

Subject: Locating sources of important submittals by CFCs
PRIOR TO DEC. 6, 1979.

1 of 6
5/18/81
J. Kane
32/136

AUXILIARY BUILDING (Feedwater Isolation Valve Pit & Electrical)
Penetration Area

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
Mar. 29, 1979	Tab 45	
Jun 18, 1979	Tab 65	
Aug. 7, 1979	Tab 66	
	Tab 74	July 18, 1979 Meeting w/ NRC incl. Gould presentation (Appears to be initial presentation of any details to NRC)
Aug. 5, 1979	Tab 79	Minutes of July 18, 1979 meeting
Aug. 27, 1979	Tab 84	Underpinning Specs sent to Gould.
Oct. 17, 1979	Tab 90	Gould's response to Bechtel on underpinning spec
Aug. 10, 1979	50.55(E) Ltr. Howell to Keppler Aug. 10, 1979	Purpose of remedial measures is to replace questionable fill (bearing capacity adequacy) as evidenced by soil sampling. Remedy is place structural elements which extend to glacial till. will utilize structural capacity of EPA to bridge questionable fill by placing caissons @ extremities. $\frac{1}{2}$ DL+LL to control tower & other half to caissons FIVP - remove all fill to till & replace w/ concrete * see page B which gives procedure for underpinning indicates caissons to go a min of 5 into till Adopted caisson tip pressure of 25KSF

AUXILIARY BUILDING (cont.)

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
Aug 10, 1979	50.55e Aug. 10, 1979 Ltr. Howe to Keppler	Liquefaction evaluated @ control tower & railroad bay Conclusion using 0.12g - Unlikely @ railroad bays, no problem @ control tower
	Pg. 3 Sect. 4	Seismic reanalysis Dr. Peck
	Pg. 5 of Sect. 5	Nine caissons under each of EPA wings will be individually & group tested
Aug. 17, 1979	50.55(e) Inter. Rpt 7 MCAR 24 Aug. 17, 1979	Pg. 9 Crack mapping (Fig. 76 thru 79) & Figs. 85 thru 87 Interim Rpt 6 & Interim Rpt. 7 show crack mapping for Auxil. Bldg. See pg. 14 which gives construction scheduling

Diesel Generator Building

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
Aug. 10, 1979	50.55(e) Ltr. Howell to Kepler Aug. 10, 1979	Minutes of July 18, 1979 <ul style="list-style-type: none"> - Provides results (settlement vs. time) of preload program up to the end of June 1979 - Provides settlement contours
		pg. 11 - liquefaction evaluated @ DGB using 0.12g. Possible liquefaction problem - solution - permanent dewatering
		pg. 14 - Settlement due to Earthquake Shaking - Estimated 1/2" to 1" using 0.12g
		pg. 6 sect. 4 - New seismic analysis & new static analysis will be performed for <u>variable foundation conditions</u>
		pg. 7 sect. 4 - Figures showing settlement marker & piezometer locations are shown <ul style="list-style-type: none"> * Typical results of settlement & pore water measurements shown (Fig. 54)
		pg. 8 - Secondary Settlement Prediction is less than 1.5 inches during 40yr life of plant
		pg. 1 sect. 6 - Estimate work to be completed about mid-May 1980 or 2 to 3 months later
Oct. 19, 1979	50.55(e) MCAR 24 Interim Rpt. 8	pg. 1 - Concludes successful preload program & good basis for future settlement prediction Fig. 43, 47 thru 56 provide settlement data
Nov. 30, 1979	Ltr from S. Varga to S. Howell on Mar 30, 1979 on OPEN ITEMS	NRC requested CPG to evaluate effects of differential settlement for structures (Cat. I) located on plant fill CPG stated a stress evaluation of DGB will be provided

3.06
5/18/81

Borated Water Storage Tank

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
Aug. 10, 1979	50.55(e) Ltr. Howell to Keppler Aug. 10, 1979	Condition of fill is suitable for supporting BWS.T. will fill with water for full scale test to confirm acceptability.
Oct. 19, 1979	50.55(e) MCAR 24 Interim Rpt-8	Removed all unsuitable material & area backfilled to El. 632 Ran plate load tests

Diesel Oil Storage Tanks (4 tanks)

Aug. 10, 1979	50.55(e) Ltr. Howell to Keppler Aug. 10, 1979	Condition of fill is suitable for supporting tanks will fill with water & monitor. Has been 3 months (as of Aug 1979) & no appreciable settlement has been noted. Considered adequate.
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Permanent Dewatering

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
July 1979	Tab 70	
July 23, 1979	Tab 75	Meeting of July 18, 1979
Aug. 10, 1979	50.55E Ltr. Howell to Kepler Aug. 10, 1979	minutes of July 18, 1979 meeting par. 1 - Delete chemical grout option & go to site dewatering concept - better remedial measure to address liquefaction P-15 Presents a dewatering scheme
Oct. 25 & 30, 1979	Tabs 93 & 94	
Dec. 11, 1979	Tab 102	
Jan. 4, 1980	Tab 106	
Jan. 14, 1980	Tab 110	
(continuing w/ Aug. 10, 1979		P-15 Dewatering (Presented @ July 18, 1979 meeting Provided Plan (Fig. 40) of exterior permanent dewatering system Est. 12 - 0.007 ft/min from initial pumping test @ Auxil. Bldg. Estimate 200 to 300 deepwells required (includes redundant system) would monitor for fines Would install piezometers (locations not shown) to monitor levels & be prepared to shutdown if levels reached a predetermined level.
Oct. 16, 1979	Minutes of July 18, 1979 meeting by D. Hood (dated Oct. 16, 1979)	Staff directed CPCs to SRP Sect. 2.4.13 & Branch Tech. Position for acceptance criteria for the proposed dewatering scheme

Underground Piping

<u>Date</u>	<u>Reference</u>	<u>Information Provided in Reference</u>
Aug. 10, 1979	50.55(e) Ltr. Howell to Keppler	Minutes of July 18, 1979 Meeting. Cat-I piping? elect-duct bank - Indicates profiling of pipes completed by GZD & Assoc. using Nold Aquaducer - Pipes profiled were analyzed for meas. diff. settlement & stresses FOUND TO BE WITHIN ALLOWABLE CODE LIMITS. NO REMEDIAL WORK IS anticipated for buried piping
	(pg. 6)	
		<u>DUCT BANKS</u> - Are reinforced concrete elements enclosing PVC & steel conduits for voids for the cables - Passed rabbit thru voids which indicates they are intact
Aug 17, 1979	50.55(e) Interim Rpt. 7	pg. 12 Fig. 6a presented giving profiles by GZD Indicates future settlement due to fill settlement is being studied (results not available)
Oct. 19, 1979	50.55(e) Interim Rpt 8	pg. 4 Piping reprofiled in July 1979. Piping in GB area reprofiled in Sept. 1979. Results are being plotted Reconnected the (2) 20" & (2) 6" condensate lines outside turbine bldg.
Oct. 16, 1979	Minutes of July 18, 1979 meeting (by D. Hood) dated Oct. 16, 1979	Staff requested CPCs to describe design features that would assure that piping from BWST & service water lines under RR tracks would not be subjected to excessive loads

Investigation of Plant Fill Problem & Cracking

Date Reference Information Provided in Reference

Aug. 10, 1979 50.55e
Mr. Howell to
Keppler
Aug. 19, 1979

minutes of July 18, 1979 meeting
- Indicates scope of exploration to investigate
- Indicates launching of cracking study

pg. 6
sect. 4

Cracking affects only serviceability
Cracks > 15 mils will be sealed in future

Except for DGB, concrete cracking would probably not be of any concern

ACCEPTANCE CRITERIA

Oct. 16, 1979 Minutes of
July 18, 1979
Meeting
by D. Hodd
(Dated Oct. 16, 1979)

* NRC staff noted that 50.54(f) responses covering acceptance criteria for remedial actions were indicating that criteria would be determined during or after the remedial action. The staff noted that this approach by CPCo does not provide for timely feedback at the outset of the remedial work and that the staff must await the results of the remedial program to determine what acceptance criteria was used and if the criteria is acceptable

* **THUS THE REMEDIAL ACTION IS BEING CONDUCTED ENTIRELY AT THE APPLICANT'S OWN RISK**

Meetings between NRC & CPCo on Plant Fill Problem

Dates

- 12/3 & 4/78 → D. Hood has summary @ site. (Summary dated 1/12/79)
- 3/16/79 → Visit by Hood, Gillen, Haffa & Gallagher during pre-load program (10' placed) @ site. ^{D. Hood has summary - not significant to case.} (Summary dated 3/20/79)
- 6/7/79 → D. Hood has summary - No significant information @ site to inspect test pits. (Summary 6/21/79)
- ^{Imply} 7/18/79 ^{in Bethesda} on SOIL FIXES. ^{Applicant} (Summary 8/10/79 as 50.55(e) action) ^{NRC Summary 10/16/79 by D. Hood}
(Documentation is in 50.55(e) document - Aug. 10, 1979 letter from Howell to Keppeler)
- 7/19/79 on geology & seismology
- BEFORE
DEC
6, 1979 11/14/79 ^(Initial tour) COE visits site. (Summary 12/3/79)
- AFTER
DEC.
6, 1979 1/16/80 ^{in Bethesda} w/ Consultants. (Summary 2/4/80)
Discussed responses to question 4, 14, 24 thru 35
- 2/27 & 28/80 @ site w/ Consultants (Summary 3/31/80)
Initial visit of NRC Consultants. CPCo announcement to defer all remedial work until accepted by the Staff
- 7/31/80 in Bethesda (Presentation by Dr. Peck) on Staff Request for Addtl. Borings & Testing
- 8/12/80 in Midland - Appeal by CPCo of NRC Staff Position on Borings
- 12/5/80 in Bethesda - Meeting on Seismic Input Parameters

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	pg. 6 Sec. 4	Cracking affects only serviceability Cracks > 1/8 mils will be sealed in future Except for DGB, concrete cracking would probably not be of any concern

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5/18/81
Sofb

Underground Piping

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- 12/5/80 in Bethesda - Meeting on Seismic Input Parameters

- Prepared by Ellen Brown
- 2 comments by J. Kane phoned to E. Brown on 7/1/81 (Rgs. 2&3)

Rec'd 6/30/81

32/B6

OPENING STATEMENT for July 7, 1981 Session
of ASLB Hearing on Midland

The hearing that begins today arises out of an Order issued by the NRC Staff against Consumers Power Company more than 1-1/2 years ago. The reasons for the Order were three-fold: (1) quality assurance deficiencies involving the settlement of the DGB and soil activities at the Midland site; (2) a material false statement in the FSAR; and (3) numerous unresolved safety issues associated with the remedial actions proposed to correct the soil deficiencies under and around safety-related structures. This Order, which was issued on December 6, 1979, modified the Midland construction permits by prohibiting any further soils construction and physical implementation of the proposed remedial actions. Because Consumers Power Company requested a hearing, the Order modifying the construction permits did not go into effect immediately and also is not in effect today. Consumers, however, has voluntarily agreed to comply with the prohibitions in the Order with the exception of a recent decision in which the Staff concurred to proceed with the installation of some back-up wells.

By way of background information, the Staff will briefly recount the significant events that both preceded and prompted the issuance of the Order.

In July 1978--less than 6 months after the start of construction on the DGB--Consumers observed that there was excessive settlement of the structure. Indeed, the settlement values at that time were approaching the total settlement values for the 40-year life of the building. This excessive settlement was reported orally to the NRC resident inspector at the end of July.

Late in September, Consumer filed with the NRC a written notification pursuant to 10 CFR 50.55(e) of a significant deficiency in construction--namely, excessive settlement of DGB. An investigation by the NRC Office of Inspection and Enforcement followed. The conclusions of that investigation were that (1) there was inadequate control and supervision of the plant fill; (2) corrective action regarding nonconformances was inadequate; (3) construction specifications and design bases were not followed; (4) interface between design organization and construction was inadequate; and (5) the FSAR contained inconsistent, incorrect and unsupported statements.

In January of 1979, Consumers began placing a 20-ft. sand surcharge on the DGB^{area}. This remedial action proceeded without the approval or concurrence of the NRC Staff. The surcharge was removed in August when Consumers' experts determined that secondary consolidation had been reached.

In the spring of 1979, Consumers took soil borings at the Midland site. The results of these borings showed that the fill material beneath several additional structures was also inadequate. On the basis of these results, Consumers proposed remedial measures for these other structures.

In March of 1979, the NRC Staff issued the initial 10 CFR 50.54(f) request for information concerning the adequacy of the plant fill, the quality assurance program and the determination and justification of acceptance

criteria for the various remedial measures already taken and proposed to be taken by Consumers. While Consumers did respond to the 50.54(f) requests, most of their responses were found incomplete and inadequate therefore necessitating the issuance of follow-up requests for information.

Suffice it to say that as of December 6, 1979, when the Order was issued, there were numerous unresolved safety issues associated with the proposed remedial measures. In general terms, the Staff was not satisfied that the designs for the proposed remedial actions were sufficiently conservative.

As a result of the 50.54(f) requests, follow-up requests and other communications between itself and the Staff, Consumers has gradually changed the proposed "fixes" to take account of the safety concerns raised by the staff. Indeed, within the past 6 months, Consumers has changed the fixes for two of the major structures affected by the inadequate fill.

For example, the "fix" originally proposed by Consumers for the Service Water Pump Structure involved placing piles and corbels beneath the cantilevered portion of the structure. The Staff did not ^{have reasonable assurance} believe that the piles and corbels would adequately support the cantilevered portion of that structure and therefore in November, 1980 posed several interrogatories with respect to the pile and corbel design. In March of this year, in response to interrogatories Consumers informed the Staff that it had decided to drop the pile and corbel design "fix" and now proposed a more conservative "fix," specifically, a continuous wall footing which will extend to the glacial till. In fact, as recently as May of this year,

Consumers abandoned the originally proposed fix for the Auxiliary Building Electrical Penetration areas which was to place caissons under the area and instead has decided to proceed with a more conservatively designed "fix" which involves removing the bad fill and replacing it with a mass of concrete. The NRC Staff has welcomed these changes since they address the Staff's original concerns. The staff is currently in the process of either waiting for more specific information on certain "fixes" or reviewing for approval information already received on other "fixes."

Ordinarily, in an enforcement proceeding such as this, the Staff would proceed first with its presentation of testimony on the basis for the Order. However, because the Staff and Consumers are currently in the process of negotiating stipulations and because a proposed stipulation already has been filed on QA, the Staff has decided to postpone presentation of its case in support of the Order and instead to proceed with its testimony on QA and management attitude in response to Intervenor Barbara Stamiris' Contentions 1, 2 and 3.

In addition to addressing certain of Mrs. Stamiris' contentions in the following 2 weeks of hearing, Consumers and the Staff will seek a ruling from the Licensing Board on the proposed quality assurance stipulation and the Staff will present testimony in support of the last paragraph of the stipulation.

This stipulation which was filed by Consumers and the Staff on June 8 consists of 3 paragraphs. The first 2 paragraphs relate to the enforcement aspect of the case, that is, in paragraph 1 Consumers admits that prior to December 1979

there were certain enumerated QA deficiencies associated with soil construction activities at the Midland site and then in paragraph 2 Consumers agrees not to contest the Staff's conclusion that these enumerated QA deficiencies constituted a breakdown in QA and an adequate basis for issuance of the December 6 Order. Because Consumers has submitted to the jurisdiction of the Licensing Board with respect to the QA breakdown, it is not necessary for the parties to present testimony in support of that issue.

Paragraph 3 of the proposed stipulation, however, is a different matter. That paragraph addresses the present QA situation at Midland and specifically stipulates that NRC has reasonable assurance that QA and QC programs will be appropriately implemented with respect to future soils construction activities. Because that paragraph involves a health and safety finding which the Board cannot delegate to the Staff but rather must independently make, Mr. Keppler - the Director of Region 3 - will present testimony which addresses the "reasonable assurance" conclusion in paragraph 3 of the stipulation.

Paragraph 3 also stipulates that the QA program satisfies all requisite NRC criteria. This statement was included at the urging of Consumers. It must be noted, however, that the docketed QA program is not at issue in this proceeding. The Staff has never alleged that the QA program was inadequate; the implementation of the program is what the Staff has found deficient. Nevertheless, Mr. Gilray - a QA engineer - will appear with Mr. Keppler to provide testimony in support of paragraph 3.

If the proposed stipulation is accepted, the Staff maintains that it has satisfied its burden of going forward with evidence "sufficient to require reasonable minds to inquire further."

With respect to Mrs. Stamiris' contentions the Staff plans on introducing testimony on the following:

- (1) In general terms Contention 1 alleges Consumers' less than complete and candid dedication to providing information to the NRC. The contention specifies examples in support of its thesis. Staff witnesses will address all of Contention 1, with the exception of 1(d). That includes the 6 supplemental examples that Mrs. Stamiris raised in an April 20, 1981 pleading.
- (2) Parts of Contention 2 will also be addressed. Contention 2 alleges that Consumers' time and financial pressures have adversely affected resolution of the soil settlement problem. Staff witnesses will address only 2(a), (c) and (d) during this portion of the hearing.
- (3) Contention 3 alleges failure to implement Consumers' QA program. That contention will be addressed in full by a Staff witness.

The balance of Mrs. Stamiris' contentions and Mrs. Sinclair and Mr. Marshall's OL contention will be addressed at a later session of this proceeding.

I. Service Water Pump StructureHearing

- Not yet scheduled for underpinning design.
- The seismic model session is scheduled for 12/14/81 and SEB testimony was filed 12/1/81 based upon review of CPCo's 9/30/81 letter describing dynamic model.
- Neither the CPCo testimony nor the staff testimony have addressed the input (soil spring constants) into the seismic model and part of a later hearing session may be used. Staff review is by COE/Vicksburg.

Testimony

Due two weeks prior to start of hearing (Holidays and years-end annual leave wipe out last two weeks of December).

<u>Submittals</u>	<u>Review Completion Date</u>	<u>Branch/Resource</u>
1. August 26, 1981 Letter, "Technical Report on Underpinning the SWPS (also discussed at 9/17/81 meeting)	TBD* TBD TBD TBD	HGEB COE SEB NSWC
2. November 6, 1981 Letter, "Responses to NRC Requests for Additional Information on Proposed Underpinning"	TBD TBD	HGEB COE
3. November 6, 1981 Letter, "Test Results, SWPS, Soil Boring and Testing Program"	TBD TBD	HGEB COE
4. Sept. 30, 1981 Letter (Encl. 1), "SWPS Seismic Model"	TBD TBD	SEB COE (Vicksburg)

Construction Start

Construct access shaft 4/15/82
Excavate and install piers 5/05/82

Future Submittals Needed

Struct. Static Model and Analysis (finite element)

Crack Analysis

Soil Spring inputs for seismic model (Needs to be covered in hearing by testimony)

*TBD = to be determined

II. Auxiliary Building

Hearing

- Underpinning design session held 12/1-4/81. Identified several licensing conditions and followup needed.
- Seismic models session scheduled for 12/14-18/81 and testimony was filed 12/1/81.
- Soil spring constants input to the model are not addressed in present testimony. A later session may be used for this part.

Testimony

Due two weeks prior to hearing start. Holidays and years-end leave to be considered in immediate planning.

<u>Submittals</u>	<u>Review Completion</u>	<u>Branch</u>
1. Sept. 30, 1981 Letter (Encl.2), "Auxiliary Building Seismic Model"	12/1/81 (testimony) 12/18/81(E)(soil springs)	SEB COE
2. Oct. 26 report and Nov. 24, 1981 Letters, "Parts 1 & 2, Woodward-Clyde Report on Test Results, Soil Boring and Testing Program"	Pt I: 11/23/81(C) Pt II: TBD	HGEB/COE HGEB/COE
3. Nov. 16, 1981 Letter, "Response to NRC Questions (from Oct. 30, 1981 Conf. call)"	1/30/81 - 5/1/82 (license conditions)	HGEB/COE SEB
4. Dec. 3, 1981 <u>Construction Start</u>		

Installation (not activation) of access shaft and freezewayl

Approved 11/24/81

Subsequent activities

(See license conditions from staff testimony - Table A.20)

Future Submittals

Responses to license conditions (Table A.20)

(E) = estimated

III. Borated Water Storage Tank Foundations

Hearing

- Remedial action session not yet scheduled.
- Seismic model session scheduled for 12/14-18/81 and SEB testimony filed 12/1/81.
- Applicants testimony (received 12/7/81) includes dynamic model for BWST not previously submitted for NRC review.

Testimony

Due two weeks prior to hearing start

Submittals

Review Completion Date

Branch

1. Nov. 13, 1981 Letter, "Design Report for BWST Foundation Analysis"	TBD TBD	SEB HGEB/COE
2. Nov. 10, 1981 Letter, "Test Reports, BWST, Soil Boring & Testing Program." Also enclosure on settlement vs. log of time	TBD	HGEB/COE
3. <u>Nov. 24, 1981 Dynamic Model of BWST Construction Start</u>		
Surcharge BWST valve pits		Staff approved 9/25/81. Now in place.
Reset tank	TBD	
Begin construction of adjacent ring found.	TBU	March 1, 1982

Anticipate removal of surcharge @ end of Feb. 82

IV. Diesel Generator Building

Hearing

- Session on adequacy of surcharging not yet scheduled (covered in part during Aug. 4-13 session on intervenor Stamiris contentions).
- Session on seismic model not yet rescheduled. Originally scheduled for 12/14/81. Applicant and staff agreed to defer.

Testimony

Due two weeks prior to hearing start.

<u>Submittals</u>	<u>Review Completion Date</u>	<u>Branch</u>
1. July 27, 1981 Letter, "Update of Settlement Readings and Piezometer Data"	TBD	HGEB/COE
2. Oct. 21, 1981 Letter, "CPCo Response to NRC Questions (from May 5, 1981 Meeting) with 8 Enclosures"	TBD TBD	HGEB/COE SEB
3. Oct. 2, 1981 Letter, "D&B Concrete Crack Analysis Study"	TBD TBD	SEB/NSWC HGEB/COE
4. Boring Test Results (Reports dated 7/31/81 & 8/17/81)	Mid-November, 1981(c)	HGEB/COE
5. Amendment 97 - Revision 12 to 50.54(f) Responses on Plant Fill - Updated Piezometer and Settlement Plots. Submitted 10/26/81 and 11/3/81	TBD	HGEB/COE

Construction Start

The surcharge program is completed. No further construction remedial activity is pending staff approval.

V. Underground Pipes and Utilities

Hearings

Not yet scheduled

Testimony

Two weeks prior to hearing start

Submittals

None (other than meeting presentations and earlier profile results and stress calculations)

Branch

MEB/ETEC

Construction Start

To be determined

VI. Permanent Dewatering

Installation approved by NRC. It is not known whether any further separate hearing session for this subject is intended by the Board.

Future Submittals

Branch

Results of drawdown and watertable recovery tests (recharge tests)

HGEB

Table A.20

<u>Construction Milestone</u>	<u>Date Information Available for Staff Review</u>	<u>Requested Starting Date of Construction Milestone</u>
1. Install Vertical Access Shaft to El. 609 and Complete Freeze Wall Installation.	No submittal required	12/29/81
Proposed Special License Condition: None		
2. Activate Freezing of Soil along Freeze Wall Alignment	12/15/81	2/1/82
Proposed Special License Conditions:		
2a. Provide documentation demonstrating the Freeze Wall, when activated, will not adversely affect seismic Category I structures, conduits and pipes by causing ground heave or resettlement upon unfreezing.		
2b. Provide a plan, with established criteria and basis, for field monitoring of the effects of the Freeze Wall. The required plan will include a commitment to monitor both vertical and lateral movements at a minimum of four locations where safety related structures and utilities could potentially be affected. <i>This plan is to be provided by 1/15/82.</i>		
2c. Provide responses for questions ^{3 and 4} identified in Attachment 21 except for Questions 9, 18, 20, 25, 26 and 30.		
2d. Provide responses for review concerns identified in answers to questions 14 and 17 of this testimony.		

<u>Construction Milestone</u>	<u>Date Information Available for Staff Review</u>	<u>Requested Starting Date of Construction Milestone</u>
3. Extend Vertical Access Shaft below El. 609 and begin to remove soil foundation support from beneath Feedwater Isolation Valve Pit.	1/15/82	2/15/82

Proposed Special License Conditions:

- 3a. Provide design analysis for temporarily supporting the Feedwater Isolation Valve Pits (FIVP) on beams extending from the Buttress Access Shaft to the Turbine Building. The design will identify actual loads and displacements and demonstrate the adequacy and safety of the temporary support system.
- 3b. Provide an acceptable monitoring program with criteria for avoiding adverse impact on FIVP.
- 3c. Provide responses to questions 5, 8, 10, 11, 12, 13, 24, 26, 27 and 29 identified in Attachment 21.

4. Begin drift excavation beneath the Turbine Building.	1/15/82	2/15/82
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Proposed Special License Conditions:

- 4a. Provide design analysis (including supporting calculations, drawings and specifications) which evaluates the anticipated undermining and temporary construction loading on the Turbine Building at this stage. The analysis will be required to demonstrate an acceptable margin of safety for the Turbine Building to safely carry the imposed temporary construction loads so as to avoid adverse impact on the adjacent Auxiliary Building.
- 4b. Provide an acceptable monitoring program for affected Category I structures, conduits and pipes with criteria and basis for this construction stage. Criteria basis should describe how movements to be measured are related to code allowable stresses and allowable strains.
- 4c. Provide documentation demonstrating the adequacy of the final permanent support system along the north side of the Turbine Building in safely providing long-term support for the Turbine Building without adversely impacting the Auxiliary Building.
- 4d. Provide responses for questions 9, 14, 15, 25 and 30 which are identified in Attachment 21.

<u>Construction Milestone</u>	<u>Date Information Available for Staff Review</u>	<u>Requested Starting Date of Construction Milestone</u>
5. Begin removal of soil foundation support from beneath Auxiliary Building.	2/1/82	4/1/82

Proposed Special License Conditions:

- 5a. Provide design analysis (including supporting calculations, drawings and specifications) which evaluates the temporary support system for the Auxiliary Building at appropriate sequential stages of excavation and jacking. The design analysis will be required to demonstrate acceptable margins of safety at the various stages of temporary construction.
- 5b. Provide an acceptable monitoring program with criteria and basis for temporary conditions of loading at this stage of construction.
- 5c. Provide responses for questions ^{6, 7, 12} 10, ^{19, 20, 21, 22} 23 and 28 which are identified in Attachment 21.
- 5d. Provide design analysis (including supporting calculations, drawings and specifications) demonstrating the adequacy of the installed temporary post-tensioning system.
- 5e. Provide an engineering evaluation of all cracks (existing and new) and propose a plan for the detailed evaluation of through cracks.

6. Begin construction of permanent underpinning wall.	5/17/82	11/1/82
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Proposed Special License Conditions:

- 6a. Provide design analysis (including supporting calculations, drawings and specifications) which evaluates the permanent underpinning structure. The design analysis will be required to address all load combinations including stability under seismic loading.
- 6b. Provide results of the evaluation of through cracks.
- 6c. Provide an acceptable monitoring program with criteria and basis for long-term plant operation condition.
- 6d. Provide responses for questions 1 and 2 which are identified in Attachment 21.

RECORD OF TELEPHONE CONVERSATIONS

Date: October 30, 1981Project: Midland 50-330Recorded by: Joseph D. Kane

Talked With:	<u>CPCo</u>	<u>Bechtel</u>	<u>NRC</u>	<u>COE</u>
	D. Budzik G. Keeley	A. Boos N. Swanberg	R. Landsman F. Rinaldi D. Hood J. Kane	H. Singh

Route To: For Information

G. Lear
L. Heller
D. Hood
W. Fatou
F. Rinaldi
R. Landsman, I&E, Region III
H. Singh, COE, Chicago
J. Kane

Main Subject of Call: Remedial Underpinning of Auxiliary Building and
Feedwater Isolation Valve Pits

Items Discussed:

1. Enclosure 3 to CPCo September 30, 1981 submittal from J. W. Cook to H. R. Denton entitled "Technical Report on Underpinning the Auxiliary Building and Feedwater Isolation Valve Pits". During the October 30, 1981 conference call CPCo was requested to respond to the following questions which had been developed in the COE/IIRC review of Enclosure 3, relative to geotechnical engineering aspects in underpinning the Auxiliary Building.
 - Q.1. (Pg. 2, Sect. 4, 2nd Para.) Please define "design jacking force," how established and the duration that it will be held?
 - Q.2. (Pg. 2, Sect. 4, 3rd Para.) Discuss and provide detail of dowel connection. (Diameter, how distributed along wall, length of embedment, etc).
 - Q.3. (Pg. 3, Sect. 5.1, last para) The agreed upon acceptance criteria for soil particle monitoring during dewatering requires 0.005 mm and not 0.05 mm. Correction by CPCo required.

- Q.4. (Pg. 3, Sect. 5.1, Para. b) Installing the frozen cutoff membrane will cause expansion and possibly increase the soil voids. When ultimately unfrozen, what is the effect (e.g., further settlement), on safety related structures, conduits and piping. Provide discussion on the basic system of the frozen membrane [size and spacing of holes to be drilled, method for pumping brine into foundation layers, range of temperatures that are critical to wall stability which are to be monitored, decommissioning (e.g., grouting, etc)].
- Q.5. (Pg. 3, Sect. 5.2) Clarify the procedure to be used in post tensioning the Electrical Penetration Area. Where will the buoyancy force be transmitted to the foundation and in what manner?
- Q.6. (Pg. 4, Sect. 5.6, 2nd Para.) Please explain the meaning of "failure bearing capacity factors" and the basis for "the nine times the shear strength for the cone"?
- Q.7. (Pg. 4, Sect. 5.b, 4th Para.) How will the equivalent soil modulus be determined? What is the depth that the measured settlement will be distributed over and what is the area to be used in determining the stress?
- Q.8. (Pg. 4, Sect. 6) Presently, this paragraph implies that crack monitoring will not be performed on the existing structure. Please correct. Before remedial underpinning begins an accurate and up-to-date record of cracks should be developed for those safety related structures which could potentially be affected by the underpinning operations. This background record should be verified by I&E inspection and could serve as the basis for evaluating any changes in cracks due to underpinning operations.
- Q.9. (Pg. 5, Sect 6.1.1 and 6.1.2) When will the acceptance criteria for the differential and absolute settlement be provided to the NRC?
- Q.10. (Pg. 5, Sect. 6.2) Provide the basis for establishing the crack width of 0.03 inch. Appendix D should also address crack monitoring requirements during underpinning (frequency of reading, format for presenting observations, action levels etc).
- Q.11. (Pg. 6, Sect. 7.2.1, last Para.) Provide discussion why the drained shear strength is not required to be considered in analyzing for adequate bearing capacity. Also in the last paragraph in Section 7.2.1, Pg. 7 indicate the basis for the 2 days and what would be required if the settlement rate does not reach a straight line trend in 2 days.
- Q.12. (Pg. 7, Sect. 7.2.2) Where are the WCC controlled rebound-reload cycle soil test results? What is the corresponding stress level with a secant modulus of elasticity equal to 3500 KSF?

- Q.13. (Pg. 8, Sect 7.2.3, 1st Para.) The estimates of settlement using the referenced NAVFAC DM-7 do not include secondary consolidation. What secondary consolidation would be indicated if the consolidation test results using the appropriate load increment were used? Compare this estimate with values for permanent wall conditions "after jacking, long term". Please provide basis for the three estimated settlement values for "Load transfer points for temporary load to reactor footing" at the bottom of pg. 8 and discuss any effects of this settlement on the reactor and pipe connections.
- Q.14. (Pg A-1, Sect. 1, 2nd Par.) Please indicate how the soil spring constants were established for long term loads.
- Q.15. (Pg C-2, last Par. and Pg. C-6, Par. B) What are the protective construction measures planned for the Turbine Building and Butress Access Shafts and when will they be placed? Please provide discussion on the sequence of operations to complete the drift beneath the Turbine Building and show sectional views of this work with respect to the Turbine Building foundations and affected piping and conduits.
- Q.16. (Pg C-3, Par. A.1.a) Please explain what is meant by minimizing the amount of concrete to be removed.
- Q.17. (Pg. C-3, Par. A.1.c. and A.1.d) What is the magnitude of the load for testing the temporary support pier and how was it established and how will it be applied? Is the EPA foundation slab capable of supporting this load at this time?
- Q.18. (Pg. C-4, Sect. A.1.f., 1st complete para.) Provide discussion on monitoring of the control tower behavior at this time. What criteria will be used to decide if preload should be stopped and support capacity should be added to the control tower?
- Q.19. (Pg. C-4, Sect. A.2.) What are the reasons why the three temporary supports under the EPA should not be completed before the permanent support at the control tower is initiated?
- Q.20. (Pg. C-4, Sect. A.3.a) Questions are raised as to whether the EPA structure can withstand the overhang condition which results if the initial temporary supports is assumed to fail. What is the basis and need for this extreme assumption? Is the EPA structure capable of withstanding this loading condition?
- Q.21. (Pg. C-4, Sect A.3.b and A.3.c) The distinction between 3.b and 3.c is unclear. What is the magnitude of the load for testing and how established? Is there a problem with the EPA foundation slab providing a sufficient reaction load?
- Q.22. (Pg. C-5, Sect. 14 and 15) It appears the operations described in these items are intended only for the wings and not the control tower. How is the load test and load transfer for the control tower to be completed. For the long term load test on the wings, what is the load magnitude and how was it established? What is the final

sequence of operations in transferring the structure load to the permanent underpinning.

- Q.23. (Pg. D-1, Sect 1.0, 2nd Par) Describe the procedure that relates allowable stresses and allowable strains with structure movements that are being monitored.
- Q.24. (Pg D-2, Sect. 1, 3rd Par.) Please clarify the distinction between the first and second layer systems for detecting structure movement.
- Q.25. (Pg D-2, Sect. 1, 4th, 6th, and 7th Para.) Please provide elevations and sectional views with typical details for the deep seated bench mark and the instrumentation for monitoring relative horizontal movement and absolute horizontal movement.
- Q.26. (Pg. D-3, Sect. 2, 2nd Par.) Please clarify the explanation why the hydraulic pressure data cannot be used to measure load.
- Q.27. (Pg. D-3, Sect. 2, 3rd Par.) Provide sectional view of set up for measuring difference in relative position. How does this procedure address the possibility of both the underpinning element and structure settling? Provide the basis for maintaining the jack/hydraulic system for 1 hour and for establishing the 0.01 inch movement.
- Q.28. (Pg. D-4, Sect. 2, 4th Para.) When will the modeling and critical structural stresses and strains be determined and furnished to the NRC?
- Q.29. (Pg D-5, Sect. 2, 2nd and 3rd Para.) Provide sketch and locations with typical details of instrumentation for measuring concrete stress, tell tale devices and predetermined points for monitoring vertical movement.
- Q.30. (Pgs. D-5 and D-6, Sect. 3, Par. 3A.1, 3A.2, 3A.3) For the various types of monitoring described in these paragraphs provide an example of the forms to be used for plotting the recorded data. What are the predetermined levels of movements which would require adjustments and/or action by the onsite geotechnical engineer. Identify any specific instrumentation which would be continued to be read during plant operation and which eventually will be addressed by a Technical Specification.
2. Consumers was notified that the above questions do not contain the COE/NRC review comments on the laboratory test results for foundation soils beneath the Auxiliary Building. The COE/NRC comments on the test results will be furnished at a later date following CCo submittal of the Part II lab test report which is expected to be submitted to the NRC the week of November 2, 1981.
3. Consumers indicated the questions asked in the conference call of October 30, 1981 would be addressed as far as possible in the upcoming meeting with NRC in Bethesda on November 4, 1981.