoring program to include periodic measurements of rattelspace for plant operating life. Provide justification for all exceptions.
- 4.7 justification for the high (beyond limits) reported settlement stresses

5. Provide the following information regarding the Diesel Generator Building:

- 5.1 a structural reanalysis considering:
  - (a) Presurcharge conditions
  - (b) Conditions during the surcharge
  - (c) 40-year settlement effects
  - (d) The combined effects of (a) through (c) above
- 5.2 a structural reanalysis assuming reduction in soil spring stiffnesses between bays 3 and 4 on the south side and beneath adjacent cross wall
- 5.3 a statistical evaluation of settlements to evaluate impact of survey inaccuracies versus actual differential settlements which have been experienced

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- 5.4 acceptability of 1.5 X SSE (FSAR) versus SSRS for bounding design
  - 5.5 criteria relating crack width and spacing to reinforcing steel stress
  - 5.6 settlement monitoring program to be required during plant operation with action levels and remedial measures identified (Tech. Spec.)
  - 5.7 evaluation of effect of past and future differential settlements to diesel lines from the day tank to the diesels.
6. Provide a settlement monitoring program to be required during plant operation with action levels and remedial measures identified (Tech. Spec.) for the underground Diesel Fuel Oil Storage Tanks.
7. Provide the following information regarding the permanent dewatering system:
- 7.1 results of the dewatering recharge tests
  - 7.2 technical specification requirements on the permanent dewatering system.
  - 7.3 a summary discussion of your contingency plans which would be implemented in the event groundwater levels at critical locations exceed limits in the technical specifications.
8. Provide a settlement monitoring program to be required for structures founded on natural soils and plant fill which have not been identified above with action levels and remedial measures identified. (Tech. Spec.)

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