

Documents Requested
by NRC From Package
Produced by Tom Cooke,
Midland Plant Superintendent,
but not used as Deposition
Exhibits 10/22/80

TO J W Cook

JIBacon
JEBrunner
DEBudzik
TCCooke
MEGibbs (IL&B)
CSKeeley
DEMiller
JARutgers (Bechtel)
NJSaari

Attached are revised pages
to the "Documentation and
Meetings Relative to Soils"
List.

JEB/fs

CONSUMERS POWER COMPANY

RECEIVED

OCT 09 1980

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

DOCUMENTATION AND MEETINGS RELATIVE TO SOILS

3/13/73	Hunt/Hanson (Rogn 33-73)	C-210 comments
9/19/74	CAHunt comment on C-210 compaction of plant area - Hunt 110-74	
8/25/77	Grade beam failure - See also BCCC (see below 2794), 3010 Bechtel - UST memo of 2/1/78	
9/8/77	TCCooke Serial 2538 to Newgen on Article 9	
9/23/77	BCCC-2794 Newgen acknowledgment	
2/1/78	Newgen to US Testing	
8/22/78	Verbal discussion with RCCook by WRB & JLC on settlement (78-13) also 8/24 Cook exit	
8/25/78	Article 9, TCC/JFN - See also CSC-3797, Loose sands, Serial 3478	
8/31/78	SHH/GSK/RCB/JJZ	NRC meeting in Washington
9/7/78	50.55 (e) telecon report to NRC on settlement - WRB and JLC to RCCook	
9/8-Exit & 9/10-29/78	RCook	78-14
9/14/78	GSK (GSK handwritten notes) (Where are meeting notes?)	Meet with Bechtel at site on Foundation settlement
9/22/78	MCAR 24, Interim Report No 1, BLC-6578	
9/26/78	PAM - GSK telecon	Question on removal of natural sands
9/28/78	Dr Peck on soils at site	
9/29/78	Wuokko to CAH/GSK and Wuokko CAH to GSK	Review of settlement
9/29/78	Siple/Cheek note	Test on fill
9/29/78	50.55 (e) Report	

0/78	RCCock	78-21
10/4/78	GSK/DBM/TCC	Discuss earthwork specs
10/8/78	Dr Hendron site visit	
10/9/78	Afifi to Peck	Transmitted Vol IV of FSAR
10/9/78	Afifi to Hendron	Transmitted Vol IV of FSAR
10/9/78	RMW - 11/1/78 - settlement status - AA	
10/10/78	TCC/JFN Serial 3487	Dike borings
10/11/78	GSK (RMW & TCC asked to review conditions)	Soils discussion on site
10/12/78	Field - AA telecon	Dike borings
10/12/78	Afifi to Peck	Transmitted settlement contours for DGB SK-C-620
10/12/78	Afifi to Hendron	Transmitted settlement contours for DGB SK-C-620
10/17/78	GSK/CAH (Discussed RMW inconsistency notes)	Visit site on foundations
10/18/78	Dunnicliff	Site visit
10/18/78	Afifi to Peck	Meeting in Urbana
10/20/78	Pond fill & D/S Settlement AA	
10/23/78	Hendron to Afifi	Comments on site visit
10/23/78	JFN/TCC (also plan mtg w/GSK)	Dike borings
10/24-27/78	Region III site inspection 78-12	NRC notes dated 11/17/78 also 280 FQA78 (DEH)
10/25/78	GSK (handwritten notes) (where are official meeting notes?) BLC-6747	D/G settlement meeting at site
10/26/78	Afifi to Hendron	Transmitted data 1. Boring logs 2. Consolidation tests 3. Updated settlement data

10/26/78	Afifi to Peck	Transmitted data 1. Boring logs 2. Consolidation tests 3. Updated settlement data
10/27/78	Draft TCC/JFN	Activities prior to preload also NRC exit that date
10/30/78	WRB/RMW/DEH (where are notes?)	MCAR discussion on settlement Bechtel-AA
10/31/78	Draft NRC exit (GSK)	
10/78	RCook 78-22	
11/1/78	Keppler memo to Thornburg asking NRC Staff to take over responsibility	
11/1/78	PAM/GSK - BLC-6747	Continuation of D/G work
11/2/78	Afifi to Hendron	Transmitted 10/8/78 meeting notes
11/2/78	GSK/RMW/DBM/TCC/DES (see material assembled by RMW 11/1/78	Meet w/Bechtel on settlement Bechtel-AA (GSK meeting notes 12/4/78)
11/6/78 or 11/7/78	Champaign, IL mtg	Handwritten (CAH notes)
11/6/78	Afifi to Peck	Transmitted Dunicliff's site visit recommendations
11/6/78	Afifi to Hendron	Transmitted Dunicliff's site visit recommendations
11/6/78	MCAR 24, Interim Report No 2	BLC-6767
11/6/78	Afifi to Hendron	Transmitted Dr Wood Dutch cone data
11/7/78	50.55 (e) (Tentatively planned to have review meeting last two weeks in November and NRC will be invited.)	
11/7/78	TCC/DES/RMW/CAH/DEH - CSC-3674 Bechtel minutes	Meet with Dr Peck and Hendron on settlement at Urbana, IL
11/10/78	Afifi to Hendron	Telecon: Recommendations on pre- load prior to NRC meeting
11/14/78	NRC notified meeting at site for 12/3 and 12/4/78	

11/15/78	Meeting with consultants at Urbana (Bruce Peck's notes 11/21/78)	
11/16/78	DBM CSM-0050 to PAM	Continue construction of building
11/16/78	Urbana Meeting	CSC-3621
11/16/78	Ohmstead to ASLB including Keppler to Thornburg 11/1/78 memo and CP Co 9/24/78 50.55 (e)	
11/17/78	Hendron to Afifi	Comments and conclusions to 11/7/78 meeting notes
11/17/78	Inspection Report (Gallagher 10/24-27/78 inspection on site)	
11/18/78	Meeting in Urbana w/Hendron	
11/20/78	Cherry memo to Keppler (Is at- tached to 12/14/78 Keppler reply to Cherry)	
11/21/78	GSK	Meet w/RCY, PAT by NRC?
11/27/78	Afifi to Peck	Transmitted 9/27/78 meeting notes
11/27/78	Afifi to Hendron	Transmitted 9/27/78 meeting notes
11/28/78	Afifi to Hendron w/ Peck	Instrumentation and cross-sections for DGB. Cage for vertical pressure
11/30/78	GSK/RMW	Meet w/Bechtel on preparation for NRC site visit on settlement
12/3-4/78	TCC, CSC-3663 to PAM BLC-7233 & Bechtel minutes; Hoco's mtg notice of 11/14/78	NRC on site for settlement issue. DHood/WLayman/DGillen/Bechtel/CP/ Dr Peck
12/7/78	JLC/DEH Gallagher Telecon	Roller Passes
12/8/78	Met w/consultant (where are meeting notes? CSC-3699 & Bechtel minutes	(BPeck CSC-3712 refers to it)
12/11-13/78	NRC 78-20 Soils	AA, Site, Jackson
12/11/78	Ferris to Peck	NRC letter dated 11/17/78
12/13/78	Gray to GZD (Schultz) w/GeoT	Minerology of soil
12/13/78	GZD to QF	Qualification of people

12/14/78	Met with Bechtel to discuss 12/8/78 meeting with consultants and concerns of CP Co - CPC-3663. (BPeck CSC-3712 dated 12/20/78)	
12/21/78	Between the lines	
12/21/78	50.55 (e) that preload is corrective action to be taken	Site task group
12/27/78	Afifi to Hendron	Telecon: Preload sequence for DGE
12/27/78	Afifi to Hendron	Telecon: DGB preload defrosting
12/28/78	Ferris to Hendron	Transmitted backfill Spec C-210 & 211 and SK-C-355 requirements
12/28/78	Ferris to Peck	Transmitted backfill Spec C-210 & 211 and SK-C-355
12/28/78	MCAR 24, Interim Report No 3	BLC-6949
12/29/78	GZD to GeoT	Personnel Qualifications
12/29/78	Afifi to Peck	Transmitted sketch SK-C-620, SK-C-623 and settlement vs time for pedestals plus copy of NRC questions
12/29/78	Afifi to Hendron	Transmitted sketch SK-C-620, SK-C-623 and settlement vs time for pedestals plus copy of NRC questions
12/78-1/79	RCook 78-20	
1/3/79	Newbury, TCC	Newsletter on soil compaction
1/4/79	AA meeting task group	
1/4/79	Revision to MCAR 24, Interim Report No 3 - BLC-6971	
1/5/79	50.55 (e) Report	
1/10/79	GZD to Castleberry w/Geo T	Transmitting inspection and reading procedure
1/12/79	NRC investigation US testing allegations (no notes)	
1/15/79	Afifi to Castleberry w/Peck	Next meeting February 4, 1979

1/15/79	Afifi to Peck w/Hendron	Transmitting 12/8/78 meeting notes
1/17/79	Afifi to Hendron	Transmitted meeting notes for November 7 and 18, 1978
1/17/79	Afifi to Dunnicliff	Transmitted meeting notes for November 7, 1978
1/18/79	Afifi to Peck	Transmitted meeting notes for November 7 and 18, 1978
1/23/79	Site	Task Group
1/30/79	Afifi to Dunnicliff	Discussing TSA
1/31/79	Afifi to Hendron	Transmitted FSAR Question 362.13 w/draft answer
2/1-3/79	Code 79-09; also 1/2-31/79	
2/5/79	GZD to Castleberry	Supplemental QA Manual
2/5/79	GZD to Castleberry	TSA
2/7/79	GSK/DBM (where are official meeting notes?)	Meet w/JKeppler at Site (GSK notes)
2/15-16/79	GSK/WRB/CAH/TRT/TCC/RMW (where are meeting notes?) AA handouts & handwritten notes	Status of diesel generator building foundation - Bechtel - AA (See GSK notes)
2/16/79	MCAR 24, Interim Report No 4	BLC-7179
2/20/79	TCC memo CSC-3852 to CAH commenting on DRW 12-78 & 13-78	
2/21/79	RCB/CAH & GSK discussion (GSK notes) also Hunt 29-79	
2/23/79	Met with Region 3 at Glen Ellyn	
2/23/79	50.55 (e)	
2/23/79	Afifi to Peck	Location of Class I piping and profiles by GZD
2/24/79	Afifi to Peck	Telecon: Effective saturation of compacted fill
3/1/79	Hand notes - AA meeting, I think	

3/5/79	SHH/GSK/TCC/DEH	Meet with Region 3 in Glen Ellyn. At end of this meeting requested NRC for technical meeting.
3/5/79	Draft cause memo by TCC	
3/6/79	NRC visited site to review preload. NRC documented 3/20/79	Also planning meeting on site
3/8/79	Meeting w/Bechtel (no formal notes)	Planning K/T analysis
3/9/79	SHH memo to Keppler	Asked for reply on scheduling technical meeting.
3/12/79	Task Force meeting	Jobsite
3/14/79	Prof N Newmark	Urbana
3/15/79	NRC meeting notes of 2/23/79 & 3/5/79 meeting in Glen Ellyn	
3/19/79	RCB Eng SU request	Subsidence/settlement check
3/20/79	TCC/DES/GSK	Meet with Dr Peck on settlement at Bechtel AA, BLC-8093
3/21/79	GSK	Received NRC's 50.54 (f) questions on settlement
3/22/79	Keppler to SHH	Results of investigation by Philip, Gallagher and Maxwell 12/11, 18/78 & 1/4, 9, 22/79
3/22/79	Afifi to Peck	Transmitted copy of 10 CFR 50.54 (f) question (22 questions)
3/22/79	Afifi to Hendron	Transmitted copy of 10 CFR 50.54 (f) question (22 questions)
3/23/79	Review 50.54 (AA)	
3/23/79	Between the lines	
3/23/79	Afifi to Peck	Transmitted: 1. Liquefaction potential study; 2. Field cyclical stress ratio; 3. Earthquake induced settlement

3/23/79	Afifi to Hendron	Transmitted: 1. Liquefaction potential study; 2. Field cyclical stress ratio; 3. Earthquake induced settlement
3/27/79	GSK response to letter on soils	Review 50.54 (f) question with Bechtel in AA
3/28/79	Afifi to Peck	Transmitted Dr Woods report on Dutch cone data
3/28/79	Afifi to Hendron	Transmitted Dr Woods report on Dutch cone data
3/28-29/79	Gallagher inspection on Site (JLC memo 3/29/79 111FQA79 & NRC report 4/9/79)	79-06
3/29/79	Gould - AA meeting	
4/3/79	50.55 (e)	
4/4/79	Underpinning	AA Spencer White & Prentices
4/4/79	Afifi to Hendron	Update of March 23, 1979 letter
4/9/79	BWM & DEH & Bechtel meeting at US Testing. (Meeting notes on 4/25/79 memo)	
4/10/79	Davvisson, Loughney, Gould	Site Tour
4/12/79	Afifi to Davisson	Transmitting: boring logs; location plan of areas being considered for underpinning; Midland FSAR soils section
4/17/79	MCAR 24 coordination	
4/19/79	GSK	Review answers to NRC
4/23-24/79	Site meetings on data & Q-List fill	
4/24/79	SHH	Respond to NRC's 50.54 (f) settlement issues
4/24/79	Resumption of Q-List backfill BCDC 3995	
4/24/79	Soil & Rock to Castleberry	Field data April 3 to 10 pipe profiles

4/25/79	MCAR 24, Interim Report No 5	BLC-7505
4/26/79	Task Group	
4/26/79	Castleberry to Intrusion prepack	Grouting of sand
4/27/79	Castleberry to Loughney	Transmittal for underpinning 12 drawings; 17 figures; boring logs
4/27/79	Afifi to Hendron	Transmitting 17 figures showing response of instrumentation to surcharge
4/27/79	Afifi to Peck	Transmitting 17 figures showing response of instrumentation to surcharge
4/27/79	Dunnicliff to Chen	Received soil samples
5/1/79	Afifi to Peck	Transmitted responses to NRC questions
5/1/79	Afifi to Hendron	Transmitted responses to NRC questions
5/7/79	2 telecons with Hood	Settlement issue is broad. NRC Staff too tied up with TMI-2 to meet
5/10/79	RMW	Meet with D/G consultant at Bechtel-AA
5/11/79	GSK	NRC Exit Interview at Bechtel-AA
5/11/79	GSK/TCC - BLC-7830	Meet with Bechtel on proposed fixes to structures
5/16/79	Task Group	Site
5/17/79	TCC memo CSC-4066 to Newgen on air line leak in tank farm	Also NRC Exit
5/17/79	NRC 79-10 & 170FQA79	Site
5/21/79	Afifi to Loughney	Transmitted C-88 for review
5/22/79	Afifi to Davisson w/Peck, w/Dunn; w/Hendron	Transmitted May 10, 1979 meeting summary
5/22/79	Davisson - Afifi	May 10 meeting in AA summary
5/24/79	Afifi to Davisson w/Gould	Transmitted Spec C-95 for review

5/24/79	Afifi to Hendron w/ Davisson	C Gould participation with Davidsson
5/25/79	Afifi to Davisson	Transmitted C-94 for review
5/29/79	Davisson to Afifi	Response to May 10, 1979 meeting summary
5/30/79	D/G Task Group, BLC-8051	AA
5/31/79	Loughney, Woods, DES	AA dewatering
5/31/79	SHH	Rev 1 to 50.54 (f)
6/79	Review of UST	
6/1/79	NRC Notice of Test Pit Visit - 6/7/79	
6/5/79	RLC/TCC	Prospective Bidding
6/6/79	Afifi to Hendron	Liquefaction potential of railroad bay
6/7/79	TCC, CSC-4138	NRC site visit to observe test pits (TCC memo 6/13/79, CSC-4138 and NRC Report dated 6/21/79)
6/11/79	DES (where are minutes?)	Meet at Bechtel to discuss diesel gen MCAR
6/12/79	Afifi to Hendron	Update of borings, cross-sections & other information
6/12/79	Afifi to Peck	Update of borings, cross-sections & other information
6/12/79	Afifi to Woods	Update of borings, cross-sections & other information
6/12/79	Afifi to Davisson	Update of borings, cross-sections & other information
6/12/79	Afifi to Gould	Update of borings, cross-sections & other information
6/12/79	Afifi to Peck	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/12/79	Afifi to Hendron	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and rev 1

5/12/79	Afifi to Davisson	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/12/79	Afifi to Gould	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/13/79	Chen to Hendron	Telecon - Interim Report #6 to MCAR 24 - questions on liquefaction of control tower BLC-7749
6/15/79	MCAR, Interim Report No 6	
6/18/79	SHH/GSK/JJZ/RFG	Meet with NRC on Licensing Schedule in Washington, DC
6/18-19/79	DES	Meet with consultants at Bechtel-AA (TCC memo CSC-4297 dated 8/8/79)
6/20/79	CP Co motion for separate hearings on environmental and soils	
6/22/79	GSK/BWM/WRB/DEH, CSC-4297	Meet at Bechtel to discuss upcoming NRC meeting
6/25/79	50.55 (e)	
6/25/79	DES - D/G Task Group	AA BLC-7944
6/27-28/79	Meeting with consultants in Denver (TCC memo CSC-4306 dated 8/10/79 and CSC-4274 dated 8/7/79)	
6/29/79	SHH to Keppler	CP Co response to noncompliance on prestressing - soils also inspected on 5/14-17/79
6/29/79	Afifi to Peck	Interim Report #6 to MCAR 24
6/29/79	Afifi to Davisson	Interim Report #6 to MCAR 24
6/29/79	Afifi to Hendron	Interim Report #6 to MCAR 24

6/29/79	Afifi to Loughney	Interim Report #6 to MCAR 24
6/29/79	Afifi to Gould	Interim Report #6 to MCAR 24
6/29/79	Afifi to Peck	Report by D Gray dated 5/7/79
6/29/79	Afifi to Hendron	Report by D Gray dated 5/7/79
6/29/79	Afifi to Dunnicliff	Peck's suggestion on temperature correction for DGB Instrumentation
7/2/79	Gould, Davisson, Loughney, Peck to Afifi	Transmitting Denver meeting notes signed by the senders
7/3/79	TCC telecon with Lipinski	
7/3/79	GSK/PAM, BLC-7827	Arrangements for 7/18/79 meeting (Washington)
7/3/79	Newgen/Cooke	Resumption of Q-List fill
7/3/79	Afifi to Ferris w/Hendron	Settlement during earthquake
7/6/79	Telecon SHH to Boyd	Concern on need for continuing activity on settlement
7/7/79	Afifi to Loughney	Meeting notice
7/7/79	Afifi to Gould	Meeting notice
7/7/79	Afifi to Peck	Meeting notice
7/9/79	SHH	Send in Rev 2 to 10 CFR 50.54 (f)
7/10/79	Denton reply to SHH	TWX says they will continue reviews of soils
7/10/79	NRC Staff reply to CP Co 6/20/79 motion	
7/10/79	DNR - Hittle	Draining Pond to D/G
7/10/79	TRT/DEH/GSK/TCC	Pre-7/18 meeting
7/17/79	Review Monitoring w/Loughney	AA
7/17-18/79	GSK/TCC/TRT	Premeeting with consultants in Washington, DC. Meet with NRC on settlement in Washington, DC 50.55 (e) dated 8/10/79 documented meeting
7/18/79	Hood issued meeting notes of 7/18/79 meeting on 10/16/79	

7/18/79	Meeting Submittal	
7/18/79	Afifi to Gould	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Davisson	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Hendron	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Peck	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Loughney	Transmitting Rev 2 of 50.54 (f) questions
7/23/79	Gould to Afifi	Summary of presentation made to the NRC 7/18-19, 1979
7/23/79	Peck to Afifi	Summary of presentation made to the NRC July 18-19, 1979
7/25/79	Afifi to Davisson	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Loughney	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Dunnicliff	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Peck	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Hendron	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Gould	Transmitted meeting notes of 6/18-19/79
7/25/79	Loughney to Afifi	Summary fo presentation made to the NRC July 18-19, 1979
7/26/79	Meeting with SHH & Bechtel on Lessons Learned. (B&W meeting notes 7/26/79, BWM 101-79)	
7/31/79	Telecon with Hood	Discussion on documenting 7/18/79 meeting. Hood stated that Staff said positive aspects of meeting were proposed design fixes.

8/1/79	Task Force, BLC-8092	
8/2/79	Chen to Peck	Data for settlement evaluation of DGB
8/2/79	Chen to Hendron	Data for settlement evaluation of DGB
8/3/79	Telecon with Miller	Update on 7/18/79 soils meeting and Bechtel Mgmt Meetings
8/6/79	Fobes to JSS/RLB	Dewatering info request
8/10/79	50.55 (e)	Meeting notes of 7/18/79 meeting with NRC staff
8/10/79	Afifi to Woods	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Peck	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Hendron	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Davisson	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Gould	DGB settlement Dutch cone data pipe profiles
8/10/79	Woods to Afifi	Pile stiffness report on service water structure
8/13/79	Afifi to Castleberry w/Peck, w/Hendron	Telecon: Reference w/Peck & Hendron on removing the surcharge
8/14/79	Newgen/Castleberry TWX	Release to remove surcharge
8/15/79	PAM to GSK, BLC-8021	Justification for removing preload
8/16/79	Chen to Hendron & Dunningcliff	Telecon: Settlement monitoring during surcharge removal
8/24/79	Dewatering (AA)	
8/24/79	MCAR 24, Interim Report No 7	BLC-8073
8/28/79	Afifi to Loughney	Interim Report No 7
8/28/79	Afifi to Peck	Interim Report No 7
8/28/79	Afifi to Hendron	Interim Report No 7

8/28/79	Afifi to Davisson	Interim Report No 7
8/28/79	Afifi to Gould	Interim Report No 7
8/29/79	Rubenstein/Howell	Question 1 meeting
8/31/79	JJZ/WRB	Held preplanning meeting for NRC QA settlement meeting at Bechtel-AA
9/4/79	Revision to MCAR 24, Interim Report No 7	BLC-8088
9/5/79	Darl Hood meeting notes	Meet with NRC on QA settlement (Q-23)
9/5/79	50.55 (e) & RMW AA dewatering?	
9/6/79	Dewatering CSC-4376	
9/7/79	Dewatering AA	
9/10/79	Afifi to Loughney	Interim Report No 7
9/10/79	Afifi to Peck	Interim Report No 7
9/10/79	Afifi to Hendron	Interim Report No 7
9/10/79	Afifi to Davisson	Interim Report No 7
9/10/79	Afifi to Gould	Interim Report No 7
9/11/79	SHH	NRC sent letter on QA settlement issue (Question 23)
9/11/79	Testing & monitoring AA	
9/12/79	GSK/BWM/WRB/JJZ	Meet on QA settlement in Jackson
9/13/79	SHH	Rev 3 to 50.54 (f)
9/13/79	RMW/Dunnicliff CSC-4405	Task Group AA
9/17/79	Chen to Hendron	Telecon: Monitoring of only selected borres anchors
9/18/79	Afifi to Curtis w/Woods	Insitu shear wave measurements & additional borings

7/18-19/79	Case Load Forecast Panel Site Visit. Serial 7759. Agenda Item 6. Discussed work schedules and completion of investigation and saw no schedule effects.	
9/27/79	SHH/GSK/JJZ/TJS - Serial 7921	NRC Management Meeting in Washington, DC. Rubenstein stated he had trouble getting Tech Staff to review soils.
10/1/79	Bechtel	Tank Farm Investigation Report
10/1/79	UST-Bechtel	Response to Bechtel review
10/9/79	GSK/BWM/WRB/JJZ	Meet on 50.54 (f) (Question 23) in Jackson
10/9/79	TCC/DES/DEH/TRT (CSC-4504-below) also BLC-8439	D/G Task Group AA
10/11/79	GSK	Meet with TRT to prepare for Bechtel dewatering meeting (Jackson)
10/12/79	GSK	Meet at Bechtel-AA all day?
10/15/79	Gray to Schultz	Dispersive soil test data
10/15/79	Schultz to Afifi	Dispersive soil test data
10/16/79	JJZ	NRC notification that Corps of Engineers is helping on geo-technical reviews so asked that 50.55 (e) and 50.54 (f) be sent to them
10/16/79	D Hood - 7/18/79 minutes	
10/16/79	TCC to Curtis CSC-4504	Comments on dewatering RG
10/19/79	Dunnicliff to Afifi	DGB settlement
10/22/79	SHH	Transmittal of draft RF on dewatering systems
10/25/79	SHH/BWM/GSK (tendon Meeting)?	Meet with NRC Region III in Chicago
10/25/79	TCC/DES (where are meeting notes)?	Meeting with consultants Gould & Hendron at Bechtel-AA
10/25/79	Mtg Notes (Hendron, Gould)	Plant Area fill

10/29/79	MCAR 24, Interim No 8	BLC-8370
10/30/79	TCC/DES (Where are meeting notes)? BLC-8474, 11/19/79 Curtis - TCC	Dewatering meeting with consultants Bechtel-AA
10/31/79	Afifi to Loughney	Interim Report No 8
10/31/79	Afifi to Peck	Interim Report No 8
10/31/79	Afifi to Hendron	Interim Report No 8
10/31/79	Afifi to Gould	Interim Report No 8
11/1/79	TCC - Curtis	Pond dewatering requirements
11/2, 79	SHH to NRC	8th Interim Report
11/9/79	Curtis to DBM, BLC-8441	Need for pond dewatering
11/9/79	JAR to GSK	Suggested 50.54 (f) Question 23 include commitment to review previous 50.55 (e) reports.
11/12/79	Afifi to Hendron	Review of DG Calc
11/12/79	Afifi to Peck	Review of DG Calc
11/13/79	SHH	Submitted Rev 4 to 10 CFR 50.54 (f) relative to QA (Question 23)
11/14/79	TCC (where are meeting notes?) I have, but not published	D Hood w/Corps of Engineers visits site (NRC meeting notes dated 12/6/79)
11/15/79	CP testing telecon Bechtel-AA	Settlement/vibration question
11/15/79	WRB - Dreisbach	QC commitments on 50.54 (f) questions
11/16/79	Bechtel/Consultants	Vibration Meeting, Bechtel-AA
11/19/79	Supplemental 50.54 (f) Questions 23-35	
11/19/79	Listing of commo w/consultants	
11/20/79	TCC (where are meeting notes?) not published yet (AA)	Dewatering task force meeting at Bechtel
11/21/79	Curtis - Cooke pond dewatering	Technical aspects
11/21/79	Cooke - Fobes	Pond dewatering reasons/method

11/27/79	Afifi to Peck	Transmit October 25, 1979 Notes
11/27/79	Afifi to Gould	Transmit October 25, 1979 Notes
11/27/79	Afifi to Hendron	Transmit October 25, 1979 Notes
11/27/79	GZD to Castleberry	Transmit Test Pit and Plate Load Test
11/29/79	Afifi to Hendron	Transmit October 30, 1979 Notes on Dewatering
11/29/79	Afifi to Gould	Transmit October 30, 1979 Notes on Dewatering
11/29/79	Afifi to Loughney	Transmit October 30, 1979 Notes on Dewatering
11/29/79	TCC/Starr Eby MDN Telecon	Other Bldg Settlement
11/30/79	Afifi to Woods	Transmit Additional Information on DG Pedestal Vibration
11/30/79	Afifi to Peck	Transmit Supplemental 50.54 Questions
11/30/79	Afifi to Hendron	Transmit Supplemental 50.54 Questions
11/30/79	RLT memo to Bechtel PE	Data for new settlement problems
11/30/79	Fiorelli to SHH	IR 50-329/79-20, 50-330 cons methods/spec rev (inadvertent)
11/30/79	JBPost - TCC	Mengentime bid question
12/1-28/79	R Cook 78-23	
12/3/79	GSK (no meeting notes)	Meet with Bechtel at site on 50.54 (f) Questions 24-35
12/3/79	Curtis to Davis memo	Dewatering work responsibilities
12/3/79	Fobes - to distribution	Response to TCC 11/21 memo on draining pond
12/4/79	GSK to JAR Serial 8021	Answer to JAR memo to GSK on QA commitments
12/4/79	Fobes - Lansing	Draining pond
12/4/79	Fobes - TCC	Permission to drain

12/5/79	Pond dewatering	Final preparations for dewatering
12/5/79	New 50.54 (f) Questions	Planning session
12/5/79	Meeting at Site to discuss additional 50.54 (f) soils questions - TCC memo 12/11/79, CSC-4660	
12/6/79	Underpinning meeting in AA	Pre-award
12/6/79	NRC issues Order modifying Construction Permit	
12/6/79	Telecon between CP Co and Hood on Order	
12/6/79	Dreisbach NRC response to JLCorley	Dewatering fine sampling
12/7/79	TCC memo to Fobes	Miscellaneous dewatering info
12/11/79	Telecon with Hood interpretation of Order between 50.54 (f) and Order	
12/12/79	NRC Order of December 6, 1979	Investigate work activities which may not proceed under Order
12/13/79	Telecon with Hood on follow-up of 12/11/79 telecon	
12/18/79	Telecon with Hood on not getting Questions 4 and 14 on 50.54 (f) in until Mid-January and that some of 11/19/79 50.54 (f) questions are pertinent to amendment	
12/18/79	CP Co/NRC telecon on future meeting	
12/18/79	Dewatering Meeting in Ann Arbor	
12/19/79	Amendment 72 referencing 50.55 (e) and 50.54 (f) material	
12/19/79	Telecon Cooke/Weidner - Planning PR release on Order	
12/19/79	SHH memo submitting amendment	
12/20/79	MOR to RCB (BLC-8165)	Vibratory Settlement of the D/G Pedestals

12/20/79	Bechtel/Consultants (BLC-8615)	Vibration Meeting, Bech-AA Meeting Notes No 1085
12/20/79	GZD to Afifi	Transmit Settlement Marker Calc
12/26/79	SHH to RBD/GSK/BWM/DBM	NRC Region III - CP Co Mgmt Meeting - 1/11/80
12/26/79	Miller to EGCase & VStello	Request for Hearing
12/26/79	JAR to GSK (BLC-8622)	Modification of Midland Construction Permit - Schedule Analysis on Impact of Order
12/26/79	QAR - Question 23, Item I	
12/26/79	Fobes/Cooke Memo on Pond Dewatering	
12/28/79	BLC-8630, LHC to RCB	Responses to 10 CFR 50.54 (f) Questions on Plant Fill
1/80	NRC Letter to Nila Najawicz	Response to her letter of January 19, 1980 regarding Soils Settlement
1/2/80	NRC Meeting Notice	
1/3/80	QA telecon on Number of Infractions	
1/4/80	Geo Tech/Hendron Dewatering Mtg	
1/4/80	Memo to File from BHP/RMW	12/18/79 Mtg in Ann Arbor - Permanent Dewatering
1/7/80	Bechtel/Loughney/Hendron McClure/Ferril	Dewatering Meeting
1/8/80	CP Co/Bechtel Meeting - Ann Arbor	Dewatering & Questions #4 and #14
1/8/80	Woods to Afifi	Transmit Cross-Hole Test Report
1/9/80	Woods to Afifi	Evaluation of DG Pedestal Vibratory Settlement
1/9/80	Bechtel/Mergentime	Suspend Bid
1/10/80	Dreisbach/Corley	Fines Monitoring
1/14/80	CP Co/Bechtel - Ann Arbor	Preparation for NRC Mtg - 1/16/80

1/14/80	BLC-8692 - JAR to GSK	50.54 (f) Question 23 Actions - December Status Report
1/16/80	CP Co/Bechtel	NRC Meeting in Bethesda on 50.54 (f) questions and update on soils cor- rective action technical items
1/17/80	Telecon with Hood, JJZ, GSK	On Soils
1/17/80	Memo from MIMiller to GSK & SHH	On NRC soils Reporting Requirements
1/17/80	Telecon Between D Hood and JJZabritski	Soils Issue
1/23/80	Cooke/Rothwell Telecon	50.54 (f) Questions
1/23/80	Fobes/District Engineer	Dewatering Discharge to Pond
1/25/80	TCC Memo to MRothwell, CSC-4763	Answers to 50.54 (f) questions based on NRC meeting of 1/16/80
1/25/80	Horn/Gallagher	Lean Concrete Backfill
2/4/80	Telecon Record, JJZ and DHood	Future Meeting on Soils Settle- ment Issue
2/4/80	NRC to CP Co (SMH)	1/16/80 Mtg on Supplemental Requests regarding Plant Fill
2/6/80	QA Dept Oral Communications Record - WRB, JJZ, LJRichards with Dick Knop, NRC	50.54 (e) letter transferring D/G Foundations and Bldg Settlement Problem to Licensing
2/7/80	SHH to Keppler, Howe 23-80	Closing out 50.55 (e)
2/7/80	Probably no Minutes	50.54(f) Questions Response Review Meeting - AA
2/8/80	Dunncliffe to Afifi	Review of DG Bldg Settlement
2/8/80	Telecon Record, JJZ, and D Hood	Soils Mtg on Site for Consultants
2/11/80	SMH to DVassallo, Howe 39-30, Serial 8333	Reference Material for Amendment 72
2/11/80	NRC, RMDiggs to SHHowell	Additional Fee for Licensing on Soils
2/12/80	Afifi to Gould	Transmit Updated Spec C-95 and C-88 for Review
2/12/80	Probably no Minutes	50.54 (f) Questions Response Review Meeting - AA

2/13/80	Telecon Record, D Hood and J Nowak	NRC Mtg on Soils at the Midland Site
2/14/80	BLC-8827, JAR to GSK	50.54 (f) January Status Report
2/14/80	NRC letter to SHH	Termination of 50.54(f). Context for Further Responses on Midland Soils Settlement
2/14/80	NRC - LSRubenstein from DHood	Notice of Initial Site Visit for NRC Consultants to Observe Midland Soils Settlement and Effects
2/14/80	Woods to Afifi	Correction for Cross-Hole Test Report (1/8/80)
2/14/80	Draft Agenda	Feb 27-28 Mtg w/NRC
2/15/80	BLC-8833 - MOR to RCB	Meeting Notes No 1115 of January 8 and 14, 1980 meetings in AA - 10 CFR 50.54(f) Questions on Plant Fill
2/15/80	BLC-8833	Minutes for 1/8 and 1/14 Mtg
2/21/80	SHH (Howe 44-80) to NRC, R M Diggs	Rebutting 2/11/80 Memo Requesting Additional Fee on Licensing
2/21/80	Curtis to Gould	Request to Attend Feb 28, 1979 Mtg
2/22/80	Woods to Afifi	Recommending Shear Wave Profile in DF Bldg and Tank Farm
2/22/80	Woods to Afifi	Revise Report
2/25/80	Memo From NRC, G Fiorelli to SHH	Acknowledging 2/7/80 50.55(e) Report as Final Report
2/26/80	NRC, LSR to SHH	Request that Naval Surface Weapons Center receive Soils Info
2/27/80	Afifi to Hendron	Transmit Dr Wood's Cross-Hole Test Report
2/27-28/80	Mtg with NRC and Consultants at Site	
2/27/80	Afifi to Peck	Transmit Dr Wood's Cross-Hole Test Report
2/28/80	SHH to D Vassallo Serial 8454 (Howe 50-80)	Transmittal of Amendment 74 to FSAR Answer to 50.54(f) Questions 24-37, Rev 5

2/29/80	Memo From NRC, LSR to SHH	Use of Energy Tech Engg Center for Mech Engg Review for Soils and Operating License
2/29/80	Amendment 74 Submittal	Update and Questions 24-35
3/3/80	NRC Memo	Gallagher Inspection 2/12 and 2/14
3/10/80	BLC-8955, JAR to GSK	50.54(f) Soils Status Report
3/10/80	Zabritski/Curtis Added FSAR and Fill Distribution	Serial 8486
3/13/80	TCC to File 0465.16	Mtg w/NRC on Fill Status and Resolution - 2/27-28/80
3/14/80	Board notice of hearing	Notice of Hearing held before ASLB
3/17/80	Afifi to Dunicliff	Meeting Notes 2/20/80
3/18/80	Soils Documents to Misc Parties	Serial 8509
3/20/80	BLC-9021 LHC to RCB (Doc Rev - 3/25/80)	10 CFR 50.54(f): Core Drilling for Crack Depth Investigation
3/25/80	Afifi to Davisson	Transmitting C-94 Spec for Comment on Test Pile
3/27/80	GSK to JAR Serial 8548	50.54(f) Monthly Status Reports - Soils
3/31/80	DSH, NRC to SHH	Summary of 2/27-28/80 Mtg and Site Tour With Consultants to Review Soil Settlement
4/1/80	SHH to DVassallo, NRC, Serial 8570 (Howe 72-80)	Amendment No 76
4/1/80	BLC-9069, LHC to RCB	Mtg Notes 1131, 10 CFR 50.54(f) Requests Mtg January 16, 1980
4/1/80	LSR, NRC, to SHH	Req for Reports, Dwg and Other Info Regarding Plant Fill Settlement and Effects
4/2/80	Mtg w/IL&B, DEH, GSK and TCC	
4/15/80	Telecon, D Hood, NRC and G E Clyde	Re: LSR ltr to SHH dated 4/1/80, "Request for Reports, DWG, & Other Info Regarding Plant Fill Settlement & Effects"

4/16/80	IL&B reply to Board Notice of Hearing	
4/17/80	BLC-9140, LHC to RCB	Vibratory Settlement of the Diesel Generator Pedestals
4/30/80	NRC Staff Motion for Issuance of Amended Notice of Hearing	
5/5/80	JWC to Vassallo	Amendment 77 on Additional Documentation and Updated List of FSAR Sections No Longer Applicable
5/7/80	JWC/SHH to J G Keppler, NRC (Howe-84-80; Serial 8803)	IE Bulletin No 79-02

5/12-13/80	Oral Comm Record, WRB 51-80	D/G Settlement Program 50.54(f) Commitments on Equipment Qualification
5/16/80	Serial CSC-5043, TCC to LHC	Open Items - Soils
5/21/80	BLC-9289, JAR to JWC	Soils Settlement Schedules
5/21/80	CP Co Answer to NRC Staff Motion	Issuance of Amended Notice of Hearing
5/22/80	BLC-9305, JAR to JWC	Responses to NRC Questions on Plant Fill
5/27/80	IL&B to CP Co attaching Motion to ASLB	Motion to Partial Consolidation of soils & operating license hearing
5/28/80	JLB to CP Co (JBF/SHH/LBL/JWC/RFG/ GSK/MGK)	Regulation - Federal - NRC -Constr Permit Modification -Correspondence
5/30/80	NRC, A Schwencer to SHH	Display ad re: Hearing on Order For Mod of Constr Permit
6/5/80	Note to File: RMW-CSC-5084	Mtg with Bechtel on Action Items For Soils Issues
6/16/80	JAR to JWC	50.54(f) May Status Report
6/16/80	ASLB from NRC Staff	NRC Staff Response to CP Co, Motion for Partial Consolidation And Staff Motion to Post-pone further Response
6/16/80	Carol Gilbert to NRC	Petition to Intervene
6/23/80	William A Thibodeau to NRC	Petition to Intervene
6/24/80	George Wilson to NRC	Petition to Intervene
6/25/80	Patrick Race to NRC	Petition to Intervene
6/25/80	Michael Race to NRC	Petition to Intervene
6/25/80	Terry Miller to NRC	Petition to Intervene
6/26/80	Sandra Reist to NRC	Petition to Intervene
6/26/80	Sharron Warren to NRC	Petition to Intervene

6/27/80	Ivan Smith, Chairman ASLB	ASLB Memo and order Granting NRC Staff's Request to Post-poner Responses on Motion to Consolidate Issues
6/27/80	Barbara Stamiris to NRC	Petition to Intervene
6/30/80	Memo from Schwencer to JWC	On Requests for Additional Information Regarding Plant Fill
7/1/80	Answer to CP Co to Petition to Leave to Intervene of Thibodeau, Miller, Race, Stamiris and Gilbert	
7/7/80	NRC Staff to ASLB	Staff answer to Petition for leave to intervene signed by Carol Gilbert
7/8/80	From IL&B to ASLB	Answers of CP Co to Petitions to Intervene of Race, Wilson, Reist and Warren
7/14/80	Telecon Record - GSK/TJS/TRI/JEB/ to D Hood	Request by Corps of Engineers for Additional Information Regarding Plant Fill
7/14/80	NRC Staff Order	To Petition for leave to Intervene Filed by Wendell H Marshall
7/24/80	Memo to L Curtis from T Cooke	Expediting soils placement
7/24/80	NRC - Memo and Order	Ruling upon standing to intervene
7/24/80	NRC - Order	Ruling on Mapleton Intervenors 6/30/80 Petition to the Board
7/24/80	NRC - Order and Notice	Prehearing Conference
7/24/80	Memo and Order	Ruling upon standing to intervene
7/24/80	Order and Notice	Prehearing Conference
7/25/80	Telecon Record - D Hood/GSK/DMB	Discussion on Forthcoming NRC Corps of Engineers Mtg on Soils
7/30/80	Wendell Marshall memo to ASLB	Answering CP Co motion for consolidation and includes move for stop of construction.

8/12/80

TRT to file

Mtg with NRC Staff and Corps
of Engineers on soils.

8/14/80

Correspondence
from J E BrunnerConstruction Permit
Modification

8/15/80

To DVassallo
from S H Lowell

Amendment No 80

8/27/80	Tedesco to JWC.	Request for additional info regarding dewatering (Question 49 - 53)
8/27/80	Wendell Marshall to ASLB on NEPA not evaluating Class 9 accidents.	
9/9/80	Supplement to Warren Petition to Intervene & Amended Supplement to Stamaris Petition to Intervene	
9/12/80	JWC to Eisenhut Amendment 81	<ol style="list-style-type: none">1. Discussion of Applicants Position on need for additional borings.2. Settlement Update3. Answer to Question 36 & 38 & borings for Figure 35-3
9/16/80	JWC to Vollmer on General Discussion on Applicant's Position on Need for Additional Borings & including Item 1 From Amendment 81.	
No date	Statement of CPCo with respect to supplement to Warren Petition & Amended Stamaris Supplement	
9/19/80	Notice of Replacement of Ivan Smith by Charles Bechhoefer	

- 8/ 4/80 Schwencer to JWC on Corps of Eng Report Question 39 - 48
- 8/ 7/80 Meet w/Bechtel to Plan Responses to Corps of Eng Questions from 7/31/80 NRC mtg
- 8/11,20, 22,25/80 Amended Petition by Stamairis
- 8/12/80 Carol Gilbert to NRC Statement Concerning Contentions
- 8/12/80 Memo to ASchwencer from DHood Notice of Mtg to Appeal Staff Position Requiring Add'l Explorations & Testing of Midland Plant Fill
- 8/12/80 Hood Notice of Appeals Mtg on 8/29/80
- 8/12/80 Notice of Mtg to Appeal Staff Position Requiring Add'l Exploration & Testing of Midland Plant Fill
- 8/13/80 Marshall Attorney Mewitt to ASLB Withdrawal
- 8/14/80 Supplement to Petition to Intervene by Sharon Warren
- ~~8/14/80 Correspondence from J E Brunner Construction Permit Modification~~
- 8/15/80 To D Vassallo from SHHowell Amendment No 80 on Update of Commitments on QA Answers to 23 and Test Report on Compaction Equip Qualification
- 8/15 & 25/80 Supplement to Petition to Intervene by Barbara Stamirifis
- 8/18/80 JLB to JWC/JEB/GFH/LHH/GSK Contracts - Bechtel - Subcontracts: US Testing Company
- 8/20/80 Wheeler Notes on Mtg with Bechtel on Answering Corps of Engineers Questions on Additional Borings.

To File
 From JEBrunner, P-24-513 *JEBrunner/rjg*
 Date October 3, 1980
 Subject MIDLAND PROJECT
 MINUTES OF 8/29/80 MEETING TO APPEAL NEED FOR
 ADDITIONAL BORINGS
 FILE: 0485.16 UFI: 00234S, 71*01 SERIAL: 9610

TCC

CONSUMERS
 POWER
 COMPANY

Internal
 Correspondence

CC JWCook, P-14-113A MIMiller, IL&B
 TCCooke, Midland JARutgers, Bechtel
 GSKeeley, P-14-113B TRThiruvengadam, P-14-400
 DBMiller, Midland CWiedner, Bechtel

CC
 P

MID
 N

TCC
BHP
DJV
GBJ
JSK
WCS
MHM
DAK
EME
GWR
WFS
DES
TAS
MFB
BNV
JCB
JJD
ZAC
ISS
RLS
ASH
CMO
SEC
CLERK
FILE

The meeting was convened at 1:00 pm at the Midland Service Center. The attendance list is enclosed as Attachment 1. The agenda for the meeting is enclosed as Attachment 2. Following introductions, G S Keeley summarized historical events relating to the supply of soils-related information to the NRC. Keeley indicated that CP Co had submitted information via 50.54(f) responses, 50.55e reports, meetings and site visits, and responses to requests for document production covering a period of almost two years (See Attachment-3).

J D Wanzeck of Bechtel Geotech then described the soil investigation done to date, all of which excepting information on 59 borings have been supplied to the NRC in connection with CP Co's proposed soils fix. Wanzeck reviewed past borings taken to date, test pits, cross-hole shots, and settlement information as well as other aspects of CP Co's past efforts to develop soils data necessary to demonstrate the adequacy of the proposed fix. He stated that CP Co had taken over 900 borings at the Midland site and expressed the opinion that no additional borings are necessary.

Dr Ralph Peck, Bechtel's consultant, who is an internationally recognized expert on foundation soils, then discussed the technical basis for Consumer's conclusion that the pre-load program would provide an acceptable solution of the diesel generator building settlement problem. Peck, with admirable clarity and organization, described the pre-load program, the settlements observed upon surcharging, pore pressure variations as observed through piezometer readings and the future settlements which may be predicted based on an extrapolation of observed settlements. Peck expressed the opinion that the pre-load approach is universally accepted in the soils field and that the information directly supplied via pre-loading would accurately predict future settlement behavior.

A method utilizing results from borings lacks this accuracy, according to Peck, because of inherent inaccuracies in an indirect approach, and because the "fix" would not eliminate all variations in soils parameters below the diesel generator building. Peck felt that the borings approach would erroneously predict greater settlements than would be observed.

Peck's presentation was illustrated with charts and graphs showing settlement measurements and predictions with and without the surcharge, variations in porewater pressure during and after the pre-load, and the loading level on

soils below the diesel generator building as a function of elevation during the preload. The latter clearly showed that the effective stresses in the fill up to elevation 603 under full surcharge load exceeded the post-surcharge effective stresses upon the fill with the full dead and live loads, including effects of permanent dewatering. This was documented in Amendment 81.

Peck was followed by A J Hendron, Jr, another noted expert in the field. Hendron began his presentation with an analysis of inherent errors that can be expected in settlement computations derived from consolidation tests performed on best-possible, undisturbed samples obtained from borings. His conclusion was that the measurement errors inherent in such an approach would totally eliminate any value otherwise obtainable.

Hendron then addressed the subject of bearing capacity. He stated that new calculations which he had recently performed provide a more accurate prediction of the behavior of the soils from a bearing capacity standpoint than had past analyses, which had excluded certain terms from the bearing capacity equation. His latest calculations, which included such terms, demonstrated a factor of safety from a bearing capacity failure on the order of 6 or 7. The design goal for bearing capacity safety factor is 3. Hendron concluded that additional borings were totally unnecessary to demonstrate adequate bearing capacity. This was documented in Amendment 81.

M T Davisson then concluded the technical part of CP Co's presentation with a discussion of underpinnings - piles and caissons. Davisson stated that the use of underpinnings was designed to eliminate the need to consider soils characteristics in plant fill. Additional borings were technically inferior to the in-place tests under load which would be carried out when underpinnings are installed. Davisson felt that additional borings would be useless and misleading. This was documented in Amendment 81.

After a short recess, the staff presented its arguments in favor of more borings. Lyman Heller, US NRC, in a short introductory statement, argued that the additional borings were not intended to "negate" field data, but only to supplement it. Heller also argued that the Corps had requested only 18 additional borings, compared with over 900 already taken. Heller further stated that the staff had been "burned" twice at North Anna by the use of field data alone.

Joseph D Kane, US NRC/NRR/HGEB, then presented the major substance of the NRR arguments. Referring first to the cooling pond dike, Kane stated that a series of borings and lab tests should be taken to provide the dikes stable under all conditions and to determine the properties of fill after compaction.

In the area where underpinnings would be installed, Kane stated that it was proper engineering procedure to estimate foundation behavior prior to any field tests. Kane also stated that borings were necessary because of possible space limitations if the number of caissons necessary to do the job was under estimated. He also expressed concern about negative skin friction being factored into underpinning design.

With respect to the diesel generator building, Kane admitted that field testing was advantageous, but that borings would confirm predicted values, that he was not sure if primary consolidation had been completed, that the building had settled 4" before pre-load and 3-1/2" during pre-loading, and that certain observations of piezometer levels taken during the surcharge may have resulted from errors introduced by varying the level of the cooling pond. Kane also mentioned that CP Co had presented only positive effects of surcharge, and had failed to address 4"-settlement which took place and its effects on structures. Kane failed to state what connection the latter point has with the additional borings issue.

After Kane's presentation, the NRR caucused.

Messrs Vollmer and Knight then questioned the various individuals present. Vollmer indicated that, in view of the present political climate, he was somewhat surprised at CP Co's attitude toward not supplying additional technical information. He inquired of Mr Cook whether or not CP Co's objections went to the mere necessity of the borings or went to the possibility that the borings results would be actually misleading and counterproductive. Mr Cook answered that both points were primary objections.

Mr Knight wanted to know whether or not CP Co had been advised of the additional borings request when the latest 66 samples were taken. CP Co answered in the negative.

Following a discussion on the negative porewater pressure question (during which there was an exchange between Kane, Peck, Hendron, and Davisson, in which Peck stated that the results were exactly as he would expect), Vollmer indicated, though somewhat ambiguously, that the data supplied seemingly satisfied his concern on the settlement issue. He further stated that new information had been presented during the meeting and that this should formally be supplied. He stated that if he had to make a decision immediately he would have to agree with the staff's recommendation.

It was decided that CP Co would supply a summary of all soils information including the additional information supplied at the meeting, by 9/15/80. The meeting was then adjourned.

On the same day as and prior to the above meeting, Mr G Lear (NRC) was shown pictures of the piping associated with the return of emergency service water. The part of the piping which is buried along the sides of the emergency cooling pond was exhibited to Lear using the following photos:

Cartridge 4253	Frame 1965
	1966
	2057
	2058
	2033
	2039

- Pictures 905
- 906
- 907
- 908
- 1080
- 1081

The review of the above photos showed that the pipe was located in an excavated trench in the berm and not the dike slope. Therefore, a postulated baffle dike failure precipitated by the trench is not considered to be a plausible scenario and would not interfere with functioning of the Emergency Cooling Pond.

To File 0485.16
From TRThiruvengadam *TNT*
Date September 24, 1980
Subject MEETING WITH NRC STAFF AND
CORPS OF ENGINEERS. ON SOILS
JULY 31, 1980
FILE: 0485.16 UFI: 00234(S) 71*01 SERIAL 9830
CC SHHowell
JWCook
GSKeeley
DBMiller/TCCooke
TRThiruvengadam
JEBrunner
JARutgers, Bechtel
KWeidner, Bechtel
MMiller, IL&B

The following are meeting notes of a meeting between NRC Staff, NRC's Consultants, Consumers Power Company, Bechtel and Bechtel's Consultants.

Place NRC Offices at Bethesda, MD
Date & Time July 31, 1980 - 8:30 AM
Subject Soil/settlement issues - 50.54(f).
Specifically, recent requests from Corps of Engineers for additional soil borings and laboratory tests on samples taken and interpretation of results.
List of Attendees See Attachment 1.
Agenda See Attachment 2.

1. Opening Remarks (G S Keeley)

Meeting was called by CP Co's request primarily to update NRC and its consultants on investigations done since last submittal and to discuss the technical justifications and need for requesting additional borings and

Laboratory tests on samples by Corps of Engineers in the recent letter from A Schwencer of the NRC to J W Cook of CP Co dated June 30, 1980.

2. Summary of Total Investigative Program (J Wanzak) (Attachment 3)

To date a total of 255 borings were made since late 1978, out of which boring logs for 199 borings have already been submitted to NRC. The logs for remaining 56 borings are being checked and will be given to NRC in the next submittal. Most of the borings belonging to the latter case were done for construction dewatering effort in order to repair a duct bank and install a valve pit. A drawing with all the locations for borings and including test pits was shown. The investigations done since the preload programs were circled in green pen to differentiate these recent borings from those taken prior to the completion of the preload program. The majority of the borings were of the standard SPT type; namely, SPT every 2.5 ft for the first 10 ft and 5 ft afterwards. When the soil samples were taken, only specific tests that were needed were performed. For the 56 borings, the standard penetration blow counts were recorded. Some of the boring logs requested by the Corps in the letter referenced earlier were companion holes, mainly for observing the drawdown during operations. Though these holes were identified in the drawing as to their locations, no samples were taken in these borings.

Question: Were any surprises encountered in the results of borings performed after preloading? When were the additional borings in diesel generator building area performed?

Response: No surprises were encountered. The information was similar as before, if not better. The additional borings, for cross-hole tests, were done during December of 1979. The preload was taken off approximately four months earlier.

The test pits (seven of them) were dug in the areas shown in the drawing. Two plate load tests were performed in the tank farm area.

Thirteen dutch cone probe tests were performed with the assistance of Dr R D Woods of University of Michigan in the diesel generator building area. Four cross-hole tests with 21 borings were performed, with the assistance of Dr R D Woods, in four areas as indicated in response to question 35. Laboratory tests performed on selected samples, when required, consisted of shear strengths, consolidation, compaction, Atterberg limits, grain size and clay mineralogy (with the assistance of Professor Gray of University of Michigan).

Load Tests

1. The preload program on diesel generator building is actually a full scale load test. At present, equipment is being installed in the building.
2. Condensate Storage Tanks: Load test is in progress.
3. Diesel Fuel Oil Tanks: Load tests have been completed. The tanks have been filled for a period of more than three months. Insignificant settlements were observed during the load test and there was no significant rebound after the load was removed.
4. Borated Water Storage Tanks: Load test on these tanks are planned for the near future. There is still some construction work being done on these tanks.

Pump Tests (Dewatering)

Drawdown during construction dewatering for the repair of a duct bank and valve pit work were monitored. Four to six feet of drawdown was measured with no measurable effect on settlement. This aspect will be covered later in this presentation.

Question: (Hood) Last February during a site visit it was observed that the service water pipe entering the pump house structure was supported on wedges. A concern was expressed at that time that if the wedges were removed and if the building or the pipe settled, there is a possibility that the pipe would get hung up on the building, resulting in unacceptable stress levels in the pipe. Has this situation changed and has a program been established to monitor this pipe and other pipes in similar situations?

Response: These wedges have since been removed. In one of the pipes, after the wedges had been removed a movement of 1/32" was measured. Borros anchors installed in the vicinity of service water pipes showed no significant settlements during construction dewatering.

Question: (Heller) How deep were the excavations for the repair of the duct bank? Were any geotechnical tests or investigations conducted during the excavations?

Response: The depth of the excavations were in the range of 18 feet. No geotechnical investigations were conducted. Only borings for dewatering were made.

Update On Investization Since Last Submittal

Settlement observations made on diesel generator building structure is as shown in Attachment 4. The latest settlement reading, as of June 12, 1980, shows no significant increase in settlement. In comparison, the projection of original slope; namely, the predicted settlement curve, indicates the conservatism in the settlement prediction. Predicted versus measured settlement is shown in Attachments 5 and 6. Again, the comparison demonstrates the conservatism in the prediction.

Question: (Hood) The small break in measured settlement plot in Attachment 4 - does that indicate rebound?

Response: No. Slight rebound immediately after preload removal was observed. However, the break in the curve is not due to rebound. It is due to change in reference bench marks. Again, it doesn't mean data is lost, it merely indicates change in datum.

Question: (Hood) Are differential settlements between condensate pipe line and condensate tank being monitored?

Response: No. Condensate tank is a Nonseismic Category I structure. Only the settlement of condensate tank is being monitored as a part of overall monitoring program.

Question: (NRC) The settlement prediction in Attachment 4 - does it include settlement due to permanent dewatering?

Response: No. The settlement due to permanent dewatering has been computed separately. This has been addressed in Response to Question 27.

There was a drop in water level of about 4 ft at the diesel generator building structure due to pond lowering and construction dewatering. There was no settlement observed due to this drawdown. Furthermore, the Borros anchors located adjacent to the service water pipe lines and pump house structure showed only small settlement.

Question: What is the schedule for starting the dewatering operation?

Response: CP Co was ready to issue the contract bids for temporary dewatering on December 6, 1979, however, due to the NRC order issued on December 6, 1979 on remedial action, CP Co has not started temporary dewatering or remedial action.

Question: (Corps) If the dewatering and underpinning operations are done simultaneously or in quick succession, wouldn't dewatering result in settlement of footings of adjacent buildings which could cause additional load on the caissons?

Response: Dewatering is intended to be done down to the glacial till. There will be sufficient time gap between the completion of dewatering and start of transferring load to the caissons.

Question: (NRC) Would the dewatering of the plant area cause inflow from outside sources such as Dow chemical pond? Is there a need for a monitoring program to assure the proper functioning of the cut-off wall in the plant dike?

Sufficient information on plant dike, such as cross-sections, materials used and relative elevations of Dow's chemical pond, etc, is not provided in FSARs.

Response: As a part of dike monitoring program, the dikes are observed for undue seepage. No such seepage has been observed so far. When the groundwater elevation at the plant site was at 623 (+) and elevations of chemical pond on the west end and river on the east being considerably lower no undue seepage was observed. This lack of water movement established the proper functioning of the cut-off wall and, therefore, no special monitoring program is intended. In addition, a few piezometers located on either side of the plant dike confirm the observation stated above.

Remarks (G S Keeley)

CP Co would like to discuss the requests made in NRC's letter dated June 30, 1980, specifically items (1) to (4) in the letter. CP Co would also reiterate the guidance given previously by the NRC that the original requirements in PSAR would not be changed now, and the PSAR would be accordingly revised once the 50.54(f) issues are resolved.

Response: (Hood and Corry)

The statements made in Items (1) to (4) in the letter are to be construed only as comments on responses provided CP Co.

Statement: (Peck) Concerning Items (1) to (4) of the Referenced Letter

There is no doubt that if one goes into the fill now and measures the common properties which are normally used as control properties, such as density, moisture content, etc, one will find considerable scatter in the properties. These are all index properties. The overall control property is compressibility. Stressing the soil by overloading it including the effects of dewatering, allows the compressibility to be measured thereby allowing a reasonable settlement prediction to be made. One of the reasons why the pond water level was raised prior to the completion of the preload was to saturate the fill as much as possible. At that time, the water table was two to four feet beneath the footing level. The capillary action in the zone above the water table would be preserved, sands and clays would consolidate. With regards to the request for additional soil borings in order to obtain an independent verification of the predictions for future settlement, independent results could be obtained from the results of new borings and tests. However,

settlements computed from the results of new borings and tests need not necessarily result in a correct prediction. The answer we want to verify is already known from the preload program. During the boring process there would be sampling disturbance which would result in predications of much higher settlement than would actually be observed. There would also be considerable scatter in test results. Some borings will show stiff material and probably an equal number of borings may show soft material. In order to obtain reasonable conclusions, one would have to treat the data statistically. The settlements computed on these bases would turn out to be too large and the question is what does this data mean, since the preload program has already answered the question. Now, one can turn the tables and ask a question that with soil data having considerable scatter, such as those that would be encountered here, what one would do if settlement prediction is required, one would most surely require proof load testing. In our case this has already been done. There has been no significant settlement in the last eleven months. Except for the pedestal, the structure is almost fully loaded and contact pressure at the bottom of the footing is probably near the maximum value and with this situation no further settlement has been observed. The final soil pressure under the pedestal is going to be considerably less once the diesel generator is placed than that experienced during the preload. Furthermore, during temporary dewatering that is scheduled to be performed for underpinning operations under auxiliary building wing walls, the water table would be lowered almost to the same level as under the permanent dewatering scheme. By this means, the real settlements of the structure would be known before the plant actually goes into operation.

The settlement predictions due to dewatering are not going to be based on information from tests done on soil samples but instead on actual readings taken from drawdown during temporary dewatering programs over a very large area. The entire approach has been based on performance of the soil under fully loaded conditions and the settlements will be known and can be predicted with great accuracy before the plant goes into operation.

Such an approach in settlement prediction is not without precedents for nuclear power plants. In the Kewanee plant, currently in operation, a 40-ft clay layer was encountered. Extensive sampling of the soil was done and the computations from laboratory tests showed a prediction of settlement of 15 inches, which is definitely not a reasonable number. There was evidence that the clay was precompressed by glaciation since a fairly thick layer of till had to be removed to reach the clay layer. One clay layer above the rock was very uniform in moisture content which indicated that it is lacustrine, however, strength values varied widely. From such observations the magnitude of the preconsolidation load was computed and a settlement value of 1-1/2" was predicted. The structural foundation consisted of a raft foundation, which was poured in sections. Very accurate settlement measurements were taken. The measured settlement turned out to be 1-1/2" as predicted for the foundation. At its completion, the structure experienced an additional settlement of 0.15". On the basis of sampling and testing, the predictions would have been ten times higher.

As another example, for the Quanicassees plant, originally proposed and later cancelled by CP Co, borings and sampling indicated 10" to 15" of settlement of thick deposits of clay and granular material. A limited dewatering program was carried out, wherein the water table was pulled down to the rock level, thereby loading the deposit by removing the buoyancy. Piezometers responded in predictable fashion, deposits behaved elastically and a direct measurement of confined modulus resulted in a measured settlement of 1.5" which was 1/8 to 1/10 of the settlement prediction obtained from conventional sampling techniques. These examples show that the best possible sampling techniques and subsequent laboratory testing and theoretical computations will result in computed settlements which could be very high. By the preloading program the best possible answer was obtained. One will put themselves in a considerably difficult position if one has to go back and start taking samples and predict settlements based on laboratory tests and find that the predictions are orders of magnitude higher than what was observed.

Question: (Hood)

Recognizing that this is the state of the art at that point in time, is it possible to use the observations made in Kenwanee and Quanicassees to refine the sampling techniques and methods of computations so that this can be applied to cases such as Midland?

Response: (Peck)

Standard techniques consisting of sampling, laboratory testing and theoretical computations don't work well on overloaded clays, stiff soils and compacted fills. Such methods are good for materials such as homogenous clays and soft soils.

Question: (Hood)

Why can't results from field experiences such as Kewanee be the source for a great deal of research in the field of soil mechanics in order to devise means to improve the predictions?

Response:

Yes, considerable research is in progress. Considerable advancement has been made in many areas such in sampling techniques, however, not in all aspects of soil mechanics. It should be realized that soil mechanics by no means is an exact science. It is still an art in many areas.

With reference to Item (4) of the referenced letter, it should be pointed out that there was no simultaneous raising of water table and the preload surcharge. Once the final preload was achieved, both levels were constant for the entire period of surcharge. Water level was raised to eliminate capillary as much as possible and to saturate the clays. This enabled the piezometers to react well. By raising the water level three to four feet, the effective load was slightly reduced due to buoyancy effect, however, this was a reasonable price to pay for the benefits stated above.

Questions: (Corps)

If some fill was placed dry of optimum, what would be the effect?

Response: The effect would not be crushing as it could not be that dry. However, it would have been distortion; ie, change in shape. This would have been noticeable in time lag in settlement similar to creep phenomenon. The bending and distortion shows up in secondary consolidation, which is included in the prediction.

Question: (Corps)

If some fill were placed wet of optimum, what would be effect on strength?

Response:

This question is difficult to address directly. Settlement curves have shown that settlements have been stabilized for the last 11 months. Building footings are now experiencing the soil pressure very close to their final value. With the additional load there has been no settlement. Even in brittle clay, with a nonlinear settlement curve, the curve tends to fall over. There is not a slightest indication of this behavior. Therefore, the factor of safety is considerably higher than 1.0.

The present data indicate some rebound following removal of the surcharge, therefore the foundation contact pressure is less than under the surcharged conditions. The factor of safety must be at least one and is clearly greater than this. There is experience (Fargo grain elevator) that even in stiff materials there is nonlinear behavior at loads above about 80 percent of the ultimate. Therefore, the factor of safety is clearly significantly larger than one since nonlinear behavior has not been recorded. The factors of safety beneath the generator pedestals will be even greater because the current pressure is less beneath them.

Question:

All the preloading has been at the surface, where influence would be to impart maximum stress near the surface and decrease in stress with depth. However, stress due to dewatering will have the opposite distribution. Minimum near the top and increasing with depth. Won't this induce more settlement?

Response:

The part of the material compressed most due to surcharge is the upper part. Borings made earlier showed that the top 15 feet formed the poorly compacted fill. Fill below elevation 615 (+) had high blow counts, indicating good compaction. The deeper the soil layer, the greater is the overburden stress. In e-logp curve, more Δp produces less Δe . Therefore, one would expect to see little settlement due to drawdown. There may be areas wherein the dewatering would induce stress more than the preload. However, the effect of this would be observed during temporary dewatering.

Question: (Corps)

Settlement plot indicates that contact pressure under footings may not be uniform and wouldn't this cause overstress of soil exceeding bearing capacity and overstress of the structural elements.

Response:

Most of the settlement of the diesel generator building was due to the settlement of the fill. The building just went along for the ride. Because of the differential settlements observed, contact pressure may not be the same. However, the building was surcharged both inside and outside uniformly. Initially a portion of the building was hung up on a vertical duct bank. Once this was removed, the building settled uniformly. The stress in the building was evaluated by analyzing the building with variable foundation modulus.

Response: (Afifi)

Regarding the question of safety factors against bearing capacity failure, the issues have already been addressed in response to Question 35. Consolidated undrained triaxial shear strength tests were conducted on samples of plant area clay fill, in areas such as transformer, condensate tanks, taken during the 1978 exploration program. See attachment 7 for a plot of undrained shear strength versus confining pressure from these tests. Based on undrained shear strength from the normally consolidated envelope a factor of safety 3 for dead and live loads and greater than 2 for dead plus seismic loads have been calculated.

Question: (Corps)

How can one be sure that such confining pressures exist.

Response:

It is more likely that very high confining pressure exists in the field due to lateral stresses arising out of surcharge.

Question: (Corps)

The borings from which these tests were done and the depths at which these test samples were taken are not currently available. Could this be provided?

Response:

Yes. The requested information will be provided in our next submittal.

Question:

Modulus of elasticity was computed based upon the unloading curve. Shouldn't this be computed on the basis of a reloading curve?

Response:

The lab tests usually show a hysteresis type of curve for unloading and reloading. This is primarily due to side friction in the sample testing process. However, in the real situation, there is very little difference between unloading and reloading curves.

Question: (J Kane)

We would predict considerable rise of pore water pressure immediately after surcharging. However, piezometers didn't indicate this. Could this be due to bridging and arching of clay over rigid sand seams? Also in fourteen piezometers, recovery of pore pressure was noticed after the load has been taken off. How would one explain this phenomenon?

Response:

The rapid dissipation of pore water pressure is anticipated earlier because borings indicated sand layers and seams and clay would have macro voids which are typical of compacted clay fill. The surcharging process took several days and pore pressures were being rapidly dissipated during the surcharging operations. The surcharge causes excess pore pressure to be driven off, which results to a certain extent in negative consolidations and the reason as to why fourteen piezometers showed recovery of pore pressure was the reflection of the pond.

Question: (Heller)

Can't additional testing be done with refined sampling techniques?

Response:

It is possible, however, the reason for not doing it is not to get into a statistical argument because of unavoidable scatter in test results.

Question: (Heller)

The factor of safety for bearing capacity is known only to be at least equal to 1.0. Is it 1.2, or greater?

Response:

Shear strength at footing level may show a lot of scatter. Any compaction of sand layers observable from blow counts in a boring with SPT would be obscured in the scatter of the N values. The bearing capacity factor of safety may need some confirmation. For this purpose, load tests on larger masses of soils are preferable.

Question: (Heller)

The more heterogeneous the soil, the more samples it would require. It still would be possible with adequate samples to reach an independent conclusion.

Response:

The question is what is needed to be known. The preload has given the answer one needs to know. A lot of money has been spent on this preload program. The main purpose was to consolidate the fill and in the process obtain the required answer.

Question: (Corps)

This is not an ordinary structure. One has to be 100% sure, hence the need for additional borings.

Response:

The testing program outlined by the NRC will not erase the doubts so that one can be 100% sure. It will introduce more doubts and raise more questions which cannot be explained with the current state of knowledge.

In summary, there are three basic issues:

1. Dewatering: The effects of dewatering can readily be observed and measured, before the operation of the plant, by starting the temporary dewatering operations soon.
2. Bearing Capacity - (factor of safety): This could be more expeditiously determined by large scale direct tests, such as plate load tests.
3. Adequacy of Surcharge: This is a false concern since evidence of reality (settlement measurements) is quite sufficient.

Discussion of additional borings adjacent to auxiliary building electrical penetration areas, service water pump structure and retaining walls.

Presentation (T R Thiruvengalam)

The referenced letter requested additional borings with extensive laboratory tests adjacent to electrical penetration areas, service water structure and Category I retaining walls. The purpose of this investigation would be to verify the design capacities of caissons and piles for vertical load carrying capability and stability of retaining wall. Caissons will be driven into the till layer. The caissons will be typically,

four feet in diameter such that it enables a person to get down and inspect the till before concrete is placed. Furthermore, the caisson will be load tested to 1.5 times its design load and also has rigid settlement criterion. Similarly, the piles for service water structure also will be driven well into till until refusal. The design capacity of the pile will be determined from a pile load test. Preliminary capacities for caisson and pile were established from initial recommendations made by Dames & Moore Report. Caissons and piles are designed to carry only vertical load and lateral loads due to earthquake are transmitted through a different system. Skin friction on caissons and piles will be very small since most of the settlement in fill due to its own weight have taken place already. The settlements reported in retaining wall were observed immediately after construction. Since then, no significant settlement has been observed.

Question: (Corps)

Are there any boring and test data from Dames & Moore Report that could provide data in lieu of information that could be obtained from borings requested by the MRC for auxiliary building and service water pump structure.

Response:

The data from Dames and Moore Report will be investigated for such a case. However, in order to provide meaningful information, boring data in the vicinity of the caissons would be required. Due to the presence of adjacent structures, even a new boring would have to be located 20 to 30 feet away from the edge of the auxiliary building.

Statement (Corp)

A boring at that distance would be adequate.

Cooling Pond Dike

Presentation (Wanzek and Sibbald)

The letter requested several borings in cooling pond dike. CP Co's position is that it is not necessary, not only because it is a Nonseismic Category I structure, but also for the following reasons:

1. Extensive stability analyses of the dike slope are provided in the FSAR.
2. The dike was built under a different specification, which is a method specification. This specification relied on the method of compaction such as number of passes of rollers, lift thickness, etc, and compaction test results.
3. The dike was built by a different contractor. It was a large structure, heavy equipment was used with very little use of hand held equipment for compaction and therefore resulted in better control.
4. Monitoring of the settlement monuments, 27 in number, show no significant settlements. The pond has been filled for two years with no adverse conditions noted.
5. Scheduled semiannual inspections are performed by walking the entire dike area to observe seepage, stability problems, erosion, etc.
6. Piezometers located in the dike which are read monthly show stable levels.
7. Several borings in the dike area, during construction, showed considerably better material than in the Category I fill.
3. Drilling holes at this stage might result in a potential for damage due to hydraulic fracture resulting in dike failure.

Conclusion

After all the detailed technical discussion NRC and their staff reiterated their requirements for additional borings and testing. CP Co stated that, based on the recommendations of their consultants, we don't feel the additional borings are needed or justified. CP Co stated that it would provide the information on borings already taken as well as other information requested in this meeting by a submittal on or before September 15, 1980.

Amesbury
July 31, 1980

<u>Name</u>	<u>Organization</u>
Paul J. Ford	1-B3/WRR
Bill Patton	NRC - Attorney
B. B. Peck	Consultant. Bechtel
THIRU R. THIRUVENGADAM	Consumers Power - Civil
S. S. Afifi	Bechtel - Bechtel
WALTER R. FERRIS	Bechtel - Bechtel
J. C. WILKINSON	Bechtel - Bechtel
SHING C. LO	BECHTEL - CIVIL
D. E. Sibbald	Consumers Power.. Civil
Chris Kieley	Consumers Power Co.
KARL WIEDNER	BECHTEL - EISGR
Ron Erickson	Corps of ENGINEERS Beotech
William C. Otto	Corps of Engineers Chief Geotec.
Joseph Kane	NRC, Geot. Engr. DE, HEEB
JOHN NORTON	Corps of Eng North Central Division Geo Tech Chicago, IL, Ill.
Hari N. Singh	Corps of Engineer, Debert District
James W. Simpson	
Lyman Heller	NRC

MIDLAND PROJECT MEETING WITH THE
NRC/CORPS OF ENGINEERS ON SOILS
WASHINGTON, D. C.
July 31, 1980

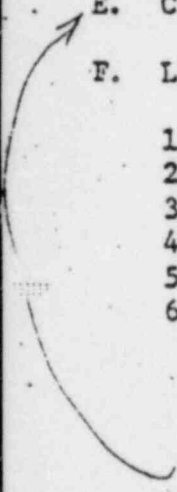
Agenda

1. Summary of total investigative program
2. Update on investigation since last submittal
 - a. Settlement observations of structures
 - b. Settlement observation during localized construction dewatering
3. Review NRC letter of June 30, 1980
4. Summary

SUMMARY OF INVESTIGATIONS
PERFORMED
SINCE AUGUST 1978 TO DATE

I. Borings, test pits, plate load tests, cross hole shear wave velocity test,
dutch cone probes and laboratory testing.

A. Borings	255	(199 boring logs submitted) 56 to be submitted	Reference (partial) FSAR volume 5 section 2.5
B. Test Pits	7		Volume 4 10CFR 50.54(f) Items 134,135,136,137 & 143.
C. Plate Load Tests	2	- Tank Farm Area.	Volume 5 10CFR 50.54(f) Items 138 & 139
D. Dutch Cone Probes	13	- Dr. Woods - in Diesel Area.	Volume 3 10CFR 50.54(f) Item 11
E. Cross Hole Probes	21		Volume 5 10CFR 50.54 (E) Items 81 & 142
F. Laboratory Tests Included			
1. Shear strength			Volumes 6 & 7 10CFR
2. Consolidation			50.54(f)
3. Compaction			Items 144 thru 149
4. Atterberg limits			
5. Grain size			
6. Clay mineralogy		- Prof Gray Vol M with Raribing Zeiss etc.	Gokberg Zeiss 2. Pennick



SWPS
Tankfarm } Prof. Wood
etc

56 -> Temp dew. syst. for Contment
Also stands for param dew. syst.

Investigation continued

II. Load Tests

~~Equipment~~
ERMT being installed
~~SOFT~~

References

- | | | |
|--------------------------------------|------------------------|----------|
| A. Diesel Generator Building | (ERMT being installed) | Q 4 & 27 |
| B. Condensate Storage Tanks | | Q 4 & 6 |
| C. Diesel Fuel Oil Tanks (done) | | Q 4 & 33 |
| D. Borated Water Tanks (near future) | | Q 4 & 31 |

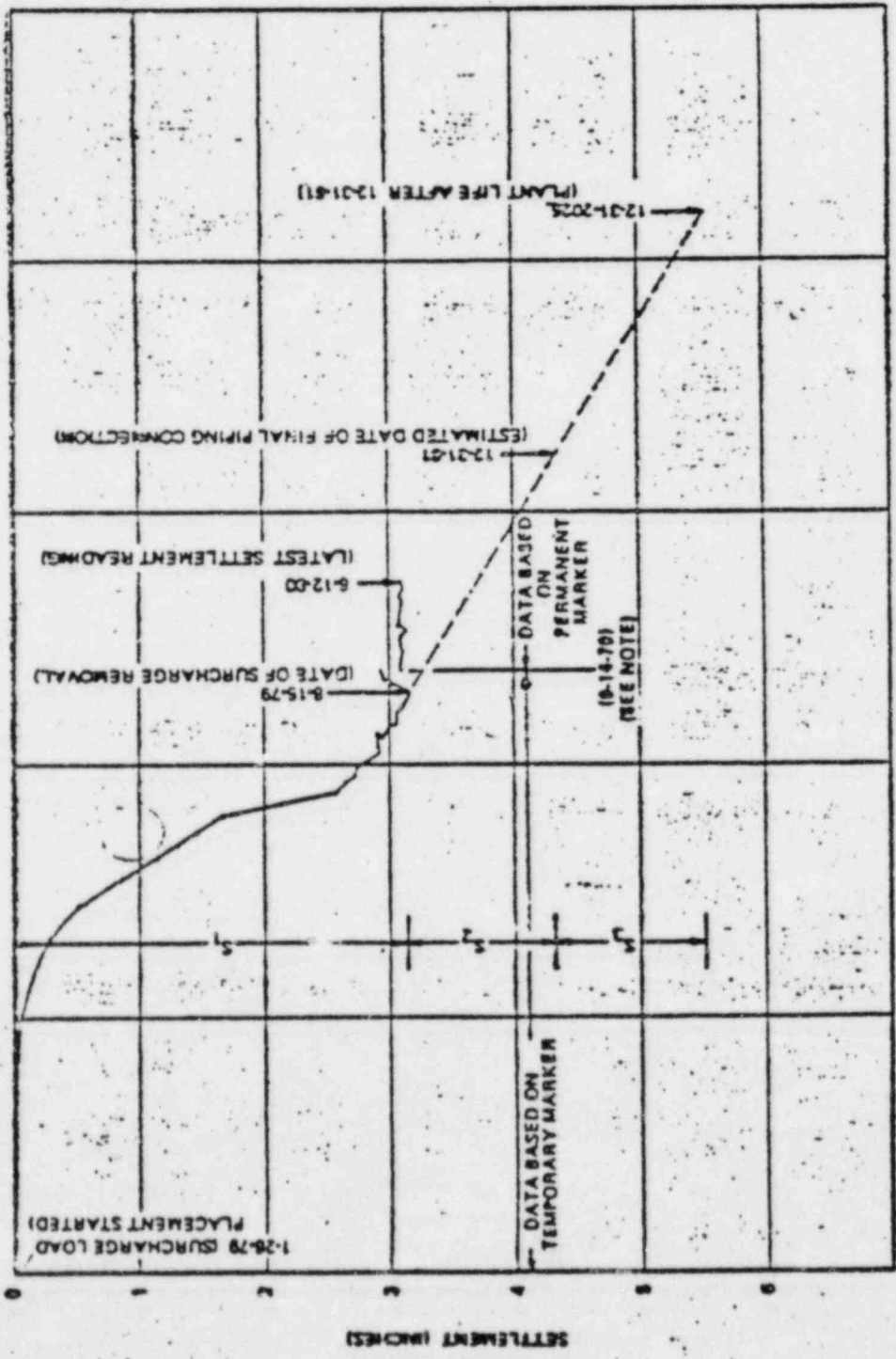
III. Pump Tests (Dewatering)

- | | |
|-----------------------------------|--------------|
| 1. Construction Dewatering System | See attached |
| 2. Permanent Dewatering System | Q 24 |

Also ongoing settlement observation is being done.
References noted ie are from the responses to various questions.

Q 5

Attachment 4

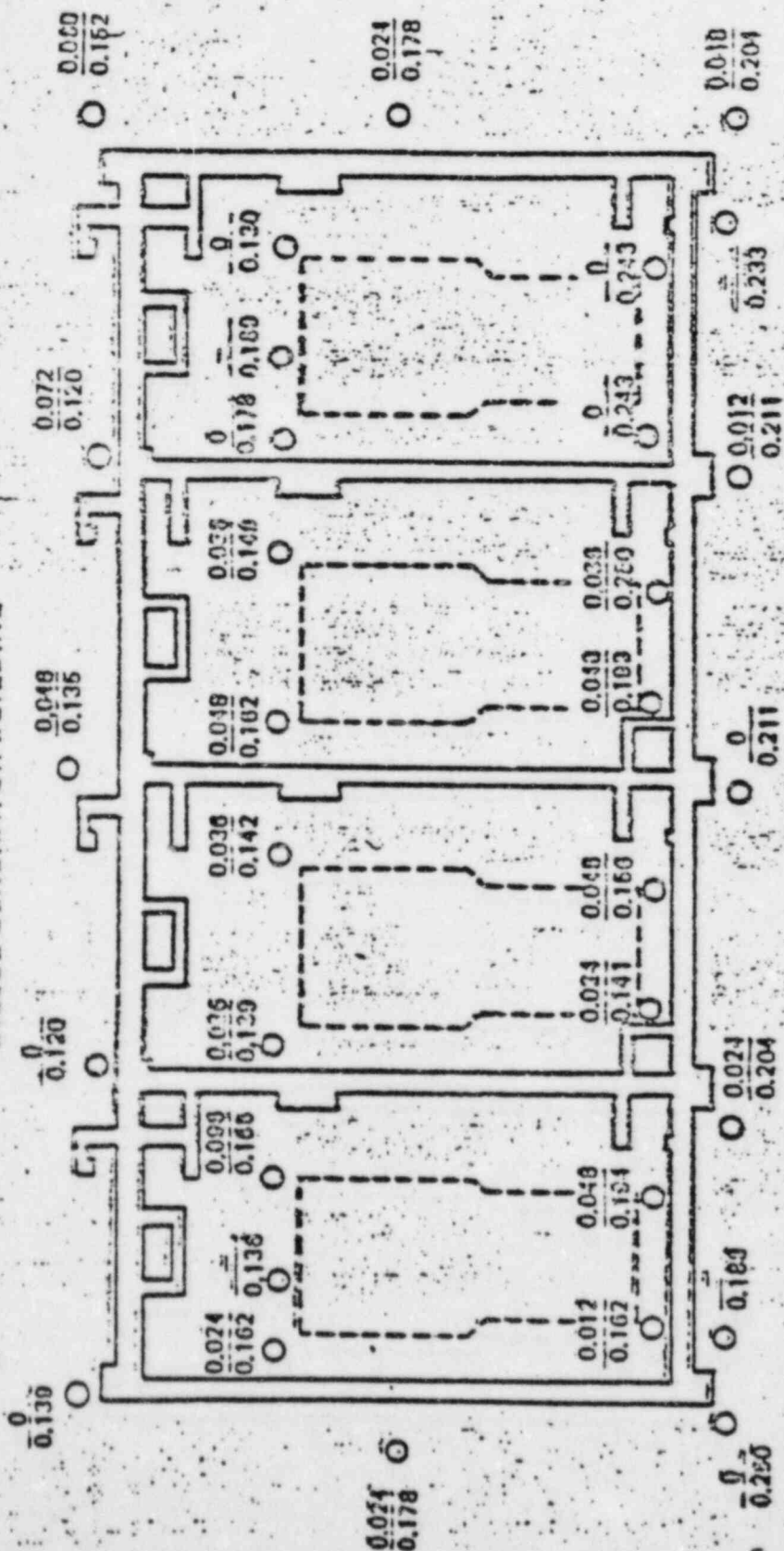


BECHTEL AIRBORN	
MIDLAND POWER PLANT	
MEASURED AND PREDICTED SETTLEMENT VS LOG OF TIME (DAYS)	
7220	FIGURE
REV.	REV.

NOTE:
The permanent marker could not be installed from 3-27-79 to 8-14-79 due to surcharge. Temporary markers at elevation 804'-0" were used during this period to estimate the settlement of the permanent markers. On 8-14-79 the settlement was again based directly upon the permanent markers.

LEGEND
 — MEASURED SETTLEMENT
 - - - PREDICTED SECONDARY COMPRESSION SETTLEMENT ASSUMING SURCHARGE REMAINS

DIESEL GENERATOR BUILDING



LEGEND:

- — BUILDING / PEDESTAL SETTLEMENT MARKER
- 0.012 — MEASURED SETTLEMENT BETWEEN 8-15-70 and 8-12-80 IN INCHES
- 0.211 — PREDICTED SETTLEMENT BETWEEN 8-15-70 and 8-12-80 IN INCHES AFTER ACCOUNTING FOR SURCHARGE REMOVAL

NOTE:

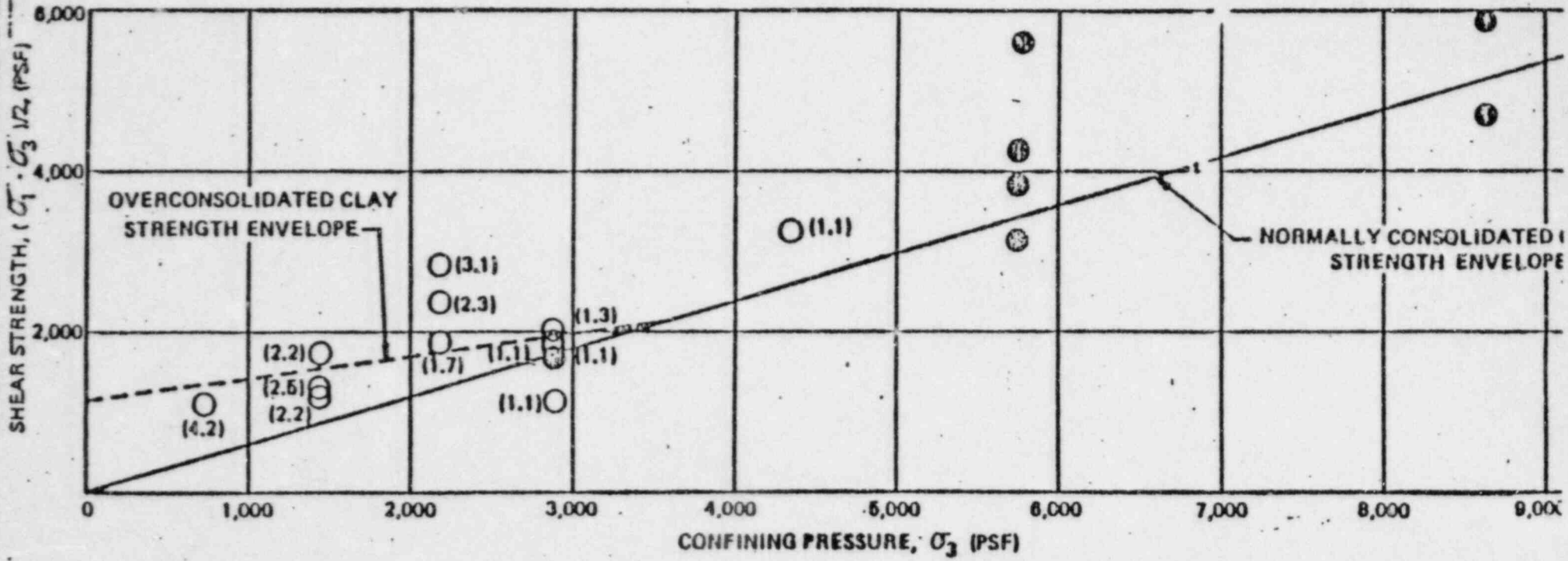
The measured settlements do not include the heave observed approximately between 8-15-70 & 9-14-78.

BECHTEL
ASHLAND

MIDLAND POWER PLANT

MEASURED VS PREDICTED SECONDARY
COMPRESSION SETTLEMENT (8-15-79/
6-12-80) (SURCHARGE REMOVED)

7220 · FIGURE 27-16



LEGEND

- NORMALLY CONSOLIDATED SOIL SAMPLES
- (2.5) ○ OVERCONSOLIDATED SOIL SAMPLES
↑ OVER CONSOLIDATION RATIO (OCR)

NOTE:

CONSOLIDATED UNDRAINED
 TRIAXIAL COMPRESSION TESTS
 ON PLANT AREA FILL

Attachment 7 X

To JWCook, P-14-113
JEBrunner, M-1079
GFHill, M-1018

From JLBacon, M-1085A

Date August 18, 1980

Subject CONTRACTS - BECHTEL POWER CORPORATION
- Subcontracts: U.S. Testing Company

LHHoriszw 1073
GSKeeley 408B
DBM
TCC
REM
DDJ
NJS
S/C C-208
I
I ROW

cc DBM/TEC
M2-1st
File CAB5

Consumers
Power
Company

RECEIVED

AUG 22 1980

INTERNAL
CORRESPONDENCE

cc

Site Mgr.

Midland Project

Attached for your information is a copy of an August 15, 1980 letter from the Bechtel Midland Site Manager to U.S. Testing Company, Inc, forwarding a proposed agreement to toll the statute of limitations in connection with possible claims arising from the foundation soils problems at the site. Mr. Becnel has said he will keep us informed of new developments.

RECEIVED

AUG 19 1980
MIDLAND PROJECT
MANAGEMENT

J. Hancock, Esq.
R. Placier, Esq.
L. M. Scoville, Jr., Esq.
J. Bacon, Esq.

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



August 15, 1980

U. S. Testing Company, Inc.
1415 Park Avenue
Hoboken, NJ 07030

Attention: Dave Edley

Job 7220 Midland Project
Subcontract 7220-C-208
Tolling of Statute of
Limitations
C-208-B-505

Dear Mr. Edley:

Attached are three (3) copies of an Agreement to toll the statute of limitations for possible claims arising out of the soils-related problems on the Midland Project which has been prepared by our Legal Department for your consideration.

If the Agreement is satisfactory, we request that you indicate your assent by signing and returning all three of the duplicate original copies of the Agreement to us for execution by the other parties, whereupon we will return one of the originals to you for your records.

Phil Becnel in our Legal Department (415-768-4574) is available to discuss this matter with you or your legal representative should you desire.

Your response is requested within two weeks from the date of this letter. Your prompt attention to this matter would be appreciated.

Very truly yours,


L. E. Davis
Site Manager

LED/JWL/rs1

Attachment

cc: John Speltz
J. Rutgers
P. Hansen

RECEIVED
AUG 18 1980

AGREEMENT

THIS AGREEMENT is entered into as of August 1, 1980, by and between BECHTEL POWER CORPORATION, BECHTEL ASSOCIATES PROFESSIONAL CORPORATION, and CONSUMERS POWER COMPANY, and U. S. TESTING COMPANY, INC.

WHEREAS, Bechtel Power Corporation and U. S. Testing Company, Inc. entered into a subcontract dated August 24, 1973, under which U. S. Testing was to furnish certain soils and other testing services in connection with the Midland Nuclear Power Plant owned by Consumers Power Company and located at Midland, Michigan; and

WHEREAS, certain problems with the soils and soil compaction and soils testing work at that plant have been discovered and require remedial action; and

WHEREAS, the parties hereto desire to preserve as provided herein any rights they may have with respect to these soils-related problems,

NOW, THEREFORE, in consideration of the premises, covenants and agreements herein contained, and intending to be legally bound hereby, the parties agree as follows:

1. All statutes of limitation and any possible laches applicable to any claim or cause of action by Bechtel Power Corporation, Bechtel Associates Professional Corporation, or Consumers Power Company, or any or all of them, against U. S. Testing Company, or any claim or cause of action by U. S. Testing against Bechtel Power Corporation, Bechtel Associates Professional Corporation, or Consumers Power Company, or any or all of them, arising out of or in connection with the soils-related problems on the Midland Project are hereby tolled until sixty days following receipt of written notice by any party to the other, terminating this Agreement, or until August 1, 1983, whichever first occurs. The foregoing provision shall not have the effect of barring any suit that would not otherwise be barred in the absence of this Agreement.
2. This Agreement is deemed to be one made under the laws of the State of Michigan and shall be construed and given effect in accordance with those laws.

IN WITNESS THEREOF, the parties have hereto set their hands.

ATTEST:

BECHTEL POWER CORPORATION

By: _____

ATTEST:

BECHTEL ASSOCIATES PROFESSIONAL CORPORATION

By: _____

ATTEST:

CONSUMERS POWER COMPANY

By: _____

ATTEST:

U. S. TESTING COMPANY, INC.

To TCCooke

FROM RMWheeler *RM Wheeler*

DATE August 11, 1980

SUBJECT MIDLAND PROJECT GWO 7020 - MEETING NOTES FOR
AUGUST 4, 1980 - RESPONSE TO NRC/CORPS. OF ENGINEERS
REQUEST FOR ADDITIONAL INFORMATION
File: 0280 UFI: 50*31*01 Serial: CSC-5224

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

CC DBMiller
GSKeeley
TRThiruvengadam
KWiedner, Bechtel

*See also
CSC 5240,
for correction*

Attendees: S. Afifi, Bechtel
K. Wiedner, Bechtel
S. Lo, Bechtel
G. Keeley, CPCo
T. Thiruvengadam, CPCo
R. Wheeler, CPCo

GSKeeley began with some opening comments about the upcoming events relative to this issue. A meeting is going to be held between Selby and Denton from the NRC on August 21, 1980. It is expected that this issue of additional information for the Corps. of Engineers will be on the agenda. Between now and August 21, 1980, GSKeeley will attempt to set up a meeting with the NRC to appeal this issue through the NRC management hierarchy (Heller/Knight). S. Afifi is to check on the availability of Dr. Peck in order to support a meeting prior to August 21, 1980.

K. Wiedner summarized the information verbally requested by the Corps. of Engineers per the August 31, 1980 meeting with the NRC and the Corps. of Engineers as follows:

1. The additional 56 borings which have not previously been submitted will be provided by Geotech to be complete by August 11, 1980.
2. Settlement records for all buildings will be updated and prepared for a September 15, 1980 amendment to 50.54 (f). Geotech/T. Thiruvengadam
3. The specification on caissons/piles will be paraphrased and the negative skin friction question will be answered by Project Engineering. To be complete by August 20, 1980.
4. W. Paris of Geotech will provide information to address the concern of in-flow through the dike due to plant dewatering. To be complete by August 15, 1980.
5. Figure 35-3 will be revised on Geotech to add boring numbers to the locations shown on the figure. To be complete by August 11, 1980.

6. The concern regarding the Service Water piping distress in the pipe sleeves penetrating the building will be answered by the writer. To be complete by August 15, 1980.
7. Dr. Peck/Hendron will provide backup for no additional borings in the Diesel Generator Building.
8. Justification for no additional borings for Aux/Service Water Structure will be provided by Afifi/Davisson. To be complete by August 20, 1980.
9. Justification for no additional borings on the Service Water/Auxiliary Wing sections will be provided by Afifi/Civil. To be complete by August 20, 1980.
10. Justification for no additional borings in the dike will be provided by DESibald. This will include a discussion of how the material was placed, settlement data since completion of the dike, visual walkdowns and concern over hydraulic fracturing due to drilling. To be complete August 15, 1980.
11. More field work is required in order to answer bearing capability questions. Plate load tests will be conducted and are expected to be complete by August 31, 1980.
12. The concern over buoyancy forces due to filling the cooling pond while the preload was intact will be addressed by Civil/Geotech. To be complete by September 2, 1980.
13. In order to answer questions regarding the affect of dewatering on settlement, Bechtel intends to start the temporary dewatering system for the Aux. wing sections by August 11, 1980, with the objective of having some meaningful results by September 10, 1980.

The response for the 13 items above should be submitted to the NRC by September 15, 1980. These responses will later be supplemented to address the questions raised by the Corps. of Engineers through the NRC letter dated August 4, 1980 regarding the request for additional information on plant fill.

bd

RESPONSE TO SERVICE WATER

PIPE CONCERN

During the February 27 and 28, 1980 NKC/Consultants site visit, concern was expressed regarding the penetration of the service water pipes through the northwest wall of the service water structure. It was suggested that the piping may have experienced differential settlement relative to the building and may be over stressed due to contact between the pipe and the wall penetration. This observation was based on deformed 2 x 4 wedges placed at the bottom of the wall penetration and some apparent irregularities on the surface of the service water pipes.

Wedges similar to those observed during the February 27 and 28 site visit are commonly used as temporary support to assist in the erection of large pipe. The wedges are used to maintain clearance and provide support to the pipe during the erection phase.

As a result of the concerns the wood wedges were removed and inspections were performed to evaluate the condition of the pipe. The inspection results are as follows:

1. No movement of the pipe was observed due to the removal of all of the wood wedges. Measurements were taken before and after wedge removal in order to verify there was no relative movement.
2. After removal of wood wedges, visual inspections were performed to determine the clearance between the pipe and the sleeve. In all cases the pipe was not in contact with the pipe sleeve. Measurements were taken between

the pipe and the sleeve with the minimum clearance observed at the bottom of the pipes, to be approximately 7/8 inch.

3. After removal of wood wedges, the wedge contact area and surrounding areas were examined for any irregularities. The examination revealed that the pipes had incurred no damage. In some cases the coating protection had been damaged due to the insertion of the wedges. This is not a problem since the pipe coating is not required inside the building. The purpose of the coating is to protect buried pipes from corrosion.

Inspection performed after removal of the wood wedges clearly demonstrate that the pipe was not in a stressed condition nor had differential settlement occurred between the building and the pipe.



ANN ARBOR

MEMORANDUM

004477

TO TCCooks LOCATION _____

FROM RL Rixford DATE 1-8-80 . 19__

SUBJECT 7-18 Presentation to NRC JOB NO. 7220

re: RSB Settlement FILE _____

Attached is the list of questions raised by the NRC at the 7-18-79 presentation. The list has been supplemented by, in most cases, a reference to where the subject has been discussed, but in some cases a brief notation has been made in the response, and in a few cases the question was deemed irrelevant to the MCR and the response so indicates.

If anything more detailed, more complete, or more formal is required please let myself or Karl Wiedner know.

cc: K Wiedner w/a
C. McConnell w/a
T.O. Wanzick w/a
RL Rixford w/orig.

References to: "Question" are the NRC 50.54(f) Questions
"Item" are the items in this list

Item 1 Agenda Item 2 - Is it possible that the condensate line or other utilities are still providing support to the Diesel Generator Building? (Lyman Heller, 7/7 Darl Hood)

Response: No, the settlement data and drawing clearly show the building has settled in all areas. However, the differential settlement of the building does seem to have been exaggerated by the presence of either the condensate line and the concrete encasement around the condensate line or the concrete back fill in the area.

Item 2 Agenda Item 3 - Have provisions been made for the train bay tracks loading effect on the borated storage tank lines? (Darl Hood)

Response: Considered irrelevant to MCAR scope, but it was addressed in BLC-8370, 10/29/79, which transmitted Interim Report #8 to Consumers Power Company

Item 3 How does dewatering tie into the load test of the borated water storage tanks (time frame)? (Lyman Heller)

Response: Adequate settlement data can be acquired by the load test whether it is done prior to or after dewatering. Therefore, the dewatering and load test are considered to be independent items.

Item 4 How much settlement of the borated water storage tanks is acceptable? (Lyman Heller)

Response: Original plans outlined in BLC-8370, 10/29/79, were suspended upon receipt of Question 31 from NRC.

Item 5 Has any concrete pipe been profiled? (Ron Lipinski)

It was noted at this time that there is no Class I concrete pipe in the fill.

Response: No, the response during meeting is correct.

Item 6a What is the limiting factor in the design of the concrete duct banks?

(Lyman Heller)

Response: The design of buried utilities was described in the response to Question 13 with additional specifics for the Aux. to DGB duct in the response to Question 30.

Item 6b What is the basis for the assumption that no further remedial action is required for the duct banks? (Ron Lipinski)

Bechtel responded that settlement monitoring would continue probably through cable pulling.

Ron Lipinski noted that duct banks are a Category I structure the same as any other structure on the site.

Response: Basis is that the ducts are not pressure boundaries, and have been evaluated for Category I seismic effects. The integrity of the ducts due to plant area fill settlement will be determined by techniques described in the response to Question 12, Table 12-1, Note 2. Additional discussion is in the response to Questions 7 and 30.

Item 6c Did we analyze the load associated with a large crane parked over the duct bank which may have a void below it? (Lyman Heller)

Carl Wiedner discussed the flexibility of the electrical duct bank and the structural analysis.

Response: Irrelevant to the MCAR. It was not a design load combination and was not analyzed. Additional discussion is in the response to Question 34.

Item 7 Is there any corrosion protection for stainless steel Class I pipes?

(Darl Hood)

Response: Irrelevant to the MCAR.

Item 8 Chuck Goulds Presentation - Question concerning the valve pit caissons going through construction pads and reinforcement of caissons for transfer of horizontal loads. (Ron Lipinski)

Item 8
Cont.

It was noted that various tools would be used for demolition which would deliver about 1,000 foot pounds per blow and that this would not damage any of the other structures. It was also noted that the valve pit crane pad was about $2\frac{1}{2}$ feet thick.

004477

Response: Response made in meeting addresses caissons going through the construction pads. Caissons will not provide for transfer of horizontal loads.
(refer to MCAR 24, Interim Report 7, page 5)

Item 9a Sherif Afifi's Presentation - With $\frac{1}{2}$ " to 1" as the upper limit for seismic settlement, would there be no effects on other structures due to dewatering?
(Lyman Heller)

It was noted to be a small general settlement to be evaluated by Sherif.

Response: Refer to the response to Question 27.

Item 9b Why do we feel that a 1.5 factor of safety is adequate? (Darl Hood)

It was noted that primarily this was due to the fact that 7.5 earthquake value was too large.

Response: Answer during meeting considered adequate assuming the factor of safety against liquefaction was the one being questioned.

Item 10 Where exactly are the liquefaction potential problem areas? (Lyman Heller)

Sherif responded that the small zone in the railroad bay was not a problem.

The borated water storage tank line was not a problem.

We have not analyzed all areas yet; however, this is in reality a hypothetical question since dewatering will answer the potential liquefaction questions in any area in the power block.

Response: Permanent site dewatering will handle all potential liquefaction problem areas.

Item 11a Dick Loughney's Presentation - Would the Service Water Building be outside the perimeter of the dewatering system? (Lyman Heller)

Response: Yes. MCAR 24 Interim Report #6 addresses soil conditions and corrective actions for this structure.

004477

Item 11b When would the clay dike cutoff in front of power block be in place? (Lyman Heller)

Response: Design of dewatering system does not assume any cutoff system.

Item 11c Will this comply with the new Reg. Guides? (Ron Lipinski)

Response: Yes. Refer to the response to Question 24.

Item 11d What will be the systems discharge rate? (Gene Gallagher)

It was noted that it would be less than 400 GPM.

Response: Refer to the response to Question 24.

Item 12 General Question on electrical blackout. It was noted that it would be low since the horsepower requirements for the pumps are small. (D. Hayes)

Response: Irrelevant to the MCAR, no discussion of diesel backup.

Item 13 Expressed a general interest on getting test pit information. (Gillan)

Response: MCAR 24, Interim Report 8 addressed test pit information.

Item 14 Ted Johnson's Presentation. Please comment on ACI 349 which includes settlement with dead load and wind, earthquake, etc. (Gene Gallagher)
Bechtel noted that they had done a similar consideration. They also noted that they would probably seal all cracks greater than 15 mils because of potential corrosion problems and that they were still pursuing an analysis in this area.

Response: The response to Question 15 addresses this, as will the study in response to Question 28.

Item 15. Exactly what all will the caissons support? (Henderson)

It was noted that Bechtel had not completed the horizontal support analysis in this area.

Response: Assuming the reference is to the Auxiliary Building caissons, refer to MCAR 24, Interim Report 7 (page 4).

Item 16a Sherif Afifi's Presentation - Will the Diesel Generator sand surcharge be removed prior to dewatering? (Lyman Heller)

Response: Yes, Surcharge removal discussed in MCAR 24, Interim Report 8 (page 2).

Item 16b How much lower than the construction water would dewatering operation go? (Lyman Heller)

It was noted that it would be a minimum elevation of 600 feet (existing till), and that it was still under evaluation.

Response: Refer to the response to Question 24.

Item 17 Are we confident that the material below the borated water storage tank is acceptable? (Lyman Heller)

It was noted that it is mainly clay and with minimal amounts of sand.

Response: Refer to MCAR 24, Interim Report 7 (page 11) and response to Question 31.

Item 18 Considering the settlement to the southeast side of the Diesel Generator Building, what accounts for this impact?

There also appears to be some concerns on conduit supporting the building.

It was noted that there is more sand on the north side of the building.

(Lyman Heller)

Response: Refer to response to Item 1 above.

Item 19 Interim Report #6 to the MCAR 24 (50/553 Report) stated that we would be removing the top 3-4 ft. of soil. Why? (Gene Gallagher)

It was noted that this was to take care of weathering that the soil had experienced and also possible the bubbling of air through that portion of the soil. 004477

Response: Refer to response to Item 17 above.

Item 20 The PLOCAP location (?) shown on the drawings as a dotted line is no longer part of the design. (Darl Hood)

The control room pressurizer is in the location proposed, but how will it be determined that the soil will be acceptable for any new Class I structures? (Darl Hood)

Response: Borings have been done (MCAR 24, Figure 67)

Item 21 Since we have eliminated chemical grout what about the control tower area void? (Gillan)

Sherif responded that this was an insignificant area and would still probably be pressure grouted.

Response: Refer to the response to Question 12, Table 12-1, Item A.1

Item 22 Dr. Peck Presentation - How would the Diesel Generator surcharge improve the bearing capacity of the fill? (Lyman Heller)

It was noted that long term bearing capacity was based on the friction of the material, and the load has increased the settlement capacity.

Response: Refer to the response to Questions 27 and 35.

Item 23 Why are we testing the caissons at 1.5 times the working load? (Lyman Heller)

It was noted that this was to avoid any unanticipated settlement in the adjacent areas.

Response: Response during meeting considered adequate (MCAR 24, Interim Report 7, pg. 5)

Item 24. TCCooke Presentation on Schedule - When will the cutoff wall be established?
It was noted that there would be not cutoff wall the south end of the power block area, since the rate of flow of water to the sands and/or clays was expected to be minimal. However, if necessary, a slurry trench or chemical grout could be utilized in this area. 4477

Response: Refer to the response to Question 24

Item 25 Phil Martinez's Presentation - If there is too much reliance on testing during the plant area fill what did the dike people rely on? (Ron Lipinski)

Response: Refer to the response to Question 23

Item 26 Why do you say re-excavation was not a cause? (Lyman Heiler)

Response: Refer to the response to Question 23

Item 27 How can you possibly say there was not a problem with people qualifications?

Response: Refer to the response to Question 23

Item 28 Can you say that there was a bona fide soils engineers on site? (Gene Gallagher)

Response: Refer to the response to Question 23

Item 29 How can you possibly say that you have achieved correction action with no "yes" on personnel as a cause?

How can you say there are bad test procedures when personnel was not involved as a cause?

The NRC disagrees with qualifications of personnel as not being a cause.

(Gene Gallagher)

Response: Refer to the response to Question 23

Item 30 How can you say the procedures were not bad?

Response: Refer to the response to Question 23

Item 31 Why was the Spec not included as a cause? (Gene Gallagher)

Response: Refer to the response to Question 23

Item 32 D. Hayes also disagrees with the QC people not being a cause. If the people^{004, 77} were qualified, many of the five most probable causes would have been eliminated.
(Gene Gallagher)

Response: Refer to the response to Question 23.

Item 33 How come in some areas QC identified problems, but nothing happened? (D. Hayes)

Response: Refer to the response to Question 23

Item 34 He commented that there were also problems with moisture density relationship
Phil said that moisture did not cause the problem.

Response: Refer to the response to Question 23

Item 35 Does the applicant endorse the most probable causes? (Darl Hood)

Yes - Per GSKeeley after checking with Don Horn.

Response: Refer to the response to Question 23.

Item 36 How then do people enter into the analysis? (Darl Hood)

It was noted that Don Horn's presentation would cover this.

Response: Refer to the response to Question 23.

Item 37 Don Horn's Presentation - Why are we no longer using the Nuclear Densometer?

(Gene Gallagher)

It was noted that because of moisture problems found in the sand and clay.

Response: Response during meeting considered adequate.

Item 38. What does generic mean? (D. Hayes)

It was noted that this means U. S. Testing in some cases.

Response: Irrelevant to MCAR

004477

Item 39. What was the source of the air bubbles at the tank farm at elevation 611' and bubbles at 527'? (Lyman Heller)

Response: Refer to MCAR 24, Interim Report 7 (page 11)

Item 40. Has the tank farm test pit (inspection pit 20 X 20) confirmed boring information? (Lyman Heller)

It was noted that it has not been compared yet, but the material appeared good below the top four feet.

Was there clay in both pits or was there sand? (Lyman Heller)

Response: Refer to MCAR 24, Interim Report 7 (page 11)

Item 41. What other plant improvements will be made as a result of the soils experience?

Will there be a topical report? (Lyman Heller)

Response: Refer to the response to Question 23

Item 42. Who pays the on-site GEOTECH Man? (Lyman Heller)

Response: Irrelevant to MCAR

Item 43. Is QC separate and does it have authority to stop work? (Lyman Heller)

Response: Yes, per SF/PSP G-1.1, Section 3.5

Item 44. What is the criteria for acceptability of the borated storage tank ring foundation?

Response: See Item 4 above.

Item 45a Lyman Heller was concerned with the flexure of the ring beam.

It was noted that the tank bottom transfers load to the soil.

Response: Irrelevant to MCAR

004477

Item 45b Lyman also seemed concerned about the fact that the borated storage tank had no baffles. He was really looking for a measurement on membrane stretching.

Darl Hood noted that this was the basis for 50.54(f) questions.

Response: Irrelevant to MCAR

Item 46a Since air bubbles may have travelled horizontally, how can borings confirm that there are not problems?

Dr. Peck noted that in all likelihood the air passages were already there and that the only evidence of air leaking was the bubbling at the surface.

Response: MCAR 24, Interim Report 7 (page 11)

Item 46b Will the fact that the air line condition existed two months be part of the decision on what to do with the tank farm soil? (Gene Gallagher)

Dr. Peck noted that you could expect some surface disturbance, but he believes there would be little damage to the underlying soil.

TCCooke then noted that the piezometers could have provided paths for the air bubbles leaking to the surface.

Response: MCAR 24, Interim Report 7 (page 11)

Item 47 Has Consumers Power Company applied lessons to other sites? (D. Hayes)

Response: (Consumers Power Company)

Item 48 How are the procedures now reviewed? (D. Hayes)

Response: (Consumers Power Company)

Item 49. Question on structural mat vs. spread footing - It was noted that it would have to be rechecked to see that the design would have to be satisfactory. The 50.54(f) response was confusing to Ron Lipinski.

It was noted that this was a settlement calculation only.

004477

Response: Refer to the response to Question 27

Item 50a What load or elevation will the underpinning be made to? (Lyman Heller)

Response: Elevation for underpinning of valve pit will be determined by the use of dutch cone penetration tests. (no longer applicable for Aux. Bldg.)

Item 50b How will we decide what load has to be applied to each pile during jacking?

It was noted that we would calculate the theoretical reactions.

Response: Exact techniques will be developed by underpinning subcontractor.

But it will be based on a combination of structure weight and movement during jacking.

Item 50c How will we transfer load from the jacks to the structure? (Ron Lipinski)

Response: This is a subcontractor design and will be included in procedures he will develop.

Item 51 What about earthquake vibration? (Ron Lipinski)

Response: Seismic loads will be carried by the fill under the Main Feedwater Valve pit.

Refer to MVAR 24, Interim Report 7, (page 4).

Item 52 Who runs the show on underpinning? (Lyman Heller)

It was noted that Bechtel would do the design with Chuck Gould acting as a consultant.

Consumers Power would then review it.

Response: Subcontractor after Bechtel, Gould, and Consumers Power review of procedures.

Item 53. GSKeeley's Presentation - Darl Hood noted that the staff was aware of the confusion they may have created by attacking the soil problem from several directions, and were trying to compensate for same.

Response: (NRC) Irrelevant to the MCAR

004477

Item 54 Darl Hood wanted Keeley statement on his confidence that the deficiencies were sufficiently understood and the corrective actions taken to preclude repetitions in this area.

Response: (Consumers Power Company - See response to Question 23)

Item 55 Darl Hood also wanted to know whether all problems have been understood prior to remedial action. That is, the problems should not again show up during the remedial activities. For example, flooding was noted to have been removed from the specification by Rev. 7.

Response: The remedial actions for each structure do have a sound basis.

Item 56 Will all remedial action be accomplished by the Consumers Power Quality Assurance Program? (Gene Gallagher)

Response: All remedial action performed upon the Q-listed portions of the backfill will be accomplished under the QA program.

Item 57 Will dewatering be part of the Quality System? This has to be responded in accordance with criteria 2. (Gene Gallagher)
The NRC is reviewing the standard review plan and we will look for compliance.
(Darl Hood)

Response: Refer to the response to Question 24.

Item 58. Documentation is needed. (Jim Knight)

It was noted that there is more information in existing reports and that the narrative of today's discussions will take approximately two weeks to prepare for Mr. Knight.

004477

He also noted that there appeared to be much positive progress in the Diesel Generator and he would appreciate having the documentation very quickly. (Jim Knight)

Response: Documentation of presentation provided to NRC via HOWE-218-79, dated August 10, 1979.

MEMO FROM

MICHAEL O. ROTHWELL

TO:

Tom Cooke

DATE

1/17/80

Here's my stuff
such as it is

MOR

40
9.0
75
175 = 3 hrs
9 AM - noon

w/ NRC @ Bethesda 1-16-80
BAPC / CPC

Wanzeck described our investigative/test program

Staff got confused when Afifi showed post loading settlement projections and called it acceptance criteria

Other concerns expressed:

- ~~with~~ how will differential settlement criteria be used in design
- when all types of settlement are considered additive you get some pretty big numbers which prompted the question "Do you consider this excessive"
- Lipinski got hung up on settlement to date vs projected future settlement

RIII
One guy kept going back to "do you consider this settlement excessive?"

Schare (structural) challenged curve fit on one of Sherif's slides as non-conservative
ie shallower line slope than cluster of data points above curve

then PIII type challenged that ~~was~~ we are in secondary consolidation mode post-pre loading

Lipinski asked about BWST settlement monitoring program

"are we dismissing this as a problem"

effect of

his previously mentioned

Heller says he is repeating concern over cracks in ring beam which carries into shell of tank and rips it crack on diff settlement

Heller negative on completeness of analysis of effect of cracks in ring wall during seismic event (on diff settlement I can't tell which)

The general subject of differential settlement has NRC staff spoken

Hood wants overload on tank test (Q 31) to show consecutive position (ie proof test syndrome) Kubinski asked

Was Wind load considered in ring wall design

I predict Heller will freak about cracking when he finds out ring wall and valve pits have been combined

Heller also said stainless steel is not very ductile

Q 33 Hood noted we should address why we terminated diesel tank load test

Hood pushed for refilling diesel tanks with wet

word corrosion was used as reason for emptying tanks - from earlier discussion

for not reloading tanks w/water

3

- Q33 Our basic reason is additional load test period not needed cuz no movement in six month period when it was loaded

Dewatering - Bill Paris

interceptor wells only
no retaining walls or grouting to stop water

grouting may be used a little to solve specific local problems

dewatering system not Cat I

20 days recharge time based on going from 595 to 610

The RIT guy w/ Gallagher has been in the wellpoint business and fancies himself to be an expert. He favors grout over intercepting wells ^{seems to}

Heller asked why we are dewatering
Answer is to be able to preclude possibility of liquefaction. Grouting does not absolutely preclude the possibility of liquefaction

Give reason why dewatering system can't lower level of ~~the~~ ultimate heat sink in case of dike failure

Dewatering well design - How winterized
ie - keep from freezing

Plug weep holes in circ water / su water structure retain walls w/ flap gaps per Karl Wiedner sketch - as soon as possible w/ diver from pond side

Stmt was made that w/ non-seismic dewater system justified because not needed post-SSE possibility exists that system could be knocked out by <SSE type earthquake (like OBE) and not be available after that

MEB feedback on Q's 16-20
augment existing answers by revision to treat the MEB concerns

Lipinski harpooned Ted Johnson ^{when Ted asked if he was satisfied}

Johnson stated ~~to~~ we are reanalysing seismic & structural to reflect changed conditions from those assumed for design original as regards soils condition

Lipinski wants to know

which Johnson don't want to do

- what is cause of cracks
- what do structural cracks do to structure

Lipinski in ACI ^{say} new code has some new load combo whatever this means

"Settlement is a self-limiting effect"
— Ted Johnson

Ted says Code lacks definition on what significant settlement is

Lipinski wants a report with some bolt and impressiveness on analysis and evaluation of cracks - one part of evaluation should address effect of cracks on resistance to SSE (what happens during earthquake w/ & w/o cracks

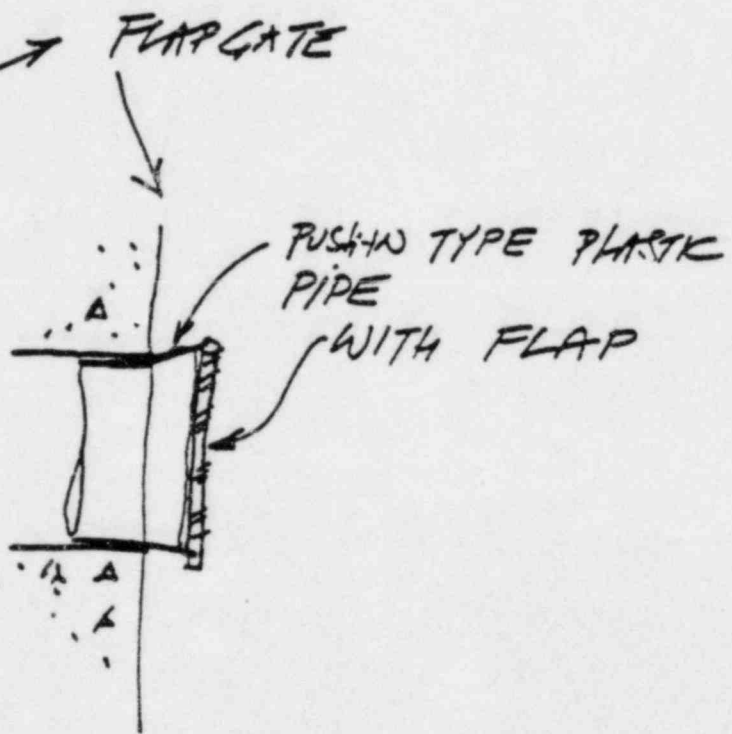
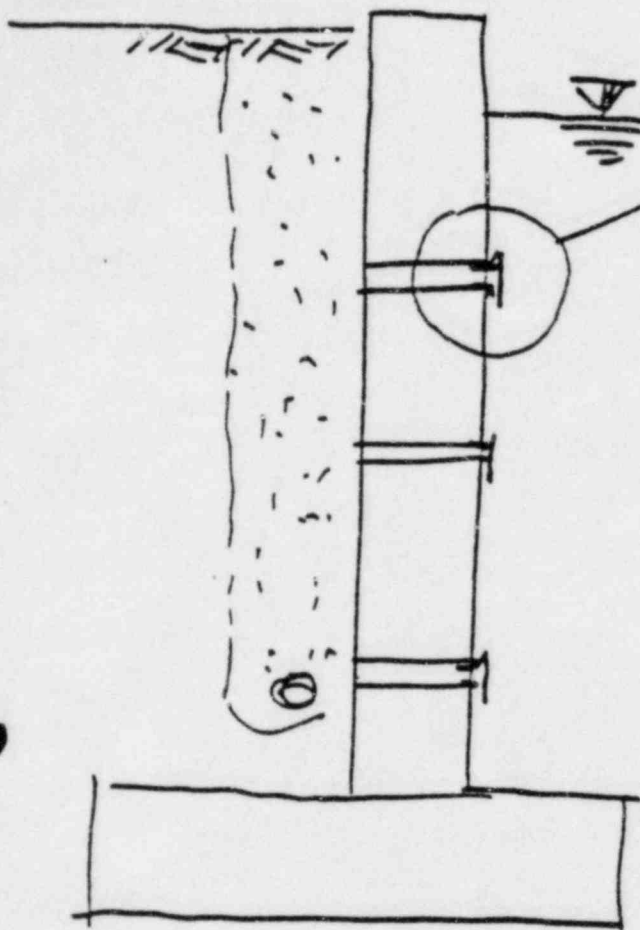
(5)

Ted was a little hazy on ^{UB} duct bank seismic design criteria used. Checked in 1976 to confirm duct banks are cat I.

Question 25

Johnson position is finite element analysis requested in Q25 is a ratchet beyond state of art when original damped mass analysis was done.

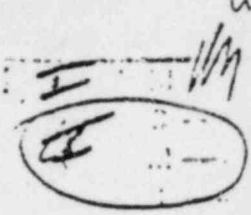
Apparently no resolution w/ Lipinski. Hood mentioned possibly continue discussion w/ conf call.



Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



CEK

we better look it this close check

BLC- 8615

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

Attention: Mr. R.C. Bauman

CONSUMERS POWER CO.
RECEIVED

DEC 23 1979

December 20, 1979

Site M57
Midland Project

Subject: Consumers Power Company
Midland Plant - Job 7220
Vibratory Settlement of the
Diesel Generator Pedestals
File: 0279

Gentlemen:

Attached are Meeting Notes No. 1085 for a preliminary meeting between Bechtel geotechnical services, geotechnical services' consultant, and the civil structural group. The meeting was held to determine the necessity for obtaining a consultant, to discuss the potential for vibratory settlement of the diesel generator pedestals, and to establish a pedestal instrumentation and settlement monitoring program.

Very truly yours,

L.H. Curtis
for L.H. Curtis
Project Engineer

HC/ht
12/3/5

Enclosure: Meeting Notes No. 1085

- cc: P.K. Chen w/a
- T. Cooke w/a
- L. Curtis w/a
- B. Dhar w/a
- B.C. McConnell w/a
- D.B. Miller w/a
- M. Rothwell w/a
- T.J. Sullivan w/a
- J. Wanzeck w/a
- K. Wiedner w/a

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1085

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220

DATE: November 16, 1979
PLACE: Bechtel Office, Ann Arbor, Michigan
SUBJECT: Vibratory Settlement of the Diesel Generator Pedestals
FILE: 0279

ATTENDEES: Bechtel Consultant
H.G. Chapman R. Woods
P.K. Chen
B.C. McConnel

PURPOSE: The meeting was held to discuss the potential for vibratory settlement of the diesel generator pedestals and to establish a pedestal instrumentation and settlement monitoring program.

ITEMS DISCUSSED:

The possibility of vibratory shakedown of the sands underlying the diesel generator pedestals due to generator operation was discussed. The magnitude of this settlement has not been determined. Vibrating the pedestals to allow initial settlement to occur and to monitor the settlement was discussed. Should initial settlement prove to be a problem, grouting would remain a possible means of preventing additional settlement.

The startup testing phase of diesel operation could provide the means of vibrating the pedestals, allow initial settlement to occur, and provide the necessary settlement data. Alternative means of simulating diesel generator vibration other than actual operation is not practical.

R. Woods would be a consultant to perform the necessary vibratory analysis to establish sand shakedown settlement criteria (settlement versus running time), formulate a settlement monitoring program, and perform an analysis to determine long-term settlement.

R. Woods discussed vibratory compaction and outlined the information necessary to determine sources of problems. He remarked that dominant modes of vibratory motion, their associated amplitudes, and energy content at each operational frequency (spectrum analysis) must be established before a prediction of the effects of vibration can be made. He advised providing instrumentation to monitor pedestal vibration as well as pedestal settlement to obtain the necessary information.

The necessity for grouting the foundation in Bays 1 and 2 should be evaluated prior to the vibration test. R. Woods' scope of work will be to perform the vibration settlement analysis and to formulate the settlement monitoring program. The monitoring program could be included as part of the startup testing procedure for the diesel generators, which would allow surveillance of pedestal settlement under inservice conditions. The monitoring program will be written in a manner to allow the program to vary based on settlement observed.

The schedule of work and associated events were discussed. Close coordination of the monitoring program with CPCo startup testing of the diesel generator was determined to be imperative.

The meeting was summarized with the following action items established.

ACTION ITEMS:

- | | | |
|---------------------|----|---|
| Bechtel/Geotech | 1. | Geotechnical services is to obtain and coordinate the consulting services of R. Woods. |
| Project engineering | 2. | Project engineering will provide the consultant with available information pertaining to the diesel generators, modes of operation, foundation material, the design of the diesel generator pedestals, and the equipment layout on the pedestal by November 28, 1979. |
| Consultant | 3. | The consultant will provide project engineering with a detailed pedestal instrumentation and settlement monitoring program by January 1, 1980. |
| Project engineering | 4. | Project engineering will prepare a settlement monitoring procedure for review and coordination with CPCo diesel generator startup testing group by January 1, 1980. |

- Consultant
5. The consultant will analyze vibration settlement of the diesel generator pedestals and determine the necessity for grouting the foundation material beneath the pedestals in Bays 1 and 2 by January 1, 1980.
- Consultant
6. The consultant will provide project engineering with sand shakedown settlement criteria for the testing program by February 1, 1980.
- Consultant
7. The consultant will provide a detailed procedure for implementing the monitoring program in Item 3 by March 1, 1980.
- Consultant
8. The consultant will provide project engineering with any long-term vibration and settlement behavior for each pedestal.

Prepared by: *[Signature]*

Reviewed by: *[Signature]*

HC/lsh
11/27/12

To File
FROM TCCooke *TC*
DATE December 11, 1979
SUBJECT MIDLAND PROJECT GWO 7020 -
POND DEWATERING MINUTES - MEETING DECEMBER 5, 1979
File: B2.6, C88 UFI: 70*40*06 Serial: CSC-4659
CC Attendees

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

Attendees:

Consumers Power Company

DBMiller
RRFrisch
DESibbald
GSlade
DLAnderson
RGWollney
ASPuplis
DBruck
TCCooke
RFGreen
CAHunt
MRPutnam
GSKeeley
RASinervo
PELatvaitis

Bechtel Power Corporation

JARutgers
GKrzisnik
JWasylewski
BDhar
CRussell
JWanzeck
RMGanatra
JMorris
ABoos
MORothwell

The advantages and disadvantages of the pond dewatering operation were reviewed prior to beginning discussion of the attached agenda.

- I. All prerequisites of the dewatering operation had been met, however, Bill Paris noted that he would require some additional time for pump testing which will delay the dewatering operation until Saturday or Monday morning, (December 10, 1979). During the discussion, it was also noted that the monitoring cost would be offset at least in part by the removal of some of the algae bloom and weeds because of the exposure to air. It was also noted we wish to do whatever possible to avoid fish and algae problems prior to operation. It was noted that we may have to deal with it at that time again. A discussion of fish cleanup revealed that fish may be damaged as they leave the site through the discharge gates, some fish will probably be left in puddles and some fish will be concentrated in the emergency cooling pond and die because of lack of oxygen. The emergency cooling pond will probably be the biggest problem area and will require netting dead fish in the spring and disposing of same. PMO will include a brief statement on the release of the fish to the Tittabawassee River in their press statement to be made prior to or during the pond dewatering operation. It was noted that the introduction of these fish to the Tittabawassee River should enhance the river

somewhat, however, some fish will be injured during the transit. Consumers Power Company will attempt to net these fish.

II. Dewatering Operation

John Cosens will have to be notified again if extensive problems develop during the dewatering operation. During the eight hour per day dewatering for six days, the following perimeters will have to be monitored:

- a. Temperature at the gate discharge weekly by plant operators
- b. Pitot tube readings at one half hour intervals by Geotech
Board readings at one half hour intervals by Geotech
Weekly water chemistry on the river upstream and downstream side of the discharge channel by consultants
Continual surveillance by Geotech to include a visual inspection of the opposite side of the river early each morning. Don Sibbald and Darell Anderson will accompany Geotech during this surveillance
Geotech also plans to send a diver down to inspect the inlets after the first eight hours of draining

- c. Measurements to be taken during the continuous operation of the dewatering include the following perimeters:

Temperature and pitot tube readings at intervals to be determined by Geotech after the six day operation. Operators will take these readings
Board readings will be taken at eight hour intervals by operators
Weekly water chemistry of the Titabawassee River upstream and downstream (discharge) will be taken by the consultants
Geotech again will be responsible for daily overall inspection.

- ## III.
- All the above will collect their data and forward same to Don Sibbald, PMO-Construction. Rich Sinervo will be responsible for checking to see that the proper tags are hung on the equipment before it is operated and to see that a CAR has been issued. Once the readings have been turned into Mr. Sibbald, he will transmit same to Environmental Activities who will then transmit them to the DNR. Don Sibbald will be coordinating all activities. Rich Sinervo will be handling the operating personnel for Mr. Sibbald. Geotech personnel and others who have questions or instructions for the operators will work through Mr. Sinervo.

- ## IV.
- Starting time will be as noted in Section I above.

Attachment

pls

POND DEWATERING AGENDA

December 5, 1979

9:30 AM

I. Prerequisites Status or Responsibility

A. Bechtel

Pump Tests

Inlet Examination

Diver Inspection of Downstream Pipe

Gate Manufacturers Recommendations

Acceptability

Gate (% open to be utilized) 220 cfs

Pitot Tube Installation

Pond Elevation Board

Making Gate Usable

B. Consumers Power Company

Manpower for Gate & Monitoring Flow

Pond Chemistry & Fish Cleanup

II. Dewatering Operations

A. Notification of John Cosens

B. Measurements for six day at eight hour/day Operation

Temperature

Pitot Tube Readings at $\frac{1}{2}$ hour intervals

Board Readings at $\frac{1}{2}$ hour intervals

Weekly Water Chemistry Upstream and

Downstream

Geotec Inspections

General Surveillance

C. Measurements for Continuous Operation

Temperature

Pitot Tube Readings at one hour intervals

Board Readings at eight hour intervals

Weekly Water Chemistry Upstream and

Downstream

Geotec Inspections

General Surveillance

III. Monthly Tabulation & Submittal of Sampling & Flow Measurements

IV. Starting Time

12-6-79 A²
PRE AWARDS

41

NO TEMPORARY DRAWINGS EVEN GIVEN TO EITHER
SUBCONTRACTOR (MORGANTINE OR SPENCER PRENTICE WHITE)

SPEC REQUIREMENT TO SKOUT 7' IN ANYTHING THAT'S
SKOUTABLE TO PREVENT WASH WHICH WILL
IN UNDATE SOME OF THE WELLS. THE FACT
THAT LOUSHNEY WILL HAVE TO WORK IN PITS
~~WELLS~~ WHICH WILL CAUSE COSTLY INTERFERENCE
PROBLEMS - IN ADDITION, LOUSHNEY SAYS HE
HAS TO HAVE THESE WELLS

LOUSHNEY & GOULD @ MEETING

APPARENTLY LACK OF COMM. BY BEENTEL

WILL HAVE TO GO OUT W/ADDENDUM FROM
ABOVE CHANGES TO BOTH BIDDERS PRIOR
TO BOTH BIDDERS

NO CLEAR DEFINITION OF LOCAL DEWATERING

HANSON IS MORGANTINE'S ENGR & REGISTERED
WILL CHECK IF MANY STATES COMPLY
W/MICH LICENSING - JSS SAVE COPY OF LAW.
(NOTE: HANSON NOT PARTY TO CONTRACT)

IF WE HAD MENTIONED ONE UNIT THEN ANOTHER,
SUB WOULD HAVE DROPPED US - WE WENT
W/SUB'S SCHEDULE

GOULD HAS CONFLICT OF INTEREST ROLE - ADVISING
BIDDERS ON HOW & EXTRA COMPENSATION

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



IN-HOUSE MEETING NOTES NO. 11

MIDLAND PLANT UNITS 1 & 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-001

*Not
proofed*

DATE: November 30, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Supplemental 10 CFR 50.54 Requests Regarding Plant F111
(12 Questions)
FILE: 0279.1

ATTENDEES:

Bechtel

S. Afifi	L. Mattews
S. Blue	R. Rixford
P. Chen	M. Rothwell
b. Dhar	J. Wanzeck
J. Hook	K. Wiedner
S. Lo	

PURPOSE: To establish division of responsibility and schedule for answering these questions

ITEMS DISCUSSED:

The only item that was discussed was the NRC letter from L.S. Rubenstein to S.H. Howell (CPCo).

The following numbers correspond to the questions identified in the above letter and identifies the group(s) required to respond to the questions. Where more than one group is identified.

The first group will be responsible for the coordination for that question.

- Question 24a - Geotechnical Services
b - Geotechnical Services
c - Civil, Geotechnical Services
d - Civil, Geotechnical Services

- e - Civil, Geotechnical Services
- f - Geotechnical Services
- g - Civil, Geotechnical Services, Licensing
- h - Civil, Geotechnical Services, Mechanical
- i - Geotechnical Services, Civil

- Question 25 - Civil, Geotechnical Services
- Question 26 - Civil
- Question 27 - Geotechnical Services
- Question 28 - Civil
- Question 29 - Civil
- Question 30 - Civil
- Question 31 - Geotechnical Services
- Question 32 - Civil, Geotechnical Services, Scheduling
- Question 33 - Geotechnical Services
- Question 34 - Civil
- Question 35 - Geotechnical Services

The schedule for completing the actions is as follows:

- Prepare an outline - December 7, 1979.
- Prepare a draft response - December 21, 1979.
- Coordinate (including CPCo) - January 4, 1980.
- Finalize response - February 1, 1980.

All of the responses to the latest round of questions will be coordinated by the Civil group.

Prepared by: _____
J. Hook

Concurrence by: _____
B. Dhar

JGH/sg
12/3/4

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1085

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220

DATE: November 16, 1979
PLACE: Bechtel Office, Ann Arbor, Michigan
SUBJECT: Vibratory Settlement of the Diesel Generator Pedestals
FILE: 0279

ATTENDEES: Bechtel Consultant
H.G. Chapman R. Woods
P.K. Chen
B.C. McConnel

PURPOSE: The meeting was held to discuss the potential for vibratory settlement of the diesel generator pedestals and to establish a pedestal instrumentation and settlement monitoring program.

ITEMS DISCUSSED:

The possibility of vibratory shakedown of the sands underlying the diesel generator pedestals due to generator operation was discussed. The magnitude of this settlement has not been determined. Vibrating the pedestals to allow initial settlement to occur and to monitor the settlement was discussed. Should initial settlement prove to be a problem, grouting would remain a possible means of preventing additional settlement.

The startup testing phase of diesel operation could provide the means of vibrating the pedestals, allow initial settlement to occur, and provide the necessary settlement data. Alternative means of simulating diesel generator vibration other than actual operation is not practical.

R. Woods would be a consultant to perform the necessary vibratory analysis to establish sand shakedown settlement criteria (settlement versus running time), formulate a settlement monitoring program, and perform an analysis to determine long-term settlement.

R. Woods discussed vibratory compaction and outlined the information necessary to determine sources of problems. He remarked that dominant modes of vibratory motion, their associated amplitudes, and energy content at each operational frequency (spectrum analysis) must be established before a prediction of the effects of vibration can be made. He advised providing instrumentation to monitor pedestal vibration as well as pedestal settlement to obtain the necessary information.

The necessity for grouting the foundation in Bays 1 and 2 should be evaluated prior to the vibration test. R. Woods' scope of work will be to perform the vibration settlement analysis and to formulate the settlement monitoring program. The monitoring program could be included as part of the startup testing procedure for the diesel generators, which would allow surveillance of pedestal settlement under inservice conditions. The monitoring program will be written in a manner to allow the program to vary based on settlement observed.

The schedule of work and associated events were discussed. Close coordination of the monitoring program with CPCo startup testing of the diesel generator was determined to be imperative.

The meeting was summarized with the following action items established.

ACTION ITEMS:

1. Bechtel/Geotech Geotechnical services is to obtain and coordinate the consulting services of R. Woods.
2. Project engineering Project engineering will provide the consultant with available information pertaining to the diesel generators, modes of operation, foundation material, the design of the diesel generator pedestals, and the equipment layout on the pedestal by November 28, 1979.
3. Consultant The consultant will provide project engineering with a detailed pedestal instrumentation and settlement monitoring program by January 1, 1980.
4. Project engineering Project engineering will prepare a settlement monitoring procedure for review and coordination with CPCo diesel generator startup testing group by January 1, 1980.

- Consultant 5. The consultant will analyze vibration settlement of the diesel generator pedestals and determine the necessity for grouting the foundation material beneath the pedestals in Bays 1 and 2 by January 1, 1980.
- Consultant 6. The consultant will provide project engineering with sand shakedown settlement criteria for the testing program by February 1, 1980.
- Consultant 7. The consultant will provide a detailed procedure for implementing the monitoring program in Item 3 by March 1, 1980.
- Consultant 8. The consultant will provide project engineering with any long-term vibration and settlement behavior for each pedestal.

Prepared by: *[Signature]*

Reviewed by: *[Signature]*

HC/lsh
11/27/12

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



CONSUMERS POWER COMPANY
RECEIVED
NOV 19 1979

November 9, 1979

BLC- 8439

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Attention: Mr. R.C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Meeting Notes No. 1061
Midland Diesel Generator Meeting
File: 0270, 0279, C-2645

Gentlemen:

Attached for your review and information are copies of Meeting Notes No. 1061 for the diesel generator building task group meeting held in Ann Arbor, Michigan on October 9, 1979.

Very truly yours,

L.H. Curtis
for L.H. Curtis
Project Engineer

DR/sg
11/2/7

Enclosure: Meeting Notes No. 1061

cc: S.S. Afifi
K.D. Bailey
T.C. Cooke MIDLAND PLANT
L.H. Curtis
L. Davis
D. Horn
D.B. Miller
J.A. Rutgers
T.J. Sullivan
D. Sibbald
T. Thiruvengadam
K. Wiedner
Com Log

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1061

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: October 9, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

A. Boos*	M. Rung	T. Cooke
B. Dhar*	J. Wanzeck	D. Horn*
C. Martin	K. Wiedner	D. Sibbald
C. McConnel		T. Thiruvengadam
W. Paris*		
D. Reeves*		

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

ITEMS DISCUSSED:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on August 1, 1979, is as follows.

1) Action Item 1 of Meeting Notes No. 1018

This item is open. The analysis for the borated water lines has not been completed.

2) Action Item 2 of Meeting Notes No. 1018

This item is closed. The FSAR change for Section 2.5 is now with the licensing group for action and tracking.

3) Action Item 3 of Meeting Notes No. 1018

This item is closed. Crack mapping for areas of the railroad bay, feedwater isolation valve chambers, and borated water storage tanks has been completed. Sketches SK-C-666 and SK-C-667 have been issued.

4) Action Item 4 of Meeting Notes No. 1018

This item is open. It was noted that the present method of analysis uses a stress amplification factor for elbows, tees, and reducers. This results in very large stresses at these points. It was suggested that two analyses be performed; one based on the difference between the design location and the location from the last survey and one based on the difference between the first survey and the last survey. Construction noted that if some of the lines are to be unearthed, it must be done soon or not until next spring, otherwise heated shelters must be provided during backfill operations.

5) Action Item 5 of Meeting Notes No. 1018

This item is closed. Specification 7220-C-94 and Drawing 7220-C-2000 for the piling subcontract were issued on August 29, 1979, and September 4, 1979, respectively.

6) Action Item 6 of Meeting Notes No. 1018

This item is open. Borated water storage tanks are under construction. The load test procedure, including water chemistry and protection of permanent plant facilities, will be issued by October 15, 1979.

7) Action Item 7 of Meeting Notes No. 1018

This item is closed. The conflict in the response to Question 6 of the NRC's 10 CFR 50.54(f) was resolved in Revision 3 of the response to the questions on September 13, 1979.

8) Action Item 8 of Meeting Notes No. 1018

This item is closed. The comments to FSAR Q&R 362.15 have been resolved. The response will remain as written.

9) Action Items 9 and 10 of Meeting Notes No. 1018

These items have been combined and are open. Project engineering will revise and clarify the specifications and responses to the NRC's 10 CFR 50.54(f) questions to show requirements for a compaction of 95% ASTM D 1557 under buildings and 90% ASTM D 1557 at other locations.

10) Action Item 11 of Meeting Notes No. 1018

This item is closed. The report of the soil test program for the air line leak in the tank farm has been completed.

11) Action Item 12 of Meeting Notes No. 1018

This item is closed. The report on the air line leak was included in Revision 7 of MCAR 24.

12) Action Item 13 of Meeting Notes No. 1018

This item is open. Consultant R. Loughney is to submit a conceptual plan for the preliminary design and scope of work for the permanent dewatering.

13) Action Item 14 of Meeting Notes No. 1018

This item is open. The bid package for permanent dewatering will be issued by January 1980.

14) Action Item 15 of Meeting Notes No. 1018

This item is open. The contract for permanent dewatering will be awarded by March 1980.

15) Action Item 16 of Meeting Notes No. 1018

This item is open. There have been several discussions with mechanical and nuclear staff. The following subjects have been discussed:

- a) A long recharge time is required because of systems that are required after safe shutdown earthquake (SSE).
- b) A program is required to establish the reliability of the piezometers.
- c) Demonstrate the capability to repair the system during recharge time.

- 16) Action Item 17 of Meeting Notes No. 1018

This item is open. A review of the NRC regulations with respect to permanent dewatering is continuing.

- 17) Action Item 18 of Meeting Notes No. 1018

This item is open. The licensing group has started a docket search for information on permanent dewatering at other plants.

- 18) Action Item 19 of Meeting Notes No. 1018

This item is open. Cost estimates for all Q-listed and part-Q-listed systems are not complete.

- 19) Action Item 20 of Meeting Notes No. 1018

This item is closed. It was recommended that the service water building piles be added to the underpinning contract.

- 20) Action Item 21 of Meeting Notes No. 1018

This item is closed. Piling will be part of the underpinning contract and will not have separate bids.

- 21) Action Item 22 of Meeting Notes No. 1018

This item is open. Construction will determine the terminology for the permanent dewatering by November 1, 1979.

- 22) Action Item 23 of Meeting Notes No. 1018

This item is closed. The underpinning bid package was sent out in August 1979. The preaward meeting will be on October 22, 1979. Consumers Power Company comments will be discussed at that time. The contract will be awarded by November 15, 1979.

- 23) Action Item 24 of Meeting Notes No. 1018

This item is open. Construction will review the insurance requirements concerning underground work associated with underpinning by November 1, 1979.

- 24) Action Item 25 of Meeting Notes No. 1018

This item is open. Removal of water from the diesel fuel tanks is being reviewed.

25) Action Item 26 of Meeting Notes No. 1018

This item is open. It is feasible to run the diesel generators to vibrate the pedestals but is not presently included in the specifications. Project engineering and geotechnical services will establish a procedure and run duration for the diesels and a settlement monitoring program by December 1, 1979. This activity will have to be coordinated with the startup test program.

26) Action Item 27 of Meeting Notes No. 1018

This item is closed. None of the surcharge sand will be used as Q-listed fill.

27) Action Item 28 of Meeting Notes No. 1018

This item is closed. Pile stiffnesses for the service water building have been finalized. It was verified during the meeting that the original values provided would not change.

28) Action Item 29 of Meeting Notes No. 1018

This item is closed. Removal of fill in the tank farm has been resolved. Refer to report on tank farm.

29) Action Item 30 of Meeting Notes No. 1018

This item is closed. The temporary air line in the tank farm that had a leak has been grouted. All other temporary lines in the tank farm will be abandoned and grouted as soon as they can be rerouted around the tank farm.

30) Action Item 31 of Meeting Notes No. 1018

This item is open. A summary of the data from the test pits and soil borings will be incorporated into the January amendment of the FSAR.

31) Action Item 32 of Meeting Notes No. 1018

This item is closed. Letters BEBC-3294 and BEBC-3311 which were sent on September 24, 1979, and October 3, 1979, respectively describe the plan that will be used to determine the permanent dewatering system parameters.

32) Action Item 33 of Meeting Notes No. 1018

This item is closed. All items relevant to the MCAR 24 scope were discussed in Revision 7 of MCAR 24.

33) Action Item 34 of Meeting Notes No. 1018

This item is closed. TWX BEBC-3176 was sent on August 13, 1979, describing the surcharge removal procedure.

34) Action Item 35 of Meeting Notes No. 1018

This item is closed. Density plots for the dike area north of the auxiliary building have been completed.

B) Status of Site Activities

1) Backfill operation and compaction tests

Backfill operations are proceeding at the site. An extensive program of documentation of material placement has been developed. Two soils engineers are presently onsite to assist in the control of backfill placement.

The questionable fill material in the tank farm has been removed and replaced. The tank farm is backfilled to el 630'-0".

Geotechnical services has given a response to NCRs 1094 and 2294. NCR M-01-5-9-012 has been partially resolved.

All compaction equipment being used at the site has been qualified for technique and can be included in the FSAR if required.

2) Temporary dewatering

In area 3 (see Attachment 1), all of the dewatering wells outside of the turbine building have been installed. Only a couple of wells, including observation wells, are left to be installed inside the turbine building. For the temporary construction dewatering in Areas 1 and 2 (see Attachment 1), almost all of the dewatering wells are installed.

The schedule for temporary dewatering is as follows (see Attachment 1):

October 15 - Start installing deep pump test well in Area 4
October 22 - Start pumping deep pump test well in Area 4 for 3 days
October 25 - Start pumping Areas 1 and 2
October 25 - Approval of Loughney procedures
November 1 - Start pumping Area 3

There are three more procedures from Loughney that must be reviewed by project engineering before dewatering in Area 3 can start. A meeting with project engineering, subcontracts and construction will be scheduled to discuss these and the other Loughney procedures.

3) Test program for permanent dewatering

Locations and directions for the borings for the well pump tests were established in the letter, BEBC-3299, sent on September 24, 1979. They were modified by letter BEBC-3311 on October 3, 1979, to expedite construction. This letter deleted and relocated some wells and established the test well diameter and requirements for piezometers and borros anchors. Based on the present schedule in Item 2 above (temporary watering), more piezometers are needed near Areas 1 and 2 prior to pumping. Their locations will be coordinated by the onsite geotechnical representative.

C) Status of Remaining Subcontracts

The status of the remaining subcontracts was not discussed as an individual item but was covered during the discussions on the various action items. The following is a summary:

- 1) Piling - Specification 7220-C-94 and Drawing 7220-C-2000 were issued on August 29, 1979, and September 4, 1979, respectively, for the piling subcontract. The service water building piles will be added to the underpinning contract. (See Items 5, 19, and 20 of the Review of Prior Action Items.)
- 2) Underpinning - The underpinning bid package was sent out in August 1979. The preaward meeting will be on October 22, 1979. Construction will review the insurance requirements concerning underground work. (See Items 22 and 23 of Review of Prior Action Items.)
- 3) Permanent dewatering - The consultant, R. Loughney, will submit a conceptual plan for the preliminary design and scope of work. The bid package will be issued by January 1980, and the contract will be awarded by March 1980. The Q-listed and non-Q-listed portions of the permanent dewatering system still have to be determined. (See Items 12 through 18 and 21 of Review of Prior Action Items.)

D) Cost Estimate and Schedule for Remaining Work

Schedules were provided for:

- 1) Service water pump structure piling (see Attachment 2)
- 2) Auxiliary building underpinning (see Attachment 3)
- 3) Permanent and temporary dewatering (see Drawings EP-101 and EP-102)
- 4) Overall cost and schedule status (see Attachment 4)

E) NRC 10 cFR 50.54(f) questions were not discussed.

F) MCAR Report

The scope of the MCAR will be limited to soil exploration and the diesel generator building. The settlement records and pipe profile figures will be submitted for the last time.

The MCAR will not contain the final results of the future predicted settlement because the meeting with J. Peck and A.J. Hendron, Jr. will not be held until October 25, 1979. No additional borings or cross-sections will be included because they will go into the January 1980 FSAR amendment.

The schedule section will be revised or shortened to one paragraph with no dates.

G) Diesel Generator Building

The grout requirements under the footings were discussed. Portions of the footings in Bays 3 and 4 were exposed and a maximum gap of 3/4 inch was found. The gap penetrated up to 2-1/2 feet under the footing. It was decided that more exploration would be performed and the information would be presented to J. Peck and A.J. Hendron, Jr.

H) Diesel Fuel Oil Lines

A design change notice (DCN) was issued requiring the diesel fuel lines to be buried 6 feet below grade. It was questioned whether the design requirements could be satisfied.

ACTION ITEMS:

- Project Engineering
- 1) Analyze the flexibility of piping connected to the borated water storage tanks assuming 4 inches of differential settlement. Set up meeting with stress group (K. Wiedner and J. Betts to attend) to discuss analysis. Investigate eliminating link seals at penetrations by October 30, 1979.
- Project Engineering
- 2) Evaluate stress conditions in the resurveyed pipes. The following two analyses were suggested:
 - a. Difference between original design location and latest survey
 - b. Difference between first survey and latest survey
- Geotechnical Services/
Project Engineering
- 3) Issue program for load test of borated water storage tanks by October 15, 1979.
- Project Engineering
- 4) Revise and clarify the specifications and responses to the NRC's 10 CFR 50.54(f) questions to show requirements for a compaction of 95% ASTM D 1557 under buildings and 90% ASTM D 1557 at other locations.
- Consultant, R. Loughney
- 5) Submit conceptual design and scope of work for the permanent dewatering system.
- Geotechnical Services/
Project Engineering
- 6) Permanent dewatering system
 - a. Design permanent dewatering system and have it reviewed in-house (SF) or by an outside consultant.
 - b. Issue bid package by January 1980.
 - c. Award contract by March 1980.
 - d. Establish a program to determine the reliability of the piezometers.
 - e. Determine Q-listed items for the following two options.

1. Complete cutoff wall, long recharge time (Q-listed monitoring of inspection procedure)
 2. Partial cutoff wall with local grouting, shorter recharge time (all Q-listed monitoring and pumping equipment)
- f) Establish program to demonstrate capability to repair dewatering system during recharge time.
 - g) Establish elevations and locations at which liquefaction would occur for 0.12 g and 0.20 g seismic events.
 - h) Continue review of NRC regulations with respect to permanent dewatering.
 - i) Continue docket search for information on permanent dewatering at other plants.
 - j) Estimate costs for two options discussed in Item e above.
- Construction
- 7) Determine terminology to be used for dewatering with respect to union jurisdictions and transmit to project engineering by November 1, 1979.
- Construction
- 8) Review insurance requirements concerning underground work associated with underpinning and inform project engineering by November 1, 1979.
- Geotechnical Services/
Project Engineering
- 9) Review diesel fuel tank settlements and issue release for removal of water from fuel tanks by October 15, 1979. Determine cleaning procedures that will be required.
- Geotechnical Services/
Project Engineering
- 10) Establish a procedure and time period for running the diesel generators. Establish a settlement monitoring program including readings:
 - a) Before placement of generators

- b) After placement of generators
c) After operation of generators
- Geotechnical Services/
Project Engineering 11) Incorporate a summary of data from test pits and soil borings into the January FSAR amendment.
- Project Engineering 12) Disposition NCRs 1004 and 2294.
- Geotechnical Services 13) Resolve remaining portions Consumers Power Company NCR M-01-5-9-012.
- Project Engineering 14) Determine if compaction requirements for current onsite compaction equipment need to be included in the FSAR.
- Construction/
Subcontracts 15) Expedite U.S. Testing's response to Bechtel's Review of U.S. Testing's Field and Laboratory Construction Test Data on Soils Used as Fill.
- Geotechnical Services 16) Establish locations for more observation wells near the construction temporary dewatering areas.
- Geotechnical Services/
Project Engineering 17) Develop a combined schedule for the temporary dewatering and pump tests for the permanent dewatering.
- Construction/
Project Engineering 18) Schedule a meeting between project engineering, construction, and subcontracts to discuss Loughney Dewatering procedures.
- Project Engineering 19) Revise the schedules (Attachments 2 through 4) to reflect the interface with the temporary dewatering.
- Project Engineering 20) Provide a procedure for grouting under the diesel generator building footings by October 12, 1979.
- Project Engineering 21) Establish the requirements for additional investigation of gaps under the diesel generator building footings both inside and outside the building.

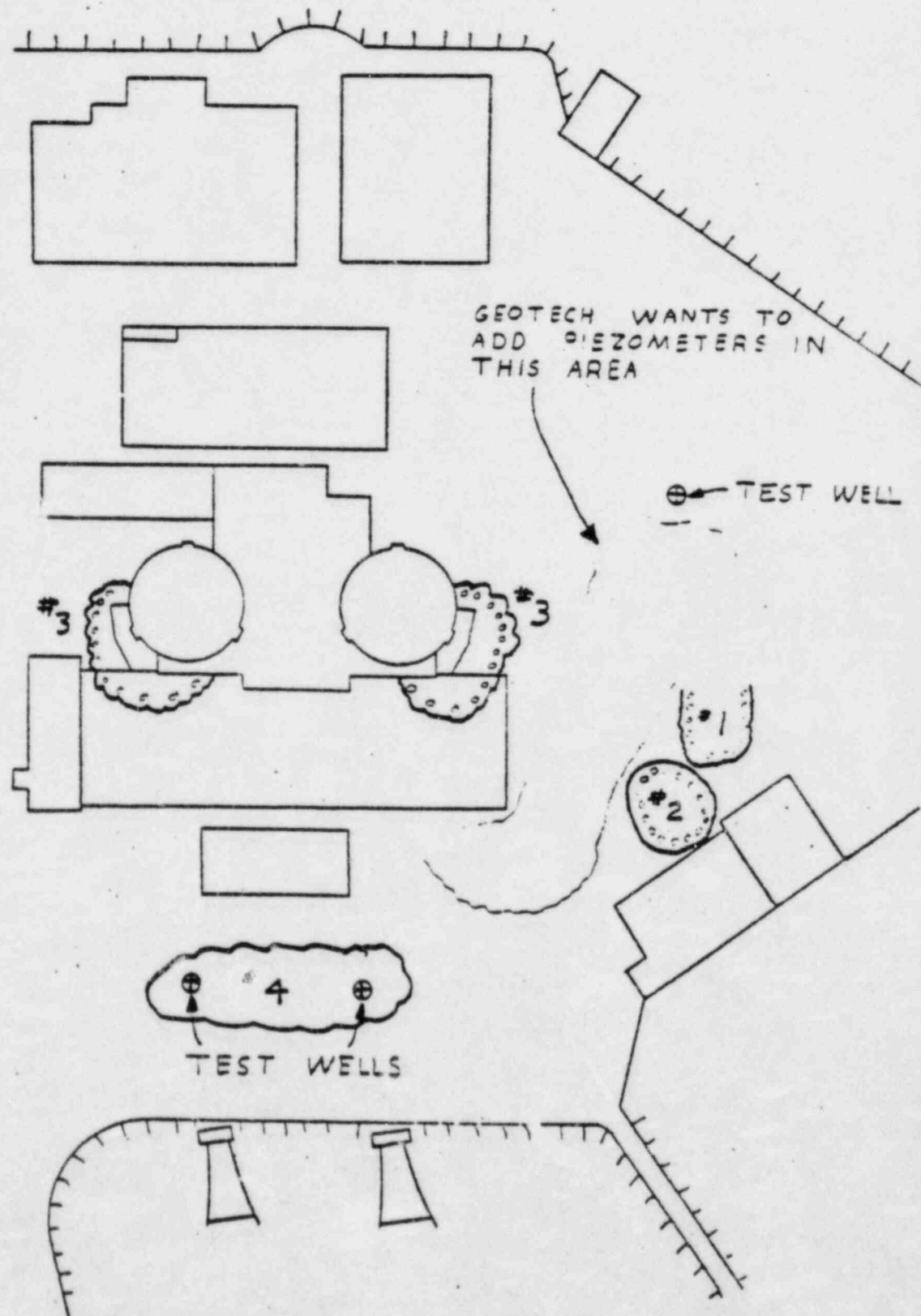
Project Engineering 22) Review the design requirements for the diesel fuel lines and determine if the DCN is satisfactory as issued.

D. Reeves
D. Reeves

DR/js
10/17/7

- Attachments
- 1) Temporary dewatering and test well locations
 - 2) Schedule for service water pump structure piling
 - 3) Schedule for auxiliary building underpinning
 - 4) Overall cost and schedule status

Meeting Notes No. 1061
Attachment 1
Temporary Dewatering and
Test Well Locations



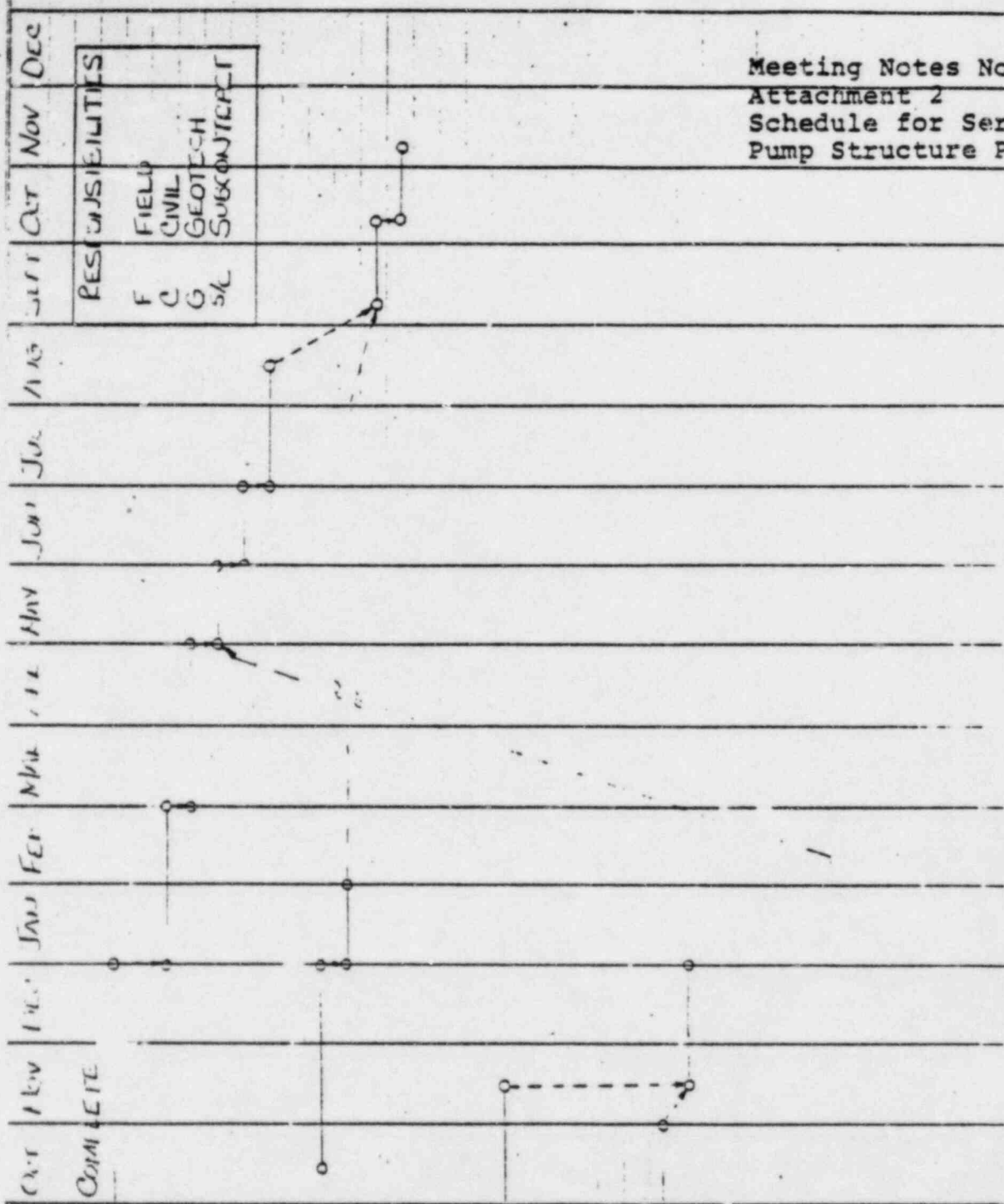
DRAWN BY D. REEVES

TEMPORARY DEWATERING
AND TEST WELL LOCATIONS

C.E.M
10/6/74

MEETING AGENDA
FOR SERVICE WATER PUMP STRUCTURE PILING

Meeting Notes No. 1061
Attachment 2
Schedule for Service Water
Pump Structure Piling

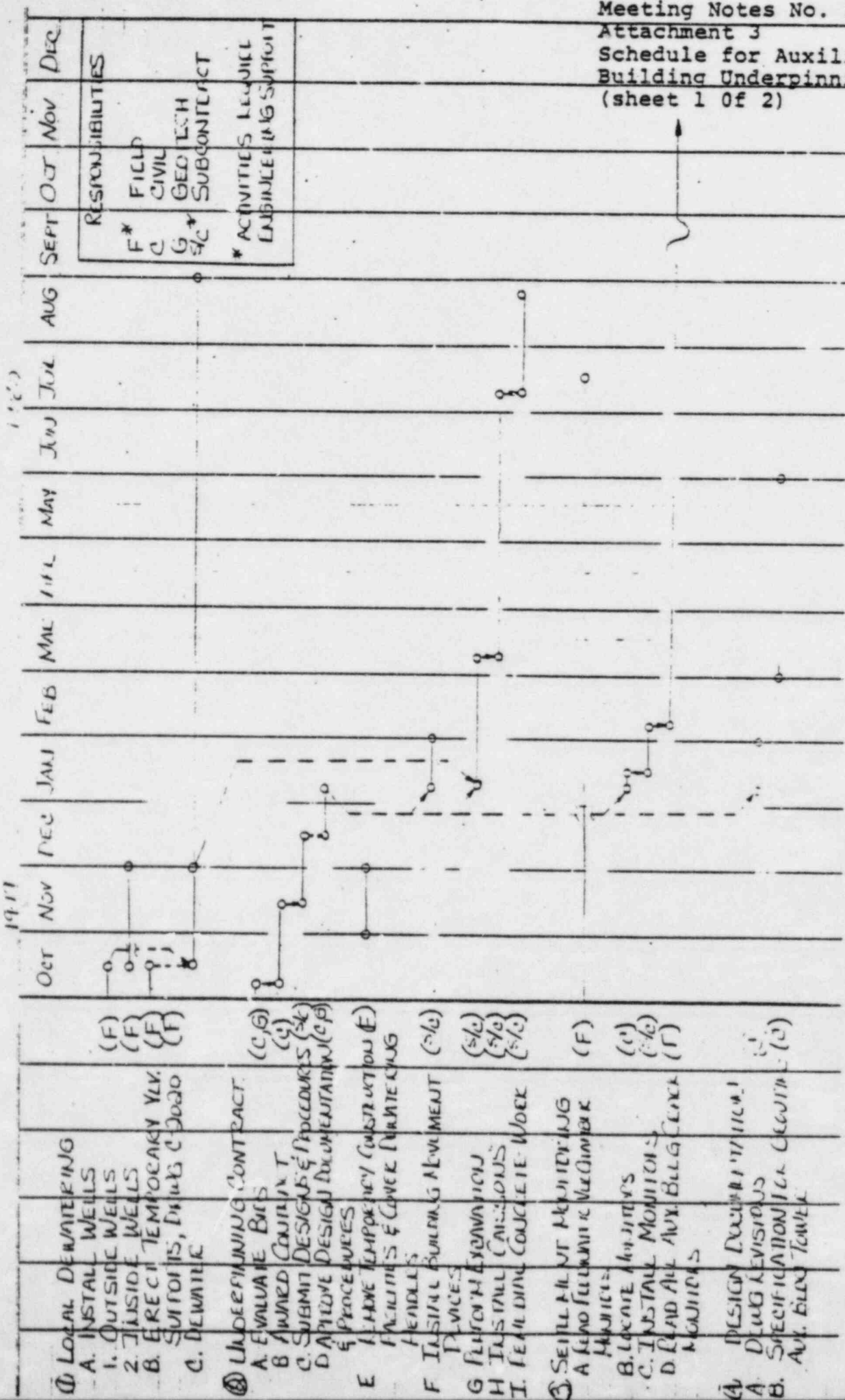


- (c) ADDITIONAL SUBJECT
- (F) A. FILL SPECIFICATION
- (F) B. INCORPORATE SUBMITTALS
- (S) C. WITH UNDERPINNING
- (S) D. SUBMIT DESIGN DETAILS
- (S) E. AFFEYAL DESIGN PLANS
- (G,C) F. REVIEW PILE TEST RESULTS
- (S) G. DRIVE PILES
- (S) H. CORBELS
- (S) I. ISSUE DRAWINGS FOR CONSTRUCTION
- (F) J. FACILITATE STILL
- (F) K. CONSULT
- (S) L. PILE JACKING
- (S) M. DOCUMENTATION
- (S) N. CHECK DESIGN PARAMETERS
- (S) O. SOIL RESISTANCE & STABILITY
- (S) P. SHEAR WALL ANALYSIS
- (S) Q. FLOODS & BEAMS
- (S) R. SEISMIC ANALYSIS
- (S) S. EVALUATION OF CRACKS
- (S) T. SPECTRUM CURVES
- (S) U. FSAR REVISIONS

NOTE: THE DELAY IN COMMENCING WORK AFTER INCOMING OF DESIGN SUBMITTALS IS DUE TO LACK OF TIME UNDERPINNING OF THE AUX BLDG

C.E.M.
10/4/79
REV 1 10/11/79

MCAR 24 SETTLEMENT
UNDERPINNING OF THE AUXILIARY
ENGINEERING BUILDING



Meeting Notes No. 1061
Attachment 3
Schedule for Auxiliary
Building Underpinning
(sheet 1 of 2)

P. C. F. L.

Meeting Notes No. 1061
Attachment 3
(sheet 2 of 2)

DELETIONS COMIT

	DEC
	NOV
	OCT
	SEPT
	AUG
	JUL
	JUN
	MAY
	APR
	MAR
	FEB
	JAN
	DEC
	NOV
	OCT

1882

1171

- 5. DOCUMENTATION
- A. AUX. BLDG ANALYSIS
- B. SPECTRUM CURVES
- C. FSAP REVISIONS

(c)
(c)
(3,6)

Meeting Notes No. 1061
Attachment 4
Overall Cost and Schedule Status

COST AND SCHEDULE STATUS

COST

Total estimated cost has increased from \$14,500,000 to \$15,200,000.
This increase is due to:

- Item 1: Pricing increase on C-95, underpinning developed from bids received (\$400,000)
- Item 2: Change in seismic acceleration criteria for underpinning design (\$300,000)

The total estimated cost includes an allowance of \$6,000,000 for the investigation, design, procurement, and installation of a permanent plant dewatering system.

SCHEDULE

Corrective actions currently outlined for this MCAR are not expected to impact the construction and testing project schedule as now being formulated. However, since the licensing schedule necessary to support the anticipated revised fuel load will require final FSAR submittal on open items due to this MCAR by September 1, 1980. Consumers and Bechtel do not want any of these MCAR items still open at that time.

Specific corrective actions and surcharge requirement for the borated water storage tanks needs to be firmed up so a schedule can be developed.

BLC-8167

Consumers Power Company.

September 17, 1979

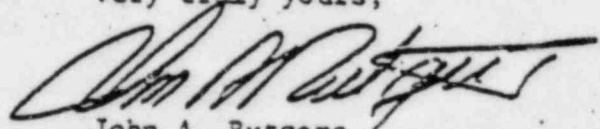
Page 2

Bechtel Power Corporation

000256

Based on the foregoing it is evident that this work does not fall under Article 9 of the Bechtel/Consumers Power Company Contract.

Very truly yours,



John A. Rutgers
Project Manager

JAR/pp

cc: Mr. D.-B. Miller

Question 362.2 (2.5.4.5.1)

000256

Question 1 and the resulting discussion on Page 8.00-1 included in Amendment Number 9 to your PSAR stated that all natural sands with relative densities less than 75% would be removed beneath all Class I structures and beneath non-Class 1 structures so sited that their failure could endanger the adjacent Class 1 structures. Discuss the methods employed in mapping and removing the sands having less than 75% relative density. Provide plan and sectional figures showing the areas where these materials were removed. Figure A9-2 of the PSAR which displays subsurface profiles of Class 1 piping should be updated to show removal of sands of less than 75% relative density and be presented in the FSAR. Figure 2.5-21 of the FSAR shows loose sands beneath the Class 1 tanks although they were to have been removed. Explain this inconsistency, and provide proper documentation of as-built conditions.

Responses

In 1970, 61 soil borings were made at the possible locations of Category I structures and systems to investigate loose surficial sands. These were shallow depth borings with depths ranging from 9 to 40 feet. The borings were designated D-1 through D-60 and are included in Appendix 2A. The locations of the borings are shown on FSAR Figure 2.5-17.

It is seen from Figure 2.5-42 that standard penetration blowcount values of 10 to 15 blows per foot are required at depths from zero to 15 feet for a relative density of 75%. Examination of Table 2.5-25 and the boring logs shows the D-borings had the blowcounts necessary for relative densities in excess of 75%. Standard penetration blowcounts were recorded at various depths in these borings. Blowcount values were in excess of 20 blows per foot with one exception. Borehole D-48 (refer to Table 2.5-25) indicated one blowcount of five at an elevation approximately 595 feet. However, borehole D-48A, located 5 feet away from D-48, showed a minimum blowcount of 20 at approximately 600 feet elevation.

Shortly after the D-borings were completed, project activities were postponed from 1970 to 1973 because soil borings under one of the Category I tanks were not made until 1978. The subsurface profile shown in Figure 2.5-21, Rev 1 (January 8, 1979), indicated the possible existence of loose sands.

During 1978, numerous soil borings were made in the tank farm area and elsewhere in the plant area. These borings are designated T, C, HT, LN, E, D, DG, Q, and CT, and their locations are included in Figure 2.5-17. The boring logs are included in Appendix 2A.

The plant area now consists of man-made fill ranging from 25 to 35 feet high. Under this condition, standard penetration blowcount values of 20 to 25 blows per foot are required⁽¹⁾ for a relative density of 75% at depths between 25 to 35 feet as can be seen from Figure 2.5-42. The T-borings in the tank farm area register blowcounts more than the minimum for a relative density of 75% (refer to Table 2.5-25). Therefore, the sands can be classified as moderately dense to dense. Based on this, the subsurface profile, Figure 2.5-21, has been revised excluding the possible existence of loose sands.

000258

18

A few borings elsewhere in the plant area, namely DG-7, DG-28, and CT-1, indicate blowcounts of 9 to 17 blows per foot at elevations of 599 to 604 feet. These are isolated lenses and will not endanger the integrity of Category I structures.

Based on the facts discussed above, it is concluded that the surficial sands existing in the plant area have relative densities greater than 75%.

⁽¹⁾ H. J. Gibbs and W. G. Holtz, "Research on Determining the Density of Sands by Spoon Penetration Testing," Proceedings-Fourth International Conference on Soil Mechanics and Foundation Engineering, Vol I (1957), London, England, pp 35-39

15

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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

TCC
FILE



CONSUMERS POWER COMPANY

RECEIVED
AUG 23 1979

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

BLC- 8051

August 21, 1979

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

Attention: Mr. R.C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Meeting Notes No. 979
Settlement Problem of
Seismic Category I Facilities
and Structures
File: 0270, 0479, C-1700, C-2645

MAY 30
NOTES

Gentlemen:

Attached is a copy of Meeting Notes No. 1001 for the meeting with CPCo in Ann Arbor regarding the diesel generator building causes and action items.

Very truly yours,

L.H. Curtis
for L.H. Curtis
Project Engineer

BCM/pd
8/11/1

Enclosure: Meeting Notes No. 1001

cc: D.B. Miller
T.J. Sullivan
T. Cooke

<input checked="" type="checkbox"/>	TCC
<input checked="" type="checkbox"/>	DHP
<input type="checkbox"/>	DJV
<input type="checkbox"/>	RLB
<input type="checkbox"/>	DAK
<input type="checkbox"/>	JFK
<input type="checkbox"/>	MMH
<input type="checkbox"/>	WFS
<input checked="" type="checkbox"/>	RAM
<input type="checkbox"/>	DEF
<input type="checkbox"/>	GML
<input type="checkbox"/>	JGB
<input type="checkbox"/>	WCB
<input type="checkbox"/>	EME
<input type="checkbox"/>	GWR
<input type="checkbox"/>	MFB
<input type="checkbox"/>	ISS
<input type="checkbox"/>	JJO
<input type="checkbox"/>	CMD
<input type="checkbox"/>	DAR
<input type="checkbox"/>	TC
<input type="checkbox"/>	PKIV
<input type="checkbox"/>	ASP
<input type="checkbox"/>	SEC
<input type="checkbox"/>	CLERK
<input type="checkbox"/>	FILE

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1001
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

DATE: May 30, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Diesel Generator Building Possible Causes and Action Items
FILE: 0279, C-2645

ATTENDEES:	<u>Bechtel</u>	<u>CPCo</u>
	K. Wiedner	D. Sibbald
	J. Hook	R. Wheeler
	G. Tuveson	D. Horn
	J. Hink*	T. Thiruvengadam
	C. McConnel*	C. Hunt
	J. Wanzeck	
	A. Boos	
	G. Richardson	
	R. Simanek	

*Part-Time

PURPOSE: The meeting was held in the Ann Arbor office to discuss the action items and possible causes of insufficient fill compaction included in Attachments 1 and 2 to Meeting Notes No. 934 dated March 12, 1979.

ITEMS DISCUSSED:

- A. Review of the status of the action items listed in Attachment 1 to Meeting Notes No. 934
 - 1. Confirmation of material compatibility adequacy - J. Wanzeck stated that placement of sand in trenches in the plant area fill is not a problem if the material has been properly placed. Geotech will provide a memorandum to close out this item.

2. Confirmation of low blow count on radwaste building - Three additional borings inside the radwaste building resulted in no low blow counts. This item is closed.
 3. Confirmation of electrical duct banks in the yard - Two additional borings near the duct banks between the service water structure and the turbine building and other borings have established the soil conditions. Any further items will be tracked by the response to Request 50.54f. This item is closed.
 4. Tabulated list of test results - Geotech has tabulated all compaction test results for the plant area fill and has issued a preliminary report for in-house review. Geotech will issue a draft report for CPCo review by June 11, 1979.
 5. Checking of water level around site - The installed piezometers around the site indicate an average water level of approximately 625.5 feet. This item is closed.
 6. Evaluation of who placed fill (Wheeler study) under all Seismic Category I structures - This is complete for the diesel generator building and service water structure. Review of other areas is in progress. Construction and CPCo are to complete this study by June 8, 1979.
 7. Checking of 1977 stockpile and rain data - Review of rainfall data indicates that the summer of 1977 was normal and not a dry year. This item is closed.
 8. Type of fill placed during the winter of 1976 - This item is being completed with Item 6.
 9. Review of work and testing in the time frame below elevation 615' - This item is being completed with Item 6.
- B. Review of the preliminary possible causes described in Attachment 2 to Meeting Notes No. 934 was accomplished. This resulted in revisions to the list. The revised list of preliminary possible causes is attached as Attachment 1 to these meeting notes.

ACTION ITEMS:

- | | | |
|-----------------|----|---|
| Bechtel/Geotech | 1) | Geotech will provide a memorandum to close out the question of sand in trenches in the plant area fill. |
| Bechtel/Geotech | 2) | Geotech is to issue a draft report on the tabulated list of compaction test results for the plant area fill for CPCo review by June 11, 1979. |

Construction/CPCo 3) Construction and CPCo are to complete the evaluation regarding who placed fill under all Seismic Category I structures (Wheeler study) by June 8, 1979. The study for the diesel generator building and service water structure has been completed.

Prepared by: Gary L. Richardson
Reviewed by: Karl Wiedner

CM/GR/js
7/11/11

Attachment: Preliminary Possible Causes of Insufficient Fill Compaction

ATTACHMENT 1

PRELIMINARY POSSIBLE CAUSES OF INSUFFICIENT FILL COMPACTION

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
1. Time difference between placement of fill and construction of facility	No	Cannot cause insufficient compaction
2. Placement method		
- Lift thickness	Yes	Investigation is continuing into capability of the equipment which was used to compact the plant area fill to compact a full 12-inch lift. ACTION: Geotech
- Moisture control	No	Material placed during the period when moisture control was not implemented is generally in the top 2 feet of fill which would not cause excessive settlement. Remaining areas are currently being investigated but are not considered a cause at this time.
- Compaction equipment	Yes	The equipment used during construction is being used to place 4-inch-thick lifts. The results obtained will be compared with the original standards used during fill placement. Thicker lifts will be made and evaluated up to a maximum thickness of 12 inches. ACTION: Geotech

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
- Types of material	No	Materials have been shown to be compactable and also compatible in test fills.
- Compactive effort	Yes	To be evaluated with lift thickness and equipment.
3. Theoretical comparison of BMP compaction versus settlement	Yes	Compare effects of different compaction levels. ACTION: Geotech
4. Specification C-211		
- General	Yes	Include with Action 2.
- Frost protection omitted	Yes	Investigate impact (refer to Part A, Item 6 of this report).
- Flooding of trenches	Yes/No	Possible cause in localized areas of sand fill areas; not a cause in clay fill.
5. Testing		
- Methods	Yes	Investigate impact. ACTION: Geotech
- Equipment		
- Results/reports		
- Retests		
- Reviews/evaluations		
- Personnel		
6. Increased test frequency and location for small areas	Yes	Investigation of frequency and distribution is in process. ACTION: Construction/CECo
7. Different contractors		
- Personnel qualifications	No	Refer to Item 16.
- Different inspection methods	Yes	Refer to Item 15.
- Placement methods	Yes	Refer to Item 2.

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
8. Extensively reexcavated area	No	Additional investigation indicates similar problems in areas where reexcavation was not accomplished.
9. Moisture intrusion in ground	Yes/No	Not a problem if properly compacted; a possible problem if undercompacted and dry of optimum.
10. Lean concrete fill	No	
11. Pond filled March 1978	No	See Item 9.
12. Stockpiled material	No	See Item 13.
-- Weathering		
- Drying out		
13. 1977 dry year	No	The year 1977 was not a dry one.
14. Own weight settlement (calcs)	No	Cannot cause poor compaction.
15. Inspection procedures after 3/17	Yes	Investigation into inspection procedures used by Bechtel and Canonie indicates that inspection of Bechtel operations was not as intense as for Canonie operations, especially after October 1976. Inspection callout was "S" (surveillance) and relied heavily on the test results to ensure proper placement.
16. Personnel	No	Review of personnel qualifications for Bechtel, Canonie, and U.S. Testing indicates the personnel probably had sufficient education, experience, and training to carry out the tasks assigned to them.
17. Effects of 1974-75 slowdown	No	

Bechtel Associates Professional Corporation

Inter-office Memorandum

To R. L. Castleberry
Subject Midland Units 1 & 2
Job No. 7220-101
Dewatering Meeting

Date June 5, 1979
From G. T. LeFevre
Of Geotechnical Services

Copies to S. L. Blue
1320, 3130

At Ann Arbor 10 D 5
7220-79-91

Attached are my notes on a dewatering meeting held in our office on 31 May 1979.

G. T. LeFevre
G. T. LeFevre

GTL/nm
Attachments

ATTENDEES:

- G. A. Tuveson
- C. B. McConnel
- J. G. Hook
- K. Wiedner
- P. K. Chen
- S. S. Afifi
- J. W. Wanzeck
- E. M. Smith
- A. B. Arnold
- W. C. Paris
- D. Sibbald
- D. Loughney
- D. Woods

To File

FROM TCCooke/RMW *da*

DATE August 8, 1979

SUBJECT MIDLAND PROJECT GWO 7020 - MEETING TO DISCUSS
CONSULTANTS' REVISED PROPOSAL - CHANGE TO
PERMANENT DEWATERING - JUNE 22, 1979
File: B3.0.3 UFI#-00234 Serial: CSC-4297

CC Attendees
KCBrooks (2)

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

Attendees

Consumers Power Company

- T. C. Cooke³
- G. S. Keeley
- D. B. Miller
- W. R. Bird
- B. W. Marguglio
- D. E. Horn
- T. R. Thiruvengadam
- D. E. Sibbald
- K. R. Kline

Bechtel Power Corporation

- S. Afifi
- R. L. Rixford
- G. L. Richardson
- L. A. Dreisbach
- J. Milandin
- G. Tuveson
- A. J. Boos
- D. Jinnett
- R. Simanek
- P. A. Martinez
- W. Jones
- J. Wanzeck
- S. Blue
- T. Johnson

After lunch at a meeting in Ann Arbor on June 19, 1979, the consultants got together and decided that there may be some advantages to the Project in installing a permanent dewatering system as an alternative to some of the fixes transmitted to the NRC in conjunction with the 50.54f. questions. In the opinion of the consultants, this revised scheme would resolve all questions for potential liquefaction; and, therefore, eliminate the problems associated with the chemical grout. The consultants had noted that the chemical grout in the area of the Diesel Generator Building would not be completed until June or July 1980 at the earliest. They also discussed the problems with the grout penetrating building cracks, utilities, etc. The railroad bay grouting is not required and no longer needs to be considered. The consultants also requested that the need for complete mining below the Auxiliary Building wings be re-evaluated if liquefaction problems are eliminated.

They stated there is a possibility the remaining work would include shear velocity testing underneath the Auxiliary Building electrical penetration areas to estimate contact stresses with possible grouting of local void areas. Profiling of pipes before and after dewatering and duct bank checks and verification would also have to be made. The piling solution for the service water structures will remain

Page 2

File

Midland Project GWO 7020 - Meeting to Discuss Consultants' Revised Proposal
Change to Permanent Dewatering - June 22, 1979

File: B3.0.3 UFI#-00234 Serial: CSC-4297

August 8, 1979

unaffected. Resolution of whether or not permanent dewatering system would have to be a safety system and structure, the possibility of combining the permanent system with the temporary system, installation of Q-list monitoring wells, and a system to monitor the effluent for fines would be required. At the meeting on June 22, 1979, Mr. Tuveson also noted that he would have to recheck his design calculations on the buildings to see whether or not the removal of the buoyant forces would have any effect on the 40-year life of the structures.

The consultants apparently believe that the dewatering system would be easier to defend to the NRC and that it is a less complicated fix for liquefaction.

It was noted on June 22, 1979 that the consultants possibly did not consider the structural recheck required without the buoyant support or the FSAR revisions, which were primarily administrative in nature. W. Jones noted that the cost of total dewatering would be in the neighborhood of \$10 to \$15 Million with required redundancies. This was for a cased well with permanent submersible pumps considered. Dewatering for the Diesel Generator only would cost approximately \$2 Million. This would be balanced by a savings of \$2 Million for grouting, \$2.2 Million for underpinning, \$750,000 for dewatering, with nothing allowed for elimination of tie-up of the Diesel Generator area or mining obstructions.

As a sidelight, I&E Report 79-10 discussing Air Bubbles in the Tank Farm, was also suggested as a topic for the July 10 meeting with the NRC in Washington. Prior to the Thursday meeting with the consultants in Denver (June 28), a matrix should be drawn to show the advantages and disadvantages of various methods proposed to date. This would include not only our responses to the 50.54f. items and the consultants' latest proposal, but also some of the earlier alternates used which were previously discarded for one reason or another, since conditions have changed. These items will be discussed prior to the Thursday meeting with the consultants in Denver and at a meeting in Ann Arbor at 8:00 AM on June 27. It was also decided to send the MCAR 6 Interim Report with a copy letter noting that there are other evaluations being made at this time and mentioning the dewatering option.

To File

FROM TCCooke/RMW

DATE August 7, 1979

SUBJECT MIDLAND PROJECT GWO 7020
PRE-MEETING WITH CONSULTANTS
File: B3.0.3 Serial: CSC-4274 UFI#-00234-S

6/27/79

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

CC Attendees
GSKeeley, P14-408B
DBMiller
KCBrooks (2)

Attendees:

- Karl Wiedner, Bechtel Power
- Phil Martinez, Bechtel Power
- Sherif Afifi, Bechtel Power
- Dr. Ralph Peck, Consultant
- Dr. A. Hendron, Jr., Consultant
- Dr. M. T. Davisson, Consultant
- Tom Cooke, Consumers Power Company

There was a brief discussion on the various options. One of the main reasons for Option Five (Areal Dewatering) was that it grew to a large extent out of the dewatering process for Option One. The consultants expressed the opinion that we had to answer liquefaction questions wherever anyone might think they could occur (for example, the control tower at 6KSF loading). It could be a real thorn in the job at a later date, and areal dewatering is the only clean method. It is very hard to argue against dewatering, and it would be very difficult to prove the effectiveness of grouting. The question was asked about the water that could be trapped in clay. The consultants responded that over the long haul, it would drain with permanent drainage and could be proven by piezometers. While peripheral wells would probably do the job, there would be some intermediate wells. Any vein of water would be drained. Piezometers would convincingly prove that the area was dry. The construction dewatering process for the Auxiliary Building electrical penetration areas will assist in determining how much dewatering and how many wells, etc., are required. P. Martinez indicated that Bechtel would have to take another look at the design calculations in the foundation areas.

The Auxiliary Building electrical penetration area is a high narrow structure with a torsion box at the lower portion. The soil was designed to take the horizontal shear. The low soil blow counts values indicate that this structure is possibly being cantilevered to some extent off of the control tower. Dr. Peck expressed the need for the design basis for this structure. Dr. Hendron indicated that the borings were not necessarily indicative of what was beneath the structure. A parametric study for the structure should be made based on a range of soil properties. A quick rough analysis should first be done, followed by a detailed analysis. Karl Wiedner discussed the possible outer end settlement and his theory on how the structure had possibly picked up a cantilevered load during construction phases.

Tom Davisson then mentioned that, since we were thinking of permanent dewatering, a different underpinning method may be acceptable (one that would take vertical loads only). The Auxiliary Building control tower and the material below the electrical penetration areas have potential for horizontal shear resistance. The three options would be to: (1) do nothing, (2) supply something for vertical loads only, and (3) supply something for vertical loads and horizontal shear. The first step would be to check the horizontal shear resistance required. Possibly horizontal support could be picked up from the Reactor Building and/or Turbine Building. If we remove material and fix the end of the Auxiliary Building electrical penetration areas, we still would have to analyze for an unsupported mid span. Caissons were mentioned as another option. It was noted that even clay with an average blow count of three would have modest shear strength. The consultants noted that they did not have sufficient design information. Karl Wiedner and other Bechtel personnel present did not have all the answers on the design basis at the time of this meeting. However, at T. C. Cooke's suggestion, the consultants agreed to formulate their questions in writing for Bechtel response.

The consultants noted that in their opinion, \$3 Million for the underpinning of the Auxiliary Building electrical penetration areas was very low, especially when compared to the estimate of \$20 Million for permanent dewatering. They also stated that we definitely have a diesel-generator liquefaction problem although the sand would probably never actually liquefy during an earthquake. The problem was the difficulty in providing calculations which verify this and would not be subject to argument.

A brief discussion then followed concerning possible liquefaction regarding utilities, sand backfill around buildings, tank farm, railroad bay and control tower, etc. For the tank farm, railroad bay and control tower, a safety factor of 1.5 is generally acceptable. However, if for any reason, the acceleration criteria goes up in the future, Dr. Peck felt that it may be difficult to prove no liquefaction problems. The borings may not be completely satisfactory for the purpose of proving beyond a shadow of a doubt that everything was satisfactory because needlessly conservative decisions may be formulated on the "what if" type questions. The consultants noted that they were still in favor of a general dewatering program, especially in light of possibly more stringent seismic requirements in the future and the knowledge now available to the effect that generally speaking sand exists in more areas than originally anticipated in the power block area. The consultants believed that the permanent dewatering program, in general, was a must. The temporary dewatering system would show how the permanent system would work. The water can be lowered sufficiently to make the site acceptable in the new licensing arena. Dr. Peck stated that he could attend a meeting on the 18th of July in Washington to discuss the situation with the NRC.

43
TC Cooke

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1018

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: August 1, 1979
PLACE: Midland, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

J. Betts
A. Boos
P. Chen
B. Dhar
W. Kinzer*
S. Kirker
J. Lillywhite*

C. McConnel
W. Paris*
D. Reeves
R. Rixford
J. Smith
J. Wanzeck
K. Wiedner

D. Horn
D. Sibbald
T. Thiruvengadam
R. Wheeler

*Part-time

PURPOSE: The meeting was held at the Midland jobsite to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

ITEMS DISCUSSED:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on June 25, 1979, is as follows.

1) Action Item 6 of Meeting Notes No. 976

This item is closed. The data and drawings concerning separation of Canonie's work from Bechtel work by construction have been forwarded to geotechnical services for review.

- 2) Action Item 7 of Meeting Notes No. 976

This item is open. The density plots for one area are finished. The density plots for the dike area will be finished by August 3, 1979.

- 3) Action Item 8 of Meeting Notes No. 976

This item is closed. Surveillance requirements for Q-listed duct banks were established in Bechtel Letter BEEC-3053 dated June 27, 1979.

- 4) Action Item 9 of Meeting Notes No. 976

This item is closed as far as the July commitment. Additional information on time settlement will be incorporated into the FSAR after evaluation of rebound measurements and will be tracked as an action item to the NRC's 10 CFR 50.54(f) questions.

- 5) Action Item 10 of Meeting Notes No. 976

This item is closed. Drawing 7220-C-998, Rev 3, showing the design of the flexible pipe connections to the condensate tanks, was issued on May 25, 1979.

- 6) Action Item 11 of Meeting Notes No. 976

This item is closed. Review of differential settlement for pipes between structures will be reviewed on a case-by-case basis in accordance with Bechtel letter BEEC-3134 was sent on July 27, 1979.

- 7) Action Item 12 of Meeting Notes No. 976

This item is closed. Both condensate tanks are almost finished.

- 8) Action Item 13 of Meeting Notes No. 976

This item is closed. The response to Question 6 of the NRC's 10 CFR 50.54(f) was amended on May 31, 1979, to state that piping connections to the borated water storage tanks will be made before the load tests are complete.

- 9) Action Item 14 of Meeting Notes No. 976

This item is open. It was noted that the 4 inches of differential settlement is the total differential settlement between the borated water storage tanks and the auxiliary building, and is not a concentrated deformation. The stress analysis of the pipes will be completed by September 1, 1979.

- 10) Action Item 15 of Meeting Notes No. 976
This item is closed. Project engineering has passed the comments for FSAR Section 2.5 on to geotechnical services.
- 11) Action Item 16 of Meeting Notes No. 976
This item is open. Geotechnical services has all comments for FSAR Section 2.5 and will prepare an FSAR change by August 25, 1979.
- 12) Action Item 17 of Meeting Notes No. 976
This item is closed. An FSAR amendment was issued to incorporate all the changes known at that time. However, geotechnical services has further comments. See Action Item 8 of these meeting notes.
- 13) Action Item 19 of Meeting Notes No. 976
This item is open. The crack mapping has been completed. The drawings will be completed by August 17, 1979.
- 14) Action Item 20 of Meeting Notes No. 976
This item is closed. Identification of Q-listed portions of remedial work has been incorporated into the respective specifications.
- 15) Action Item 23 of Meeting Notes No. 976
This item is closed. The response to Question 12 of the NRC's 10 CFR 50.54(f) was included in Revision 1, issued on May 31, 1979.
- 16) Action Item 24 of Meeting Notes No. 976
This item is closed. The dewatering contract package was issued for bids on June 12, 1979, and a contract for temporary dewatering was awarded on July 13, 1979.
- 17) Action Item 25 of Meeting Notes No. 976
This item is closed. The requirement for chemical grouting has been deleted.

- 18) Action Item 26 of Meeting Notes No. 976
This item is closed. The requirement for chemical grouting has been deleted.
- 19) Action Item 27 of Meeting Notes No. 976
This item is closed. Specification 7220-C-95(Q) (underpinning) was issued for bids on August 2, 1979. The bid package will be transmitted by August 8, 1979.
- 20) Action Item 28 of Meeting Notes No. 976
This item is closed. The requirement for a temporary support for the auxiliary building has been deleted.
- 21) Action Item 29 of Meeting Notes No. 976
This item is closed. The requirement for a temporary support for the auxiliary building has been deleted.
- 22) Action Item 30 of Meeting Notes No. 976
This item is closed. The permanent dewatering system will eliminate the liquefaction potential of the sands under the diesel generator building and other plant structures.
- 23) Action Item 31 of Meeting Notes No. 976
This item is closed. The requirement for chemical grouting has been deleted.
- 24) Action Item 32 of Meeting Notes No. 976
This item is closed. The sixth interim report for MCAR 24 was issued on June 11, 1979.
- 25) Action Item 33 of Meeting Notes No. 976
This item is closed. The report on U.S. Testing's density tests has been completed and forwarded to project engineering.
- 26) Action Items 2 and 4 of Meeting Notes No. 1000
These items are closed. A TWX was sent to Goldberg-Zoino-Dunnicliff & Associates (GZD) on July 17, 1979, defining the areas that required further surveying. GZD has completed the additional survey and has forwarded preliminary information to project engineering.

27) Action Item 3 of Meeting Notes No. 1000

This item is open. Evaluation of the stresses in the resurveyed pipes will be completed by August 25, 1979.

28) Action Item 5 of Meeting Notes No. 1000

This item is closed. Operation of the diesel generators for 2 months after their installation to vibrate the pedestals and the monitoring of settlements during this period will be incorporated into the technical specifications.

29) Action Item 6 of Meeting Notes No. 1000

This item is closed. Specification 7220-C-211, Rev 7 (structural backfill) was issued on June 27, 1979.

30) Action Item 7 of Meeting Notes No. 1000

This item is closed. The temporary dewatering contract package was issued for bids on June 12, 1979, and the contract was awarded on July 13, 1979.

31) Action Item 8 of Meeting Notes No. 1000

This item is closed. Specification 7220-C-95 (underpinning) was issued for bids on August 2, 1979. The bid package will be transmitted by August 8, 1979.

32) Action Item 9 of Meeting Notes No. 1000

This item is closed. The requirement for chemical grouting has been deleted.

33) Action Item 10 of Meeting Notes No. 1000

This item is open. The specification and drawings for the piling subcontract will be issued by August 24, 1979.

B) Status of Site Activities

1) Compaction Tests and Backfill Operation

a. Sand

Geotechnical services and construction reported that they have tested several pieces of compaction equipment and that they have three pieces qualified (two hand and one roller) for structural and yellow sand. They have been placing non-Q fill for the past month and, contingent upon approval of the quality control inspection program by CPCo, will begin placing Q fill August 1, 1979. The lift thicknesses that they have qualified for cohesionless materials are 4 inches for hand-operated equipment and 6 inches for the roller.

b. Clay

Geotechnical services and construction reported that they are having trouble qualifying compaction equipment for clay. They can obtain 95% BMP and 90% ASTM D 1557 100% of the time. However, they cannot consistently obtain 95% ASTM D 1557.

Project engineering agreed to review the Dames and Moore recommendations to see if the compaction requirements can be reduced in certain areas specified by construction to 90% ASTM D 1557.

2) Effect of Temporary Air Line Leak on Existing Backfill

Geotechnical services reported that four soil borings, one inspection pit, and two plate load tests had been done in the area of the air line leak. No significant difference was noted between these soil borings and previous soil borings in the area. Construction will grout the air line. Geotechnical services will write a report, including R. Peck's letter, concerning the air line leak documenting the acceptance of this fill area.

3) Test Pits and Borings

Data from test pits and soil borings in the tank farm area for evaluation of the fill near the air line leak shall be transmitted to project engineering and geotechnical services by August 3, 1979. Detailed information shall be included in the next MCAR 24 report. A summary shall be included in the FSAR.

C) Status of Response to 10 CFR 50.54(f) Questions

For the status of the responses to the NRC's 10 CFR 50.54(f) questions, see Attachment 1 to these meeting notes.

D) Contracts for Remedial Work

1) Temporary Dewatering

Approximately 60 to 100 holes through the turbine building base slab will be required for dewatering. The holes will be drilled from the floor at elevation 634'-0" to reduce the number of times that the drill rig must be dismantled. The drilling will be done on a cost plus basis. The additional estimated cost for the dewatering is \$580,000. M. Rung (Extension 425) will be in charge of the subcontract. All contact with the subcontractor will be made through him.

2) Permanent Dewatering

Laughney Dewatering Inc. will submit a preliminary design and scope of work for the dewatering by August 15, 1979. Project engineering will issue the bid package by November 1979 and award it by February 1980. Project engineering will determine what is Q and non-Q. A team made up of people from each discipline will be assembled to do this specialized work. A preliminary Q-list will be due September 1, 1979. A plan will be developed to determine the drawdown and recharge rates and quantity of ground water. A yard lighting power source might be used as a backup supply for the dewatering system. Construction is to determine the proper terminology to be used for this work. This determination is to consider appropriate union jurisdictions.

3) Underpinning

The specification has been written. It will be sent to CPCo for review and to Spencer and White and to Mergentime corporation for bids.

4) Piling

Construction recommended that the service water building piling contract be made part of the bridge contract. Recommendations as to where it should be kept separate will be provided to construction by August 10, 1979. The package will be issued for bids in September 1979. The contractor will not be Q so construction will have to review and approve its procedures and issue quality control inspection reports (QCIRs) to document the contractors work.

E) Results of July 18 Meeting with the NRC and Resulting Action Items

Some of the questions that were asked by the NRC during the July 18, 1979, meeting were discussed, and it was decided that a review of all existing reports and responses would be made to verify that all of the subject areas had been adequately covered. Any relevant subjects or questions not answered would be covered in the next MCAR 24 report.

F) Discussions on any Additional Agenda Items

Construction brought up the subject of service water line turnover. The valves would be installed as soon as the profiling was complete. If the lines needed to be reprofiled, then the valves would be removed again later. It was suggested that the service water lines be plugged at the location of the future meter pits between the service water building and the valve pits. This would allow the service water lines to the auxiliary building to be used without affecting work in the diesel generator building area.

Geotechnical services reported that it would take 2 months to revise the settlement calculations once the rebound data is received and the ground water elevation is determined.

G) MCAR 24, Report 7

It was decided that details on dewatering and piles will be touched only briefly in the next MCAR report. More detailed information will be provided in a future interim report. A revised schedule should be included in the next interim MCAR report.

When diesel generator building settlement evaluation is complete, all of the revised information and reports will be incorporated at one time into the FSAR.

ACTION ITEMS:

Project Engineering

- 1) Analyze the flexibility of piping connected to the borated water storage tanks, assuming 4 inches of differential settlement. Also investigate the feasibility of eliminating link sealing from the pipe penetrations in the wall to provide flexibility. Complete by September 1, 1979.

- 2) Prepare an FSAR change to incorporate comments on FSAR Section 2.5 by August 25, 1979.
Geotechnical Services/
Project Engineering
- 3) Complete crack mapping in the areas of the railroad bay, feedwater isolation valve pit, and borated water storage tanks by August 17, 1979.
Project Engineering
- 4) Evaluate stress conditions in the resurveyed pipes by August 25, 1979.
Project Engineering
- 5) Issue specification and drawings for piling subcontract by August 24, 1979.
Project Engineering
- 6) Issue program for release of borated water storage tanks for construction, including load test and water chemistry for the water to be used in the load test by September 1, 1979.
Project Engineering
- 7) Review latest response to Question 6 of the NRC's 10 CFR 50.54(f) for a conflict between the first and second paragraphs on pipe connections.
Project Engineering
- 8) Resolve comments by geotechnical services on engineering response to FSAR Q&R 362.15 by September 1, 1979.
Geotechnical Services/
Project Engineering
- 9) Provide engineering with proposed locations of backfill to be compacted to 90% of ASTM D 1557.
Construction
- 10) Review Dames and Moore recommendations to see if compaction requirements can be reduced to 90% ASTM D 1557 in the locations proposed by construction.
Geotechnical Services/
Project Engineering
- 11) Finish report on results of soil test program for air line leak in tank farm by August 6, 1979. Include summary of R. Peck's letter.
Geotechnical Services
- 12) Incorporate air line leak report into next MCAR report. Detailed data from test program will be included in subsequent MCAR reports.
Project Engineering

- Laughney
Dewatering Inc.
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Construction
- Project Engineering
- Construction
- 13) Submit preliminary design and scope of work for permanent dewatering by August 15, 1979.
 - 14) Issue bid package for permanent dewatering by November 1979.
 - 15) Award contract for permanent dewatering by February 1980.
 - 16) Determine Q-listed items of permanent dewatering system by September 1, 1979. Assemble a team of people from each discipline to review the system, and prepare a schedule for this activity.
 - 17) Review NRC regulations with respect to permanent dewatering.
 - 18) Licensing group to do docket search for information on permanent dewatering at other plants.
 - 19) Estimate costs for all Q and part Q (instrumentation or monitoring) dewatering systems.
 - 20) Review construction recommendation to include service water building piles in bridge contract by August 10, 1979.
 - 21) Evaluate piling bids and send to CPCo for review by September 1979.
 - 22) Determine terminology to be used for dewatering with respect to union jurisdictions.
 - 23) Issue underpinning package to CPCo for review, and to Spencer and White and to Mergentime corp. for bids.
 - 24) Review insurance requirements concerning underground work associated with underpinning, Specification 7220-C-95.

- Geotechnical Services/
Project Engineering 25) Review diesel fuel tank settlements and investigate removing water by September 1, 1979.
- Project Engineering 26) Verify that the technical specification for diesel generators allows for operation of the diesel generators for 2 months after installation to vibrate the pedestals and for realignment in conjunction with results from settlement surveillance program.
- Construction 27) Investigate using diesel generator building surcharge sand as fill materials for Q areas.
- Project Engineering 28) Pile stiffnesses for service water building to be finalized by August 15, 1979.
- Geotechnical Services 29) Resolve comments noted in questions of July 18, 1979, NRC meeting on removal of 3 to 4 feet of fill from the tank farm.
- Construction 30) Grout temporary air line in the tank farm.
- Project Engineering 31) Incorporate a summary of data from test pits and soil borings into the FSAR.
- Construction/
Geotechnical Services/
Project Engineering 32) Develop a plan to determine permanent dewatering system parameters, drawdown and recharge rates, quantity of ground water, and recharge time.
- Geotechnical Services/
Project Engineering 33) Review questions asked at the meeting with the NRC on July 18, 1979. All items relevant to the MCAR scope that have not been covered in previous reports will be answered in the next MCAR report. (next MCAR report is due August 24, 1979)
- Project Engineering 34) Provide a schedule and procedure for the removal of the surcharge by August 15, 1979.
- Construction 35) Complete density plot for the dike area north of the auxiliary building by August 3, 1979.

M.D. Reeves
M.D. Reeves

MDR/js
8/7/3

ACTION ITEM NO.	50.54E RESPONSE PAGE NO. (PARA.)	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPL.
		From response to Question 1			
1	1-3 (Item 1)	Perform a final review and update of the PSAR commitment list.	J. Clements	1-1-80	
2	1-4 (Item 2)	Review sections of the FSAR determined to be inactive	J. Clements	1-1-80	
3	1-4 (Item 3)	Review EDP 4.22	R. Baltazar	6-29-79	6-1-79
4	1-4 (Item 4)	Audit action items 1-3	L. Dreistach	10-26-79	
5	1-4 & 1-5 (Item 2)	Review specifications not included in the specificity study initially	R. Baltazar	6-29-79	(see attach
	App. I I-8 (D.2.C)				
		FROM APPENDIX I			
6	I-6 (C.1.b)	Complete review of the Dames and Moore Report	J. Wanzeck B. Dhar	6-29-79	7-13-79
7	I-6 (C.3)	Complete review of pertinent portions of the FSAR Sections 2.5 and 3.8	P. K. Chen B. Dhar	6-29-79	(see attach.
8	I-6 (C-4.a)	Correct settlement calculations and update FSAR	P. K. Chen	11-1-79	
9	I-7 (C.4.c)	Schedule audits of the geo-tech section on a six months basis.	L. Dreistach	7-27-79 (first audit)	5-4-79
10	I-7 (C.5.b)	Review drawing for possible effect of vertical duct bank restrictions	C. McConnel	6-1-79	6-30-79 (see attach
11	I-7/8 (D.1)	Complete actions in response to DRVCL audit	R. Baltazar	5-18-79	(see attach

ACTION ITEMS FROM RESPONSE
TO
50.54F QUESTION NO. 1

ACTION ITEM NO.	50.54F RESPONSE PAGE NO. (PARA.)	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPL
12	I-8 (D.2.d)	Revise EDP 4.49.1 to incorporate clarifications & instructions for use of SCN	M. O'Mara	5-1-79	5-4-7
13	I-8/9 (D.4)	Schedule audits of each design discipline calculations on a yearly basis.	L. Dreisbach	6-27-79	5-4-7
14	I-11 (C.1)	Re-evaluate construction equipment used for compaction	A. Boos	Prior to resuming soils work	(see attach)
15	I-11 (C.2.a)	Assign field soils engineer and soils engineer from the design section	J. Newgen	Prior to resuming soils work	5-1-79 (approx.)
16	I-11 (D.1)	Review cons't. specs and procedures to identify equip. requiring qualifications	A. Boos	6-29-79	
17	I-11 (D.2)	Review Field Procedure FPG-3.000 to assure clarity and completeness.	A. Boos	5-31-79	7-3-79
18	I-16 (C.1.a) (C.1.b) I-17 (C.3.b)	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	R. Simanek	Prior to resuming soils work	8-1-79
19	I-17 (C.3.a)	Complete indepth review of soil test results	S. Afifi	7-31-79	6-25-79
20	I-18 (C.4.b) (D.3.c)	Perform indepth audit of U.S. Testing	L. Dreisbach	5-31-79	4-26-7
21	I-18 (D.1)	Review all active QCI's for surveillance callouts and modify where necessary.	R. Simanek	6-29-79	(see attach)
22	I-13	Evaluate documentation callouts on QCIs	R. Simanek	6-29-79	(see attach)

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

7
43

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
23	I-20 (D.5.f)	Incorporate scientific sampling plans for inspection	R. Simanek	10-19-79 (QCI for receipt by 5-15-79)	<i>(see attac</i>
24	I-22 (D.1.a)	Complete indepth review of the Bechtel Trend Program	J. Milandin B. Marguglio	6-1-79	5-25-7
25	I-22 (D.1.b)	Conduct QA Training	J. Milandin	6-1-79	6-1-79

ACTION ITEM NO.	50.54E RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION CPCO ACTIONS	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
CPCo #1	I-11 (C.2.b) I-16 (C.1.c) I-17 (C.3.c)	Implement overinspection for soils placement and U.S. Testing Activities	CPCo - QA	Upon re- suming soils work	
CPCo #2	I-22 (D.2)	Conduct QA Training	CPCo - QA	6-1-79	6-1-79

50.54F QUESTIONS NO.	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLE
3	a	Clarify response to FSAR Question 362.12	J. Clements B. Dhar	5-79 -- FSAR Amend.	6-1-79
4	a	Provide Criteria for permissible residual settlement	B. Dhar S. Afifi	8-79	
	b	Provide details of treatment of loose sands	B. Dhar S. Afifi	8-79	<i>(see attach.</i>
	c	Take dynamic moduli measurements upon removal of preloads for D.G.B. and other buildings	S. Afifi	10-79	
	d	Use data (c) to evaluate the seismic response of these structures	B. Dhar	11-79	
	e	<u>Prepare additional response to NRC for items 4a and 4b</u>	B. Dhar S. Afifi	8-79	<i>(see attach for 4b</i>
6	a	Establish procedure & criteria for filling borated water storage tanks with water to demonstrate satisfactory subsoil condition	B. Dhar	9-1-79	
	b	Deleted			
	c	Deleted			
	d	Evaluate settlement of diesel fuel oil tanks - provide precise corrective measures if required	S. Afifi	9-1-79	
7	a	Perform continuity check on duct banks after completion of preload program	A. Boos	11-79	
	b	(Included in a)			
	c	(Included in a)			

50.54F QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLETION DATE	CAT COMPL
8	a	Establish a requirement to Realign diesel generators if manufacture's tolerances for pitch and roll are exceeded	B. Dhar	9-15-79	
12	a	Complete one additional boring in middle of diesel fuel oil tanks area	J. Wanzeck	Open	4-23
	b	Complete three additional borings in the auxiliary building control tower area	J. Wanzeck	Open	5-79
	c	Complete table 12-1 for soils investigation and planned remedial measures. <u>Respond to NRC.</u>	B. Dhar	5-79	5-31- Rev.
13	a	Complete seismic reanalysis of D.G.B. to account for current lack of compaction	B. Dhar	10-79	<i>(see attach</i>
	b	Review D.G.B. design and Cat. 1 equipment, piping and elec. systems to the enveloped seismic responses	B. Dhar	12-79	
	c	Service water pump structure - Conduct a seismic reanalysis to account for revised soil - structure interaction. - Review structural design and Cat. 1 equipment, piping and elec. systems and incorporate the seismic responses of the reanalysis	B. Dhar	10-79	
				12-79	
	d	Auxiliary Building - If significant change of foundation properties results, conduct a seismic reanalysis. - Review structural design and cat. 1 equip, piping, and elec. systems and incorporate the seismic response of the reanalysis.	S. Afifi B. Dhar	12-79	<i>(see attach</i>

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
13	e	Underground Utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis	B. Dhar S. Afifi	12-79	
14	a	Review estimated settlement values for borated water storage tanks upon completion of load test program	S. Afifi	After Tank Comple- tion	
	b	For flexible buildings - analyze for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching and combine with loads from Question 15	B. Dhar	12-79	
	c	Examine auxiliary building, feed-water isolation valve pits and borated water storage tank ring foundations for cracks - map significant cracks.	B. Dhar	6-79	6-30-7
	d	Analyze building effected by differential settlement for observed differential settlement plus predicted differential settlement.	B. Dhar S. Afifi	8-79	
	e	<u>Prepare additional response to the NRC to provide analysis and evaluation</u>	B. Dhar	8-79	
15	a	For Seismic Category I structures evaluate differential settlements in accordance with ACI 318-71	B. Dhar	12-79	
	b	Expand the Midland structural design criteria for Class I structures to include the differential settlement effects.	B. Dhar	12-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	12-79	

ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

43

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLI
16	a	Perform soils borings in the areas of buried pipes.	J. Wanzeck	8-79	4-13-
17	a	Complete evaluation of impact of the failure of non-seismic Category I piping on safety-related structures, foundations and/or equipment.	B. Dhar	6-29-79	7-9-79
	b	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs.	B. Dhar	9-1-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	6-29-79	7-9-79
18	a	Perform re-examination of stresses in seismic Cat. I piping connecting between buildings as part of normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement.	D. Riat	12-79	
19	a	Profile pipes in vicinity of D.G.B after removal of preload-evaluate as described in Response 17.	C. McConnel	9-15-79	
	b	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data.	C. McConnel	9-15-79	
	c	Perform a complete evaluation of safety related piping after completion of the preload program.	D. Riat	12-79	
20	a	Analytically check affected pump and nozzle loadings. If necessary, disassemble flange joints and evaluate separation.	D. Riat	6-29-79	7-9-79
	b	Verify piping support loads for systems subjected to settlement induced loads.		6-29-79	7-9-79
	c	<u>Prepare additional response to the NRC.</u>	D. Riat	6-29-79	7-9-79

43

STATUS OF 50.54(F)
ACTION ITEMS

50.54(F) Question 1, Action Item 5:

Specificity study done July 13, 1979. Comments to be resolved by July 29, 1979. Civil response completed July 30, 1979. Arch. (A-41) has held 2 weeks of discussion with Bechtel Coatings people - changes will be resolved shortly.

50.54(F) Question 1, Action Item 7:

Reviews by Civil & Geo.Tech. for those portions of Section 2.5 and 3.8 relative to soils have been done. ~~Need documentation from Civil for review of 3.8.~~ Need documentation from Geo.Tech. for review of both sections.

50.54(F) Question 1, Action Item 10:

Actions are completed. Need to complete documentation.

50.54(F) Question 1, Action Item 11:

Actions are completed. Need to complete documentation.

50.54(F) Question 1, Action Item 14:

Equipment for compacting sand is qualified. Equipment for compacting clay is still being evaluated.

50.54(F) Question 1, Action Items 21 & 22:

Review completed June 25, 1979. Resolution of review comments is in process - response expected from PFQCE week ending 8-3-79.

50.54(F) Question 1, Action Item 23:

Letter to B. Marguglio, June 26, 1979 (LAD-971) gave a schedule for completion. Currently trying to select a plan for implementation still plan to achieve implementation by mid-August, as scheduled.

50.54(F) Question 4, Action Item 6:

Details presented in meeting with NRC on July 18, 1979. Response due to NRC in writing August, 1979.

50.54(F) Question 13, Action Item a:

This reanalysis has been done as long as assumed soil properties are substantiated.

50.54(F) Question 13, Action Item d:

Reanalysis will be based upon caisson stiffness and shear wave velocity.

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



July 27, 1979

BLC- 7944

Consumers Power Company
1945 W. Parnall Rd.
Jackson, MI 49201

Attention: Mr. R. C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Meeting Notes No. 1000
Midland Diesel Generator
Meeting
File: 0270, 0279, C-2645

Gentlemen:

Attached for your review and information are copies of the Meeting Notes No. 1000 on the diesel generator building task group meeting held in Ann Arbor, Michigan on June 25, 1979.

Very truly yours,

for me R. L. Castleberry
R. L. Castleberry
Project Engineer

AG/jc

Enclosure: Meeting Notes No. 1000

cc: D. B. Miller
T. Sullivan

SEARCHED	INDEXED
SERIALIZED	FILED
JUL 27 1979	
FBI - ANN ARBOR	
1000	
R. L. Castleberry	
Project Engineer	
AG/jc	
Enclosure: Meeting Notes No. 1000	
cc: D. B. Miller	
T. Sullivan	
B3.0.3	

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1000

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: June 25, 1979

PLACE: Ann Arbor, Michigan

SUBJECT: Meeting of the Diesel Generator Building Task Group

FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

S. Afifi	P. Martinez*	D. Korn*
A. Boos	R. Rixford	D. Sibbald*
R. Castleberry*	R. Simanek	T. Thiruvengadam
B. Dhar	J. Wansack	
A. Ganguly	K. Wiedner	
W. Jones		

* Part-time

PURPOSE: The meeting was held in the Ann Arbor office to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

SUMMARY OF DISCUSSION:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on May 16, 1979 is as follows:

1) (Action Item 1 of Meeting Notes No. 976)

This item is closed. After discussing with Goldberg-Zoino-Dunncliff & Associates (GZD) a procedure has been developed for establishing accurate reference elevations for profiling of underground pipes in the plant area fill. Portions of pipes having sharp bends in the data points, as indicated by the results of previous profiling, will be resurveyed and investigated.

- 2) (Action Item 2 of Meeting Notes No. 976)

This item is closed. Five Soundex type borros anchors and four deep dial-gage type settlement anchors are being installed. Installation of these anchors will be completed by July 6, 1979.

- 3) (Action Item 3 of Meeting Notes No. 976)

This item is closed. Accuracy of settlement measurement by the optical method of surveying has been improved to 1/2000 foot.

- 4) (Action Item 4 of Meeting Notes No. 976)

This item is closed. Settlement readings from borros anchors are available for the last two weeks.

- 5) (Action Item 5 of Meeting Notes No. 976)

This item is still open. Geotech reported that the soil consultants would prefer to have a long enough data base to predict the precise settlement rate for plant life. Scheduling of the removal of surcharge will be a major item of discussion with the consultants during the meeting in Denver, Colorado on June 28, 1979.

(Writer's Note: At this point in the meeting it was decided that only the urgent action items from Meeting Notes No. 976 and from items in the agenda (Attachment 2) would be discussed in this meeting. During the rest of the meeting, a matrix summarizing the various options of corrective actions for Seismic Category I structures on fill was prepared. This matrix will be used as the basis for discussion with the consultants in the June 28, 1979, meeting.)

- 6) (Action Item 18 of Meeting Notes No. 976)

This item is closed. The service water pump structure wall has been analyzed for the effect of liquefaction for an SSE condition. Results of the analysis indicated that the structure is adequate. No further analysis is required for this condition.

- 7) (Action Item 21 of Meeting Notes No. 976)

This item is open. The requirement in Specification 7220-C-211 for a minimum number of roller passes must be resolved. The specification will be issued by June 27, 1979.

- 8) (Action Item 22 of Meeting Notes No. 976)

This item is open. The problem of the broken compressor air line under the tank farm will be an item of discussion with the NRC in the meeting to be held in Washington, D.C.

B) Status of Response to the NRC's 10 CFR 50.54f Questions

For the status of responses to the NRC's 10 CFR 50.54f questions, see Attachment 1 to Meeting Notes No. 976. Completion dates for open action items listed in this attachment will be assigned by July 6, 1979.

C) Contracts for Remedial Work:

- 1) Dewatering: The bids for the dewatering contract are due June 25, 1979. Approximately 2 days will be required for bid evaluation. A letter of intent for the award of the contract will be sent by June 29, 1979. The dewatering contract will be coordinated through construction.
- 2) Underpinning: Project engineering reported that the underpinning consultant, C. Gould, suggested that the turbine building base slab, along column line K (south of the auxiliary building penetration areas), must be underpinned also. This will be discussed in detail with C. Gould on June 26, 1979. Assuming there is no change in the present scope of work, the bid package will be issued by July 6, 1979.
- 3) Chemical Grouting: All comments, including those from CPCo, will be incorporated. The bid package, a technical services agreement (TSA), will be issued on June 29, 1979.
- 4) Piling: Piling as a solution for the service water structure has been accepted by CPCo. Professor Davisson, the piling consultant, indicated that it is not a complicated solution. The subcontract package for this piling work will be prepared and negotiated as an add-on item to the piling subcontract for the bridge piles.

D) Analysis of options for corrective actions:

Five options were discussed in detail, comparing their relative advantages and disadvantages and their impact on schedule and on cost. A summary of the analysis is in Attachment 1 to these meeting notes. - This summary will be presented to CPCo at the meeting in the Bechtel Ann Arbor office on June 27, 1979. It will also be the basis for discussion with the consultants on June 28, 1979.

ACTION ITEMS:

- All Task Group Members
 - 1) Complete the previous action items listed in Meeting Notes No. 976, but not covered in this meeting (Items 6-17, 19, 20, 28-33).
- Construction
 - 2) Resurvey pipes having sharp bends.
- Project Engineering
 - 3) Evaluate stress conditions in the resurveyed pipes.
- Project Engineering
 - 4) Send TWX to construction stating which lines are to be resurveyed.
- Construction/
Project Engineering
 - 5) Investigate feasibility of shaking the diesel generator foundation as a means of determining settlement due to shakedown.
- Construction/
Project Engineering
 - 6) Resolve comments on Specification 7220-C-211 and issue it by June 27, 1979.
- Project Engineering
 - 7) Coordinate dewatering contract with construction and issue letter of intent for award of the contract by June 29, 1979.
- Project Engineering
 - 8) Issue underpinning bid package by July 6, 1979.
- Project Engineering
 - 9) Issue TSA on chemical grouting by June 29, 1979.
- Project Engineering
 - 10) Issue specification and drawings for piling subcontract by July 6, 1979.

A. Ganguly
A. Ganguly

AG/js
7/10/8

Attachments: 1) Analysis of Options for Corrective Actions
2) Agenda

BUILDING		OPTIONS (See Sheet 2 for descriptions and explanations of letters in parentheses)							
		1		2		3		4	5
Plan		Preload and chemical grouting		Preload, temporary dewatering, and underpinning		Preload and permanent local dewatering system (building)		Remove structure and soil and then replace	Preload and permanent dewatering system (plant)
I Diesel generator building and foundations	Advantages	1) No dewatering 2) In progress		Licensing		1) No grouting 2) No removal of material 3) Licensing		Licensing	1) No liquefaction problem 2) Licensing for liquefaction
	Disadvantages	1) Licensing 2) Extent of grouting 3) Buried utilities		1) Dewatering 2) Extent of underpinning		1) Plant operation 2) Additional analysis required 3) Licensing dewatering system design and operation		Schedule	1) Licensing system design and operation 2) Extent of dewatering 3) Additional analysis required
	Basis	8/79(a)	10/79(a)	8/79(a) Loose Sand Area Total Area		8/79(a)	10/79(a)	8/79(a)	8/79(a)
	Schedule delay	2-4 months	4-6 months	1 month	1 month	1 month	3 months	15 months	1 month
	Cost (b) (millions)	\$7(c)+ \$75(d)	\$7(c)+ \$125(d)	\$7(c)+ \$25(d)	\$8(c)+ \$25(d)	\$8(c)+ \$25(d)+\$5(e)	\$8(c)+ \$75(d)+\$5(e)	\$20(c)+\$375(d)	\$20(c)+\$25(d)+ \$20(e)
II Auxiliary building penetration areas and feedwater isolation valve pits	Plan	Temporary local dewatering and underpinning							Permanent dewatering system and possible cement grouting
	Advantages	1) In progress 2) Licensing 3) No impact on system completion							No impact on system completion
	Disadvantages	Potential impact on structures							1) Licensing 2) Potential grouting 3) Structural reanalysis
	Schedule delay	No delay(f)							No delay(f)
	Cost (b) (millions)	\$3(c) + \$0(d)							\$1(c) + \$0(d)
III Railroad bay	Plan	None unless g value changes							Permanent dewatering system (plant)
IV Service water pump structure	Plan	Piling							
(Costs of Items I and II)		\$10(c)+ \$75(d)	\$10(c)+ \$125(d)	\$10(c)+ \$25(d)	\$11(c)+ \$25(d)	\$11(c)+ \$25(d)+\$5(e)	\$11(c)+ \$75(d)+\$5(e)	\$23(c)+\$375(d) (= \$398)	\$21(c)+ \$25(d)+\$20(e)
Grand Total of Cost (millions)		\$85	\$135	\$35	\$36	\$36+\$5	\$86+\$5	\$400	\$46+\$20

ANALYSIS OF OPTIONS -- Continued

NOTES:

- (a) Assumed date of surcharge removal
- (b) Total cost since the beginning of problem identification
- (c) Construction cost
- (d) Additional cost for schedule delay
- (e) Estimated operational and maintenance costs for CPCo
- (f) See assumptions below.

Description of Options

- Option 1 Corrective actions as indicated in Table 12-1 of response to NRC's 10 CFR 54(f) request (22 questions)
- Option 2 Instead of chemical grouting in the diesel generator building area, remove and replace unsuitable (loose) sand, and provide additional temporary dewatering system as necessary
- Option 3 Same as Option 1, except provide permanent dewatering system for the diesel generator building area instead of chemical grouting
- Option 4 Same as Option 1, except remove existing diesel generator building and foundation and soil, then replace
- Option 5 Permanent dewatering system for the entire plant, excepting service water pump structure (no removal of soil or structure)

Assumptions

For the auxiliary building penetration areas and feedwater isolation valve pits there will not be any schedule delay only if:

- a) Temporary structural steel support for the auxiliary building is not used
- b) Remedial actions for both units are done simultaneously

ATTACHMENT 2
TO
MEETING NOTES No. 1000

AGENDA FOR
MIDLAND DIESEL GENERATOR TASK GROUP MEETING
Ann Arbor Office
June 25, 1979

- 1. Review of previous action items All
- 2. Status of site activities Boos/Wanzeck
 - a. Compaction tests
 - b. Pump tests
 - c. Test pits
 - d. Temporary air line leak
- 3. Status of responses to 50.54f questions All
- 4. Contracts for remedial work Dhar/Afifi
 - a. Dewatering
 - b. Chemical grouting
 - c. Piling
 - d. Underpinning
- 5. K-T analysis All
- 6. Plan and preparation for July 10, 1979 meeting with NRC All

Present Status of Site Investigation

TCCooke, Consumers Power Company, Project Superintendent at the Midland Site

A. Two slides were presented. The first one depicted the location of the Midland Nuclear Project with respect to the City of Midland, Tittabawassee River and Dow Chemical.

The second slide depicted the location of the various major structures in the power block area.

B. The investigative program included meetings with the consultants to discuss the options for remedial action as noted by Mr. G. S. Keeley, discussions concerning the NRC findings, investigation of the various remedial actions, preparation of a 50.55e Report, etc. As part of the investigative program, approximately 31 meetings have been held on this subject since September, 1978. Various consultants participated in 11 of these meetings while the NRC attended approximately 8 of these meetings. Consumers Power Company attended a majority of the meetings, also. During this time we also investigated causes and prepared responses to the 50.54 f. questions. The major portion of the investigative program was the investigation of the entire site soil conditions, which included approximately 161 soil borings, 14 dutch cone tests and 5 test pits. (refer to slides showing locations for soil borings and typical soil boring cross sections). During this period of time, an investigative program was also launched to monitor all cracks in major class I structures associated with plant area fill. Strain gauges were also utilized. (See slide on typical section through Service Water Building) It should also be noted that an independent firm (GZD) was utilized for profiling pipes to determine settlement (See slide on pipe profiling typical section) A rabbit check of electrical duct work was also utilized for continuity (See slide on typical rabbit). Of course, during this period of time the settlement monitoring of the Diesel Generator Structure was also increased.

C. Settlement - It is very important to note that the Diesel Generator Building is the only Class I structure that was observed to have excessive settlement; however, as a result of the boring program we did find some areas with questionable soils beneath the structures. These areas were: Diesel Generator Building, Service Water Building overhang portion only, Auxiliary Building electrical penetrations and Feedwater Isolation Valve Pits. To fix the Diesel Generator Building it was decided to preload to consolidate the soils and accelerate the total settlement (See overall site layout of the power block). A slide was then presented showing the settlement of the four Diesel Generator pedestals vs. the application of ^{the} surcharge. It was noted that ^{at the} completion of the surcharge application the settlement appeared to be leveling out. Two slides ^{were} then shown on the total settlement for the Diesel Generator Building. These slides were profiles looking north and looking ⁱⁿ the east-west direction. Another slide was then presented which high lighted the contours of the elevations of the Diesel Generator Building showing the differential settlement existing between the Southeast corner of the building and Northwest corner of the building. Another slide was shown representing the various utilities beneath the building. It was noted that the Diesel Generator Building was ^{initially} partially hung up on these utilities and that ^{after} they were freed the building settled in a more or less uniform fashion over the last few months. A slide was then shown on the instrumentation utilized to monitor the settlement of the building. This slide included ^{boreholes} ~~boreholes~~ anchors, plate anchors, bench marks, sondex instruments and the locations of the various piezometers which were utilized during the preload program to determine when the ^{pore} ~~poor~~ pressure had decreased to normal ~~amounts~~.

D. For the areas of questionable soil it was decided to provide vertical support for the Service Water Building Overhang and improve the support of the Auxiliary Building wingwall and Feedwater Isolation Valve Pits. Elimination of the liquefaction potential in the sand areas turned up as a result of the investigative program with chemical grout and possibly underpinning the Diesel Generator Building was the initial remedial action plan; however, after reviewing the situation,

various concerns led to ~~another decision~~ ^{a better solution}. It appears that while the grouting would sufficiently remedy the situation, it would be difficult to prove that ~~one~~ ^{one} had uniformly grouted all areas. ~~There were~~ It was noted that there were discontinuous sand lens ^{and} fine grain sands, and furthermore there were access problems. Underpinning of the Diesel Generator Building ^{also} presented ~~other~~ problems with shoring, support of utilities and schedule, so it was decided very recently (approximately June 19) that in order to provide a better overall remedy we would dewater the entire site. This dewatering would be an extremely conservative solution. All questionable soils areas would be covered, and liquefaction question would be eliminated in any site area in the power block whether or not we had determined that there was a potential for a liquefaction problem. It was also noted that dewatering would further consolidate the soils. The slides presented to discuss the various fixes under this portion of the discussion were; the site layout, the section of the Service Water Building and slide of the Diesel Generator Building showing the utilities below the building. At the conclusion of this presentation, it was noted that the individuals presenting the next portions of the agenda would discuss details of the basic plans it has just been reviewed. It was also noted that figures or slides shown during the discussions will be passed out at the end of the presentation except some that may have been missed ~~previously~~ but were probably transmitted ~~to~~ to the NRC previously as part of the response to the 50.55 e-Report or the 50.54 f. Questions. (Later, ~~on~~ ^{on} copy facilities ~~we~~ ^{we} made ~~one~~ available and a complete set of slides ~~was~~ ^{was} made available to the NRC)

Agenda Items 6.0 - Schedule

7-18-79
TCC

TCCooke, Consumers Power Company Project Superintendent at the Midland Site

Schedules of the four major remedial activities were presented to the NRC during this discussion, utilizing the overhead projector. (See schedules for details)

It was noted that the work on bearing piles for the Service Water Pump structure would commence as soon as the administrative activities were completed, probably this fall; and would complete sometime in early 1980. Since this is an independent

activity it is expected to have no impact on the overall project schedule. The slide covering the Unit 1 and 2 Auxiliary Building Electrical Penetration areas

and the Unit 1 and 2 Feedwater Isolation Valve Pits was then shown and it was noted that this work should complete about mid 1980; however, there was an error in the

handout and the actual schedule would probably extend 2-3 months beyond the dates shown. Again this is a separate activity and would not have an impact on the overall

project schedule; however, it was noted that this work would probably cause some additional work for construction due to congestion in the areas where other activities

were taking place. It is not expected to be a major problem. ~~however~~ During the discussion on the borated water storage tanks it was noted that this is a method of

completing ^{in a} this activity and may not be the final method, ~~that is decided on~~. This particular method includes a temporary cross tie between the two borated water storage

tanks (Unit 1 and Unit 2) and would take until mid 1981 for final completion. This may be the most ^{schedule} critical activity as far as the overall project schedule is concerned,

in that ^{and} flushing activities ^{and} testing activities are taking place in the same time frame as the preload. It was noted that after further evaluation this schedule

may be modified somewhat. ~~XXXXXXXXXXXXXXXXXXXX~~

The next schedule discussed was the permanent plant dewatering system. It was noted that earlier ~~that~~ we had told the NRC that we would probably have an overall impact

of two months on ~~XXXXXXXXXXXXXXXXXXXX~~ the project schedule, because of the preload on the Diesel Generator Buildings. At this time, because of a revised schedule philosophy,

^I the Unit ^{II} and Unit ^I Diesel Generator turnovers need not take place until November of 1980 and August of 1980 respectively. This actually allows some float time in the

schedule. It was also pointed out that approximately six months had been allocated in the schedule for dewatering the power block area to the design depth and about three months had been allowed after that time for recharge rate testing. This would allow all activities to complete prior to Unit 2 fuel load, and again, would not impact the overall project schedule. The major problem being that of site congestion and interference with other site activities. This is a construction problem and one that does not seem to be a major obstacle at this time. ~~XXXXXXXXXXXX~~

2.0 Present Status of Site Investigation (TCCooke - Consumers Power Company Construction Superintendent at the Site)

~~2.1 Meeting with Consultants and Options Discussed (Historical)~~

A. Description of Site Layout

~~B. Discovery of Settlement Problem July 1978 and Notification of NRC via 50.55e Report~~

~~C. Obtain Services of Consultants~~

~~D. Discussion of Options~~

~~Remove and Replace~~

~~Preload~~

~~Do nothing~~

~~Underpin~~

~~Grout~~

*B Program included:
 Consultants meetings/options (GSK)
 NRC FINDINGS DISCUSSIONS
 REMEDIAL ACTIONS
 50.55e report
 50.54f responses*

As part of the

2.2 *A* Investigative Program

A. Meetings held since September 1978	31
Consultants participated	11
NRC attended	8

We also

B. *A* Investigated Causes and Received 50.54f Questions

THE MAIN PORTION OF THE PROGRAM HOWEVER WAS THE

C. *A* Investigated Entire Site Soil Conditions

which included:

161 Soil Borings

14 Dutch Cone Tests

5 Test Pits

Crack Monitoring/Strain Gauges *(Typical)*

Profiling of Pipes (Independent GZD) *to determine settlement*

Rabbit check of duct work *for continuity*

Increase settlement monitoring *of the D/G Structure*

2, 3

*6
5
4*

2.3 Settlement

IT IS VERY IMPORTANT TO NOTE THAT OF THE

A. Class I Structures- D/G Building - only building observed for excessive settlement.

HOWEVER WE DID FIND SOME

B. Questionable Soil (Boring Program)

These areas were the

- Service Water Overhang
- Diesel Generator Building
- Auxiliary Building Electrical Penetrations
- Feedwater Isolation Valve Pits

AS A RESULT OF THE

Now, to fix the D/G Building, it was decided to:

C. Preload to consolidate the soils and accelerate total settlement

- 7 Rates of Settlement
- 10, 11 Settlement vs. Surcharge
- 8, 9 Differential Settlement

12

Prediction

13

Instrumentation

FLAG above/less UNIFORM OVER LAST FEW RICH THS

FOR THE AREAS OF QUESTIONABLE SOIL, WE

2.4 Recent Revisions and fixes DECIDED TO PROVIDE:

- A. Vertical support for Service Water Overhang
- B. Improvement of support for Auxiliary Building Wingwall and Feedwater Isolation Valve Pits

C. Sand Areas turned up as result of Investigative Program

Elimination of the liquefaction potential in the

with Chemical Grout and Underpinning Diesel Generator Building

Problems

HOWEVER WE HAD SOME CONCERNS OVER

A

Proving uniformity of grouted areas because of DISCONTINUOUS LENS OF SAND

Prevention of grout entrance into utilities, building walls, etc.

FINE GRAINED SANDS

Prevention of grout blowout

ACCESS

Possible environmental problems

B

Underpinning/support of utilities

Schedule

So - - -

to provide a better overall remedy we made a -

F. Decision to Dewater entire site

Extremely conservative solution

All questionable soils covered

Elimination of liquefaction question in any site area

Dewatering further consolidates soils

Individuals following this presentation will discuss details of the basic plan as it has just been reviewed. Figures shown will ~~not~~ ^{TODAY} be passed out ~~if they have already~~ ^{@ end of the presentations} ~~except some which may have been missed but which were probably~~ ~~been~~ transmitted to you as part of the responses to the 50.55e Report or the 50.54f

Questions. Are there any questions?

Figures Shown

1	Site Layout
67	Boring Locations and Test Pits
3 69	Boring Log
4 7-3	Rabbit
5 60	Pipe Profile (portion)
6 62	Crack Mapping
7	Settlement vs. Surcharge
8, 9 9	Settlement Contours/Utilities
10, 11 13 & 14-1	Settlement Data
12	Recent Settlement
13	Instruments

DRAFT

7-18-79

Questions asked by the NRC during the discussion.

1. Agenda Item 2 -- It is possible that the condensate line or other utility are still providing support to the Diesel Generator Building? (Lyman Heller, Darl Hood)
2. Agenda Item 3 - Have provisions been made for the train bay tracks loading effect on the borated storage tank lines? Darl Hood
3. How does dewatering tie into the load test of the borated water storage tanks (time frame)? Lyman Heller
4. How much settlement of the borated water storage tanks is acceptable? Lyman Heller
5. Has any concrete pipe been profiled? Ron Lipinski

It was noted at this time that there is no Class I concrete pipe in the fill.

6. What is the limiting factor in the design of the concrete duct banks? Lyman Heller

It was noted that duct banks were considered somewhat elastic.

What is the basis for the assumption that no further remedial action is required for the duct banks? Ron Lipinski

Bechtel responded that settlement monitoring would continue probably through cable pulling.

Ron Lipinski noted that duct banks are a category one structure the same as any other structure on the site.

Did we analyze the load associated with a large crane parked over the duct bank which may have a void below it? Lyman Heller

Carl Weider discussed the flexibility of the electrical duct bank and the structural analysis.

7. Is there any corrosion protection for stainless steel Class I pipes? Darl Hood

8. Chuck Goulds Presentation - Question concerning the valve pit caissons going through construction pads and reinforcement of caissons for transfer of horizontal loads. Ron Lipinski

It was noted that various tools would be used for demolition which would deliver about 1,000 foot pounds per blow and that this would not damage any of the other structures. It was also noted that the valve pit crane pad was about 2½ feet thick.

9. Sherif Afifi's Presentation - With ½" to 1" as the upper limit for seismic settlement, would there be no effects on other structures due to dewatering?

Lyman Heller

It was noted to be a small general settlement to be evaluated by Sherif.

Why do we feel that a 1.5 factor of safety is adequate? Darl Hood

It was noted that primarily this was due to the fact that 7.5 earthquake ^Uvalve was too large.

10. Where exactly are the liquefaction potential problem areas? Lyman Heller

Sherif responded that the small zone ^{in the} railroad bay was not a problem.

The borated water storage tank line was not a problem.

We have not analyzed all your areas yet; however, this is in reality a hypothetical question since dewatering will answer the potential liquefaction questions in any area in the power block.

11. Dick Loughney's Presentation - Would the Service Water Building be outside the perimeter of the dewatering system? Lyman Heller

When would the clay dike cutoff in front of power block be in place? Lyman Heller

Will this comply with the new Reg Guide? Ron Lipinski

What will be the systems discharge rate? Gene Gallagher

It was noted that it would be less than 400 GPM.

12. General Question on electrical ^lbackout. It was noted that it would be low since the horsepower requirements for the pumps are small. D. Hayes

13. Expressed a general interest on getting test pit information. Gillan (specific)

14. Ted Johnson's Presentation. Please comment ^{on} ACI 349 which includes settlement with dead load and wind, earthquake, etc. Gene Gallagher

Bechtel noted that they had done a similar consideration. They also noted that they would probably seal all cracks greater than 15 mils because of potential ^oerosion problems and that they were still pursuing an analysis in this area.

15. Exactly what all will the cussions support? Henderson

It was noted that Bechtel had not completed the horizontal support analysis in this area.

16. Sherif Afifi's Presentation - Will the Diesel Generator sand surcharge be removed prior to dewatering? Lyman Heller

How much lower than the construction water would dewatering operation go? Lyman Heller

It was noted that it would be a minimum elevation of 600 feet (existing till), and that it was still under evaluation.

17. Are we confident that the material below the borated water storage tank is acceptable?

Lyman Heller

It was noted that it is mainly clay and with minimal amounts of sand.

18. Considering the settlement to the southeast side of the Diesel Generator building, what accounts for this impact?

There also appears to be some concerns on conduit supporting the building.

It was noted that there is more sand on the north side of the building.

Lyman Heller

19. Interim Report #6 to the MCAR 24 (50/55e Report) stated that we would be removing the top 3-4 ft of soil. Why? Gene Gallagher

It was noted that this was to take care of weathering that the soil had experienced and also possibly the bubbling of air through that portion of the soil.

20. The post. loca shown on the drawings as a dotted line is no longer part of the design. Darl Hood

The control room pressurizer is in the location proposed, but how will it be determined that the soil will be acceptable for any new Class I structures? Darl Hood

It was noted that borings would verify the acceptability of the soil.

21. Since we have eliminated chemical grout what about the control tower area void?

Gillan

Sherif responded that this was an insignificant area and would still probably be pressure grouted.

22. Dr. Peck Presentation - How would the Diesel Generator surcharge improve the bearing capacity of the fill? Lyman Heller

It was noted that long term bearing capacity was based on the friction of the material, and the load has increased the settlement capacity.

23. Why are we testing the cussions at 1.5 times the working load? Lyman Heller

It was noted that this was to avoid any unanticipated settlement in the adjacent areas.

24. TCooke Presentation on Schedule - When will the cutoff wall be established?

It was noted that there would be no cutoff wall at the south end of the power block area, since the rate of flow of water to the sands and/or clays was expected to be minimal. However, if necessary, a slurry trench or chemical grout could be utilized in this area.

25. Phil Martinez's Presentation - If there is too much reliance on testing during the plant area fill what did the dike people rely on? Ron Lipinski

26. Why do you say re-excavation was not a cause? Lyman Heller

27. How can you possibly say there was not a problem with people qualifications?

28. Can you say that there was a bona fide soils engineers on site? Gene Gallagher

29. How can you possibly say that you have achieved corrective action with no yes " on personnel as a cause?

How can you say there are bad test procedures when personnel was not involved as a cause?

The NRC disagrees with qualifications of personnel as not being a cause.

Gene Gallagher.

30. How can you say the procedures were not bad?

31. Why was the Spec not included as a cause? Gene Gallagher

32. D. Hayes also disagrees with the QC people not being a cause. If the people were qualified, many of the five most probable causes would have been eliminated.

Gene Gallagher

33. How come in some areas QC identified problems, but nothing happened? D. Hayes

Martinez noted that the Administration Building bore holes were taken.

34. He commented that there were also problems with moisture density relationship.

Phil said that moisture did not cause the problem.

35. Does the applicant endorse the most probable causes? Darl Hood

Yes - per GSKeeley, after checking with Don Horn.

36. How then do people enter into the analysis? Darl Hood

It was noted that Don Horn's presentation would cover this.

37. Don Horn's Presentation -

Why are we no longer using the Nuclear Denseometer? Gene Gallagher

It was noted that because of moisture problems found in the sand and clay.

38. What does generic mean? D. Hayes

It was noted that this means U. S. Testing in some cases.

39. What was the source of the air bubbles at the tank farm at elevation 611' and bubbles at 627'? Lyman Heller

40. Has the tank farm test pit (inspection pit 20 X 20) confirmed boring information?

Lyman Heller

It was noted that it has not been compared yet, but the material appeared good below the top four feet.

Was there clay in both pits or was there sand? Lyman Heller

41. What other plants improvements will be made as a result of the soils experience?

Will there be a topical report? Lyman Heller

42. Who pays the on-site GEOTEC man? Lyman Heller

43. Is QC separate and does it have authority to stop work? Lyman Heller

44. What is the criteria for acceptability on the borated storage tank ring tank, ring foundation?

45. Lyman Heller was concerned with the flexure of the ring beam.

It was noted that the tank bottom transfers load to the soil.

Lyman also seemed concerned about the fact that the borated storage tank had no baffles. He was really looking for a ~~measurement~~ ^{in membrane} measurement stretching.

Darl Hood noted that this was the basis for 50.54f questions.

46. Since air bubbles may have travelled horizontally, how can borings confirm that there are not problems?

Dr. Peck noted that in all likelihood the air passages were already there and that the only evidence of air leaking up with the bubbling at the surface.

Will the fact that the air line condition existed two months be part of the decision on what to do with the tank farm soil? Gene Gallagher

Dr. Peck noted that you could expect some surface disturbance, but he believes there would be little damage to the underlining soil.

TCCooke then noted that the piezometers could have provided paths for the air bubbles leaking to the surface.

47. Has Consumers Power Company applied lessons to other sites? D. Hayes

48. How are the procedures now reviewed? D. Hayes

49. Question on Structure mat vs. spread footing - It was noted that it would have to be rechecked to see that the design would have to be satisfactory. The 50.54f response was confusing to Ron Lipinski.

It was noted that this was a settlement calculation only.

50. What load or elevation will the underpinning be made to? Lyman Heller

How will we decide what load has to be applied to each pile during jacking?

It was noted that we would calculate the theoretical reactions.

How will we transfer load from the jacks to the structure? Ron Lipinski

51. What about earthquake vibration? Ron Lipinski

52. Who runs the show on underpinning? Lyman Heller

It was noted that Bechtel would do the design with Chuck Gould acting as a consultant.

Consumers Power would then review it.

GSKeeley's Presentation-

53. Darl Hood noted that the staff was aware of the confusion they may have created by attacking the soil problem from several directions, and were trying to compensate for same.

54. Darl Hood wanted Keeley statement on his confidence that the deficiencies were sufficiently understood and the corrective actions taken to preclude repetitions in this area.

55. Darl Hood also wanted to know whether all problems have been understood prior to remedial action. That is, ~~should not~~ the problems ^{should not} again show up during the remedial activities. For example, flooding was noted to have been removed from the specification by Rev. 7.

56. Will all remedial action be accomplished by the Consumers Power Quality Assurance Program? Gene Gallagher

57. Will dewatering be part of the Quality System? This has to be responded in accordance with criteria 2. Gene Gallagher

The NRC is reviewing the standard review plan and we will look for compliance.

Darl Hood

58. Documentation is needed. Jim Knight

It was noted that there is more information in existing reports and that the narrative of today's discussions will take approximately two weeks to prepare for Mr. Knight.

He also noted that there appeared to be much positive progress in the Diesel Generator and he would appreciate having the documentation very quickly.

Jim Knight

TELEPHONE CALL

Midland Project

GWO 7020

COPY

GSKeeley

~~Notes~~

DBMiller

By Ron Lipinski Of NRC WashingtonPAMartinezTo TCCooke Of CPCoJFNewgen/ABoosDate July 3 19 79 Time 9:40 AMKWiednerTRThiruvengadam

Subject _____

DHorn

File _____

Mr. Lipinski was returning TCCooke's call of July 2, 1979 and noted that he was in the process of reviewing the April 24 or May 31 response to the 50.54f questions (both dates were mentioned by Mr. Lipinski). TCCooke briefly discussed the discovery of the problem and subsequent 50.55e notification to the NRC and the fact that the latest response to same was dated June 25, 1979 (Interim Report 6). The discussion then settled around the recent changes to the various fixes resolving soils questions at the Midland Site, since Mr. Lipinski stated that he was somewhat familiar with the background and had visited the site in conjunction with soils questions recently. During the discussion, Mr. Lipinski had the following questions:

1. Since we were making some changes to the Auxiliary Building wingwall design, how will it be modeled? A new analysis will be required. TCCooke noted that the vertical load would be supported by cussions and that the horizontal load will probably be taken up by a tie to the Turbine Building slab unless we found it necessary to complete the underpinning operation as originally planned (mining and lean concrete backfill).
2. Mr. Lipinski wondered how we arrived at the conclusion that nothing was required beneath the railroad bay. TCCooke noted that it was done by Bechtel Ann Arbor Engineering via their analysis of the soils beneath the railroad bay and the structure itself.
3. Mr. Lipinski questioned whether the original design was for saturated fill or not and received an affirmative response. TCCooke noted that our recent analysis indicates that there will be no detrimental effects going to the dry fill and that it would enhance overall site conditions.
4. The fact that the Diesel Generator settlement will be on the subject of the hearings on the 18th. (How will we proceed on this area).
5. Mr. Lipinski again noted that he was reviewing the responses to the 50.54f questions and that hopefully he will have reviewed everything in sufficient depth prior to the meeting on the 18th. TCCooke noted that the total site dewatering concept and other fixes revisions should be in Mr. Lipinski's hands next week.

6. Mr. Lipinski noted that he was still concerned on the response to question 15 in that settlement stresses were self-limiting and did not affect the structural integrity of the plant. He noted that he had discussed this with Mr. Ted Johnson during his recent site visit, and that re-analysis was very important in that stress results from settlement were locked into the structure in case of an earthquake or any other load. He further noted that the analysis will have to account for these stresses. TCCooke then noted that the Diesel Generator Building was the only building where differential settlement was noted and again stated that we are taking a super-conservative approach in effecting remedial action for all areas of the plant based on questionable material (found during soil boring program) and not settlement. Furthermore, our total dewatering program is designed to eliminate any questions that could arise concerning liquefaction in any area of the site. Mr. Lipinski generally concurred with the concept and again noted that he is mainly concerned over any area of stress.

During the discussion Mr. Cooke discussed the tentative agenda and noted that probably the following people would be attending the soils meeting on the 18th:

Consumers Power Company

GSKeeley
TCCooke
TRThiruvengadam

Bechtel Power Corporation

PAMartinez
SAfifi
CWeidner
BDahr
and others

DRAFT

June 27, 1979

Pre-Meeting With Consultants

Present:

- Karl Wiedner
- Phil Martinez
- Shariff Afifi
- Dr. Ralph Peck
- Dr. A. Hendron, Jr.
- Tom Davisson
- Tom Cooke

There was a brief discussion on the various options. One of the main reasons for option five was that it grew to a large extent: out of the dewatering process for option one. The consultants expressed the opinion that we had to answer Liquefaction questions wherever anyone might think they could occur. (for example, the control tower at 6KSF loading). It could be a real thorn in the job at a later date, and it is the only clean method. It is very hard to argue against dewatering, and it would be too complicated to get the NRC to accept grout. The question was asked about the water that could be trapped in clay. The consultants responded that over the long haul it would drain with permanent drainage and could be proven by piezometers. While peripheral wells would probably do the job, there would be some intermediate wells. Any vein of water would be milked. Piezometers would be proof positive that the area was dry and we could convince any lawyer of that fact. The construction dewatering process for the Aux Building wingwalls will determine how much dewatering and how many wells, etc. will be required later. A disadvantage is that although no additional analysis is required, P. A. Martinez indicated that Bechtel would have to take another look at the design calculations in the foundation areas.

The Auxiliary Building wingwall is a high narrow structure with a torsion box at the lower portion. The soil was supposed to take the horizontal shear. The low soil blow counts make one wonder whether or not this structure is possibly being cantilever to some extent off of the control tower. Dr. Peck expressed the need

for the design basis for this structure. Dr. Hendron indicated that the borings were not necessarily indicative of what was beneath the structure. A parametric study for the ground and the structure should be accomplished. A quick rough analysis should first be done followed by a detailed analysis. Karl Wiedner discussed the possible outer end settlement and his theory on how the structure had possibly picked up a cantilever load during construction. Tom Davisson then mentioned since we were thinking of deleting the recharge of water maybe a different underpinning method would be acceptable. (One that would take vertical loads only) The Aux Building control tower and the material below the wingwalls are worth something for horizontal shear. The three options would be to: 1) do nothing, 2) supply something for vertical loads only, and 3) supply something for vertical loads and horizontal shear. The first step would be to check the shear resistance required. Possibly horizontal support could be picked up from the Reactor Building and/or Turbine Building. If we remove material and fix the end of the Auxiliary Building wingwall, we still would have to analyze for an unsupported mid span. Se Cassions were mentioned as another option. If the structure hits the Reactor Building wall during the seismic event, this was believed to be no problem by the consultants. It was noted that even clay with an average blow count of three would supply modest shear strength. The consultants noted that they did not have sufficient design information. Karl Wiedner and other Bechtel personnel present didn't have all the answers on the design basis at this time, however, at T. C. Cooke's suggestion the consultants agreed to formulate their questions in writing for Bechtel response.

The consultants noted that in their opinion three million dollars for the Auxiliary Building wingwalls was very low, especially when compared to the estimate of twenty million dollars for permanent dewatering. They also stated that we definitely have a diesel generator liquefaction problem although the sand would probably never actually liquify during an earthquake. The problem being the difficulty in providing calculations which verify this and ^{would} not be subject to argument in a contested hearing.

June 27, 1979

Pre-Meeting with Consultants

Page 3

38

A brief discussion then followed concerning possible liquefaction regarding utilities, sand backfill around buildings, tank farm, railroad bay, and control tower, etc. For the tank farm, railroad bay, and control tower, a safety factor of 1.5 is generally acceptable; however, if for any reason the ^{law}acceleration criteria goes up in the future, Dr. Peck felt that it may be difficult to prove no problems to the intervenors. The borings may not ^{be} completely satisfactory in a court of law, i.e.; could they prove beyond a shadow of a doubt that everything was satisfactory, because the lawyers, T.V. or whatever, might cause people to make needlessly conservative decisions on the "what if" type questions. The consultants noted that they were still pushing for a general dewatering program. Especially in light of possibly more stringent seismic requirements in the future, and the knowledge now available to the effect that generally speaking, substantial sand conditions exist throughout the power block area. They believed the dewatering program, in general, was a must. The temporary dewatering system would show how the permanent system would work. The water can be lowered sufficiently to make the ^{site} acceptable in the new licensing arena. Dr. Peck stated that he could make a meeting on the 18th of July in Washington to discuss the situation with the NRC.

To File
FROM TCCooke
DATE June 13, 1979
SUBJECT MIDLAND PROJECT GWO 7026 -
NRC SITE TOUR AND OBSERVATION OF TEST PITS
File: 0460.2 Serial: CSC-4138

6/17 TOUR

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

CC *Attendees GSKeeley, P14-408B
DBMiller JJZabritski, P14-416
*Bechtel and Consumers attendees only.

I. Individuals Present:

Sherif S. Afifi	Bechtel Assistant Chief Soils Engineer
R. E. Lipinski	DSS/NRC
J. P. Knight	DSS/NRC
Daniel M. Gillen	DSS/NRC
C. A. Hunt	Consumers Power Executive Civil Engineer
P. A. Martinez	Bechtel Project Manager
*A. J. Boos	Bechtel Project Field Engineer
*R. J. Cook	Resident Inspector/NRC
*T. E. Vandell (Entrance only)	US NRC Region III
Lyman Heller	US NRC NRR
T. E. Johnson	Bechtel Chief Civil/Structural Engineer
K. Dhar	Bechtel Supervisory Engineer
T. C. Cooke	Consumers Power Project Superintendent
D. E. Sibbald	Consumers Power Senior Construction Advisor
K. Wiedner	Bechtel Engineering Manager
*D. Horn	Consumers Power Quality Assurance Group Supervisor/Civil
R. M. Wheeler	Consumers Power Civil Section Head

*Part time

II. Discussion. Tour Comments

- A. The individuals from the NRC were extremely interested in cracks in the Auxiliary Building, Service Water Building, and Diesel Generator Building. Many questions were asked regarding differential settlement. They seem to be under the impression that there was a great deal of building settlement other than the Diesel Generator Building and that large cracks exist somewhere on the site. We continually had to reiterate the fact that remedial actions were based on soil borings which showed questionable material and not settlement problems. Mr. Lipinski, in particular, was very interested in why we had cracks and analysis regarding same.
- B. During the tour it was apparent that the NRC's questions were oriented towards seismology aspects. They were also interested in whether or not we had re-reviewed the different seismic conditions in the light of our

concrete backfill revisions for the Auxiliary Building, wing walls, etc., since the addition of concrete could cause new reactions and forces requiring reanalysis. It was noted that the concrete backfill would be separated from the structures by styrofoam and not tied to the structures. The NRR alluded to possibly more stringent earthquake requirements.

- C. When observing the test pits, Mr. Heller expected more sand in the "random fill". It was noted that sand was used primarily around utilities and next to buildings.
- D. Mr. Heller appears to be of the view that the simpler engineering fix on the service water overhang, such as concrete backfill as opposed to more complex remedial action, would stand a much better chance of passing review, due at least partially to the fact that much of the available manpower in Washington was involved with Three Mile Island and also because simple straightforward engineering practices will be much easier to discuss in any hearing process. The NRR was informed that piling at the Service Water structure was only for vertical load and that no moments were involved. It appears that possibly Mr. Knight's staff has been reduced from about fifty to near eight, with the forty people being tied up on Three Mile Island activities. There will be a corresponding cutback in the normal amount of licensing activities that will be undertaken by his staff over the next several months.
- E. NRR noted that they should receive copies of any Diesel Generator (total site related) material that is being transmitted to Region III directly from the licensee. It also appears that Mr. Knight is more interested in resolving the Midland fill problems in the near future on a "real time basis" as opposed to later review and approval functions such as might be found in going the FSAR route. (Note: Consumer Power Company has been attempting for weeks to arrange a meeting with NRR but it was not until the week of June 4, 1979 that we were able to set a meeting date with them of July 10, 1979.) He recognized that presently the licensee was involved in answering the same or possibly similar questions on three fronts, namely the I&E questions, 50.54f responses and future FSAR revisions, and agreed that it would be beneficial to all parties to consolidate these areas. During the tour it also appeared that in the future NRR may become much more deeply involved in the details in all licensing aspects than they have in the past.
- F. It would appear that we should provide more rationale and better arguments for support of duct bank and pipes and man holes, valve pits, etc. during the seismic event. We have to verify or prove that duct banks, for example, will not shear during the earthquake. Mr. Heller was of the opinion that our responses on the safety aspects concerning the borated water storage tank lines will have to be extremely conservative, and that at this point in time for our responses to be accepted, he would be inclined to say that questionable material should be removed and fixed rather than going through some complex explanation as to why it was "acceptable as is" since this was a Category One item which would be required during the postulated accident conditions.

Generally, the NRR personnel appeared to find the information gathered during the tour and observation of the test pits to be of value and the type of information which would expedite their decision making process.

plw

... informed about the cold solder joints in the status
not yet determined if the item

CONSUMERS POWER COMPANY

RECEIVED
MAY 21 1979

FROM JLCorley/DRKeating, Midland
DATE May 18, 1979
SUBJECT MIDLAND PROJECT - NRC EXIT MEETING OF MAY 17, 1979
File: 0.4.2 Serial: 170FQA79

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

CC WRBird, JSC-216B
TCCooke, Midland
LADreisbach, Bechtel

GSKeeley, P-14-408B
DBMiller, Midland
RWShope, B&W

TRC	
MRP	
QJV	
RLB	
DAK	
CONSUMERS POWER COMPANY	
SEN	
GEN	
INTERNAL CORRESPONDENCE	
EME	
WAR	
FB	
IS	
JHD	
CWD	
DAR	
TC	
NEW	
UFD	
LEAK	
FILE 0.4.2	

Following the NRC inspection conducted by Messrs E W K Lee and E G Gallagher on May 14-17, 1979, an exit meeting was held. Those in attendance were as follows:

<u>Bechtel</u>	<u>CPCo</u>	<u>B&W</u>	<u>NRC</u>
WLBarclay	TCCooke	RWShope	RJCook
AJBoos	DEHorn		EGGallagher
CHHolman	DRKeating		EWKLee
AOzeroff	DBMiller		
ESmith	BHPeck		
	RGWollney		

Mr Gallagher opened the meeting by stating that the inspection report number would be 79-10.

He reported he had reviewed the post-tensioning system and that, prior to his visit, he had researched the FSAR requirements. During the inspection, he had observed two FSAR items that were inconsistent with site procedures:

- 1) Chemical limits on protective grease differ between the FSAR and Bechtel specifications and also within the FSAR.
- 2) Tendon sheathing material requirements differ between the FSAR and the specification. The FSAR indicates the material will be ASTM A-513 or A-53. The specification, correctly, calls for ASTM A-366.

Mr Gallagher indicated he considered the above to be another example of the FSAR not being reviewed in accordance with Bechtel QA review requirements.

Qualification of QC personnel was a second area that was inspected. Mr Gallagher stated that he had reviewed work experience records of six individuals and none had prior experience with post-tensioning systems. He indicated that the lesson of the soil experience relative to Criterion II training had not been learned. He was of the opinion that no one was qualified to adequately cover the work and that this item needed to be resolved prior to lifting the stop work. Mr Gallagher indicated he would probably quiz QC inspectors on their knowledge during a future inspection. Material and records on site were reviewed and found acceptable.

Mr Lee discussed that he had observed a welding purge gas flow rate of 65 CFH which, while high, was in accordance with procedures. He suggested that field welding engineers closely monitor such parameters to assure compliance.

He had observed two stainless steel spools that had mud spattered on them. It was pointed out that these were non-Q.

During observation of welding, a weld was observed that had apparent root concavity. While the amount of concavity was acceptable, the welder, when questioned about it, did not appear to know what to do if it had been unacceptable. He suggested that instructions should be provided to the welders on what to do in those cases.

Some concerns with B&W were then discussed. North reactor coolant pump B in Unit 2 had grind marks on the casing. Mr Lee inquired if any UT checks were performed. Also, the pump had wood on half of the top of the pump for people to walk on but not on the other half which people were also walking on. The top of the pump was also open. It was indicated by B&W that it was open for ventilation purposes and that it is closed when work is not in progress.

Weld WJ6-3 on the reactor coolant hot leg of Unit 2 had been radiographed but the locator did not appear to be etched on the pipe. B&W and CPCo QA will check on this item.

Also, arc strikes had been observed during the cladding operation. He indicated arc strikes needed to be minimized.

As a last item, he asked to have himself or RJCook notified when B&W PWHT started.

Gallagher expressed concern on the proposed dewatering of the power block area for remedial work under the east and west feedwater isolation valve pits and east and west penetration rooms in the Auxiliary Building because of possible additional settlement of existing structures during the draw down of the water.

Gallagher also expressed concern that the remedial action plans had not been presented to NRR for their comments. Tom Cooke stated NRR had been contacted and the earliest NRR could review the proposed remedial action would be three to four weeks. Gallagher stated he would try to expedite the meeting with NRR.

Gallagher stated that when the meeting with NRR is held, proposed specifications, procedures, design calculations, drawings, etc should be presented to justify the remedial actions to be taken.

Gallagher stated he would want to do in-process inspections during the remedial work.

Gallagher acknowledged the fact that Q-listed soil would not resume until Consumers' 13 items of concern are addressed.



MEETING NOTES NO. 979
MIDLAND PLANT UNITS 1 & 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: May 11, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Soils Resolution Plan
FILE: 0279, C-2645

ATTENDEES:	<u>Bechtel</u>	<u>CPCo</u>
	S. Afifi	T.C. Cooke
	A. Almuti	D.E. Horn
	B. Dhar	C.A. Hunt
	W. Ferris	G.S. Keeley
	R. Hermeston	D.B. Miller
	W.G. Jones	T. Thiruvengadam
	P.A. Martinez	
	B.C. McConnel	
	J. Newgen	
	G.L. Richardson	
	J.O. Wanzeck	
	K. Wiedner	

PURPOSE: To inform CPCo of the planned remedial actions relating to Seismic Category I facilities and structures other than the diesel generator building, as well as a brief status report on the diesel generator surcharge (agenda attached)

ITEMS DISCUSSED:

1) Resumption of backfill operations

The NCRs affecting the backfill operations are being resolved on a priority basis. The items discussed in the minutes of the May 4, 1979 meeting (attached to J. Newgen's memorandum to P. Martinez, dated May 4, 1979, BCBM-460) are being resolved. The first priority area is the tank farm. The remaining priorities are being established by Bechtel construction.

2) Brief review of the diesel generator building settlement

The maximum settlement is approximately 7 inches with a minimum of 3-1/4 inches. The diesel generator building wall settlement history drawings were visually examined. The north and south walls show uniform settlement since December 15, 1978. There is no indication that the condensate lines are impeding the long-term building settlement.

An estimated date for surcharge removal can be made 4 to 6 weeks after establishing a settlement slope. The settlement rate is so small at the present time that more accurate survey methods are being developed. The new methods are anticipated to have an accuracy of ± 0.02 inch.

3) Planned remedial actions for structures

a) Service water structure

The northeast portion of the building will be supported by 100-ton piles driven to till. The piles will be designed to support vertical loads only. Horizontal forces will be resisted by the portion of the structure supported on natural soil.

b) Main feedwater isolation valve pits

The questionable soil will be removed and replaced with concrete. A temporary support will be provided and will span from the tendon access pit to the turbine building wall.

c) Auxiliary building electrical penetration room

The questionable soil will be removed and replaced with concrete for both Unit 1 and 2 penetration rooms. The extent of the excavation will be the only difference in the actions taken for each unit. Temporary support provisions are being designed for the Unit 1 electrical penetration room during dewatering. The actual need for the temporary support is still under investigation.

A perimeter dewatering system will be installed to allow excavation in a dry condition. The system will go from the Unit 1 reactor building south, around the turbine, administration, and diesel generator buildings, and then north to the Unit 1 reactor building.

d) Auxiliary building railroad bay

The loose sands susceptible to liquefaction will be chemically grouted. A grouting test program will be performed to develop required spacing, pressure, gel times, and the most effective type of chemical grout.

5) Tanks

a) Emergency diesel fuel oil tanks

There are no anticipated remedial actions. Two locations on each tank are being monitored for settlement. To date, there has been essentially no settlement observed.

b) Borated water tanks

There is no anticipated remedial action. There will be no surcharge placed. The tanks will be constructed, filled with water, and monitored for settlement. The monitoring will be continued until a long-term settlement trend has been determined. The borated water lines will be evaluated for settlement effects. The system turnover and startup requirements are being studied by the task force.

c) Condensate tanks

There is no anticipated remedial action. Connection details to the tank will permit settlement without impacting piping through the use of a metal bellows which will allow up to 6 inches of vertical movement, 1/2 inch of lateral movement, and 1-1/2 degrees of rotation. Due to the low number of loading cycles, the bellows are expected to last as long as the material. The lead time is expected to be 6 weeks.

6) Other structures

a) Service water valve pits

There is no anticipated remedial action. The valve pits serve no structural purpose other than protection for the service water valves from tornado missiles and the surrounding soil and water. At present the valve pits are covered by the diesel generator building surcharge. The valve pits will be monitored as part of the FSAR site monitoring program.

b) Transformer foundations

1. Unit 1 transformer area

Surcharge will be placed over the transformer area and selected points will be monitored.

2. Unit 2 transformer area

There is no anticipated remedial action.

c) Guardhouse

The sand drain in the area has been investigated. The foundation design will not use piles but has been modified to reduce the soil pressure.

d) Retaining wall

There is no anticipated remedial action. The retaining walls will be monitored as part of the FSAR site monitoring program.

7) Underground utilities

a) Piping

1. Service water pipe

All profiling requested from Goldberg-Zoino-Dunncliff & Associates (GZD) has been completed. Markers are being installed along the top of the line to allow the profiles to be measured in zones where the GZD device could not be used.

2. Borated water pipe

Markers are being installed along the top of the line to allow the profile to be measured.

3. Emergency diesel fuel oil pipes

The present design requires a sloped return to the oil tanks and engineering is investigating the need for this requirement. The diesel oil lines will be surveyed in the future.

4) Condensate water pipes

All profiling requested from GZD has been completed. Engineering is investigating the area immediately below the diesel generator building. This investigation will account for the data from the profiles, borros anchors, settlement plates, building settlements, and condensate line settlement.

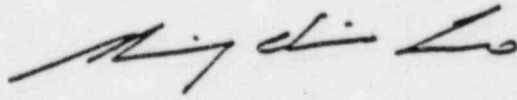
b) Electrical duct banks

A formal plan is being coordinated between engineering and construction to include functional monitoring, continuity checking, and a review of existing pulling history.

8) Cost, schedule and contracts

a) Cost - see Attachment 1

b) Schedule - see Attachment 2


for E.C. McConnel

CRM/js
5/25/1

CONSUMERS POWER COMPANY.

RECEIVED

MAY 09 1979

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



May 4, 1979

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: T. C. Cooke

Job 7220 Midland Project
Soils Meeting With CCo
BCCC-3995

Dear Mr. Cooke:

Find attached a set of meeting minutes from the April 24, 1979 meeting with Consumers concerning the resumption of Q-listed backfill. All "planned" action items included in these minutes were entered as action items at the April 26, 1979 Diesel Generator Tank Group meeting.

Very truly yours,

J. F. Newgen
J. F. Newgen

copy

JFN/AJB/jas

Attachments

cc: R. Wheeler
D. Horn

TC
BHP
DJV
RLB
DAK
JSK
MHM
WFS
RMW
DES
GBJ
JGB
WCB
FNE
GWR
MFB
JCS
JJD
CMO
DAR
TC
PK
ASP
SEC
CLERK
FILE 130

MEETING MINUTES

MIDLAND UNITS 1 & 2

Date: April 24, 1979
Time: 10:00 a.m.
Place: Midland Jobsite
Subject: Resumption of Q-listed Backfill Placement

Attendees:

<u>Bechtel</u>	<u>Consumers</u>	<u>U.S. Testing</u>
P. Martinez	D. Horn	J. Speltz
K. Wiedner	G. Black	
G. Richardson	D. Sibbald	
A. Boos		
J. Betts		
B. Dhar		
S. Kirker		
T. Lieb		
S. Afifi		

Minutes: The meeting minutes are summarized on the attached chart. All "planned" action items are to be entered as action items at the next Diesel Generator Task Group meeting scheduled for April 26, 1979.

Prepared by:

A. J. Boos

SUMMARY OF MEETING MINUTES
 "RESUMPTION OF Q-LISTED BACKFILL PLACEMENT"
 MIDLAND UNITS 1 & 2
 APRIL 24, 1979

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
1. Identify all conflicts within PSAR, within the PSAR, or between the PSAR and the PSAR, and correct these inconsistencies via official changes to the appropriate documents.	Project Engineering and Geo Tech have revised PSAR Section 2.5.4 to correct inconsistencies pertinent to soils placement.	Project Engineering and Geo Tech will perform a review of other subsections of PSAR section 2.5 pertaining to back-fill operations to eliminate inconsistencies, etc. (May 6, 1979)	Yes (As it applies to completion of review and changes to specification not processing of PSAR amendment.)	P.E. and Geo Tech
		Project Engineering and Geo Tech will perform a review of the Dames & Moore Soil Report and the	Yes (As it applies to completion of review and changes to specification not processing of PSAR amendment.)	P.E. and Geo Tech

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
		"PSAR Commitment List" pertaining to backfill placement to assure specs and FSAR are in conformance or are modified.		
		The review of "inactive" FSAR sections committed to in Appendix I, Section 1, Item C-3 (page 1-6) of the response to the NRC's 22 questions will identify and correct discrepancies in FSAR sections other than 2.5 which discuss backfill placement (Sept. 1979)	No	P.E. Geo Tech Construction
		Discuss and implement (as required) CPCo-PMO comments on FSAR Section 2.5.	Based on a prelim- inary review of the CPCo-PMO comments, the only restraint to resumption of backfill work is a revision to Spec. C-210 allowing the use of imported sands for Zone 2 Random Fill (May 6, 1979)	P.E. Geo Tech CPCo-PMO
2. Identify any inconsistencies between the PSAR/ FSAR and the		CPCo-QA will prepare their comments on Specifications C-210 and C-211 for discus- sion in conjunction with the CPCo-PMO comments listed in 1) above. (May 13, 1979)	Yes (As it applies to revising specifi- cation not process- ing of FSAR amendment.)	P.E. Geo Tech CPCo-QA

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
detailed specifications or drawings, and correct these inconsistencies via official changes to the appropriate documents.				
3. Identify any inconsistencies or omissions within the specifications and correct these inconsistencies via official Specification Change Notices.	SAME AS ITEM # 2 ABOVE			
4. Re-evaluate the appropriateness of the continued use of "random fill" in Zone 2 areas.		Specification C-210 and C-211 will be revised to redefine random fill with special emphasis on soils supporting structure (May 6, 1979)	Yes	P.E. Geo Tech
5. Provide a flow diagram of the steps which are needed for the quality control and assurance		A combined flow chart will be prepared illustrating the backfill process and the responsibilities of Bechtel Field Engineering, Bechtel Quality Control,	Yes	Construction

CPCO ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
	of soils work and assure that for each step there is a designation as to the specific organization primarily responsible for the action; a designation of the specific procedure to be used; and a designation of the specific acceptance criteria for the step.	and U. S. Testing. (May 6, 1979)		
6.	Assure that all "clarifications" and "interpretations" are resolved via official Specification Change Notices.	EDPI 4.4.9.1 will be revised. (May 4, 1979)	NO	P.E.
7.	Establish a single individual at the site to be responsible for each of the following: directing the construction aspects of the soils The following positions have been established a) Soils Field Engineer b) Geo Tech Soils Engineer (Assigned to Job 7220) c) Soils Q.C. Field Engineer			

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
	work; directing the design aspects; and directing the quality control aspects.	Their responsibilities are defined in the flow chart described in 5) above.		
8.	Institute 100 percent inspection of each lift placement with a corresponding Inspection Record documentation of the specific characteristics inspected in each case.	Bechtel Q.C. will work with CPCo-QA to finalize the revised QCIR for backfill placement. (CPCo-QA has a draft of the revised QCIR which calls for Surveillance (5) of backfill work by a fulltime Q.C. Soils Engineer with generation of daily reports) May 6, 1979	Yes	Bechtel Q.C. CPCo-QA
9.	Re-evaluate the capability of the equipment being used in relation to the maximum allowable lift thickness and the compaction requirements.	Project Engineering has received the procedure for test pad placement from Geo Tech. Project Engineering will forward said procedure to Construction for initiation of pad placement by 4/27/79. (April 27, 1979)	Yes	P.E. Construction
10.	Re-evaluates the appropriateness of the continued use of the nuclear densometer, with	The use of the nuclear densometer has been discontinued for inspection of record use.		

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
	its measure- ment accuracy being question- able relative to the moisture content specifi- cation limits of "plus or minus two percent of optimum".			
11. Re-evaluate the SAR's, specifi- cations and pro- cedures relative to their adequacy in specifying the points in the process at which the measurements or tests are to be made, the frequen- cies of these measurements or tests, and the conditions under which new labora- tory standards must be acquired.		Geo Tech will review specification C-210 and C-211 requirements as related to adequacy of specified process and testing controls (May 6, 1979) An audit will be performed on U.S. Testing by Bechtel to determine the adequacy of their soils testing procedures (April 26, 1979)	Yes Yes (Results of audit will have to be evaluated.)	Geo Tech P.E. Geo Tech Bechtel QA
12. Assure that there is a method, on a three dimensional and volumetric basis, for identifying	SAME AS ITEM # 8 ABOVE			

CPCO ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
the specific lifts which are inspected and tested.				
13. Assure that each nonconformance report (regardless of the type of report) is dispositioned.		For each Q-listed area where backfill is to be placed all Discrepancy Reports and NCR's (Bechtel and CPCo) will be fully dispositioned and closed out prior to placement of backfill.	Yes (As it relates to areas on an individual basis where backfill work is to be performed.) Note: This is an existing quality program requirement.	P.E. Construction Bechtel QC
		Additionally, P.E. will release areas for backfill which are listed in MCAR 24 as questionable areas on a case by case basis by memo or TWX.	Yes	P.E.



CONSUMERS POWER CO.
REGENT

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

DBM	---
TCC	---
JIP	---

19

DBM
TCC
JIP
B...
...

MAR 29 1979

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. Stephen H. Howell
Vice President
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This refers to a special announced inspection meeting with corporate management conducted on February 7, 1979, by Mr. J. G. Keppler and staff members of this office with you, members of your staff and members of your contractors staff at the Midland site.

The purpose of the meeting was to review the Midland project status, the settlement of the diesel generator building, inform you of changes in the organization of this office and to confirm commitments regarding continuing Quality Assurance, Quality Control coverage for the Midland project.

The enclosed copy of our inspection report summarizes the discussion.

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 enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

~~7905250283~~

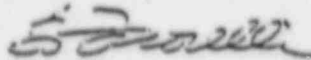
Consumers Power
Company

- 2 -

14
MAR 29 1979

We appreciate having the opportunity to meet with members of your corporate management and Midland staff. We will gladly discuss any questions you have concerning this inspection.

Sincerely,



G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Enclosure: IE Inspection
Rpt No. 50-329/79-04
and No. 50-330/79-04

cc w/encl:
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Dr. Wayne E. North
Myron M. Cherry, Chicago



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION III
790 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

MAR 29 1979

DBM	---
TCC	---
JTP	---
---	---
---	---

19

DBM
TCC
JTP
B...
...

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. Stephen H. Howell
Vice President
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This refers to a special announced inspection meeting with corporate management conducted on February 7, 1979, by Mr. J. G. Keppler and staff members of this office with you, members of your staff and members of your contractors staff at the Midland site.

The purpose of the meeting was to review the Midland project status, the settlement of the diesel generator building, inform you of changes in the organization of this office and to confirm commitments regarding continuing Quality Assurance, Quality Control coverage for the Midland project.

The enclosed copy of our inspection report summarizes the discussion.

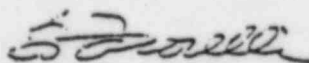
In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

Consumers Power
Company

MAR 29 1979

We appreciate having the opportunity to meet with members of your corporate management and Midland staff. We will gladly discuss any questions you have concerning this inspection.

Sincerely,



G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Enclosure: IE Inspection
Rpt No. 50-329/79-04
and No. 50-330/79-04

cc w/encl:
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Dr. Wayne E. North
Myron M. Cherry, Chicago

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Report No. 50-329/79-04; 50-330/79-04

Docket No. 50-329; 50-330

License No. CPPR-81; CPPR-82

Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Power Plant, Units 1 and 2

Inspection At: Midland Site, Midland, MI

Inspection Conducted: February 7, 1979

Inspectors: *[Signature]*
R. J. Cook

3/27/79

[Signature]
W. A. Hansen

3-27-79

[Signature]
T. E. Vandell

3-27-79

[Signature]

3/27/79

Approved By: R. C. Knop, Chief
Projects Section

Inspection Summary

Inspection on February 7, 1979 (Report Nos. 50-329/79-04 and 50-330/79-04).

Areas Discussed: Special, announced meeting between NRC, RIII inspection staff, Consumers Power Company corporate management representatives, and Bechtel Power Corporation Midland staff representatives to discuss the project status, concerns regarding recent developments onsite, and upcoming inspection activity. The meeting involved 28 manhours of regional staff time at the Midland construction site by NRC representatives.

Results: The project status and major problems were discussed.

~~790-250296~~

DETAILS

Persons Present during Management Meeting

Consumers Power Company

- S. H. Howell, Senior Vice President
- G. Keeley, Project Manager
- D. B. Miller, Jr., Site Manager
- B. W. Marguglio, Director Quality Assurance
- W. R. Bird, Section Head QA Engineering
- J. L. Corley, Section Head I, E&T Verification

Bchtel Power Corporation

- P. A. Martinez, Project Manager
- R. L. Castleberry, Project Engineer
- J. F. Mewgen, Project Superintendent
- John Milandin, QA Manager
- Len Dreisbach, Project QA Engineer
- *Howard Wall, Vice President Ann Arbor

*part time

U.S. Nuclear Regulatory Commission

- J. G. Keppler, Regional Director
- R. F. Heishman, Chief, Reactor Operations and Nuclear Support Branch
- R. C. Knop, Section Chief, Reactor Projects Section 1
- D. W. Hayes, Section Chief, Projects Section
- R. J. Cook, Resident Inspector
- W. A. Hansen, Reactor Inspector
- T. E. Vandel, Reactor Inspector

Results of Inspection Meeting

1. Mr. Keppler described the upcoming changes in the NRC organization in that Mr. R. F. Heishman, Chief, Reactor Construction and Engineering Support Branch will become Chief, Reactor Operations and Nuclear Support Branch and Mr. G. Fiorelli, who presently has that position will become Chief, Reactor Construction and Engineering Support Branch; Mr. R. L. Spessard, Chief, Construction Engineering Support Section 1 will become Chief, Reactor Projects Section 1 of the Operations Branch and Mr. R. C. Knop, who presently has that position will become Chief, Construction Projects Section; and Mr. D. W. Hayes will become Chief, Construction Engineering Support Section 1. These changes are effective February 11, 1979.

- 2. Mr. Keppler discussed in broad terms the inspection status. The construction program, although starting slow and haltingly (with work stopped in 1973 in the concrete area) has proceeded with no problems so severe that construction was stopped. Two serious problems exist however, and each has the potential for regulatory action up to stopping work.
 - a. The diesel generator building sinking is the most serious problem that Consumers Power Company must face and has the potential of drastic regulatory action.
 - b. The next most serious problem is to insure that material received for use meets the purchase specification. Material must be adequately inspected to insure that it is acceptable.

- 3. Other topics discussed were as follows:
 - a. Mr. Hayes commented on the importance of upcoming work such as:
 - (1) Installation of the Reactor Vessel Internals.
 - (2) Piping work.
 - (3) Electrical cable installation and connecting.
 - (4) The seismic and environmental qualification of equipment and material.
 - b. Mr. Heishman commented regarding the Quality Assurance, Quality Control program in that:
 - (1) A Quality Assurance program review will be performed by NRC, RIII in the near future. The intent is a thorough review of quality assurance/control activity.
 - (2) Consumers Power Company inspection overview was an important part of the quality program at Midland. The overview program was then the subject of a general discussion which included:
 - (a) Consumers Power Company performed complete overview inspection of structural concrete reinforcement installation and concrete placement.
 - (b) Consumers Power Company is performing and intends to continue an overview of the mechanical and electrical areas of work. The decision was made to inspect these areas during the initial phase of work so that faulty work could be detected and corrected early in the work phase. The plan was to inspect more work in the electrical and mechanical areas

early in the work process than had been done initially in the structural concrete phase of construction. The intent is to act early enough to avoid problems and then be forced to increase the overview program in the mechanical and electrical areas. The NRC commented that it appeared that there would be a problem if the overview program was changed to reduce inspection in that most of the significant problems identified at Midland were a result of the overview program.

Conclusion

Mr. Keppler stated in conclusion that the Midland units were greater 50% complete, the number of noncompliance items found by NRC inspectors was comparable to other construction sites, although significant problems were identified years ago, with the exception of the diesel building, most of the problems appeared to be resolved. The Consumers Power Company Quality Assurance overview is very important and Consumers Power Company has done a good job of reporting the 10 CFR 30.55(e) items. This reporting demonstrated an openness in the program rather than attempting to hide any deficient conditions that were found.

*Comments on Test Program
 not stated & NRC response
 That Test Program could
 replace some of the overview*

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Report No. 50-329/79-04; 50-330/79-04

Docket No. 50-329; 50-330

License No. CFP-81; CFP-82

Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Power Plant, Units 1 and 2

Inspection At: Midland Site, Midland, MI

Inspection Conducted: February 7, 1979

Inspectors: *[Signature]* 3/27/79
R. J. Cook

[Signature] 3-27-79
W. A. Hansen

[Signature] 3-27-79
T. E. Vandel

Approved By: *[Signature]* 3/27/79
R. C. Knop, Chief
Projects Section

Inspection Summary

Inspection on February 7, 1979 (Report Nos. 50-329/79-04 and 50-330/79-04).

Areas Discussed: Special, announced meeting between NRC, RIII inspection staff, Consumers Power Company corporate management representatives, and Bechtel Power Corporation Midland staff representatives to discuss the project status, concerns regarding recent developments onsite, and upcoming inspection activity. The meeting involved 28 manhours of regional staff time at the Midland construction site by NRC representatives.

Results: The project status and major problems were discussed.

DETAILS

Persons Present during Management Meeting

Consumers Power Company

- S. H. Howell, Senior Vice President
- G. Keeley, Project Manager
- D. B. Miller, Jr., Site Manager
- B. W. Marguglio, Director Quality Assurance
- W. R. Bird, Section Head QA Engineering
- J. L. Corley, Section Head I,EST Verification

Bechtel Power Corporation

- P. A. Martinez, Project Manager
- R. L. Castleberry, Project Engineer
- J. F. Mewgen, Project Superintendent
- John Milandin, QA Manager
- Len Dreisbach, Project QA Engineer
- *Howard Wall, Vice President Ann Arbor

*part time

U.S. Nuclear Regulatory Commission

- J. G. Keppler, Regional Director
- R. F. Heishman, Chief, Reactor Operations and Nuclear Support Branch
- R. C. Knop, Section Chief, Reactor Projects Section 1
- D. W. Hayes, Section Chief, Projects Section
- R. J. Cook, Resident Inspector
- W. A. Hansen, Reactor Inspector
- T. E. Vandel, Reactor Inspector

Results of Inspection Meeting

1. Mr. Keppler described the upcoming changes in the NRC organization in that Mr. R. F. Heishman, Chief, Reactor Construction and Engineering Support Branch will become Chief, Reactor Operations and Nuclear Support Branch and Mr. G. Fiorelli, who presently has that position will become Chief, Reactor Construction and Engineering Support Branch; Mr. R. L. Spessard, Chief, Construction Engineering Support Section 1 will become Chief, Reactor Projects Section 1 of the Operations Branch and Mr. R. C. Knop, who presently has that position will become Chief, Construction Projects Section; and Mr. D. W. Hayes will become Chief, Construction Engineering Support Section 1. These changes are effective February 11, 1979.

- 2. Mr. Keppler discussed in broad terms the inspection status. The construction program, although starting slow and haltingly (with work stopped in 1973 in the concrete area) has proceeded with no problems so severe that construction was stopped. Two serious problems exist however, and each has the potential for regulatory action up to stopping work.
 - a. The diesel generator building sinking is the most serious problem that Consumers Power Company must face and has the potential of drastic regulatory action.
 - b. The next most serious problem is to insure that material received for use meets the purchase specification. Material must be adequately inspected to insure that it is acceptable.

- 3. Other topics discussed were as follows:
 - a. Mr. Hayes commented on the importance of upcoming work such as:
 - (1) Installation of the Reactor Vessel Internals.
 - (2) Piping work.
 - (3) Electrical cable installation and connecting.
 - (4) The seismic and environmental qualification of equipment and material.

 - b. Mr. Weishman commented regarding the Quality Assurance, Quality Control program in that:
 - (1) A Quality Assurance program review will be performed by NRC, RIII in the near future. The intent is a thorough review of quality assurance/control activity.
 - (2) Consumers Power Company inspection overview was an important part of the quality program at Midland. The overview program was then the subject of a general discussion which included:
 - (a) Consumers Power Company performed complete overview inspection of structural concrete reinforcement installation and concrete placement.
 - (b) Consumers Power Company is performing and intends to continue an overview of the mechanical and electrical areas of work. The decision was made to inspect these areas during the initial phase of work so that faulty work could be detected and corrected early in the work phase. The plan was to inspect more work in the electrical and mechanical areas

early in the work process than had been done initially in the structural concrete phase of construction. The intent is to act early enough to avoid problems and then be forced to increase the overview program in the mechanical and electrical areas. The NRC commented that it appeared that there would be a problem if the overview program was changed to reduce inspection in that most of the significant problems identified at Midland were a result of the overview program.

Conclusion

Mr. Keppler stated in conclusion that the Midland units were greater 50% complete, the number of noncompliance items found by NRC inspectors was comparable to other construction sites, although significant problems were identified years ago, with the exception of the diesel building, most of the problems appeared to be resolved. The Consumers Power Company Quality Assurance overview is very important and Consumers Power Company has done a good job of reporting the 10 CFR 50.55(e) items. This reporting demonstrated an openness in the program rather than attempting to hide any deficient conditions that were found.

Comments on Test Program
 not stated & NRC response
 that Test Program could
 replace some of the overview

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 920
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

DATE: February 15 and 16, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645

ATTENDEES:

	<u>Bechtel</u>	<u>CPCo</u>
Engineering		
	K. Wiedner	*J. Milandis
	B. Dhar	*W. Jones
	C. McConnel	*J. Wanzack
	R. Marl	S. Afifi
	A. Ganguly	A. Marshall
	*P. Martinez	G. Richardson
Construction		
	A. Boos	C. Hunt
	J. Betts	R. Wheeler
		D. Horn
		T. Thiruvengadam
		D. Sibbald

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to review the progress on the resolution of the diesel generator building settlement problem and to discuss action items initiated in the January 23, 1978, meeting at the Midland jobsite.

The following notes document the discussion on the agenda items.

ITEMS DISCUSSED:

- 1) Amendments to the January 23, 1978, Meeting Notes - No amendments to the Meeting Notes No. 907 were made.
- 2) Review of Prior Action Items - Action items from the January 23, 1979, meeting were reviewed with the following current status.

1. The diesel generator building model, including mechanical equipment, large piping, and HVAC, is essentially complete. It is estimated that the small field-run piping and electrical work will take an additional 2 to 3 weeks. Construction stated that they would like the model to be sent to the jobsite as soon as the present work is complete. It was agreed that the model will be shipped to the jobsite after the present information is added to the model.
2. This action item is complete. The DCN was issued February 6, 1979, showing counterfort design.
3. This action item is complete. An FCR was generated and approved February 6, 1979, showing a steel brace in lieu of a counterfort at turbine building column line 8.0.
4. Project engineering has reviewed the double wood form design submitted by construction. However, geotech should evaluate the passive soil pressure values used in the analysis. Geotech agreed to respond to this item by February 15, 1979.
5. Geotech has contacted the soil consultant regarding defrosting of the frost protection prior to surcharge. There will be no need to defrost any material above final grade. This action item is closed.
6. This item is still open. Drawing C-1141 will be revised by February 21, 1979, to show monitoring of the condensate line at hold points IV, VI, and VII.

Profiling of the 8-inch service water line was discussed. Results indicated that the lowest point in the present position of the line is 16 inches off the position shown in the design drawings. Profiling of other Q-listed pipelines was also discussed, and questions were raised as to whether any action is immediately required. It was agreed that project engineering will meet with the mechanical and stress groups and identify the functional requirements of the Q-listed pipelines (stress, allowable curvature, etc). Construction will review installation procedures and records to determine how accurately Q-listed pipes were placed. Construction will also review the feasibility of profiling all other Q-listed pipelines in the plant fill and report to project engineering.

7. This item is complete. Pipe profiling completed to date has been received from Goldberg-Zoino-Duanncliff & Associates (GZD).
8. This item is still open. Project engineering will issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979.

9. This item is complete. Geotech has notified engineering of the necessary scope changes for the GZD contract.
10. This item is complete. Geotech has confirmed that the geology group will assist in taking piezometer readings. However, as long as continuous readings are necessary, GZD will perform this task.
11. This item is complete. The engineering and construction schedule for the diesel generator building was issued on January 26, 1979.
12. This item is still open. A preliminary cost estimate has been issued. The revised cost estimate is now scheduled for issue by March 2, 1979. The total estimate is now \$3 million for all corrective work on the diesel generator building. It was agreed that a cost estimate review will be an agenda item for the next task group meeting.
13. Engineering stated that they have responded to the FSAR questions. Some of the questions have only partial responses. These responses will be completed as criteria are developed and data from surcharge are available. This action item is closed.
14. This item is still open. A response to Gallagher's questions is now scheduled for March 2, 1979.
15. This item is complete. Interim report 4 for MCAR 24 was forwarded to CPCo on February 16, 1979.
16. This item is complete. The soil boring logs around the Class 1 structures have been completed for the MCAR report and were submitted to the FSAR.
17. This item is complete. The cover letter transmitting Meeting Notes No. 901 dated December 4, 1978, covering the meeting with the NRC was signed on March 1, 1979.
18. This item is still open. A list of milestone dates to be shown on the settlement drawings has been developed. It was agreed that the digging of the test pit in the diesel generator building and removal of surcharge should also be included in the milestone dates.
19. This item is complete. A time-history settlement drawing for the diesel generator building has been developed.
20. This item is still open. The location of the strain gage has been reviewed and revised. This information will be shown on Drawing C-1141 by February 21, 1979.

21. Construction will identify to engineering which rods used the turn-of-the-nut method of tightening and what procedure was used. This action item is closed.
22. This item is still open. Geotech is still working on evaluating liquifaction potential between the diesel generator building and the turbine building. The evaluation is expected to be sent to the consultant within 1 week. After concurrence from the consultant, a response will be forwarded to project engineering. Geotech will require additional borings to complete this evaluation.
23. This item is closed. The turbine building wall deflection monitoring will utilize dial gages. The amount of surveillance and monitoring of the turbine building wall was discussed. It was agreed that project engineering will review the monitoring program given in Specification C-83 and attempt to relax the present criteria.
24. Geotech will allow a 12-inch tolerance in lieu of the present 6-inch tolerance. Drawing C-1141 will be revised to show this by February 21, 1979. Drawing C-1141 will also be revised to allow 50% of the counterfort design strength prior to surcharge Step III.
25. Project engineering will resolve this at a later date. It was agreed that this action item should be removed from the task group's responsibility because it is a normal project engineering action.
26. This item is still open. Construction has completed seven drawings showing test locations down to el 620'-0". Each drawing shows 3 feet of fill. Construction asked if the entire plant area fill should be plotted to el 619' prior to plotting the diesel generator building area to the original grade. It was agreed that the plotting should be done in phases, with the two southern main plant areas and the area east of the power block plotted to el 619' first. Geotech will define the next phases of work after receipt of the Phase 1 work. Construction will attempt to define Canonie's work versus Bechtel's work on the plots.
27. This item is still open. An acceptance procedure has been developed by geotech. However, this acceptance procedure must be reviewed by the soil consultants. It was agreed that geotech will send a copy of its acceptance procedure to project engineering concurrently with sending it to the consultant.
28. This item is complete. Pile capacity data has been supplied to engineering.

29. The condensate tank foundation options were discussed. Engineering has estimated that 100 piles will be needed at a total cost of \$250,000. Engineering prefers the surcharge option. Construction stated that surcharging the condensate tank area to a height of 20 feet would jeopardize turnover to CPCo and would result in a claim from Chicago Bridge & Iron Co. It was agreed that a cost estimate of the two options would be developed by March 5, 1979, and that surcharge would be placed after a decision to follow this method has been made.
30. Project engineering discussed the surcharging of the Unit 1 transformer pad. It was agreed that the transformer area should be surcharged with 5 feet of fill without the transformer load as soon as possible. Construction stated that the Unit 1 stator will be moved over this same area in July 1979. Engineering agreed to investigate this potential problem and provide necessary directions to construction.
31. Plugging of drilled holes in the transformer basin will be done after surcharge. It was agreed that this action item should be treated as a regular construction item and should be removed from the task group's list of action items.
32. The corrective action on the tank farm was discussed. It was agreed that the borated water storage tank will be constructed as scheduled and then filled with water to observe settlement. Engineering will issue a memorandum to the field on this. No piping or any other utility should be connected to the tank at this time. The area should be backfilled to grade level as early as possible.
33. The corrective action on the guardhouse was addressed. It is engineering's intent to lower the foundation 2 feet and remove the central column. Engineering will discuss this plan with geotech. A minimum of three settlement plates will be installed below frost level to monitor settlements. CPCo stated that they are concerned about the possibility of a plugged sand drain in the guardhouse area. Geotech agreed to evaluate this problem and determine what remedial measures may be needed.
34. Response to Gallagher's questions. Project engineering's questions have been answered. This item is complete.
35. Comments on the potential cause list have been forwarded to QA. This item is complete.
36. This item is open. Some comments have been received by engineering on FSAR Section 2.5. However, comments are still required from CPCo and construction. Project engineering will resolve these comments, arrange for a meeting if necessary, and issue an FSAR change notice on any discrepancies or necessary changes.

Investigation of Cause

A Kepner-Tregoe problem analysis was presented to the task group by Bechtel management. This is a method of analysis which attempts to set the groundwork for establishing possible causes to a particular problem. The investigation of the diesel generator building settlement problem was presented and discussed using the Kepner-Tregoe analysis.

NCR 1004

Nonconformance Report 1004, which has remained open since November 1977, was discussed. It was agreed that engineering will analyze the service water pump structure section on plant fill to see if it can be supported by cantilever action without any support from fill. Geotech will provide the soil characteristics and conditions. Construction will provide the excavation drawing (plan and sections) used for the construction of the pumphouse foundation. Geotech will evaluate the liquifaction potential of the sand material adjacent to and/or below the structure. The civil resident engineers will perform a visual inspection of the structure for cracking and provide project engineering with the results of this inspection. Geotech will make additional borings required to evaluate the NCR.

- 3) Review of Construction Progress - The status of construction was presented. Step 1 of the surcharge placement will be completed by February 17, 1979. The monitoring of the turbine building wall may hold up surcharge Step 2. Step 2 can start on February 26, 1979, if the monitoring is complete. Step 3 may be delayed by 1 week due to the construction of the counterforts. However, Step 3 can be started on March 5, 1979, if 50% of the concrete strength is achieved on the counterforts.

The last walls in the diesel generator building were poured on February 20, 1979, with the placement of 550 yd³ of concrete. The roof is expected to be completed in mid-March.

- 4) Cost and Schedule Estimate - The cost and schedule will be reviewed at the next task group meeting.
- 5) Other Structures and Facilities - The following other Class 1 structures on plant fill were discussed.
 - a) Service Water Lines - The recent borings taken in the service water line area were discussed. One boring could not be filled with grout and had to be plugged by bridging the hole with concrete. CPGCo expressed concern about this boring and requested that Bechtel investigate conditions that could affect these lines. Geotech agreed to pursue this problem

further with construction and possibly make borings, pending the results of pipe profiling. Engineering agreed to check the secondary stresses and requirement for slopes in the service water pipelines.

- b) Diesel Fuel Tanks - It was agreed that settlement or movement of the diesel fuel tanks should be monitored. A base survey will be performed as soon as possible, the tanks will be filled, and then the tanks will be monitored for settlement. Depending on the movement after filling, engineering and geotech will decide if additional surcharging is necessary. Construction will investigate and confirm that the tanks can be filled. It was noted that the original boring logs qualifying the area as Q have been lost. Construction will attempt to relocate these borings. Geotech will make borings if the old borings cannot be located.

It was agreed that the next task group meeting would be held in approximately 2 weeks.

ACTION ITEMS:

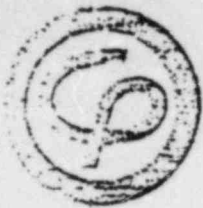
- | | | |
|---------------------|----|--|
| Geotech | 1) | Look at passive pressure values used by construction in the double-wood form design and respond to engineering by February 15, 1979. |
| Project Engineering | 2) | Meet with stress and mechanical groups to identify functional requirements for Q-listed pipeline. |
| Construction | 3) | Review installation records and procedures for Q-listed pipe to determine how accurately the profiled pipelines were placed. |
| Construction | 4) | Review the feasibility of profiling all other Q-listed pipelines and give this information to project engineering. |
| Project Engineering | 5) | Issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979. |
| Cost and Schedule | 6) | Issue a revised cost estimate by March 2, 1979. |
| Project Engineering | 7) | Provide CPCo with a response to Gallagher's questions by March 2, 1979. |
| Project Engineering | 8) | Show milestone dates on settlement drawings by March 2, 1979. |

- Project Engineering 9) Show revised strain gage locations on Drawing C-1141 by February 21, 1979.
- Construction 10) Inform project engineering by February 20, 1979, of the locations where hydraulic jacks can not be used on the tie rods (i.e. where turn-of-the-nut method was used) and provide procedure for turn-of-the-nut tightening.
- Geotech 11) Forward results of liquifaction evaluation to the soil consultant by February 28, 1979, prior to responding to engineering.
- Project Engineering 12) Review the monitoring program in Specification C-83 and attempt to relax the requirements.
- Project Engineering 13) Revise surcharge tolerances and concrete strength requirements on Drawing C-1141 by February 21, 1979.
- Construction 14) Plot density tests for plant fill for the two power block areas and the one area east of the power block prior to plotting any other areas. Construction will also attempt to separate Canonie's work versus Bechtel's work.
- Geotech 15) Define the next phase of plotting to be performed after receipt of the Phase 1 plotting.
- Geotech 16) Send a copy of the surcharge acceptance procedure to project engineering concurrently with forwarding it to the soil consultant.
- Cost and Schedule 17) Develop a cost comparison for the pile option versus the surcharge option for the condensate tanks by March 5, 1979. Engineering will provide necessary direction to construction regarding surcharging of the condensate tank area. *3/15/79*
- Construction 18) Surcharge the condensate tank area with 10 feet of fill as soon as possible, after engineering's decision has been made. *1/20/79*
- Engineering/
Construction 19) Place 5 feet of surcharge in the Unit 1 transformer areas as soon as possible after engineering evaluates the effect of 5'-0" fill in the transformer area and directs construction to do so.
- Project Engineering 20) Investigate the proposed Unit 1 stator loads in the transformer area.

- Project Engineering 21) Issue a memorandum to construction on the release of the borated water storage tank without any piping connection.
- Project Engineering 22) Get geotech's concurrence on the proposed corrective action on the guardhouse.
- Geotech 23) Review the plugged sand drain problem and provide recommendations for remedial work.
- Construction/CPCo 24) Forward their comments of FSAR Section 2.5 to project engineering.
- Construction 25) Provide an excavation drawing of the service water pumphouse to project engineering.
- Geotech 26) Provide project engineering with the soil conditions and characteristics around the service water pumphouse which were found in the recent boring program.
- Geotech 27) Evaluate liquifaction potential of the loose sands around the service water pumphouse.
- Project Engineering 28) Analyze the pumphouse as a cantilever and see if the pumphouse can be supported independently of support by the fill.
- Civil Resident Engineer 29) Inspect the pumphouse for cracking and provide results to engineering.
- Geotech/Construction 30) Evaluate the potential fill support problems in the service water line area.
- Project Engineering 31) Check the secondary stresses in the service water pipe lines and also investigate if there is a need for slope in these lines.
- Construction 32) Investigate and confirm that the diesel fuel tanks can be filled.
- Construction 33) Attempt to locate the original borings made in the diesel fuel tank area.

R. Marl/A. Ganguly

RM/AG/js
2/21/4



Consumers
Power
Company

TCC

Midland Project: P.O. Box 1963, Midland, Michigan 48640 . Area Code 517 631-0951

January 31, 1979


Mr. J. F. Newgen
Bechtel Power Corporation
P.O. Box 2167
Midland, MI 48640

MIDLAND PROJECT GWO 7020 - SOIL
PROBLEMS AND RELATED BUILDING SETTLEMENT
File: 0130 Serial: CSC-3797

Reference: Letter T. C. Cooke to J. F. Newgen, Serial 3369

On August 11, 1978 we were notified of the excessive settling of the Diesel Generator Building and the Generator Foundations. Since this time, a survey and a boring program has indicated other areas of concern, (Condensate Tanks, Guard House, Tank Farm, etc.). It was requested in our referenced letter to have a separate account set up for all additional work and related expenses. We now request that other problems or costs discovered and incurred during or after conclusion of these programs also be included in separate accounts, as they may fall under the provisions of Article 9 of the Bechtel Power/Consumers Power Company contract regarding defective work.

The basis for this request is that all the above problems are being or have been caused by the same soil problem, and therefore, should be considered as one account with several subaccounts.


T. C. Cooke
Project Superintendent

TCC/DES/sd



MEETING NOTES NO. 895
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: Thursday, December 21, 1978.
PLACE: Midland Jobsite
SUBJECT: Task Group Meeting on the Diesel Generator Building

ATTENDEES:

<u>Bechtel Engineering</u>	<u>Bechtel Construction</u>	<u>CPCo</u>
K. Wiedner	J.F. Betts	D. Sibbald
C. McConnel	A.J. Boos	
D. Reeves	W. Netzela	
J. Moravek		
R. Marl		
B. Dhar		
G. Richardson (QA)		
S. Afifi (Geotech)		
W. Jones (Cost & Schedule)		

PURPOSE: The meeting was held at the Midland jobsite to review engineering and construction progress on the resolution of the diesel generator building settlement problem and to finalize unresolved items such as turbine building modifications, surcharge sequence, and monitoring of underground facilities. It was decided that the task group would be meeting as necessary to ensure that the surcharge of the diesel generator building progresses as quickly as possible. The next meeting is to be held in Ann Arbor on January 4, 1979.

The following notes taken during the meeting are listed in the order in which the items were discussed in the meeting and as shown on the agenda.

ITEMS DISCUSSED:

1) Diesel Generator Building Construction

Construction gave a brief summary of the status of construction on the diesel generator building and stated that construction was proceeding as fast as possible with two shifts being used.

The duct bank excavations were completely filled and that structural sand fill inside the building was in process. Bays 3 and 4 are filled to el 634' with bays 1 and 2 lagging only a few days behind. Also, the slab at el 664' in three bays has been poured with the slab in the fourth bay scheduled to be poured next week.

2) Turbine Building and Diesel Generator Building Modifications

Proposed modifications to the buildings were discussed. Modifications of the turbine building Q line wall are to be shown on Drawing C-1040 and are briefly described as follows:

- A) From column line 5 to column line 7 the modification is to include shimming the wall to the concrete slab at el 631'-0" plus adding a 7'-6" high by 4'-0" wide corbel at el 614'-0".
- B) Between column lines 4 and 5 and between column lines 7 and 8 the modification is to add 2-inch ϕ steel rods as tie backs from the Q line to the diesel generator building plus adding a 7'-6" high by 4'-0" wide corbel at el 614'-0".
- C) Steel braces are to be added at column lines 3, 4, and 9.
- D) Concrete counterforts are to be added to column lines 3.5, 8.0, and 8.5 with the possibility of substituting steel for concrete at the 8.0 line.

3) Retaining Wall Above Grade

The field presented a scheme for a retaining wall between the turbine building and the diesel generator building for holding the surcharge above el 634'-0". The scheme consisted of a row of concrete blocks 30" x 8'-0" x 16'-0" stacked on top of each other with wide flange beams between the blocks. The blocks were to be tied back to the diesel generator building to prevent them from sliding.

It was determined that the concept of moving the blocks in with a crane and the amount of tie backs required would take approximately 1 month to construct. It was also determined that no blocks can be

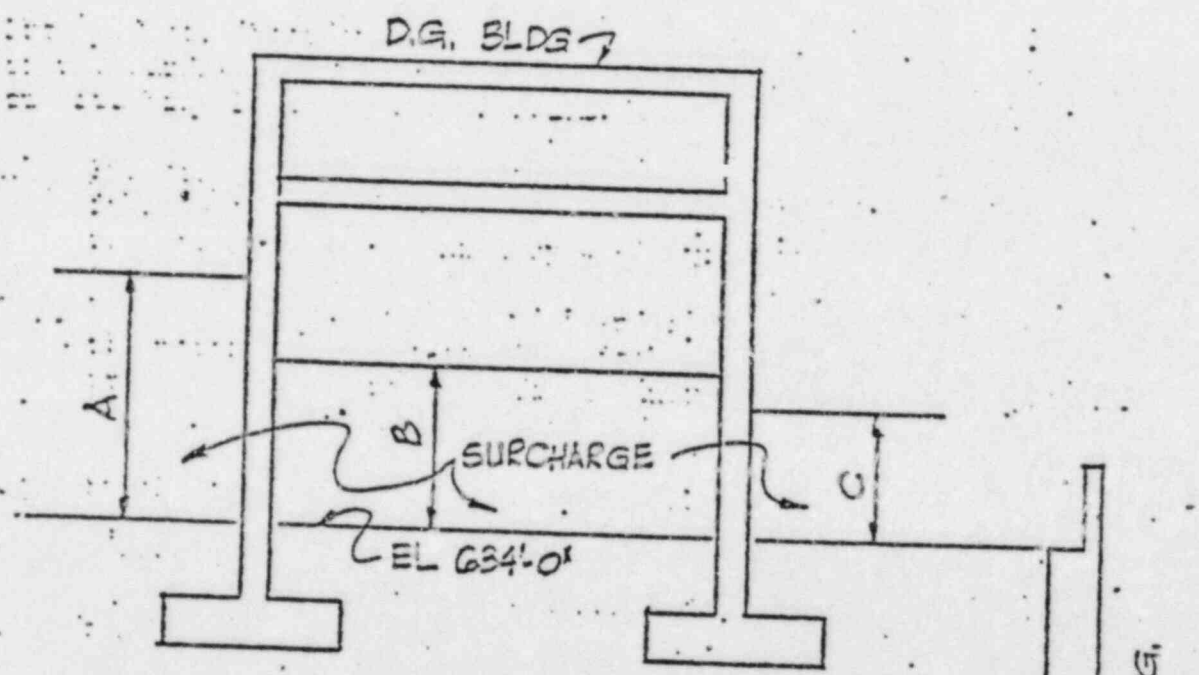
stacked until the turbine building wall is modified as described in Item 2. Therefore, the concept of the concrete block does not look advantageous for getting the surcharge load on as quickly as possible.

4) Surcharge Sequence

A review of the consultants' recommendations showed that the consultants recommended surcharging in a uniform manner and not having more than a 5-foot differential in surcharging across any wall of the diesel generator building.

In view of the amount of work involved in supporting the turbine building wall and building a retaining wall, it was decided that a more indepth surcharging sequence would be required.

The following sketch shows the proposed surcharging sequence and the approximate dates they could be completed, assuming that the retaining wall above grade will be the stacked concrete blocks, four high, as mentioned in Item 3 above.



HEIGHT OF SURCHARGE			FORECAST DATE
A	B	C	
5'	5'	0	1/15/79
10'	5'	0	1/21/79
10'	10'	0	1/29/79
10'	10'	18'*	3/1/79 START 3/15/79 C
10'	10'	10'	3/15/79 START 3/22/79 C
15'	15'	18'***	3/22/79

* LOCAL - CONC. BLOCK
 ** EXTENSIVE AREA

5) Underground Facilities and Adjacent Structures

Since cutting the duct banks loose, there has been no movement on the south side of the diesel generator building and 3/8-inch movement on the north side of the building. It was decided that the two 20-inch Ø and two 6-inch Ø condensate lines are to be cut at the first elbow outside the turbine wall so as to prevent damage to the pipes. On the south side of the diesel generator building, no action is required on the condensate lines. This point will be monitored with the present instrumentation.

The service water pipes, circulating water discharge lines, and electrical duct banks were also discussed.

A) Project engineering stated that the design calculations of the circulating water discharge lines were reviewed for the effects of the surcharge load and that there is a possibility that the additional load could produce ovaling of the pipe exceeding the original criteria. The ovaling is greatly dependent upon the condition of the backfill at the sides of the pipe. It was decided that a survey of the out-of-roundness of the pipe would be made to determine if internal supports would be needed during the surcharge period.

B) It was agreed that the conduit continuity was the only requirement for the electrical duct banks. The rupture of a conduit due to soil settlement therefore does not cause a problem as long as continuity is checked.

6) Instrumentation and Monitoring

Instrumentation and monitoring of the turbine building wall was also discussed. Project engineering stated that a specification will be prepared. It was also agreed that a decision on whether to preload the transformer pads would be made based on the behavior of the diesel generator building.

7) Schedule

A schedule is to be developed for surcharging showing the combined construction and engineering effort on major items only. This schedule is to be completed by January 12, 1979, and is to be developed for the placement of 10 and 15 feet of surcharge.

The forecast schedule for the remainder of the civil/structural activities for the original building construction will be completed by January 12, 1979.

A schedule for mechanical and electrical activities after completion of soil consolidation will be completed by May/June 1979.

8) QA and QC

It was decided that the surcharge operation and Specification C-81 would remain non-Q. However, notes will be added to Drawing C-1040 calling for protection of the instruments and showing hold points on monitoring the surcharge application.

ACTION ITEMS:

- Project Engineering
 1. Project engineering is to issue a memo releasing concrete placement for the diesel generator building above el 664'-0" (reference NCR 1482).
- Project Engineering
 2. Project engineering is to issue a DCN adding channel embeds on the inside of the diesel generator building walls for HVAC, cable tray support, etc.
- Project Engineering
 3. Project engineering is to issue a DCN adding structural backfill notation to Drawings C-1007 and C-1008 to call out the type of backfill.
- Field Engineering
 4. Project engineering is in the process of building a 3/8-inch scale model of two full bays of the diesel generator building showing equipment, piping supports, field run piping, etc. Construction is to inform R.L. Castleberry as to what they would like to include in the model. Also, consideration is to be given to the construction of a 1/2-inch scale model.
- Project Engineering
 5. A DCN is to be issued enlarging the hole diameters to be drilled into the diesel generator building and turbine building for skewed 2-inch \emptyset tie rods.
- Project Engineering
 6. A DCN is to be issued on the steel attachment for securing the 2-inch \emptyset rods to the northwest corner of the diesel generator building. Project engineering is to investigate why the corner is enlarged and if it can be core drilled.

Project Engineering

- 7. A DCN is to be issued revising rebar grid in the corbel at el 614'-0" plus showing the reinforcing in the wall at an angle so as to make it easier for grouting. Project engineering is to investigate the feasibility of issuing a DCN giving the field the option to use rock anchors in lieu of reinforcing in the slab at el 614'-0" for the turbine building wall corbel.

Project Engineering

- 8. A DCN is to be issued revising the limits of surface preparation on the turbine building wall for the corbel plus specifying that bush hammering and/or chipping is to be done.

Project engineering is to check with the chief engineer for the necessity of obtaining 1/4-inch amplitude on the surface preparation.

Project Engineering

- 9. A DCN is to be issued showing design and surface preparation required for concrete counterforts in the turbine building. Project engineering is to look at the local layout effects of the counterforts and investigate to see if removal is required.

Project engineering is to coordinate with CPCo to determine if the corbel braces and counterforts can be left in place permanently or whether they must be taken out. The task group's recommendation is that these items be left in place and removed in the future if necessary.

Project Engineering

- 10. Project engineering is to release the steel quantities and material requirements for the steel braces in the turbine building.

Project Engineering

- 11. Project engineering will attempt to issue the drawings and DCNs showing the design for the above corbel, braces, and counterforts by December 29, 1978.

Field Engineering

- 12. Bracing between column lines 3 and 4 as shown on DCN 1 to Drawing C-542 must be in place prior to construction of counterforts. The field is to expedite this activity.

Field Engineering

13. Construction is to look at the following alternatives for the retaining wall:

- a. Concrete blocks stacked four high as discussed in Agenda Item 3
- b. Concrete blocks stacked two high then filling with sand and then coming back and adding two more blocks plus sand
- c. Wood forms (single and double forms)

Geotech

14. Geotech is to investigate the concept of having four blocks high next to the turbine building with no fill between the blocks and the diesel generator building and to advise of the feasibility of this action.

Project Engineering

15. Project engineering is to review and comment on the final scheme of the retaining wall (Action Item 11).

Geotech

16. Geotech is to obtain consultants' concurrence on the surcharging sequence and also get the consultants' recommended hold points on the depth of surcharge. Geotech will also investigate the length of time the surcharge is to remain in place before additional fill can be placed.

Project Engineering

17. Project engineering is to investigate surcharge limits prior to certain elements of the turbine building wall modification being completed.

Field Engineering

18. The field is to defrost the present frost protection as required outside the diesel generator building.

Geotech

19. Geotech is to get consultant confirmation that this 15 feet is sufficient. The possibility of defrosting less than 15 feet should also be addressed.

Project Engineering

20. Drawing C-1040 is to be released for surcharging. The surcharging sequence is to be included on the drawing along with established consultant hold points.

- Project Engineering 21. A note shall be added to Drawing C-1040 calling for the protection of the instrumentation.
- Project Engineering 22. Project engineering will revise Specification C-81, Section 6.4.3, regarding removal of granular fill and will clarify the specification to say that soil testing is for informational purposes only. Section 6.1.3 will also be reviewed for the possibility of changing the 5-foot surcharge differential requirement.
- Project Engineering 23. Project engineering is to look at placing 5 feet of fill between the turbine and diesel generator buildings with support for the turbine building wall only from the tie rod installation.
- Project Engineering 24. Project engineering is to issue a DCN to cut four condensate lines outside of the turbine building wall.
- Field Engineering 25. The field will provide service water pipe profiles before and after surcharging only. From the west valve pit, the pipe is to be profiled to the turbine building and also south of the diesel generator building for approximately 270 feet. Profiles of the services water pipe are to be provided in both directions from the valve pit.
- Field Engineering 26. The field will provide profiling of the service water pipes at the east valve pit as shown on Drawing C-1040.
- Project Engineering 27. The field is to furnish ovality readings of the circulating water discharge lines to project engineering for evaluation.
- Project Engineering 28. Project engineering is to inform the field if a TV camera is to be run through the conduits of the electrical duct banks.

Project Engineering

29. Project engineering is to issue a specification on the monitoring of the 2-inch \emptyset rods in the turbine building and on the monitoring of the deflection of the turbine wall.

Geotech

30. Geotech is to check on the delivery of the probe for monitoring of the underground utilities.

Field Engineering

31. The field is to expedite getting a TV camera for monitoring the service water lines and the condensate lines.

Project Engineering

32. Project engineering is to issue a memo stating that the resident engineer is to read the strain gages which Dunnicliff installed.

Cost and Scheduling

33. The cost and schedule group is to develop schedules by January 12, 1979.

Cost and Scheduling

34. The cost and schedule group is to develop revised cost estimates as methods firm up. By February 1, 1979, a new cost estimate will be developed on the total surcharge operation.

Project Engineering

35. Drawing C-1040 is to be made Q-listed. This, with the revisions discussed under Agenda Item 4, will hopefully satisfy the QA/QC requirements.

Project Engineering

36. New questions on the FSAR need to be answered by project engineering.

Project Engineering

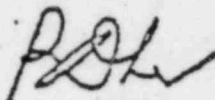
37. An answer to Gallagher's report is to be in draft form within 2 weeks after receipt of the NRC report from the current interviews being performed.

Quality Assurance

38. Quality assurance is to discuss with W. Bird (CPCo) to obtain NRC concurrence that the response to Gallagher's report need not be submitted until after receipt of the NRC report from the interviews.

Project Engineering

39. Project engineering will prepare the next interim report for NCAR #24 which is due in February.



B. Dhar

BD/bob
1/2/5

30. [Faint, illegible text]

31. [Faint, illegible text]

32. [Faint, illegible text]

33. [Faint, illegible text]

34. [Faint, illegible text]

35. [Faint, illegible text]

36. [Faint, illegible text]

37. [Faint, illegible text]

38. [Faint, illegible text]

Midland Project - Settlement of Diesel Generator City
Meeting in Champaign, IL November 6, 1978.

TCC/DBM
see P. 6^{3,5}

People present:

- | | |
|-----------------|------------|
| Chuck McConnell | T. Cooke |
| Neil Swanberg | D. Sibbald |
| Austin Marshall | R. Wheeler |
| Phil Martinez | E. Horn |
| Mike Rothwell | C. Hunt |
| Sherif Affifi | |
| Walter Ferris | |
| Jim Betts | |
| Y.K. Liu | |
| Stan Blue | |
| Skip Henderson | |
| Ralph Beck | |

- ① NRC to be contacted @ 10:30 AM by telephone.
- ② Boring logs have been drawn on sketches showing cross-section of the auxiliary Manchester Building.
- ③ No changes in trend.
- ④ The site options for future geotechnical modeling & cost for pre-load assessment. Comb. mat & previous underpinning. Remedial & design. Curious.

Offici: Pre-meeting discussion with consultants
talked pre-load as preferable.
Why other options to be rejected

Reel: Boring show what was originally known
Loose fill - settling by its own weight
Preload is only way to densify -
considering nature of materials
Piezometric readings and consolidation
tests will reveal the degree of
consolidation achieved. The
time to terminate the load
will be known. Data will be
available to assure the NRC that
the foundation is adequate.
No need to go into all detail of settlement
time rate of development will reveal
what we should do about pipelines &
duct banks.

Sandron: Discussed the objections to the other
options.
~~That plan and do-nothing, etc.~~ etc.
will go on for years - Troubles may
not start for say, 10 years when
corrections will be hard to repair. (Some
should not have etc etc corrections
-problem.)

(3)

cannot estimate the future settlement since method of construction left material more heterogeneous than would ever be found in nature.

Settlement will occur "relatively" rapidly after preload is put on. cannot predict time required. Nature

✓ Compress fill first then bring up water level to saturate the fill. ~~to fill~~

Red - Preload will make the best possible fdu - could not say if NEC will be impressed. But knowledge of the action under preload will surely convince NEC (Lyonsville) and technical people. (QA people have been looking over previous settlement calculations - a useless activity now)

Red cannot be underpinned until the subsoil is improved. Therefore the preload would be required in any event. Future underpinning might be required if uneven settlement

(4)

occurred to damage the bldg (not expected by any means). Tech expects prelim to be rapid and decisive results can be expected early.

Hendron - No bearing problem dynamic or static.

Bearing capacity failure ^{would} show shear failure with soil rising above footings, whereas the lifting of ~~footings~~ ^{footings} indicates otherwise).

A bearing pressure of 5 times unconfined compression tests leads one to suspect bearing capacity.

Sampling is biased toward soft material.

May have to demonstrate capacity by test pits.

Significance of small volumes will not affect entire mass.

~~Some time and resources will be~~

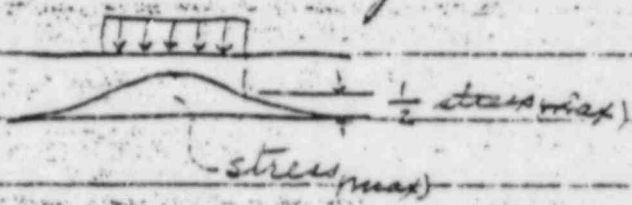
(5)

Settlement gages at varying depths should be installed at once to reveal behavior of soils at over the full depth.

[LENGTH OF TIME BETWEEN COMPLETION OF FILL AND START OF GEN. BLDG. CONSTRUCTION?]

HOW MUCH CONSOLIDATION IN INTERIM? SHOULD NOT THE FDN. HAVE BEEN SUSPECT?

note the stress diagram beneath preload.



Thus, limiting preload on north side because of turbine building will not give results desired

Sequence of loading: Bins fill up evenly to, say, 10 feet and take readings for a week. Then continue a few weeks more at 20' depth. This will equal settlement under 30' depth of fill for shorter time.

Subsequent boring and testing program
after preloading to convince NRC
would not be advisable since
we ~~are~~ ^{would then be} looking at the
entire ydu picture, not isolated
pockets.

Last operation will be grouting
under ~~the~~ spread footing to
~~an~~ established contact.

Also, grout before the building is
cut loose from ducts to prevent
sudden racking of the building. (Bechtel
will still take this recommendation under
advisement).

THEORIES OF SOIL BEHAVIOR ARE BORN
TO EXPLAIN FAILURE OF QUALITY CONTROL.

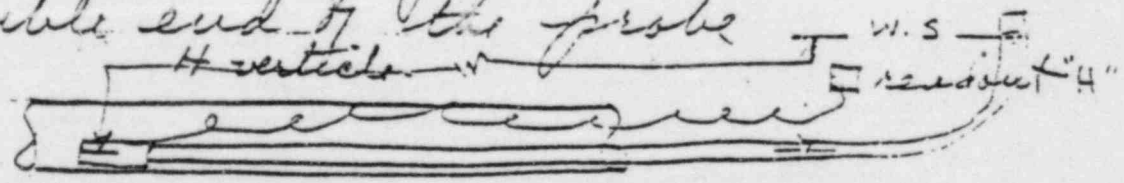
Conference call by
talked to Neil Hood of NRC and
Lyman Heller
Dates for site visit and conference
December 3 and 4, 1978.

Localized problem of loose sand on the north side of the Diesel Generator Bldg susceptible to liquefaction.

3
5
6
pressure

Instrumentation

1. Settlement gages on structure footings and machinery foundations.
2. Borris anchors in fill at various depths and into native substrata. About 50 gages contemplated with 2 or 3 remote gages for reference.
3. Settlement of representative piping (6" 3" dia) to be measured by drawing a liquid-filled tube with a pressure gage in the end through the pipe. With readout of pressure at the accessible end of the probe



4. Inclinoimeters to be installed adjacent to piping to indicate lateral movement of piping. Eight inclinometers to be installed on the north, south, and east of the Diesel Generator Building.

CONSUMERS POWER COMPANY

RECEIVED

NOV 03 1978

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

October 23, 1978

Consumers Power Company
P.O. Box 1963
Midland, Michigan 48640

Attention: T. C. Cooke

Job 7220 Midland Project
Removal of Loose Natural
Sands
BCCC-3587

Dear Mr. Cooke:

Reference: T. C. Cooke letter to J. F. Newgen, dated 10/6/78
(CCBC-1590).

This letter is written in response to your letter referenced above on the subject loose sands. Per your request we have established a separate account for costs associated with additional borings and any future corrective work measures. As regards your comment on why these sands were not removed and the applicability of Article I of the contract, we would prefer to wait until such time as our Geo-Tech group completes its investigation of the matter before we provide Consumers with a comprehensive response.

Very truly yours,

J. F. Newgen
for J. F. Newgen

JFN/AJB/ems

ICC	BHP	DIV	R.B	DAX	NAW	UES	Y.S	GRJ	IGB	V.B	EME	GHR	DOJ	LAI	JIB	JSS	CEB	TC	MCW	ASP	PAT	VICR	PEGG	FILE 0130
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	------	------	-----------

cc: GSX
JL Bacon



Consumers
Power
Company

TCC

Midland Project: P.O. Box 1963, Midland, Michigan 48640 - Area Code 517 631-0351

October 6, 1978

Mr. J. F. Newgen
Bechtel Power Cororation
P.O. Box 2167
Midland, MI 48640

MIDLAND PROJECT CWO 7020 -
REMOVAL OF LOOSE NATURAL SANDS
File: 0130 Serial: 3478

FSAR question number 362.2 relates to a loose sand layer which was to be removed if the natural sands exhibited relative densities less than 75%. In late September, 1978, it was brought to our attention that Bechtel has been unable to confirm that subject sand layer was removed or that in place tests were performed to confirm greater than 75% relative densities.

Failure to resolve this matter and fulfill the FSAR committment has, and will, result in costs to be incurred for additional borings and possible future corrective work measures. We request that a separate account be established for these costs since the above mentioned work may fall under the provisions of Article 9 of the Bechtel/CPCo contract regarding repair or resolution of this problem at the expense of Bechtel (engineering and construction costs).

To determine the liabilities involved, we request your comment on why this was not completed prior to filling over the area and whether you agree that this work falls under Article 9 of the contract.

T. C. Cooke
Project Superintendent

TCC/RMW/dw

BCC: GSKeeley
JLBacon

TCC



Consumers
Power
Company

Midland Project: P.O. Box 1963, Midland, Michigan 48640 - Area Code 517 631-0951

August 25, 1978

Mr. J. F. Newgen
Bechtel Power Corporation
P. O. Box 2167
Midland, MI 48640

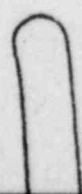
MIDLAND PROJECT GWO 7020 -
DIESEL GENERATOR BUILDING SETTLEMENT
File: 0130 Serial: 3369

On August 21, 1978, we were notified of the excessive settling of the Diesel Generator Building and the generator foundations. Inasmuch as these items could fall under the provisions of Article 9 of the Bechtel Power/Consumers Power Company contract regarding defective work (Engineering and Construction), we request that there be a separate account set up for all additional work done in this area concerning this settlement.

In your response to this letter please include what effect this will have on the scheduled completion and turn over of this building.

T. C. Cooke
Project Superintendent

TCC/DES/bd



CONSUMERS POWER
RECEIVED
FEB 10 1978

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Bechtel Power Corporation

TCC

Post Office Box 2167
Midland, Michigan 48640

February 1, 1978

U. S. Testing Company, Inc.
1415 Park Avenue
Hoboken, New Jersey 07030

Attention: Mr. D. Edley

Job 7220 Midland Project
Subcontract 7220-C-208
Failure of Fill Supporting
Administration Building Grade
Beam at Column Line 0.4
C-208-B-236

Reference: Telex Number C-208-B-283 Dated December 30, 1977 From J. F. Nauger

Dear Mr. Edley:

Pursuant to the referenced Telex, we have conducted an evaluation of the subject failure condition. Our engineering analysis has determined that the failure was caused by insufficient compaction of the fill which was placed in May and June of 1977. A careful review of the test data provided by U. S. Testing Company indicates that this fill was erroneously reported to be in conformance with Bechtel Specification requirements by U. S. Testing Company. This conclusion is supported by the following facts.

1. A summary of fifteen (15) compacted fill density tests taken by U. S. Testing to evaluate the subject fill as it was compacted is provided in Table #1. The location of each test is plotted in Figure #1. Although several initial tests indicate test failure due to insufficient compaction, each failure is properly cleared by a passing test at or near the location of the failure.
2. Maximum laboratory dry density values (from Bechtel Modified Proctor Tests) used as the standards for evaluating acceptability of fill compaction were selected by U. S. Testing Lab Technicians. In a Jobsite meeting with F. Teague and B. Check of Bechtel, J. Speltz of U. S. Testing stated that the testing technician uses a visual comparison between soil characteristics (primarily color) of the in-place sample and bottled samples of material with known maximum laboratory dry density, to select the appropriate standard. Visual examination by Bechtel soils engineers of the subject fill during the subsequent grade beam removal indicated the material was uniform in appearance with minimal variation in soil characteristics (color and plasticity) over the full extent of the fill placement.

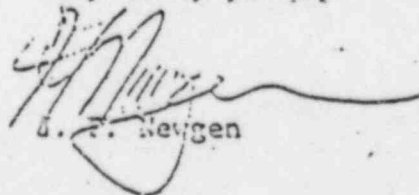
BECHTEL	
BHP	
DJV	
RLS	
DAK	
RAW	
DES	
WFS	
GBJ	
JGB	
WLB	
EAE	
GWR	
DDI	
ZAJ	
JID	
JSS	
CHD	
TC	
PKW	
ASP	
PAT	
VICKI	
PECO	
FILE	

3. The value of maximum laboratory dry density selected for comparison of the in-place dry densities in the subject fill varies between 132.9 lb./ft.³ and 116.0 lb./ft.³. This variation includes most of the full range of maximum laboratory density standards which represent significantly differing soil characteristics of the clay soils in use on this project. A graph of the maximum laboratory dry density plotted with the corresponding in-place dry density for each test is given in Figure #2. Note that for three compacted fill density tests (1469, 1494 and 1493) taken within a few feet of each other and at the same elevation, two significantly different maximum laboratory densities were used as the compaction standard by the same U. S. Testing technician.
4. Testing during removal of the subject fill was conducted by U. S. Testing in accordance with Bechtel direction and Specification 7220-C-203 requirements. A summary of test data and results is given in Table #2. The results of compacted fill density tests taken during subject fill removal confirm dry density values taken during initial fill. Bechtel modified proctor tests taken during fill removal in three locations (one at the north and south edges of the fill and one approximately in the center) confirm that the maximum laboratory dry density was uniform as the appearance of the material indicated. In addition, the subsequent testing indicates the value of maximum laboratory dry density was between 130.5 lb./ft.³ and 133.1 lb./ft.³. From these test results it is apparent that the lower maximum laboratory dry density standards selected during the original fill testing were not appropriate. As shown in Table #2, this error resulted in actual compaction in the range of 33.1% to 90.5% of optimum for three areas of the subject fill, a substantial deviation from the 95% of optimum compaction required by Specification 7220-C-203.

In conclusion, the U. S. Testing Company failure to report deviations from specified compaction requirements which was the result of repeated erroneous selection of compaction standards by U. S. Testing Company employees represents a violation of the Specification 7220-C-203, Section II, requirements, and U. S. Testing Company is therefore liable for costs associated with the subsequent failure of the fill. Such costs include but are not limited to the cost of removal and investigation of the original beam and its supporting fill in addition to all replacement costs which amounts to a total of \$134,600.00. An outline itemizing these costs is provided as Attachment #2 of this letter.

We trust U. S. Testing Company, Inc. will fulfill its contractual obligations with respect to this matter in a timely manner.

Very truly yours,



G. F. Newgen

JFW/CNC/JS/djs

Attachments

cc: P. A. Bechtel
T. C. Cooke
R. Herneston
P. A. Martinez
J. Speltz

DENSITY

MOISTURE

COUNT ONE		COUNT ONE	
COUNT TWO		COUNT TWO	
COUNT THREE		COUNT THREE	
COUNT FOUR		COUNT FOUR	
TOTAL	✓	TOTAL	✓
AVERAGE COUNT	426	AVERAGE COUNT	403

AREA: S ADMIN. BLDG.

TEST NUMBER					
DATE OF TEST	9/22/77	9/22/77			
STATION OR LOCATION	0.4 PA	0.4 PA			
OFFSET FROM CENTERLINE	E. EDGE OF FOOTING	W. EDGE OF FOOTING			
ELEVATION	613	613.0			
DEPTH OF TEST	6"	6"	6"	6"	6"
ZONE NUMBER	1	1			

DENSITY COUNT	460	733		
COUNT RATIO (DENSITY)	1.080	1.993		
WET DENSITY #/Fc ³	138.5	144.5		
TOTAL DENSITY DRY #/Fc ³	118.7	127.5		

MOISTURE COUNT	330	270		
COUNT RATIO (MOISTURE)	.819	.720		
MOISTURE FROM MANUAL CHART #/Fc ³	19.8	17.0		
MOISTURE %	16.7	13.3		

PROCTOR CURVE NUMBER	BMP-270	BMP-269		
MAXIMUM DENSITY #/Fc ³	124.6	127.3		
OPTIMUM MOISTURE %	11.1	10.0		
% DENSITY REQUIRED	95%	95%	95%	95%
MOISTURE TOLERANCE REQUIRED				
% FIELD DENSITY	95.7	101.6		
P=PASS F=FAILURE	F-M	F-M		
RETEST	NB	NB		
AREA OF TEST	PLANT	PLANT		

REMARKS: INFO ONLY
 CAUCE NO. 2932
 JERRY MORRIS NOTIFIED OF RESULTS 9/22/77 @ 10:00 BY R.S.
 CHECKED BY: SEE

TESTED BY

APPROVED BY

STANDARD
CO

DENSITY

MOISTURE

COUNT ONE	432	COUNT ONE	430
COUNT TWO	431	COUNT TWO	428
COUNT THREE	434	COUNT THREE	442
COUNT FOUR	429	COUNT FOUR	431
TOTAL	1726	TOTAL	1731
AVERAGE COUNT	432	AVERAGE COUNT	433

AREA:

IDENTIFICATION

TEST NUMBER				
DATE OF TEST	9/19/77			
STATION OR LOCATION	2' E. OF SIDE OF PAVEMENT 2' S. OF N. SIDE	NK 0.4	MP 0.4	PA 0.4
OFFSET FROM CENTERLINE	5' END OF ROAD BUILD. BEAM	ADMIN.	BUILD.	
ELEVATION	622	622	622	622
DEPTH OF TEST	6"	6"	6"	6"
ZONE NUMBER	1	1	1	1

DENSITY

DENSITY COUNT	529	464	478	447
COUNT RATIO (DENSITY)	1.225	1.074	1.106	1.035
WET DENSITY #/ft ³	130.0	139.0	137.0	141.5
TOTAL DENSITY DRY #/ft ³	108.5	119.2	117.5	121.7

MOIST.

MOISTURE COUNT	381	338	350	353
COUNT RATIO (MOISTURE)	.880	.781	.808	.815
MOISTURE FROM MANUAL CHART #/ft ³	21.5	18.8	19.5	19.8
MOISTURE "	19.5	15.7	16.6	16.2

DATA

PROCTOR CURVE NUMBER	8MP-218	8MP-270	8MP-262	8MP-262
MAXIMUM DENSITY #/ft ³	117.0	124.6	123.9	123.9
OPTIMUM MOISTURE %	15.2	11.1	11.8	11.8
% DENSITY REQUIRED	95%	95%	95%	95%
MOISTURE TOLERANCE REQUIRED	± 2%	± 2%	± 2%	± 2%
% FIELD DENSITY	92.7	95.7	94.8	98.2
P= PASS F=FAILURE	F=HD	F=M	F=HD	F=M
RETEST	NO	NO	NO	NO
AREA OF TEST	PLANT	PLANT	PLANT	PLANT

REMARKS:

GAUGE NO. 2932

INFO ONLY
SOIL REMOVED

R. Smith

TESTED BY

APPROVED BY
CHECKED BY: *[Signature]*

Summary of Compacted Fill Density TEST Data

for

Administration Building Original Fill.

(Tests Grouped by General Area and Date of Test)

TEST NO.	DATE TAKEN	TESTED BY	LOCATION	ELEV.	IN-PLACE DRY DENS.	MAX. LAB. DRY DENS.	Z COMP.	REMARKS
911	5-23-77	SM	2' N. of N. Steam Tunnel Wall - 25' W. of Turb. #1	614.5	133.1	132.9	100.2	Pass
914	5-24-77	SM	2' N. of Steam Tunnel Wall - 50' W. of Turb. #1	614.6	125.7	123.9	101.5	Fail - Moisture (Too Dry - 9%)
1403	6-3-77	RS	4' N. of N. Wall Steam Tunnel - 15' W. of 1.0	621.5	111.0	116.0	95.7	Pass
1404	6-3-77	RS	5' N. of N. Wall Steam Tunnel - 24' W. of 1.0	623.0	115.7	121.0	95.6	Fail - Moisture (Too Dry - 10%)
1362	5-27-77	SM	10' N. of Steam Tunnel - 4' E. of E. Side	615.5	114.2	117.0	97.6	Pass
1422	6-8-77	BS BT	8' E. of E. Steam Tunnel - 24' N. of N. Steam Tunnel	622.0	117.7	123.9	95.0	Pass
1469	6-13-77	BC	8' S. Hk line - 4' E. of E. Steam Tunnel Wall	617.0	115.2	127.3	90.5	Fail - Comp.
1494	6-15-77	RS	8' S. of Hk line 4' E. of E. Steam Tunnel Wall	617.0	118.2	117.0	101.0	Pass - Retest Clears 1469, 1
1493	6-15-77	RS	8' S. of Hk line 3' E. of E. Steam Wall	617.0	112.2	127.3	88.2	Fail - Comp.
1491	6-15-77	BT	8' E. of E. Steam Tunnel Wall - 46' N. of N. Steam Tunnel Wall	618.0	113.0	127.3	88.3	Fail - Comp.
1517	6-16-77	BT	5' E. of E. Steam Tunnel Wall - 60' N. of N. Wall	620.0	119.7	123.9	96.6	Pass
1519	6-16-77	BT	8' E. of E. Steam Tunnel Wall - 48' N. of N. Wall	618.0	124.0	127.3	97.4	Pass - Retest Clears 1491
1492	6-15-77	BY	38' W. of 1.0 - 5' N. of N. Steam Tunnel Wall	626.0	116.2	127.3	91.3	Fail - Comp.
1518	6-16-77	BT	38' W. of 1.0 - 5' N. of N. Wall	626.0	122.7	127.3	96.4	Fail - Moisture
1515	6-16-77	BT	38' W. of 1.0 - 5' N. of N. Wall	626.0	122.7	127.3	96.4	Pass - Retest Clears 1492, 15

Summary of Test Data and Results

for

Fill Below Original Beam at 0.4 Line

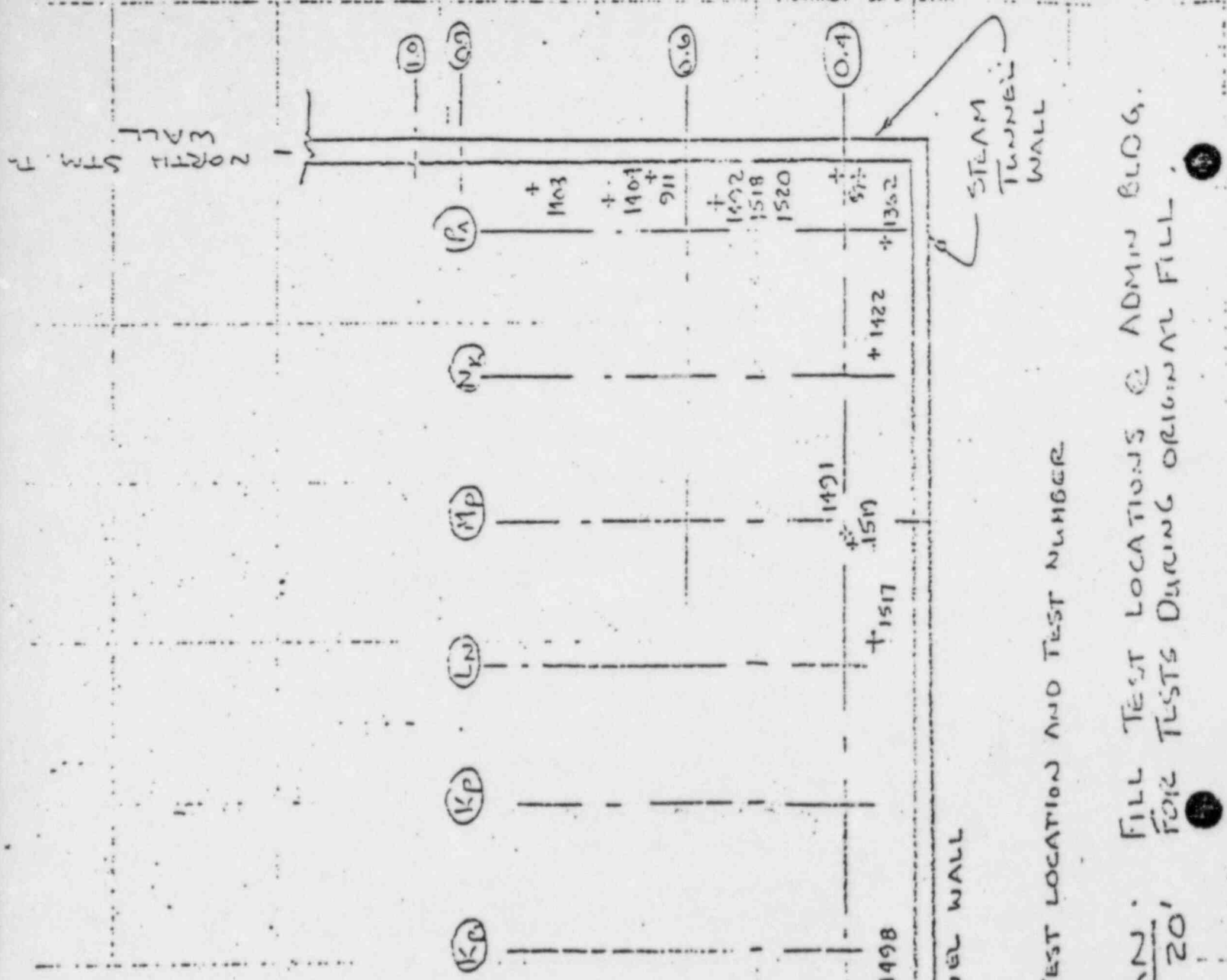
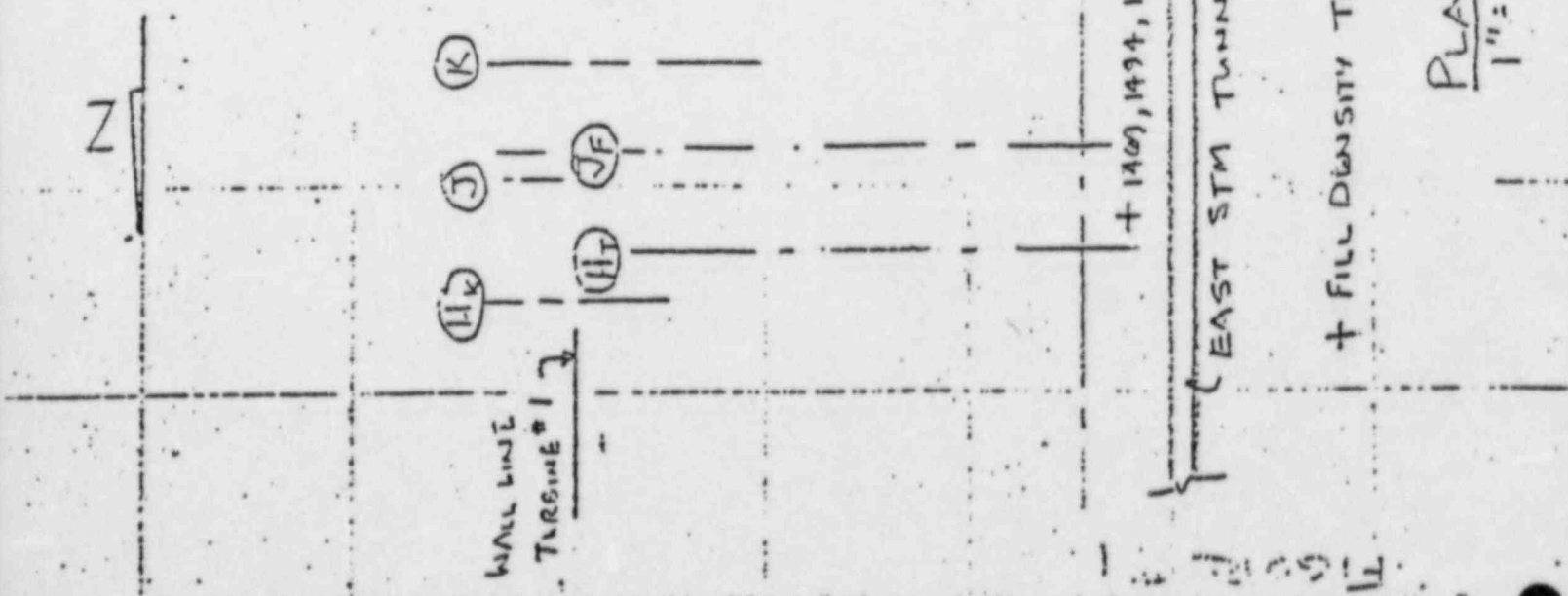
Administration Building (All Tests by U. S. Testing)

DESCRIPTION OF TEST	ELEVATION OF TEST	TEST RESULTS AT COLUMN MT	TEST RESULTS AT COLUMN LN	TEST RESULTS AT COLUMN PA
1. Initial Compacted Fill Density Test	617' ±	In-Place Dry Density = 118 lb./ft. ³ Test No. .494	In-Place Dry Density = 119.7 lb./ft. ³ Test No. 1517	In-Place Dry Density = 114.2 lb./ft. ³ Test No. 1362
2. Proctor Selected by U.S.T. Technician for Item No. 1 Tests	617' ±	BMP - 278 Max. Lab. Dry Density = 117 lb./ft. ³	BMP - 262 Max. Lab. Dry Density = 123.9 lb./ft. ³	BMP - 278 Max. Lab. Dry Density = 117 lb./ft. ³
3. In-Place Proctor After Beam Removal	617' ±	BMP - 300 Max. Lab. Dry Density = 132.2 lb./ft. ³	BMP - 299 Max. Lab. Dry Density = 133.1 lb./ft. ³	BMP - 298 Max. Lab. Dry Density = 130.5 lb./ft. ³
4. Reported % Compaction	617' ±	101%	96%	97.6%
5. % Compaction Using In-Place Proctor	617' ±	89.3%	89.9%	87.5%
6. Compacted Fill Density Tested After Beam Removal	617' ±	*Dry Density = 119.7 lb./ft. ³	Mp & 0.4 Dry Density = 117.5 lb./ft. ³	Dry Density = 108.5 lb./ft. ³
7. % Compaction Using In-Place Proctor & Dry Density Taken After Beam Removal	617' ±	90.5%	88.3%	83.1%

*Average of Three Tests at This Location

Note Code:

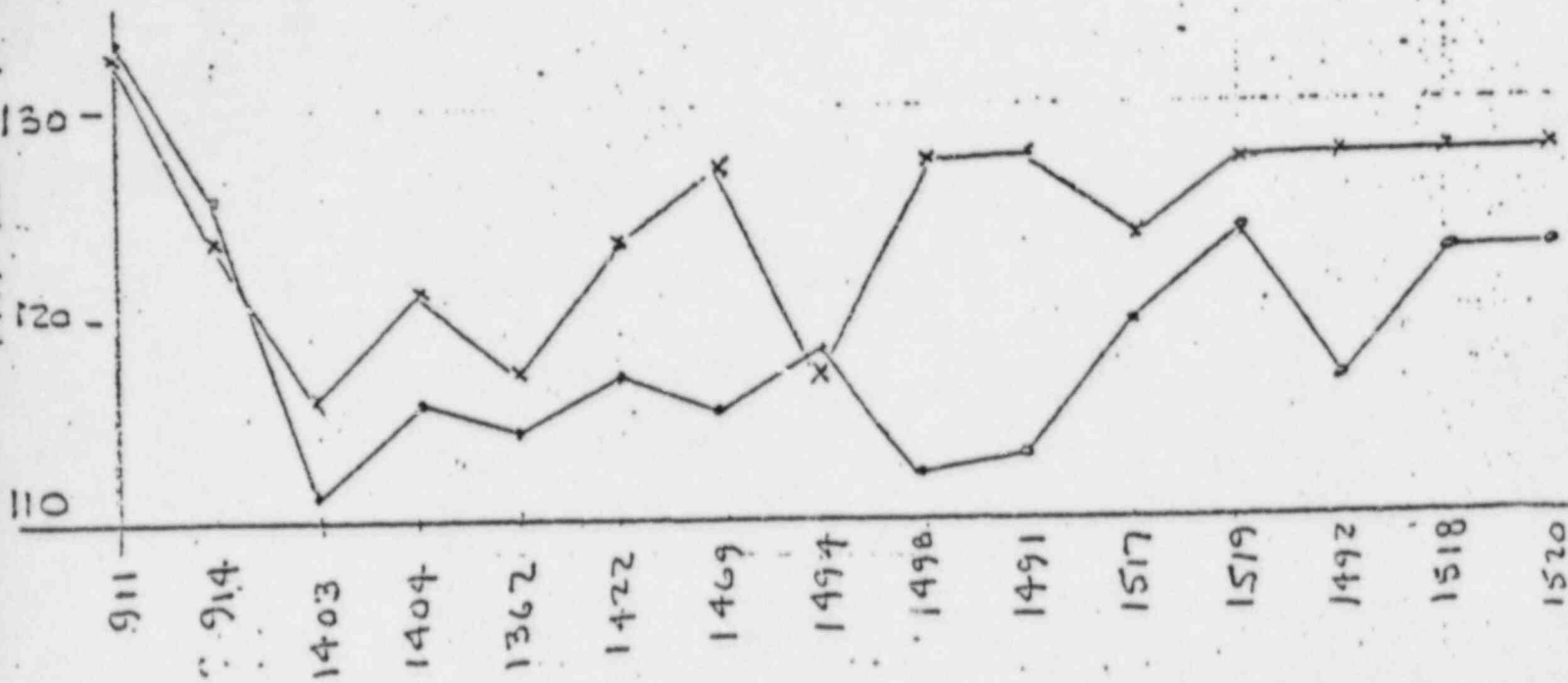
- A. Test Results do not include failing tests which were cleared by retest
- B. Reported % Compaction during initial fill compaction
- C. Actual % Compaction calculated using Item No. 1 tests divided by Item No. 3 proctor information
- D. Tests taken after footing removal were not numbered by U.S.T., and were submitted for information only to Bechtel. Copies of reports are included as Attachment No. 1



+ FILL DENSITY TEST LOCATION AND TEST NUMBER

PLAN: FILL TEST LOCATIONS @ ADMIN BLDG.
FOUR TESTS DURING ORIGINAL FILL.
1" = 20'

FILL # 2



COMPACTED FILL TEST NUMBER

x-----x MAX. LAB. (PROCTOR) DRY DENSITY SELECTED BY THE US. TESTING TECHNICIAN DURING ORIGINAL TESTING OF COMPACTED FILL

o-----o IN PLACE DRY DENSITY TAKEN DURING COMPACTION OF ORIGINAL FILL

TO J W Cook

JIBacon
JEBrunner
DEBudzik
JCCooke
MEGibbs (IL&B)
CSKeeley
DEMiller
JARutgers (Bechtel)
NJSaari

Attached are revised pages
to the "Documentation and
Meetings Relative to Soils"
List.

JEB/PS

CONSUMERS POWER COMPANY

RECEIVED

OCT 23 1980

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

DOCUMENTATION AND MEETINGS RELATIVE TO SOILS

3/13/73	Hunt/Hanson (Rogn 33-73)	C-210 comments
9/19/74	CAHunt comment on C-210 compaction of plant area - Hunt 110-74	
8/25/77	Grade beam failure - See also BCCC (see below 2794), 3010 Bechtel - UST memo of 2/1/78	
9/8/77	TCCooke Serial 2538 to Newgen on Article 9	
9/23/77	BCCC-2794 Newgen acknowledgment	
2/1/78	Newgen to US Testing	
8/22/78	Verbal discussion with RCCook by WRB & JLC on settlement (78-13) also 8/24 Cook exit	
8/25/78	Article 9, TCC/JFN - See also CSC-3797, Loose sands, Serial 3478	
8/31/78	SHH/GSK/RCB/JJZ	NRC meeting in Washington
9/7/78	50.55 (e) telecon report to NRC on settlement - WRB and JLC to RCCook	
9/8-Exit & 9/10-29/78	RCook	78-14
9/14/78	GSK (GSK handwritten notes) (Where are meeting notes?)	Meet with Bechtel at site on Foundation settlement
9/22/78	MCAR 24, Interim Report No 1, BLC-6578	
9/26/78	PAM - GSK telecon	Question on removal of natural sands
9/28/78	Dr Peck on soils at site	
9/29/78	Wuokko to CAH/GSK and Wuokko CAH to GSK	Review of settlement
9/29/78	Siple/Cheek note	Test on fill
9/29/78	50.55 (e) Report	

0/78	RCCook	78-21
10/4/78	GSK/DBM/TCC	Discuss earthwork specs
10/8/78	Dr Hendron site visit	
10/9/78	Afifi to Peck	Transmitted Vol IV of FSAR
10/9/78	Afifi to Hendron	Transmitted Vol IV of FSAR
10/9/78	RMW - 11/1/78 - settlement status - AA	
10/10/78	TCC/JFN Serial 3487	Dike borings
10/11/78	GSK (RMW & TCC asked to review conditions)	Soils discussion on site
10/12/78	Field - AA telecon	Dike borings
10/12/78	Afifi to Peck	Transmitted settlement contours for DGB SK-C-620
10/12/78	Afifi to Hendron	Transmitted settlement contours for DGB SK-C-620
10/17/78	GSK/CAH (Discussed RMW inconsistency notes)	Visit site on foundations
10/18/78	Dunnicliff	Site visit
10/18/78	Afifi to Peck	Meeting in Urbana
10/20/78	Pond fill & D/S Settlement AA	
10/23/78	Hendron to Afifi	Comments on site visit
10/23/78	JFN/TCC (also plan mtg w/GSK)	Dike borings
10/24-27/78	Region III site inspection 78-12	NRC notes dated 11/17/78 also 280 FQA78 (DEH)
10/25/78	GSK (handwritten notes) (where are official meeting notes?) BLC-6747	D/G settlement meeting at site
10/26/78	Afifi to Hendron	Transmitted data 1. Boring logs 2. Consolidation tests 3. Updated settlement data

10/25/78	Afifi to Peck	Transmitted data 1. Boring logs 2. Consolidation tests 3. Updated settlement data
10/27/78	Draft TCC/JFN	Activities prior to preload also NRC exit that date.
10/30/78	WRB/RMW/DEH (where are notes?)	MCAR discussion on settlement Bechtel-AA
10/31/78	Draft NRC exit (GSK)	
10/78	RCook 78-22	
11/1/78	Keppler memo to Thornburg asking NRC Staff to take over responsibility	
11/1/78	PAM/GSK - BLC-6747	Continuation of D/G work
11/2/78	Afifi to Hendron	Transmitted 10/8/78 meeting notes
11/2/78	GSK/RMW/DBM/TCC/DES (see material assembled by RMW 11/1/78	Meet w/Bechtel on settlement Bechtel-AA (GSK meeting notes 12/4/78)
11/6/78 or 11/7/78	Champaign, IL mtg	Handwritten (CAH notes)
11/6/78	Afifi to Peck	Transmitted Dunnicliff's site visit recommendations
11/6/78	Afifi to Hendron	Transmitted Dunnicliff's site visit recommendations
11/6/78	MCAR 24, Interim Report No 2	BLC-6767
11/6/78	Afifi to Hendron	Transmitted Dr Wood Dutch cone data
11/7/78	50.55 (e) (Tentatively planned to have review meeting last two weeks in November and NRC will be invited.)	
11/7/78	TCC/DES/RMW/CAH/DEH - CSC-3674 Bechtel minutes	Meet with Dr Peck and Hendron on settlement at Urbana, IL
11/10/78	Afifi to Hendron	Telecon: Recommendations on pre- load prior to NRC meeting
11/14/78	NRC notified meeting at site for 12/3 and 12/4/78	

11/15/78	Meeting with consultants at Urbana (Bruce Peck's notes 11/21/78)	
11/16/78	DBM CSM-0050 to PAM	Continue construction of building
11/16/78	Urbana Meeting	CSC-3621
11/16/78	Ohmstead to ASLB including Keppler to Thornburg 11/1/78 memo and CP Co 9/24/78 50.55 (e)	
11/17/78	Hendron to Afifi	Comments and conclusions to 11/7/78 meeting notes
11/17/78	Inspection Report (Gallagher 10/24-27/78 inspection on site)	
11/18/78	Meeting in Urbana w/Hendron	
11/20/78	Cherry memo to Keppler (Is at- tached to 12/14/78 Keppler reply to Cherry)	
11/21/78	GSK	Meet w/RCY, PAT by NRC?
11/27/78	Afifi to Peck	Transmitted 9/27/78 meeting notes
11/27/78	Afifi to Hendron	Transmitted 9/27/78 meeting notes
11/28/78	Afifi to Hendron w/ Peck	Instrumentation and cross-sections for DGB. Cage for vertical pressure
11/30/78	GSK/RMW	Meet w/Bechtel on preparation for NRC site visit on settlement
12/3-4/78	TCC, CSC-3663 to PAM BLC-7233 & Bechtel minutes; Hoco's mtg notice of 11/14/78	NRC on site for settlement issue. DHood/WLayman/DGillen/Bechtel/CP Dr Peck
12/7/78	JLC/DEH Gallagher Telecon	Roller Passes
12/8/78	Met w/consultant (where are meeting notes? CSC-3699 & Bechtel minutes	(BPeck CSC-3712 refers to it)
12/11-13/78	NRC 78-20 Soils	AA, Site, Jackson
12/11/78	Ferris to Peck	NRC letter dated 11/17/78
12/13/78	Gray to GZD (Schultz) w/GeoT	Minerology of soil
12/13/78	GZD to QF	Qualification of people

12/14/78	Met with Bechtel to discuss 12/8/78 meeting with consultants and concerns of CP Co - CPC-3663. (BPeck CSC-3712 dated 12/20/78)	
12/21/78	Between the lines	
12/21/78	50.55 (e) that preload is corrective action to be taken	Site task group
12/27/78	Afifi to Hendron	Telecon: Preload sequence for DGB
12/27/78	Afifi to Hendron	Telecon: DGB preload defrosting
12/28/78	Ferris to Hendron	Transmitted backfill Spec C-210 & 211 and SK-C-355 requirements
12/28/78	Ferris to Peck	Transmitted backfill Spec C-210 & 211 and SK-C-355
12/28/78	MCAR 24, Interim Report No 3	BLC-6949
12/29/78	GZD to GeoT	Personnel Qualifications
12/29/78	Afifi to Peck	Transmitted sketch SK-C-620, SK-C-623 and settlement vs time for pedestals plus copy of NRC questions
12/29/78	Afifi to Hendron	Transmitted sketch SK-C-620, SK-C-623 and settlement vs time for pedestals plus copy of NRC questions
12/78-1/79	RCook 78-20	
1/3/79	Newburry/TCC	Newsletter on soil compaction
1/4/79	AA meeting task group	
1/4/79	Revision to MCAR 24, Interim Report No 3 - BLC-6971	
1/5/79	50.55 (e) Report	
1/10/79	GZD to Castleberry w/Geo T	Transmitting inspection and reading procedure
1/12/79	NRC investigation US testing allegations (no notes)	
1/15/79	Afifi to Castleberry w/Peck	Next meeting February 4, 1979

1/15/79	Afifi to Peck w/Hendron	Transmitting 12/8/78 meeting notes
1/17/79	Afifi to Hendron	Transmitted meeting notes for November 7 and 18, 1978
1/17/79	Afifi to Dunicliff	Transmitted meeting notes for November 7, 1978
1/18/79	Afifi to Peck	Transmitted meeting notes for November 7 and 18, 1978
1/23/79	Site	Task Group
1/30/79	Afifi to Dunicliff	Discussing TSA
1/31/79	Afifi to Hendron	Transmitted FSAR Question 362.13 w/draft answer
2/1-3/79	Code 79-09; also 1/2-31/79	
2/5/79	GZD to Castleberry	Supplemental QA Manual
2/5/79	GZD to Castleberry	TSA
2/7/79	GSK/DBM (where are official meeting notes?)	Meet w/JKeppler at Site (GSK notes)
2/15-16/79	GSK/WRB/CAH/TRT/TCC/RMW (where are meeting notes?) AA handouts & handwritten notes	Status of diesel generator building foundation - Bechtel - AA (See GSK notes)
2/16/79	MCAR 24, Interim Report No 4	BLC-7179
2/20/79	TCC memo CSC-3852 to CAH commenting on DRW 12-78 & 13-78	
2/21/79	RCB/CAH & GSK discussion (GSK notes) also Hunt 29-79	
2/23/79	Met with Region 3 at Glen Ellyn	
2/23/79	50.55 (e)	
2/23/79	Afifi to Peck	Location of Class I piping and profiles by GZD
2/24/79	Afifi to Peck	Telecon: Effective saturation of compacted fill
3/1/79	Hand notes - AA meeting, I think	

3/5/79	SHH/GSK/TCC/DEH	Meet with Region 3 in Glen Ellyn. At end of this meeting requested NRC for technical meeting.
3/5/79	Draft cause memo by TCC	
3/6/79	NRC visited site to review pre-load. NRC documented 3/20/79	Also planning meeting on site
3/8/79	Meeting w/Bechtel (no formal notes)	Planning K/T analysis
3/9/79	SHH memo to Keppler	Asked for reply on scheduling technical meeting.
3/12/79	Task Force meeting	Jobsite
3/14/79	Prof N Newmark	Urbana
3/15/79	NRC meeting notes of 2/23/79 & 3/5/79 meeting in Glen Ellyn	
3/19/79	RCB Eng SU request	Subsidence/settlement check
3/20/79	TCC/DES/GSK	Meet with Dr Peck on settlement at Bechtel AA, BLC-8093
3/21/79	GSK	Received NRC's 50.54 (f) questions on settlement
3/22/79	Keppler to SHH	Results of investigation by Philip, Gallagher and Maxwell 12/11, 18/78 & 1/4, 9, 22/79
3/22/79	Afifi to Peck	Transmitted copy of 10 CFR 50.54 (f) question (22 questions)
3/22/79	Afifi to Hendron	Transmitted copy of 10 CFR 50.54 (f) question (22 questions)
3/23/79	Review 50.54 (AA)	
3/23/79	Between the lines	
3/23/79	Afifi to Peck	Transmitted: 1. Liquefaction potential study; 2. Field cyclical stress ratio; 3. Earthquake induced settlement

3/23/79	Afifi to Hendron	Transmitted: 1. Liquefaction potential study; 2. Field cyclical stress ratio; 3. Earthquake induced settlement
3/27/79	GSK response to letter on soils	Review 50.54 (f) question with Bechtel in AA
3/28/79	Afifi to Peck	Transmitted Dr Woods report on Dutch cone data
3/28/79	Afifi to Hendron	Transmitted Dr Woods report on Dutch cone data
3/28-29/79	Gallagher inspection on Site (JLC memo 3/29/79 111FQA79 & NRC report 4/9/79)	79-06
3/29/79	Gould - AA meeting	
4/3/79	50.55 (e)	
4/4/79	Underpinning	AA Spencer White & Prentices
4/4/79	Afifi to Hendron	Update of March 23, 1979 letter
4/9/79	BWM & DEH & Bechtel meeting at US Testing. (Meeting notes on 4/25/79 memo)	
4/10/79	Davvisson, Loughney, Gould	Site Tour
4/12/79	Afifi to Davisson	Transmitting: boring logs; location plan of areas being considered for underpinning; Midland FSAR soils section
4/17/79	MCAR 24 coordination	
4/19/79	GSK	Review answers to NRC
4/23-24/79	Site meetings on data & Q-List fill	
4/24/79	SHH	Respond to NRC's 50.54 (f) settlement issues
4/24/79	Resumption of Q-List backfill BCDC 3995	
4/24/79	Soil & Rock to Castleberry	Field data April 3 to 10 pipe profiles

4/25/79	MCAR 24, Interim Report No 5	BLC-7505
4/26/79	Task Group	
4/26/79	Castleberry to Intrusion prepack	Grouting of sand
4/27/79	Castleberry to Loughney	Transmittal for underpinning 12 drawings; 17 figures; boring logs
4/27/79	Afifi to Hendron	Transmitting 17 figures showing response of instrumentation to surcharge
4/27/79	Afifi to Peck	Transmitting 17 figures showing response of instrumentation to surcharge
4/27/79	Dunnicliff to C. . .	Received soil samples
5/1/79	Afifi to Peck	Transmitted responses to NRC questions
5/1/79	Afifi to Hendron	Transmitted responses to NRC questions
5/7/79	2 telecons with Hood	Settlement issue is broad. NRC Staff too tied up with TMI-2 to meet
5/10/79	RMW	Meet with D/G consultant at Bechtel-AA
5/11/79	GSK	NRC Exit Interview at Bechtel-AA
5/11/79	GSK/TCC - BLC-7830	Meet with Bechtel on proposed fixes to structures
5/16/79	Task Group	Site.
5/17/79	TCC memo CSC-4066 to Newgen on air line leak in tank farm	Also NRC Exit
5/17/79	NRC 79-10 & 170FQA79	Site
5/21/79	Afifi to Loughney	Transmitted C-88 for review
5/22/79	Afifi to Davisson w/Peck, w/Dunn; w/Hendron	Transmitted May 10, 1979 meeting summary
5/22/79	Davisson - Afifi	May 10 meeting in AA summary
5/24/79	Afifi to Davisson w/Gould	Transmitted Spec C-95 for review

5/24/79	Afifi to Hendron w/ Davisson	C Gould participation with Davidsson
5/25/79	Afifi to Davisson	Transmitted C-94 for review
5/29/79	Davisson to Afifi	Response to May 10, 1979 meeting summary
5/30/79	D/G Task Group, BLC-8051	AA
5/31/79	Loughney, Woods, DES	AA dewatering
5/31/79	SHH	Rev 1 to 50.54 (f)
6/79	Review of UST	
6/1/79	NRC Notice of Test Pit Visit - 6/7/79	
6/5/79	RLC/TCC	Prospective Bidding
6/6/79	Afifi to Hendron	Liquefaction potential of railroad bay
6/7/79	TCC, CSC-4138	NRC site visit to observe test pits (TCC memo 6/13/79, CSC-4138 and NRC Report dated 6/21/79)
6/11/79	DES (where are minutes?)	Meet at Bechtel to discuss diesel gen MCAR
6/12/79	Afifi to Hendron	Update of borings, cross-sections & other information
6/12/79	Afifi to Peck	Update of borings, cross-sections & other information
6/12/79	Afifi to Woods	Update of borings, cross-sections & other information
6/12/79	Afifi to Davisson	Update of borings, cross-sections & other information
6/12/79	Afifi to Gould	Update of borings, cross-sections & other information
6/12/79	Afifi to Peck	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/12/79	Afifi to Hendron	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and rev 1

5/12/79	Afifi to Davisson	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/12/79	Afifi to Gould	Copy of the NRC 10 CFR 50.54 (f) questions dated 4/24/79 and Rev 1 dated 5/31/79
6/13/79	Chen to Hendron	Telecon - Interim Report #6 to MCAR 24 - questions on liquefaction of control tower
6/15/79	MCAR, Interim Report No 6	BLC-7745
6/18/79	SHH/GSK/JJZ/RFG	Meet with NRC on Licensing Schedule in Washington, DC
6/18-19/79	DES	Meet with consultants at Bechtel-AA (TCC memo CSC-4297 dated 8/8/79)
6/20/79	CP Co motion for separate hearings on environmental and soils	
6/22/79	GSK/BWM/WRB/DEH, CSC-4297	Meet at Bechtel to discuss upcoming NRC meeting
6/25/79	50.55 (e)	
6/25/79	DES - D/G Task Group	AA BLC-7944
6/27-28/79	Meeting with consultants in Denver (TCC memo CSC-4306 dated 8/10/79 and CSC-4274 dated 8/7/79)	
6/29/79	SHH to Keppler	CP Co response to noncompliance on prestressing - soils also inspected on 5/14-17/79
6/29/79	Afifi to Peck	Interim Report #6 to MCAR 24
6/29/79	Afifi to Davisson	Interim Report #6 to MCAR 24
6/29/79	Afifi to Hendron	Interim Report #6 to MCAR 24

6/29/79	Afifi to Loughney	Interim Report #6 to MCAR 24
6/29/79	Afifi to Gould	Interim Report #6 to MCAR 24
6/29/79	Afifi to Peck	Report by D Gray dated 5/7/79
6/29/79	Afifi to Hendron	Report by D Gray dated 5/7/79
6/29/79	Afifi to Dunnicliff	Peck's suggestion on temperature correction for DGB Instrumentation
7/2/79	Gould, Davisson, Loughney, Peck to Afifi	Transmitting Denver meeting notes signed by the senders
7/3/79	TCC telecon with Lipinski	
7/3/79	GSK/PAM, BLC-7827	Arrangements for 7/18/79 meeting (Washington)
7/3/79	Newgen/Cooke	Resumption of Q-List fill
7/3/79	Afifi to Ferris w/Hendron	Settlement during earthquake
7/6/79	Telacon SHH to Boyd	Concern on need for continuing activity on settlement
7/7/79	Afifi to Loughney	Meeting notice
7/7/79	Afifi to Gould	Meeting notice
7/7/79	Afifi to Peck	Meeting notice
7/9/79	SHH	Send in Rev 2 to 10 CFR 50.54 (f)
7/10/79	Denton reply to SHH	TWX says they will continue reviews of soils
7/10/79	NRC Staff reply to CP Co 6/20/79 motion	
7/10/79	DNR - Hittle	Draining Pond to D/G
7/10/79	TRT/DEH/GSK/TCC	Pre-7/18 meeting
7/17/79	Review Monitoring w/Loughney	AA
7/17-18/79	GSK/TCC/TRT	Premeeting with consultants in Washington, DC. Meet with NRC on settlement in Washington, DC 50.55 (e) dated 8/10/79 documented meeting
7/18/79	Hood issued meeting notes of 7/18/79 meeting on 10/16/79	

7/18/79	Meeting Submittal	
7/18/79	Afifi to Gould	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Davisson	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Hendron	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Peck	Transmitting Rev 2 of 50.54 (f) questions
7/18/79	Afifi to Loughney	Transmitting Rev 2 of 50.54 (f) questions
7/23/79	Gould to Afifi	Summary of presentation made to the NRC 7/18-19, 1979
7/23/79	Peck to Afifi	Summary of presentation made to the NRC July 18-19, 1979
7/25/79	Afifi to Davisson	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Loughney	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Dunicliff	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Peck	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Hendron	Transmitted meeting notes of 6/18-19/79
7/25/79	Afifi to Gould	Transmitted meeting notes of 6/18-19/79
7/25/79	Loughney to Afifi	Summary of presentation made to the NRC July 18-19, 1979
7/26/79	Meeting with SHH & Bechtel on Lessons Learned. (B&W meeting notes 7/26/79, BWM 101-79)	
7/31/79	Telecon with Hood	Discussion on documenting 7/18/79 meeting. Hood stated that Staff said positive aspects of meeting were proposed design fixes.

8/1/79	Task Force, BLC-8092	
8/2/79	Chen to Peck	Data for settlement evaluation of DGB
8/2/79	Chen to Hendron	Data for settlement evaluation of DGB
8/3/79	Telecon with Miller	Update on 7/18/79 soils meeting and Bechtel Mgmt Meetings
8/6/79	Fobes to JSS/RLB	Dewatering info request
8/10/79	50.55 (e)	Meeting notes of 7/18/79 meeting with NRC staff
8/10/79	Afifi to Woods	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Peck	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Hendron	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Davisson	DGB settlement Dutch cone data pipe profiles
8/10/79	Afifi to Gould	DGB settlement Dutch cone data pipe profiles
8/10/79	Woods to Afifi	Pile stiffness report on service water structure
8/13/79	Afifi to Castleberry w/Peck, w/Hendron	Telecon: Reference w/Peck & Hendron on removing the surcharge
8/14/79	Newgen/Castleberry TWX	Release to remove surcharge
8/15/79	PAM to GSK, BLC-8021	Justification for removing preload
8/16/79	Chen to Hendron & Dunnicliff	Telecon: Settlement monitoring during surcharge removal
8/24/79	Dewatering (AA)	
8/24/79	MCAR 24, Interim Report No 7	BLC-8073
8/28/79	Afifi to Loughney	Interim Report No 7
8/28/79	Afifi to Peck	Interim Report No 7
8/28/79	Afifi to Hendron	Interim Report No 7

8/28/79	Afifi to Davisson	Interim Report No 7
8/28/79	Afifi to Gould	Interim Report No 7
8/29/79	Rubenstein/Howell	Question 1 meeting
8/31/79	JJZ/WRB	Held preplanning meeting for NRC QA settlement meeting at Bechtel-AA
9/4/79	Revision to MCAR 24, Interim Report No 7	BLC-8088
9/5/79	Darl Hood meeting notes	Meet with NRC on QA settlement (Q-23)
9/5/79	50.55 (e) & RMW AA dewatering?	
9/6/79	Dewatering CSC-4376	
9/7/79	Dewatering AA	
9/10/79	Afifi to Loughney	Interim Report No 7
9/10/79	Afifi to Peck	Interim Report No 7
9/10/79	Afifi to Hendron	Interim Report No 7
9/10/79	Afifi to Davisson	Interim Report No 7
9/10/79	Afifi to Gould	Interim Report No 7
9/11/79	SHH	NRC sent letter on QA settlement issue (Question 23)
9/11/79	Testing & monitoring AA	
9/12/79	GSK/BWM/WRB/JJZ	Meet on QA settlement in Jackson
9/13/79	SHH	Rev 3 to 50.54 (f)
9/15/79	RMW/Dunnicliff CSC-4405	Task Group AA
9/17/79	Chen to Hendron	Telecon: Monitoring of only selected borres anchors
9/18/79	Afifi to Curtis w/Woods	In situ shear wave measurements & additional borings

7/18-19/79	Case Load Forecast Panel Site Visit. Serial 7759. Agenda Item 6. Discussed work schedules and completion of investigation and saw no schedule effects.	
9/27/79	SHH/GSK/JJZ/TJS - Serial 7921	NRC Management Meeting in Washington, DC. Rubenstein stated he had trouble getting Tech Staff to review soils.
10/1/79	Bechtel	Tank Farm Investigation Report
10/1/79	UST-Bechtel	Response to Bechtel review
10/9/79	GSK/BWM/WRB/JJZ	Meet on 50.54 (f) (Question 23) in Jackson
10/9/79	TCC/DES/DEH/TRT (CSC-4504-below) also BLC-8439	D/G Task Group AA
10/11/79	GSK	Meet with TRT to prepare for Bechtel dewatering meeting (Jackson)
10/12/79	GSK	Meet at Bechtel-AA all day?
10/15/79	Gray to Schultz	Dispersive soil test data
10/15/79	Schultz to Afifi	Dispersive soil test data
10/16/79	JJZ	NRC notification that Corps of Engineers is helping on geo-technical reviews so asked that 50.55 (e) and 50.54 (f) be sent to them
10/16/79	D Hood - 7/18/79 minutes	
10/16/79	TCC to Curtis CSC-4504	Comments on dewatering RG
10/19/79	Dunnicliff to Afifi	DGB settlement
10/22/79	SHH	Transmittal of draft RF on dewatering systems
10/25/79	SHH/BWM/GSK (tendon Meeting)?	Meet with NRC Region III in Chicago
10/25/79	TCC/DES (where are meeting notes)?	Meeting with consultants Gould & Hendron at Bechtel-AA
10/25/79	Mtg Notes (Hendron, Gould)	Plant Area fill

10/29/79	MCAR 24, Interim No 8	BLC-8370
10/30/79	TCC/DES (Where are meeting notes)? BLC-8474, 11/19/79 Curtis - TCC	Dewatering meeting with consultants Bechtel-AA
10/31/79	Afifi to Loughney	Interim Report No 8
10/31/79	Afifi to Peck	Interim Report No 8
10/31/79	Afifi to Hendron	Interim Report No 8
10/31/79	Afifi to Gould	Interim Report No 8
11/1/79	TCC - Curtis	Pond dewatering requirements
11/2/79	SHH to NRC	8th Interim Report
11/9/79	Curtis to DEM, BLC-8441	Need for pond dewatering
11/9/79	JAR to GSK	Suggested 50.54 (f) Question 23 include commitment to review previous 50.55 (e) reports.
11/12/79	Afifi to Hendron	Review of DG Calc
11/12/79	Afifi to Peck	Review of DG Calc
11/13/79	SHH	Submitted Rev 4 to 10 CFR 50.54 (f) relative to QA (Question 23)
11/14/79	TCC (where are meeting notes?) I have, but not published	D Hood w/Corps of Engineers visits site (NRC meeting notes dated 12/6/79)
11/15/79	CP testing telecon Bechtel-AA	Settlement/vibration question
11/15/79	WRB - Dreisbach	QC commitments on 50.54 (f) questions
11/16/79	Bechtel/Consultants	Vibration Meeting, Bechtel-AA
11/19/79	Supplemental 50.54 (f) Questions 23-35	
11/19/79	Listing of commo w/consultants	
11/20/79	TCC (where are meeting notes?) not published yet (AA)	Dewatering task force meeting at Bechtel
11/21/79	Curtis - Cooke pond dewatering	Technical aspects
11/21/79	Cooke - Fobes	Pond dewatering reasons/method

11/27/79	Afifi to Peck	Transmit October 25, 1979 Notes
11/27/79	Afifi to Gould	Transmit October 25, 1979 Notes
11/27/79	Afifi to Hendron	Transmit October 25, 1979 Notes
11/27/79	GZD to Castleberry	Transmit Test Pit and Plate Load Test
11/29/79	Afifi to Hendron	Transmit October 30, 1979 Notes on Dewatering
11/29/79	Afifi to Gould	Transmit October 30, 1979 Notes on Dewatering
11/29/79	Afifi to Loughney	Transmit October 30, 1979 Notes on Dewatering
11/29/79	TCC/Starr Eby MDN Telecon	Other Bldg Settlement
11/30/79	Afifi to Woods	Transmit Additional Information on DG Pedestal Vibration
11/30/79	Afifi to Peck	Transmit Supplemental 50.54 Questions
11/30/79	Afifi to Hendron	Transmit Supplemental 50.54 Questions
11/30/79	RLT memo to Bechtel PE	Data for new settlement problems
11/30/79	Fiorelli to SHH	IR 50-329/79-20, 50-330 cons methods/spec rev (inadvertent)
11/30/79	JBPost - TCC	Mengentime bid question
12/1-28/79	R Cook 78-23	
12/3/79	GSK (no meeting notes)	Meet with Bechtel at site on 50.54 (f) Questions 24-35
12/3/79	Curtis to Davis memo	Dewatering work responsibilities
12/3/79	Fobes - to distribution	Response to TCC 11/21 memo on draining pond
12/4/79	GSK to JAR Serial 8021	Answer to JAR memo to GSK on QA commitments
12/4/79	Fobes - Lansing	Draining pond
12/4/79	Fobes - TCC	Permission to drain

12/5/79	Pond dewatering	Final preparations for dewatering
12/5/79	New 50.54 (f) Questions	Planning session
12/5/79	Meeting at Site to discuss additional 50.54 (f) soils questions - TCC memo 12/11/79, CSC-4660	
12/6/79	Underpinning meeting in AA	Pre-award
12/6/79	NRC issues Order modifying Construction Permit	
12/6/79	Telecon between CP Co and Hood on Order	
12/6/79	Dreisbach NRC response to JLCorley	Dewatering fine sampling
12/7/79	TCC memo to Fobes	Miscellaneous dewatering info
12/11/79	Telecon with Hood interpretation of Order between 50.54 (f) and Order	
12/12/79	NRC Order of December 6, 1979	Investigate work activities which may not proceed under Order
12/13/79	Telecon with Hood on follow-up of 12/11/79 telecon	
12/18/79	Telecon with Hood on not getting Questions 4 and 14 on 50.54 (f) in until Mid-January and that some of 11/19/79 50.54 (f) questions are pertinent to amendment	
12/18/79	CP Co/NRC telecon on future meeting	
12/18/79	Dewatering Meeting in Ann Arbor	
12/19/79	Amendment 72 referencing 50.55 (e) and 50.54 (f) material	
12/19/79	Telecon Cooke/Weidner - Planning PR release on Order	
12/19/79	SHH memo submitting amendment	
12/20/79	MOR to RCB (BLC-8165)	Vibratory Settlement of the D/G Pedestals

12/20/79	Bechtel/Consultants (BLC-8615)	Vibration Meeting, Bech-AA Meeting Notes No 1085
12/20/79	GZD to Afifi	Transmit Settlement Marker Calc
12/26/79	SHH to RBD/GSK/BWM/DBM	NRC Region III - CP Co Mgmt Meeting - 1/11/80
12/26/79	Miller to EGCASE & VStello	Request for Hearing
12/26/79	JAR to GSK (BLC-8622)	Modification of Midland Construction Permit - Schedule Analysis on Impact of Order
12/26/79	QAR - Question 23, Item I	
12/26/79	Fobes/Cooke Memo on Pond Dewatering	
12/28/79	BLC-8630, LHC to RCB	Responses to 10 CFR 50.54 (f) Questions on Plant Fill
1/80	NRC Letter to Nila Najawicz	Response to her letter of January 19, 1980 regarding Soils Settlement
1/2/80	NRC Meeting Notice	
1/3/80	QA telecon on Number of Infractions	
1/4/80	Geo Tech/Hendron Dewatering Mtg	
1/4/80	Memo to File from BHP/RMW	12/18/79 Mtg in Ann Arbor - Permanent Dewatering
1/7/80	Bechtel/Loughney/Hendron McClure/Ferril	Dewatering Meeting
1/8/80	CP Co/Bechtel Meeting - Ann Arbor	Dewatering & Questions #4 and #14
1/8/80	Woods to Afifi	Transmit Cross-Hole Test Report
1/9/80	Woods to Afifi	Evaluation of DG Pedestal Vibratory Settlement
1/9/80	Bechtel/Mergentime	Suspend Bid
1/10/80	Dreisbach/Corley	Fines Monitoring
1/14/80	CP Co/Bechtel - Ann Arbor	Preparation for NRC Mtg - 1/16/80

1/14/80	BLC-8692 - JAR to GSK	50.54 (f) Question 23 Actions - December Status Report
1/16/80	CP Co/Bechtel	NRC Meeting in Bethesda on 50.54 (f) questions and update on soils cor- rective action technical items
1/17/80	Telecon with Hood, JJZ, GSK	On Soils
1/17/80	Memo from MIMiller to GSK & SHH	On NRC soils Reporting Requirements
1/17/80	Telecon Between D Hood and JJZabritski	Soils Issue
1/23/80	Cooke/Rothwell Telecon	50.54 (f) Questions
1/23/80	Fobes/District Engineer	Dewatering Discharge to Pond
1/25/80	TCC Memo to MRothwell, CSC-4763	Answers to 50.54 (f) questions based on NRC meeting of 1/16/80
1/25/80	Horn/Gallagher	Lean Concrete Backfill
2/4/80	Telecon Record, JJZ and DHood	Future Meeting on Soils Settle- ment Issue
2/4/80	NRC to CP Co (SHH)	1/16/80 Mtg on Supplemental Requests regarding Plant Fill
2/6/80	QA Dept Oral Communications Record - WRB, JJZ, LJRichards with Dick Knop, NRC	50.54 (e) letter transferring D/G Foundations and Bldg Settlement Problem to Licensing
2/7/80	SHH to Keppler, Howe 23-80	Closing out 50.55 (e)
2/7/80	Probably no Minutes	50.54(f) Questions Response Review Meeting - AA
2/8/80	Dunnicliff to Afifi	Review of DG Bldg Settlement
2/8/80	Telecon Record, JJZ, and D Hood	Soils Mtg on Site for Consultants
2/11/80	SHH to DVassallo, Howe 39-80, Serial 8333	Reference Material for Amendment 72
2/11/80	NRC, RMDiggs to SHHowell	Additional Fee for Licensing on Soils
2/12/80	Afifi to Gould	Transmit Updated Spec C-95 and C-88 for Review
2/12/80	Probably no Minutes	50.54 (f) Questions Response Review Meeting - AA

2/13/80	Telecon Record, D Hood and J Nowak	NRC Mtg on Soils at the Midland Site
2/14/80	BLC-8827, JAR to GSK	50.54 (f) January Status Report
2/14/80	NRC letter to SHH	Termination of 50.54(f) Context for Further Responses on Midland Soils Settlement
2/14/80	NRC - LSRubenstein from DHood	Notice of Initial Site Visit for NRC Consultants to Observe Midland Soils Settlement and Effects
2/14/80	Woods to Afifi	Correction for Cross-Hole Test Report (1/8/80)
2/14/80	Draft Agenda	Feb 27-28 Mtg w/NRC
2/15/80	BLC-8833 - MOR to RCB	Meeting Notes No 1115 of January 8 and 14, 1980 meetings in AA - 10 CFR 50.54(f) Questions on Plant Fill
2/15/80	BLC-8833	Minutes for 1/8 and 1/14 Mtg
2/21/80	SHH (Howe 44-80) to NRC, R M Diggs	Rebutting 2/11/80 Memo Requesting Additional Fee on Licensing
2/21/80	Curtis to Gould	Request to Attend Feb 28, 1979 Mtg
2/22/80	Woods to Afifi	Recommending Shear Wave Profile in DF Bldg and Tank Farm
2/22/80	Woods to Afifi	Revise Report
2/25/80	Memo From NRC, G Fiorelli to SHH	Acknowledging 2/7/80 50.55(e) Report as Final Report
2/26/80	NRC, LSR to SHH	Request that Naval Surface Weapons Center receive Soils Info
2/27/80	Afifi to Hendron	Transmit Dr Wood's Cross-Hole Test Report
2/27-28/80	Mtg with NRC and Consultants at Site	
2/27/80	Afifi to Peck	Transmit Dr Wood's Cross-Hole Test Report
2/28/80	SHH to D Vassallo Serial 8454 (Howe 50-80)	Transmittal of Amendment 74 to FSAR Answer to 50.54(f) Questions 24-37, Rev 5

2/29/80	Memo From NRC, LSR to SHH	Use of Energy Tech Engg Center for Mech Engg Review for Soils and Operating License
2/29/80	Amendment 74 Submittal	Update and Questions 24-35
3/3/80	NRC Memo	Gallagher Inspection 2/12 and 2/14
3/10/80	BLC-8955, JAR to GSK	50.54(f) Soils Status Report
3/10/80	Zabritski/Curtis Added FSAR and Fill Distribution	Serial 8486
3/13/80	TCC to File 0485.16	Mtg w/NRC on Fill Status and Resolution - 2/27-28/80
3/14/80	Board notice of hearing	Notice of Hearing held before ASLB
3/17/80	Afifi to Dunicliff	Meeting Notes 2/20/80
3/18/80	Soils Documents to Misc Parties	Serial 8509
3/20/80	BLC-9021 LHC to RCB (Doc Rev - 3/25/80)	10 CFR 50.54(f): Core Drilling for Crack Depth Investigation
3/25/80	Afifi to Davisson	Transmitting C-94 Spec for Comment on Test Pile
3/27/80	GSK to JAR Serial 8548	50.54(f) Monthly Status Reports - Soils
3/31/80	DSH, NRC to SHH	Summary of 2/27-28/80 Mtg and Site Tour With Consultants to Review Soil Settlement
4/1/80	SHH to DVassallo, NRC, Serial 8570 (Howe 72-80)	Amendment No 76
4/1/80	BLC-9069, LHC to RCB	Mtg Notes 1131, 10 CFR 50.54(f) Requests Mtg January 16, 1980
4/1/80	LSR, NRC, to SHH	Req for Reports, Dwg and Other Info Regarding Plant Fill Settlement and Effects
4/2/80	Mtg w/IL&B, DEH, GSK and TCC	
4/15/80	Telecon, D Hood, NRC and G E Clyde	Re: LSR ltr to SHH dated 4/1/80, "Request for Reports, DWG, & Other Info Regarding Plant Fill Settlement & Effects"

4/16/80	IL&B reply to Board Notice of Hearing	
4/17/80	BLC-9140, LHC to RCB	Vibratory Settlement of the Diesel Generator Pedestals
4/30/80	NRC Staff Motion for Issuance of Amended Notice of Hearing	
5/5/80	JWC to Vassallo	Amendment 77 on Additional Documentation and Updated List of FSAR Sections No Longer Applicable
5/7/80	JWC/SHH to J G Keppler, NRC (Howe-84-80; Serial 8803)	IE Bulletin No 79-02

5/12-13/80	Oral Comm Record, WRB 51-80	D/G Settlement Program 50.54(f) Commitments on Equipment Qualification
5/16/80	Serial CSC-5043, TCC to LHC	Open Items - Soils
5/21/80	BLC-9289, JAR to JWC	Soils Settlement Schedules
5/21/80	CP Co Answer to NRC Staff Motion	Issuance of Amended Notice of Hearing
5/22/80	BLC-9305, JAR to JWC	Responses to NRC Questions on Plant Fill
5/27/80	IL&B to CP Co attaching Motion to ASLB	Motion to Partial Consolidation of soils & operating license hearing
5/28/80	JLB to CP Co (JBF/SHH/LBL/JWC/RFG/ GSK/MGK)	Regulation - Federal - NRC -Constr Permit Modification -Correspondence
5/30/80	NRC, A Schwencer to SHH	Display ad re: Hearing on Order For Mod of Constr Permit
6/5/80	Note to File: RMW-CSC-5084	Mtg with Bechtel on Action Items For Soils Issues
6/16/80	JAR to JWC	50.54(f) May Status Report
6/16/80	ASLB from NRC Staff	NRC Staff Response to CP Co. Motion for Partial Consolidation And Staff Motion to Post-pone further Response
6/16/80	Carol Gilbert to NRC	Petition to Intervene
6/23/80	William A Thibodeau to NRC	Petition to Intervene
6/24/80	George Wilson to NRC	Petition to Intervene
6/25/80	Patrick Race to NRC	Petition to Intervene
6/25/80	Michael Race to NRC	Petition to Intervene
6/25/80	Terry Miller to NRC	Petition to Intervene
6/26/80	Sandra Reist to NRC	Petition to Intervene
6/26/80	Sharron Warren to NRC	Petition to Intervene

6/27/80	Ivan Smith, Chairman ASLB	ASLB Memo and order Granting NRC Staff's Request to Post-poner Responses on Motion to Consolidate Issues
6/27/80	Barbara Stamiris to NRC	Petition to Intervene
6/30/80	Memo from Schwencer to JWC	On Requests for Additional Information Regarding Plant Fill
7/1/80	Answer to CP Co to Petition to Leave to Intervene of Thibodeau, Miller, Race, Stamiris and Gilbert	
7/7/80	NRC Staff to ASLB	Staff answer to Petition for leave to intervene signed by Carol Gilbert
7/8/80	From IL&B to ASLB	Answers of CP Co to Petitions to Intervene of Race, Wilson, Reist and Warren
7/14/80	Telecon Record- GSK/TJS/TRT/JEB/ to D Hood	Request by Corps of Engineers for Additional Information Regarding Plant Fill
7/14/80	NRC Staff Order	To Petition for leave to Intervene Filed by Wendell H Marshall
7/24/80	Memo to L Curtis from T Cooke	Expediting soils placement
7/24/80	NRC - Memo and Order	Ruling upon standing to intervene
7/24/80	NRC - Order	Ruling on Mapleton Intervenors 6/30/80 Petition to the Board
7/24/80	NRC - Order and Notice	Prehearing Conference
7/24/80	Memo and Order	Ruling upon standing to intervene
7/24/80	Order and Notice	Prehearing Conference
7/25/80	Telecon Record - D Hood/GSK/DMB	Discussion on Forthcoming NRC. Corps of Engineers Mtg on Soils
7/30/80	Wendell Marshall memo to ASLB	Answering CP Co motion for consolidation and includes move for stop of construction.

8/12/80	TRT to file	Mtg with NRC Staff and Corps of Engineers on soils.
8/14/80	Correspondence from J E Brunner	Construction Permit Modification
8/15/80	To DVassallo from S H Howell	Amendment No 80

8/27/80	Tedesco to JWC.	Request for additional info regarding dewatering (Question 49 - 53)
8/27/80	Wendell Marshall to ASLB on NEPA not evaluating Class 9 accidents.	
9/9/80	Supplement to Warren Petition to Intervene & Amended Supplement to Stamaris Petition to Intervene	
9/12/80	JWC to Eisenhut Amendment 81	<ol style="list-style-type: none">1. Discussion of Applicants Position on need for additional borings.2. Settlement Update3. Answer to Question 36 & 38 & borings for Figure 35-3
9/16/80	JWC to Vollmer on General Discussion on Applicant's Position on Need for Additional Borings & including Item 1 From Amendment 81.	
No date	Statement of CPCo with respect to supplement to Warren Petition & Amended Stamaris Supplement	
9/19/80	Notice of Replacement of Ivan Smith by Charles Bechhoefer	

8/ 4/80 Schwencer to JWC on Corps
of Eng Report Question 39 - 48

8/ 7/80 Meet w/Bechtel to Plan
Responses to Corps of Eng
Questions from 7/31/80 NRC mtg

8/11,20,
22,25/80 Amended Petition by Stamairis

8/12/80 Carol Gilbert to NRC Statement Concerning Contentions

8/12/80 Memo to ASchwencer from DHood Notice of Mtg to Appeal Staff
Position Requiring Add'l Explorations
& Testing of Midland Plant Fill

8/12/80 Hood Notice of Appeals Mtg
on 8/29/80

8/12/80 Notice of Mtg to Appeal Staff
Position Requiring Add'l
Exploration & Testing of
Midland Plant Fill

8/13/80 Marshall Attorney Mewitt to
ASLB Withdrawal

8/14/80 Supplement to Petition to
Intervene by Sharon Warren

~~8/14/80 Correspondence from J E Construction Permit Modification
Brunner~~

8/15/80 To D Vassallo from SHHowell Amendment No 80 on Update of
Committments on QA Answers to
23 and Test Report on Compaction
Equip Qualification

8/15 &
25/80 Supplement to Petition to
Intervene by Barbara Stamiris

8/18/80 JLB to JWC/JEB/GFH/LHE/GSK Contracts - Bechtel - Subcontracts:
US Testing Company

8/20/80 Wheeler Notes on Mtg with
Bechtel on Answering Corps
of Engineers Questions on
Additional Borings.

1075780
TCC

To File
From JEBrunner, P-24-513
Date October 3, 1980

JEBrunner / rjg

CONSUMERS
POWER
COMPANY

Subject MIDLAND PROJECT
MINUTES OF 8/29/80 MEETING TO APPEAL NEED FOR
ADDITIONAL BORINGS
FILE: 0465.16 UFI: 00234S, 71*01 SERIAL: 9610

Internal
Correspondence

CC JWCook, P-14-113A MIMiller, IL&B
TCCooke, Midland JARutgers, Bechtel
GSKeeley, P-14-113B TRThiruvengadam, P-14-400
DBMiller, Midland CWiedner, Bechtel

cc
MID
A.

TCC
BMP
DJV
GBJ
JKK
WCS
MMM
DAK
EME
GWR
WFS
DES
TAS
MFB
ARMY
JCS
JJD
SAC
JSS
RLB
ASB
CMD
SEC
CLERA
FILE

The meeting was convened at 1:00 pm at the Midland Service Center. The attendance list is enclosed as Attachment 1. The agenda for the meeting is enclosed as Attachment 2. Following introductions, G S Keeley summarized historical events relating to the supply of soils-related information to the NRC. Keeley indicated that CP Co had submitted information via 50.54(f) responses, 50.55e reports, meetings and site visits, and responses to requests for document production covering a period of almost two years (See Attachment-3).

J D Wanzeck of Bechtel Geotech then described the soil investigation done to date, all of which excepting information on 59 borings have been supplied to the NRC in connection with CP Co's proposed soils fix. Wanzeck reviewed past borings taken to date, test pits, cross-hole shots, and settlement information as well as other aspects of CP Co's past efforts to develop soils data necessary to demonstrate the adequacy of the proposed fix. He stated that CP Co had taken over 900 borings at the Midland site and expressed the opinion that no additional borings are necessary.

Dr Ralph Peck, Bechtel's consultant, who is an internationally recognized expert on foundation soils, then discussed the technical basis for Consumer's conclusion that the pre-load program would provide an acceptable solution of the diesel generator building settlement problem. Peck, with admirable clarity and organization, described the pre-load program, the settlements observed upon surcharging, pore pressure variations as observed through piezometer readings and the future settlements which may be predicted based on an extrapolation of observed settlements. Peck expressed the opinion that the pre-load approach is universally accepted in the soils field and that the information directly supplied via pre-loading would accurately predict future settlement behavior.

A method utilizing results from borings lacks this accuracy, according to Peck, because of inherent inaccuracies in an indirect approach, and because the "fix" would not eliminate all variations in soils parameters below the diesel generator building. Peck felt that the borings approach would erroneously predict greater settlements than would be observed.

Peck's presentation was illustrated with charts and graphs showing settlement measurements and predictions with and without the surcharge, variations in porewater pressure during and after the pre-load, and the loading level on

- Pictures 905
- 906
- 907
- 908
- 1080
- 1081

The review of the above photos showed that the pipe was located in an excavated trench in the berm and not the dike slope. Therefore, a postulated baffle dike failure precipitated by the trench is not considered to be a plausible scenario and would not interfere with functioning of the Emergency Cooling Pond.

To JWCook, P-14-113
JEBrunner, M-1079
GFHill, M-1018

FROM JLBacon, M-1085A

DATE August 18, 1980

SUBJECT CONTRACTS - BECHTEL POWER CORPORATION
- Subcontracts: U.S. Testing Company

LHHorisza, M-1073
GSKeeley, M-408B

DBM
TCC
REM
DDJ
NJS
S/C C-208
I. RAW

CC DBM/TEC
M2- list
File CAB5

Consumers
Power
Company

CONSUMERS POWER
RECEIVED

INTERNAL
CORRESPONDENCE

AUG 22 1980

CC

Site Mgr.
Midland Project

Attached for your information is a copy of an August 15, 1980 letter from the Bechtel Midland Site Manager to U.S. Testing Company, Inc, forwarding a proposed agreement to toll the statute of limitations in connection with possible claims arising from the foundation soils problems at the site. Mr. Becnel has said he will keep us informed of new developments.

RECEIVED

AUG 19 1980
MIDLAND PROJECT
MANAGEMENT

Hancock, Esq.
R. Placier, Esq.
L. M. Scoville, Jr., Esq.
J. Bacon, Esq.

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



August 15, 1980

U. S. Testing Company, Inc.
1415 Park Avenue
Hoboken, NJ 07030

Attention: Dave Edley

Job 7220 Midland Project
Subcontract 7220-C-208
Tolling of Statute of
Limitations
C-208-B-505

Dear Mr. Edley:

Attached are three (3) copies of an Agreement to toll the statute of limitations for possible claims arising out of the soils-related problems on the Midland Project which has been prepared by our Legal Department for your consideration.

If the Agreement is satisfactory, we request that you indicate your assent by signing and returning all three of the duplicate original copies of the Agreement to us for execution by the other parties, whereupon we will return one of the originals to you for your records.

Phil Becnel in our Legal Department (415-768-4574) is available to discuss this matter with you or your legal representative should you desire.

Your response is requested within two weeks from the date of this letter. Your prompt attention to this matter would be appreciated.

Very truly yours,


L. E. Davis
Site Manager

LED/JWL/rs1

Attachment

cc: John Speltz
J. Rutgers
P. Hansen

RECEIVED
AUG 18 1980

Legal

AGREEMENT

THIS AGREEMENT is entered into as of August 1, 1980, by and between BECHTEL POWER CORPORATION, BECHTEL ASSOCIATES PROFESSIONAL CORPORATION, and CONSUMERS POWER COMPANY, and U. S. TESTING COMPANY, INC.

WHEREAS, Bechtel Power Corporation and U. S. Testing Company, Inc. entered into a subcontract dated August 24, 1973, under which U. S. Testing was to furnish certain soils and other testing services in connection with the Midland Nuclear Power Plant owned by Consumers Power Company and located at Midland, Michigan; and

WHEREAS, certain problems with the soils and soil compaction and soils testing work at that plant have been discovered and require remedial action; and

WHEREAS, the parties hereto desire to preserve as provided herein any rights they may have with respect to these soils-related problems,

NOW, THEREFORE, in consideration of the premises, covenants and agreements herein contained, and intending to be legally bound hereby, the parties agree as follows:

1. All statutes of limitation and any possible laches applicable to any claim or cause of action by Bechtel Power Corporation, Bechtel Associates Professional Corporation, or Consumers Power Company, or any or all of them, against U. S. Testing Company, or any claim or cause of action by U. S. Testing against Bechtel Power Corporation, Bechtel Associates Professional Corporation, or Consumers Power Company, or any or all of them, arising out of or in connection with the soils-related problems on the Midland Project are hereby tolled until sixty days following receipt of written notice by any party to the other, terminating this Agreement, or until August 1, 1983, whichever first occurs. The foregoing provision shall not have the effect of barring any suit that would not otherwise be barred in the absence of this Agreement.
2. This Agreement is deemed to be one made under the laws of the State of Michigan and shall be construed and given effect in accordance with those laws.

IN WITNESS THEREOF, the parties have hereto set their hands.

ATTEST:

BECHTEL POWER CORPORATION

By: _____

ATTEST:

BECHTEL ASSOCIATES PROFESSIONAL CORPORATION

By: _____

ATTEST:

CONSUMERS POWER COMPANY

By: _____

ATTEST:

U. S. TESTING COMPANY, INC.

To TCCooke

FROM RMWheeler *RM Wheeler*

DATE August 11, 1980

SUBJECT MIDLAND PROJECT GWO 7020 - MEETING NOTES FOR
AUGUST 4, 1980 - RESPONSE TO NRC/CORPS. OF ENGINEERS
REQUEST FOR ADDITIONAL INFORMATION
File: 0280 UFI: 50*31*01 Serial: CSC-5224

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

CC DBMiller
GSKeeley
TRThiruvengadam
KWiedner, Bechtel

*See also
CSC 5240,
for correction*

Attendees: S. Afifi, Bechtel
K. Wiedner, Bechtel
S. Lo, Bechtel
G. Keeley, CPCo
T. Thiruvengadam, CPCo
R. Wheeler, CPCo

GSKeeley began with some opening comments about the upcoming events relative to this issue. A meeting is going to be held between Selby and Denton from the NRC on August 21, 1980. It is expected that this issue of additional information for the Corps. of Engineers will be on the agenda. Between now and August 21, 1980, GSKeeley will attempt to set up a meeting with the NRC to appeal this issue through the NRC management hierarchy (Heller/Knight). S. Afifi is to check on the availability of Dr. Peck in order to support a meeting prior to August 21, 1980.

K. Wiedner summarized the information verbally requested by the Corps. of Engineers per the August 31, 1980 meeting with the NRC and the Corps. of Engineers as follows:

1. The additional 56 borings which have not previously been submitted will be provided by Geotech to be complete by August 11, 1980.
2. Settlement records for all buildings will be updated and prepared for a September 15, 1980 amendment to 50.54 (f). Geotech/T. Thiruvengadam
3. The specification on caissons/piles will be paraphrased and the negative skin friction question will be answered by Project Engineering. To be complete by August 20, 1980.
4. W. Paris of Geotech will provide information to address the concern of in-flow through the dike due to plant dewatering. To be complete by August 15, 1980.
5. Figure 35-3 will be revised on Geotech to add boring numbers to the locations shown on the figure. To be complete by August 11, 1980.

6. The concern regarding the Service Water piping distress in the pipe sleeves penetrating the building will be answered by the writer. To be complete by August 15, 1980.
7. Dr. Peck/Hendron will provide backup for no additional borings in the Diesel Generator Building.
8. Justification for no additional borings for Aux/Service Water Structure will be provided by Afifi/Davisson. To be complete by August 20, 1980.
9. Justification for no additional borings on the Service Water/Auxiliary Wing sections will be provided by Afifi/Civil. To be complete by August 20, 1980.
10. Justification for no additional borings in the dike will be provided by DESibald. This will include a discussion of how the material was placed, settlement data since completion of the dike, visual walkdowns and concern over hydraulic fracturing due to drilling. To be complete August 15, 1980.
11. More field work is required in order to answer bearing capability questions. Plate load tests will be conducted and are expected to be complete by August 31, 1980.
12. The concern over buoyancy forces due to filling the cooling pond while the preload was intact will be addressed by Civil/Geotech. To be complete by September 2, 1980.
13. In order to answer questions regarding the affect of dewatering on settlement, Bechtel intends to start the temporary dewatering system for the Aux. wing sections by August 11, 1980, with the objective of having some meaningful results by September 10, 1980.

The response for the 13 items above should be submitted to the NRC by September 15, 1980. These responses will later be supplemented to address the questions raised by the Corps. of Engineers through the NRC letter dated August 4, 1980 regarding the request for additional information on plant fill.

bd

RESPONSE TO SERVICE WATER

PIPE CONCERN

During the February 27 and 28, 1980 NKC/Consultants site visit, concern was expressed regarding the penetration of the service water pipes through the northwest wall of the service water structure. It was suggested that the piping may have experienced differential settlement relative to the building and may be over stressed due to contact between the pipe and the wall penetration. This observation was based on deformed 2 x 4 wedges placed at the bottom of the wall penetration and some apparent irregularities on the surface of the service water pipes.

Wedges similar to those observed during the February 27 and 28 site visit are commonly used as temporary support to assist in the erection of large pipe. The wedges are used to maintain clearance and provide support to the pipe during the erection phase.

As a result of the concerns the wood wedges were removed and inspections were performed to evaluate the condition of the pipe. The inspection results are as follows:

1. No movement of the pipe was observed due to the removal of all of the wood wedges. Measurements were taken before and after wedge removal in order to verify there was no relative movement.
2. After removal of wood wedges, visual inspections were performed to determine the clearance between the pipe and the sleeve. In all cases the pipe was not in contact with the pipe sleeve. Measurements were taken between

the pipe and the sleeve with the minimum clearance observed at the bottom of the pipes, to be approximately 7/8 inch.

3. After removal of wood wedges, the wedge contact area and surrounding areas were examined for any irregularities. The examination revealed that the pipes had incurred no damage. In some cases the coating protection had been damaged due to the insertion of the wedges. This is not a problem since the pipe coating is not required inside the building. The purpose of the coating is to protect buried pipes from corrosion.

Inspection performed after removal of the wood wedges clearly demonstrate that the pipe was not in a stressed condition nor had differential settlement occurred between the building and the pipe.



ANN ARBOR

MEMORANDUM

004477

TO TCCook LOCATION _____
FROM RL Rixford DATE 1-8-80 19____
SUBJECT 7-18 Presentation to NRC JOB NO. 7220
re: O&A Settlement FILE _____

Attached is the list of questions raised by the NRC at the 7-18-79 presentation. The list has been supplemented by, in most cases, a reference to where the subject has been discussed, ~~but~~ in some cases a brief notation has been made in the response, and in a few cases the question was deemed irrelevant to the MCAE and the response so indicates.

If anything more detailed, more complete, or more formal is required please let myself or Karl Wiedner know.

cc: K Wiedner w/a
C. McConnell w/a
T.O. Wanecek w/a
RL Rixford w/orig.

References to: "Question" are the NRC 50.54(f) Questions
"Item" are the items in this list

Item 1 Agenda Item 2 - Is it possible that the condensate line or other utilities are still providing support to the Diesel Generator Building? (Lyman Heller, 7, 7
Darl Hood)

Response: No, the settlement data and drawing clearly show the building has settled in all areas. However, the differential settlement of the building does seem to have been exaggerated by the presence of either the condensate line and the concrete encasement around the condensate line or the concrete back fill in the area.

Item 2 Agenda Item 3 - Have provisions been made for the train bay tracks loading effect on the borated storage tank lines? (Darl Hood)

Response: Considered irrelevant to MCAR scope, but it was addressed in BLC-8370, 10/29/79, which transmitted Interim Report #8 to Consumers Power Company

Item 3 How does dewatering tie into the load test of the borated water storage tanks (time frame)? (Lyman Heller)

Response: Adequate settlement data can be acquired by the load test whether it is done prior to or after dewatering. Therefore, the dewatering and load test are considered to be independent items.

Item 4 How much settlement of the borated water storage tanks is acceptable? (Lyman Heller)

Response: Original plans outlined in BLC-8370, 10/29/79, were suspended upon receipt of Question 31 from NRC.

Item 5 Has any concrete pipe been profiled? (Ron Lipinski)

It was noted at this time that there is no Class I concrete pipe in the fill.

Response: No, the response during meeting is correct.

Item 6a What is the limiting factor in the design of the concrete duct banks?

(Lyman Heller)

Response: The design of buried utilities was described in the response to Question 13 with additional specifics for the Aux. to DGB duct in the response to Question 30.

Item 6b What is the basis for the assumption that no further remedial action is required for the duct banks? (Ron Lipinski)

Bechtel responded that settlement monitoring would continue probably through cable pulling.

Ron Lipinski noted that duct banks are a Category I structure the same as any other structure on the site.

Response: Basis is that the ducts are not pressure boundaries, and have been evaluated for Category I seismic effects. The integrity of the ducts due to plant area fill settlement will be determined by techniques described in the response to Question 12, Table 12-1, Note 2. Additional discussion is in the response to Questions 7 and 30.

Item 6c Did we analyze the load associated with a large crane parked over the duct bank which may have a void below it? (Lyman Heller)

Carl Wiedner discussed the flexibility of the electrical duct bank and the structural analysis.

Response: Irrelevant to the MCR. It was not a design load combination and was not analyzed. Additional discussion is in the response to Question 34.

Item 7 Is there any corrosion protection for stainless steel Class I pipes?
(Darl Hood)

Response: Irrelevant to the MCR.

Item 8 Chuck Goulds Presentation - Question concerning the valve pit caissons going through construction pads and reinforcement of caissons for transfer of horizontal loads. (Ron Lipinski)

Item 8
Cont.

It was noted that various tools would be used for demolition which would deliver about 1,000 foot pounds per blow and that this would not damage any of the other structures. It was also noted that the valve pit crane pad was about 2½ feet thick.

004477

Response: Response made in meeting addresses caissons going through the construction pads. Caissons will not provide for transfer of horizontal loads.
(refer to MCAR 24, Interim Report 7, page 5)

Item 9a Sherif Afifi's Presentation - With ½" to 1" as the upper limit for seismic settlement, would there be no effects on other structures due to dewatering?
(Lyman Heller)

It was noted to be a small general settlement to be evaluated by Sherif.

Response: Refer to the response to Question 27.

Item 9b Why do we feel that a 1.5 factor of safety is adequate? (Darl Hood)

It was noted that primarily this was due to the fact that 7.5 earthquake value was too large.

Response: Answer during meeting considered adequate assuming the factor of safety against liquefaction was the one being questioned.

Item 10 Where exactly are the liquefaction potential problem areas? (Lyman Heller)

Sherif responded that the small zone in the railroad bay was not a problem.

The borated water storage tank line was not a problem.

We have not analyzed all areas yet; however, this is in reality a hypothetical question since dewatering will answer the potential liquefaction questions in any area in the power block.

Response: Permanent site dewatering will handle all potential liquefaction problem areas.

Item 11a Dick Loughney's Presentation - Would the Service Water Building be outside the perimeter of the dewatering system? (Lyman Heller)

Response: Yes. MCAR 24 Interim Report #6 addresses soil conditions and corrective actions for this structure.

004477

Item 11b When would the clay dike cutoff in front of power block be in place? (Lyman Heller)

Response: Design of dewatering system does not assume any cutoff system.

Item 11c Will this comply with the new Reg. Guides? (Ron Lipinski)

Response: Yes. Refer to the response to Question 24.

Item 11d What will be the systems discharge rate? (Gene Gallagher)

It was noted that it would be less than 400 GPM.

Response: Refer to the response to Question 24.

Item 12 General Question on electrical blackout. It was noted that it would be low since the horsepower requirements for the pumps are small. (D. Hayes)

Response: Irrelevant to the MCAR, no discussion of diesel backup.

Item 13 Expressed a general interest on getting test pit information. (Gillan)

Response: MCAR 24, Interim Report 8 addressed test pit information.

Item 14 Ted Johnson's Presentation. Please comment on ACI 349 which includes settlement with dead load and wind, earthquake, etc. (Gene Gallagher)
Bechtel noted that they had done a similar consideration. They also noted that they would probably seal all cracks greater than 15 mils because of potential corrosion problems and that they were still pursuing an analysis in this area.

Response: The response to Question 15 addresses this, as will the study in response to Question 28.

Item 15. Exactly what all will the caissons support? (Henderson)

It was noted that Bechtel had not completed the horizontal support analysis in this area.

Response: Assuming the reference is to the Auxiliary Building caissons, refer to MCAR 24, Interim Report 7 (page 4).

Item 16a Sherif Afifi's Presentation - Will the Diesel Generator sand surcharge be removed prior to dewatering? (Lyman Heller)

Response: Yes, Surcharge removal discussed in MCAR 24, Interim Report 8 (page 2).

Item 16b How much lower than the construction water would dewatering operation go? (Lyman Heller)

It was noted that it would be a minimum elevation of 600 feet (existing till), and that it was still under evaluation.

Response: Refer to the response to Question 24.

Item 17 Are we confident that the material below the borated water storage tank is acceptable? (Lyman Heller)

It was noted that it is mainly clay and with minimal amounts of sand.

Response: Refer to MCAR 24, Interim Report 7 (page 11) and response to Question 31.

Item 18 Considering the settlement to the southeast side of the Diesel Generator Building, what accounts for this impact?

There also appears to be some concerns on conduit supporting the building.

It was noted that there is more sand on the north side of the building.

(Lyman Heller)

Response: Refer to response to Item 1 above.

Item 19. Interim Report #6 to the MCAR 24 (50/553 Report) stated that we would be removing the top 3-4 ft. of soil. Why? (Gene Gallagher)

It was noted that this was to take care of weathering that the soil had experienced and also possible the bubbling of air through that portion of the soil. 004 4-7-7

Response: Refer to response to Item 17 above.

Item 20 The PLOCAP location (?) shown on the drawings as a dotted line is no longer part of the design. (Darl Hood)

The control room pressurizer is in the location proposed, but how will it be determined that the soil will be acceptable for any new Class I structures? (Darl Hood)

Response: Borings have been done (MCAR 24, Figure 67)

Item 21 Since we have eliminated chemical grout what about the control tower area void? (Gillan)

Sherif responded that this was an insignificant area and would still probably be pressure grouted.

Response: Refer to the response to Question 12, Table 12-1, Item A.1

Item 22 Dr. Peck Presentation - How would the Diesel Generator surcharge improve the bearing capacity of the fill? (Lyman Heller)

It was noted that long term bearing capacity was based on the friction of the material, and the load has increased the settlement capacity.

Response: Refer to the response to Questions 27 and 35.

Item 23 Why are we testing the caissons at 1.5 times the working load? (Lyman Heller)

It was noted that this was to avoid any unanticipated settlement in the adjacent areas.

Response: Response during meeting considered adequate (MCAR 24, Interim Report 7, pg. 5)

Item 24. TCCooke Presentation on Schedule -When will the cutoff wall be established?

It was noted that there would be not cutoff wall the south end of the power block area, since the rate of flow of water to the sands and/or clays was expected to be minimal. However, if necessary, a slurry trench or chemical grout could be utilized in this area.

4477

Response: Refer to the response to Question 24

Item 25 Phil Martinez's Presentation - If there is too much reliance on testing during the plant area fill what did the dike people rely on? (Ron Lipinski)

Response: Refer to the response to Question 23

Item 26 Why do you say re-excavation was not a cause? (Lyman Heller)

Response: Refer to the response to Question 23

Item 27 How can you possibly say there was not a problem with people qualifications?

Response: Refer to the response to Question 23

Item 28 Can you say that there was a bona fide soils engineers on site? (Gene Gallagher)

Response: Refer to the response to Question 23

Item 29 How can you possibly say that you have achieved correction action with no "yes" on personnel as a cause?

How can you say there are bad test procedures when personnel was not involved as a cause?

The NRC disagrees with qualifications of eprsonnel as not being a cause.

(Gene Gallagher)

Response: Refer to the response to Question 23

Item 30 How can you say the procedures were not bad?

Response: Refer to the response to Question 23

Item 31 Why was the Spec not included as a cause? (Gene Gallagher)

Response: Refer to the response to Question 23

Item 32 D. Hayes also disagrees with the QC people not being a cause. If the people were qualified, many of the five most probable causes would have been eliminated. (Gene Gallagher)

00477

Response: Refer to the response to Question 23.

Item 33 How come in some areas QC identified problems, but nothing happened? (D. Hayes)

Response: Refer to the response to Question 23

Item 34 He commented that there were also problems with moisture density relationship Phil said that moisture did not cause the problem.

Response: Refer to the response to Question 23

Item 35 Does the applicant endorse the most probable causes? (Darl Hood)

Yes - Per GSKeeley after checking with Don Horn.

Response: Refer to the response to Question 23.

Item 36 How then do people enter into the analysis? (Darl Hood)

It was noted that Don Horn's presentation would cover this.

Response: Refer to the response to Question 23.

Item 37 Don Horn's Presentation - Why are we no longer using the Nuclear Densometer?

(Gene Gallagher)

It was noted that because of moisture problems found in the sand and clay.

Response: Response during meeting considered adequate.

Item 38 What does generic mean? (D. Hayes)

It was noted that this means U. S. Testing in some cases.

Response: Irrelevant to MCAR

004477

Item 39 What was the source of the air bubbles at the tank farm at elevation 611' and bubbles at 627'? (Lyman Heller)

Response: Refer to MCAR 24, Interim Report 7 (page 11)

Item 40 Has the tank farm test pit (inspection pit 20 X 20) confirmed boring information? (Lyman Heller)

It was noted that it has not been compared yet, but the material appeared good below the top four feet.

Was there clay in both pits or was there sand? (Lyman Heller)

Response: Refer to MCAR 24, Interim Report 7 (page 11)

Item 41 What other plant improvements will be made as a result of the soils experience?

Will there be a topical report? (Lyman Heller)

Response: Refer to the response to Question 23

Item 42 Who pays the on-site GEOTECH Man? (Lyman Heller)

Response: Irrelevant to MCAR

Item 43 Is QC separate and does it have authority to stop work? (Lyman Heller)

Response: Yes, per SF/PSP G-1.1, Section 3.5

Item 44 What is the criteria for acceptability of the borated storage tank ring foundation?

Response: See Item 4 above.

Item 45a Lyman Heller was concerned with the flexure of the ring beam.

It was noted that the tank bottom transfers load to the soil.

Response: Irrelevant to MCAR

004477

Item 45b Lyman also seemed concerned about the fact that the borated storage tank had no baffles. He was really looking for a measurement on membrane stretching.

Darl Hood noted that this was the basis for 50.54(f) questions.

Response: Irrelevant to MCAR

Item 46a Since air bubbles may have travelled horizontally, how can borings confirm that there are not problems?

Dr. Peck noted that in all likelihood the air passages were already there and that the only evidence of air leaking was the bubbling at the surface.

Response: MCAR 24, Interim Report 7 (page 11)

Item 46b Will the fact that the air line condition existed two months be part of the decision on what to do with the tank farm soil? (Gene Gallagher)

Dr. Peck noted that you could expect some surface disturbance, but he believes there would be little damage to the underlying soil.

TCCooke then noted that the piezometers could have provided paths for the air bubbles leaking to the surface.

Response: MCAR 24, Interim Report 7 (page 11)

Item 47 Has Consumers Power Company applied lessons to other sites? (D. Hayes)

Response: (Consumers Power Company)

Item 48 How are the procedures now reviewed? (D. Hayes)

Response: (Consumers Power Company)

Item 49. Question on structural mat vs. spread footing - It was noted that it would have to be rechecked to see that the design would have to be satisfactory. The 50.54(f) response was confusing to Ron Lipinski.

It was noted that this was a settlement calculation only.

004477

Response: Refer to the response to Question 27

Item 50a What load or elevation will the underpinning be made to? (Lyman Heller)

Response: Elevation for underpinning of valve pit will be determined by the use of dutch cone penetration tests. (no longer applicable for Aux. Bldg.)

Item 50b How will we decide what load has to be applied to each pile during jacking?

It was noted that we would calculate the theoretical reactions.

Response: Exact techniques will be developed by underpinning subcontractor.

But it will be based on a combination of structure weight and movement during jacking.

Item 50c How will we transfer load from the jacks to the structure? (Ron Lipinski)

Response: This is a subcontractor design and will be included in procedures he will develop.

Item 51 What about earthquake vibration? (Ron Lipinski)

Response: Seismic loads will be carried by the fill under the Main Feedwater Valve pit.

Refer to MCAR 24, Interim Report 7, (page 4).

Item 52 Who runs the show on underpinning? (Lyman Heller)

It was noted that Bechtel would do the design with Chuck Gould acting as a consultant.

Consumers Power would then review it.

Response: Subcontractor after Bechtel, Gould, and Consumers Power review of procedures.

Item 53. GSKeeley's Presentation - Darl Hood noted that the staff was aware of the confusion they may have created by attacking the soil problem from several directions, and were trying to compensate for same.

Response: (NRC) Irrelevant to the MCAR

004477

Item 54 Darl Hood wanted Keeley statement on his confidence that the deficiencies were sufficiently understood and the corrective actions taken to preclude repetitions in this area.

Response: (Consumers Power Company - See response to Question 23)

Item 55 Darl Hood also wanted to know whether all problems have been understood prior to remedial action. That is, the problems should not again show up during the remedial activities. For example, flooding was noted to have been removed from the specification by Rev. 7.

Response: The remedial actions for each structure do have a sound basis.

Item 56 Will all remedial action be accomplished by the Consumers Power Quality Assurance Program? (Gene Gallagher)

Response: All remedial action performed upon the Q-listed portions of the backfill will be accomplished under the QA program.

Item 57 Will dewatering be part of the Quality System? This has to be responded in accordance with criteria 2. (Gene Gallagher)
The NRC is reviewing the standard review plan and we will look for compliance.
(Darl Hood)

Response: Refer to the response to Question 24.

Item 58. Documentation is needed. (Jim Knight)

It was noted that there is more information in existing reports and that the narrative of today's discussions will take approximately two weeks to prepare for Mr. Knight.

004477

He also noted that there appeared to be much positive progress in the Diesel Generator and he would appreciate having the documentation very quickly. (Jim Knight)

Response: Documentation of presentation provided to NRC via HOWE-218-79, dated August 10, 1979.

To File
FROM TCCooke *TCC*
DATE December 11, 1979
SUBJECT MIDLAND PROJECT GWO 7020 -
POND DEWATERING MINUTES - MEETING DECEMBER 5, 1979
File: B2.6, C88 UFI: 70*40*06 Serial: CSC-4659
CC Attendees

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

Attendees:

Consumers Power Company

DBMiller
RRFrisch
DESibbald
GSlade
DLAnderson
RGWollney
ASPuplis
DBruck
TCCooke
RFGreen
CAHunt
MRPutnam
GSKeeley
RASinervo
PBLatvaitis

Bechtel Power Corporation

JARutgers
GKrzisnik
JWasylewski
BDhar
CRussell
JWanzeck
RMGanatra
JMorris
ABoos
MORothwell

The advantages & disadvantages of the pond dewatering operation were reviewed prior to beginning discussion of the attached agenda.

- I. All prerequisites of the dewatering operation had been met, however, Bill Paris noted that he would require some additional time for pump testing which will delay the dewatering operation until Saturday or Monday morning, (December 10, 1979). During the discussion, it was also noted that the monitoring cost would be offset at least in part by the removal of some of the algae bloom and weeds because of the exposure to air. It was also noted we wish to do whatever possible to avoid fish and algae problems prior to operation. It was noted that we may have to deal with it at that time again. A discussion of fish cleanup revealed that fish may be damaged as they leave the site through the discharge gates, some fish will probably be left in puddles and some fish will be concentrated in the emergency cooling pond and die because of lack of oxygen. The emergency cooling pond will probably be the biggest problem area and will require netting dead fish in the spring and disposing of same. PMO will include a brief statement on the release of the fish to the Tittabawassee River in their press statement to be made prior to or during the pond dewatering operation. It was noted that the introduction of these fish to the Tittabawassee River should enhance the river

somewhat, however, some fish will be injured during the transit. Consumers Power Company will attempt to net these fish.

II. Dewatering Operation

John Cosens will have to be notified again if extensive problems develop during the dewatering operation. During the eight hour per day dewatering for six days, the following perimeters will have to be monitored:

- a. Temperature at the gate discharge weekly by plant operators
- b. Pitot tube readings at one half hour intervals by Geotech
Board readings at one half hour intervals by Geotech
Weekly water chemistry on the river upstream and downstream side of the discharge channel by consultants
Continual surveillance by Geotech to include a visual inspection of the opposite side of the river early each morning. Don Sibbald and Darell Anderson will accompany Geotech during this surveillance
Geotech also plans to send a diver down to inspect the inlets after the first eight hours of draining
- c. Measurements to be taken during the continuous operation of the dewatering include the following perimeters:

Temperature and pitot tube readings at intervals to be determined by Geotech after the six day operation. Operators will take these readings
Board readings will be taken at eight hour intervals by operators
Weekly water chemistry of the Titabawassee River upstream and downstream (discharge) will be taken by the consultants
Geotech again will be responsible for daily overall inspection.

- III. All the above will collect their data and forward same to Don Sibbald, PMO-Construction. Rich Sinervo will be responsible for checking to see that the proper tags are hung on the equipment before it is operated and to see that a CAR has been issued. Once the readings have been turned into Mr. Sibbald, he will transmit same to Environmental Activities who will then transmit them to the DNR. Don Sibbald will be coordinating all activities. Rich Sinervo will be handling the operating personnel for Mr. Sibbald. Geotech personnel and others who have questions or instructions for the operators will work through Mr. Sinervo.

- IV. Starting time will be as noted in Section I above.

Attachment

pls

POND DEWATERING AGENDA

December 5, 1979

9:30 AM

I. Prerequisites

Status or Responsibility

A. Bechtel

Pump Tests

Inlet Examination

Diver Inspection of Downstream Pipe

Gate Manufacturers Recommendations

Acceptability

Gate (% open to be utilized) 220 cfs

Pitot Tube Installation

Pond Elevation Board

Making Gate Usable

B. Consumers Power Company

Manpower for Gate & Monitoring Flow

Pond Chemistry & Fish Cleanup

II. Dewatering Operations

A. Notification of John Cosens

B. Measurements for six day at eight hour/day Operation

Temperature

Pitot Tube Readings at $\frac{1}{2}$ hour intervals

Board Readings at $\frac{1}{2}$ hour intervals

Weekly Water Chemistry Upstream and

Downstream

Geotec Inspections

General Surveillance

C. Measurements for Continuous Operation

Temperature

Pitot Tube Readings at one hour intervals

Board Readings at eight hour intervals

Weekly Water Chemistry Upstream and

Downstream

Geotec Inspections

General Surveillance

III. Monthly Tabulation & Submittal of Sampling & Flow Measurements

IV. Starting Time

12-6-79 A²
PRE AWARDS

NO TEMPORARY DRAWINGS EVEN GIVEN TO EITHER
SUBCONTRACTOR (MORGANTINE OR SPENCER PRENTICE WHITE)

SPEC REQUIREMENT TO GROUT 7' IN ANYTHING THAT'S
GROUTABLE TO PREVENT WASH WHICH WILL
INUNDATE SOME OF THE WELLS. THE FACT
THAT LOUSHNEY WILL HAVE TO WORK IN PITS
~~WELLS~~ WHICH WILL CAUSE COSTLY INTERFERENCE
PROBLEMS - IN ADDITION, LOUSHNEY SAYS HE
HAS TO HAVE THESE WELLS

LOUSHNEY & GOULD @ MEETING

APPARENTLY LACK OF COMMO BY BEENTEL

WILL HAVE TO GO OUT W/ADDENDUM FROM
ABOVE CHANGES TO BOTH BIDDERS PRIOR
TO BOTH BIDDERS

NO CLEAR DEFINITION OF LOCAL DEWATERING

HANSON IS MORGANTINE'S ENGR & REGISTERED
WILL CHECK IF MANY STATES COMPLY
W/MICH LICENSING - JSS SAVE COPY OF LAW
(NOTE: HANSON NOT PARTY TO CONTRACT)

IF WE HAD MENTIONED ONE UNIT THEN ANOTHER,
SUB WOULD HAVE DROPPED US - WE WENT
W/SUB'S SCHEDULE

GOULD HAS CONFLICT OF INTEREST ROLE - ADVISING
BIDDER ON HOW & EXTRA COMPENSATION

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



IN-HOUSE MEETING NOTES NO. 11

MIDLAND PLANT UNITS 1 & 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-001

*Not
proofed*

DATE: November 30, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Supplemental 10 CFR 50.54 Requests Regarding Plant Fill
(12 Questions)
FILE: 0279.1

ATTENDEES:

Bechtel

S. Afifi	L. Mattews
S. Blue	R. Rixford
P. Chen	M. Rothwell
B. Dhar	J. Wanzeck
J. Hook	K. Wiedner
S. Lo	

PURPOSE: To establish division of responsibility and schedule for answering these questions

ITEMS DISCUSSED:

The only item that was discussed was the NRC letter from L.S. Rubenstein to S.H. Howell (CPCo).

The following numbers correspond to the questions identified in the above letter and identifies the group(s) required to respond to the questions. Where more than one group is identified.

The first group will be responsible for the coordination for that question.

Question 24a - Geotechnical Services
b - Geotechnical Services
c - Civil, Geotechnical Services
d - Civil, Geotechnical Services

- e - Civil, Geotechnical Services
- f - Geotechnical Services
- g - Civil, Geotechnical Services, Licensing
- h - Civil, Geotechnical Services, Mechanical
- i - Geotechnical Services, Civil

- Question 25 - Civil, Geotechnical Services
- Question 26 - Civil
- Question 27 - Geotechnical Services
- Question 28 - Civil
- Question 29 - Civil
- Question 30 - Civil
- Question 31 - Geotechnical Services
- Question 32 - Civil, Geotechnical Services, Scheduling
- Question 33 - Geotechnical Services
- Question 34 - Civil
- Question 35 - Geotechnical Services

The schedule for completing the actions is as follows:

- Prepare an outline - December 7, 1979.
- Prepare a draft response - December 21, 1979.
- Coordinate (including CPCo) - January 4, 1980.
- Finalize response - February 1, 1980.

All of the responses to the latest round of questions will be coordinated by the Civil group.

Prepared by: _____
J. Hook

Concurrence by: _____
B. Dhar

JGH/sg
12/3/4

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1085
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: November 16, 1979
PLACE: Bechtel Office, Ann Arbor, Michigan
SUBJECT: Vibratory Settlement of the Diesel Generator Pedestals
FILE: 0279
ATTENDEES: Bechtel Consultant
H.G. Chapman R. Woods
P.K. Chen
B.C. McConnell
PURPOSE: The meeting was held to discuss the potential for vibratory settlement of the diesel generator pedestals and to establish a pedestal instrumentation and settlement monitoring program.

ITEMS DISCUSSED:

The possibility of vibratory shakedown of the sands underlying the diesel generator pedestals due to generator operation was discussed. The magnitude of this settlement has not been determined. Vibrating the pedestals to allow initial settlement to occur and to monitor the settlement was discussed. Should initial settlement prove to be a problem, grouting would remain a possible means of preventing additional settlement.

The startup testing phase of diesel operation could provide the means of vibrating the pedestals, allow initial settlement to occur, and provide the necessary settlement data. Alternative means of simulating diesel generator vibration other than actual operation is not practical.

- Consultant 5. The consultant will analyze vibration settlement of the diesel generator pedestals and determine the necessity for grouting the foundation material beneath the pedestals in Bays 1 and 2 by January 1, 1980.
- Consultant 6. The consultant will provide project engineering with sand shakedown settlement criteria for the testing program by February 1, 1980.
- Consultant 7. The consultant will provide a detailed procedure for implementing the monitoring program in Item 3 by March 1, 1980.
- Consultant 8. The consultant will provide project engineering with any long-term vibration and settlement behavior for each pedestal.

Prepared by: [Signature]

Reviewed by: [Signature]

HC/lsh
11/27/12

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



CONSUMERS POWER COMPANY
RECEIVED
NOV 19 1979

November 9, 1979

BLC- 8439

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Attention: Mr. R.C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Meeting Notes No. 1061
Midland Diesel Generator Meeting
File: 0270, 0279, C-2645

Gentlemen:

Attached for your review and information are copies of Meeting Notes No. 1061 for the diesel generator building task group meeting held in Ann Arbor, Michigan on October 9, 1979.

Very truly yours,

L.H. Curtis
for *M. Rothwell*
L.H. Curtis
Project Engineer

DR/sg
11/2/7

Enclosure: Meeting Notes No. 1061

cc: S.S. Afifi
K.D. Bailey
T.C. Cooke MIDLAND PLANT
L.H. Curtis
L. Davis
D. Horn
D.B. Miller
J.A. Rutgers
T.J. Sullivan
D. Sibbald
T. Thiruvengadam
K. Wiedner
Com Log

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1061

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: October 9, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

A. Boos*	M. Rung	T. Cooke
B. Dhar*	J. Wanzeck	D. Horn*
C. Martin	K. Wiedner	D. Sibbald
C. McConnel		T. Thiruvengadam
W. Paris*		
D. Reeves*		

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

ITEMS DISCUSSED:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on August 1, 1979, is as follows.

1) Action Item 1 of Meeting Notes No. 1018

This item is open. The analysis for the borated water lines has not been completed.

2) Action Item 2 of Meeting Notes No. 1018

This item is closed. The FSAR change for Section 2.5 is now with the licensing group for action and tracking.

3) Action Item 3 of Meeting Notes No. 1018

This item is closed. Crack mapping for areas of the railroad bay, feedwater isolation valve chambers, and borated water storage tanks has been completed. Sketches SK-C-666 and SK-C-667 have been issued.

4) Action Item 4 of Meeting Notes No. 1018

This item is open. It was noted that the present method of analysis uses a stress amplification factor for elbows, tees, and reducers. This results in very large stresses at these points. It was suggested that two analyses be performed; one based on the difference between the design location and the location from the last survey and one based on the difference between the first survey and the last survey. Construction noted that if some of the lines are to be unearthed, it must be done soon or not until next spring, otherwise heated shelters must be provided during backfill operations.

5) Action Item 5 of Meeting Notes No. 1018

This item is closed. Specification 7220-C-94 and Drawing 7220-C-2000 for the piling subcontract were issued on August 29, 1979, and September 4, 1979, respectively.

6) Action Item 6 of Meeting Notes No. 1018

This item is open. Borated water storage tanks are under construction. The load test procedure, including water chemistry and protection of permanent plant facilities, will be issued by October 15, 1979.

7) Action Item 7 of Meeting Notes No. 1018

This item is closed. The conflict in the response to Question 6 of the NRC's 10 CFR 50.54(f) was resolved in Revision 3 of the response to the questions on September 13, 1979.

8) Action Item 8 of Meeting Notes No. 1018

This item is closed. The comments to FSAR Q&R 362.15 have been resolved. The response will remain as written.

9) Action Items 9 and 10 of Meeting Notes No. 1018

These items have been combined and are open. Project engineering will revise and clarify the specifications and responses to the NRC's 10 CFR 50.54(f) questions to show requirements for a compaction of 95% ASTM D 1557 under buildings and 90% ASTM D 1557 at other locations.

10) Action Item 11 of Meeting Notes No. 1018

This item is closed. The report of the soil test program for the air line leak in the tank farm has been completed.

11) Action Item 12 of Meeting Notes No. 1018

This item is closed. The report on the air line leak was included in Revision 7 of MCAR 24.

12) Action Item 13 of Meeting Notes No. 1018

This item is open. Consultant R. Loughney is to submit a conceptual plan for the preliminary design and scope of work for the permanent dewatering.

13) Action Item 14 of Meeting Notes No. 1018

This item is open. The bid package for permanent dewatering will be issued by January 1980.

14) Action Item 15 of Meeting Notes No. 1018

This item is open. The contract for permanent dewatering will be awarded by March 1980.

15) Action Item 16 of Meeting Notes No. 1018

This item is open. There have been several discussions with mechanical and nuclear staff. The following subjects have been discussed:

- a) A long recharge time is required because of systems that are required after safe shutdown earthquake (SSE).
- b) A program is required to establish the reliability of the piezometers.
- c) Demonstrate the capability to repair the system during recharge time.

16) Action Item 17 of Meeting Notes No. 1018

This item is open. A review of the NRC regulations with respect to permanent dewatering is continuing.

17) Action Item 18 of Meeting Notes No. 1018

This item is open. The licensing group has started a docket search for information on permanent dewatering at other plants.

18) Action Item 19 of Meeting Notes No. 1018

This item is open. Cost estimates for all Q-listed and part-Q-listed systems are not complete.

19) Action Item 20 of Meeting Notes No. 1018

This item is closed. It was recommended that the service water building piles be added to the underpinning contract.

20) Action Item 21 of Meeting Notes No. 1018

This item is closed. Piling will be part of the underpinning contract and will not have separate bids.

21) Action Item 22 of Meeting Notes No. 1018

This item is open. Construction will determine the terminology for the permanent dewatering by November 1, 1979.

22) Action Item 23 of Meeting Notes No. 1018

This item is closed. The underpinning bid package was sent out in August 1979. The preaward meeting will be on October 22, 1979. Consumers Power Company comments will be discussed at that time. The contract will be awarded by November 15, 1979.

23) Action Item 24 of Meeting Notes No. 1018

This item is open. Construction will review the insurance requirements concerning underground work associated with underpinning by November 1, 1979.

24) Action Item 25 of Meeting Notes No. 1018

This item is open. Removal of water from the diesel fuel tanks is being reviewed.

- 25) Action Item 26 of Meeting Notes No. 1018

This item is open. It is feasible to run the diesel generators to vibrate the pedestals but is not presently included in the specifications. Project engineering and geotechnical services will establish a procedure and run duration for the diesels and a settlement monitoring program by December 1, 1979. This activity will have to be coordinated with the startup test program.

- 26) Action Item 27 of Meeting Notes No. 1018

This item is closed. None of the surcharge sand will be used as Q-listed fill.

- 27) Action Item 28 of Meeting Notes No. 1018

This item is closed. Pile stiffnesses for the service water building have been finalized. It was verified during the meeting that the original values provided would not change.

- 28) Action Item 29 of Meeting Notes No. 1018

This item is closed. Removal of fill in the tank farm has been resolved. Refer to report on tank farm.

- 29) Action Item 30 of Meeting Notes No. 1018

This item is closed. The temporary air line in the tank farm that had a leak has been grouted. All other temporary lines in the tank farm will be abandoned and grouted as soon as they can be rerouted around the tank farm.

- 30) Action Item 31 of Meeting Notes No. 1018

This item is open. A summary of the data from the test pits and soil borings will be incorporated into the January amendment of the FSAR.

- 31) Action Item 32 of Meeting Notes No. 1018

This item is closed. Letters BEBC-3294 and BEBC-3311 which were sent on September 24, 1979, and October 3, 1979, respectively describe the plan that will be used to determine the permanent dewatering system parameters.

- 32) Action Item 33 of Meeting Notes No. 1018

This item is closed. All items relevant to the MCAR 24 scope were discussed in Revision 7 of MCAR 24.

33) Action Item 34 of Meeting Notes No. 1018

This item is closed. TWX BEBC-3176 was sent on August 13, 1979, describing the surcharge removal procedure.

34) Action Item 35 of Meeting Notes No. 1018

This item is closed. Density plots for the dike area north of the auxiliary building have been completed.

B) Status of Site Activities

1) Backfill operation and compaction tests

Backfill operations are proceeding at the site. An extensive program of documentation of material placement has been developed. Two soils engineers are presently onsite to assist in the control of backfill placement.

The questionable fill material in the tank farm has been removed and replaced. The tank farm is backfilled to el 630'-0".

Geotechnical services has given a response to NCRs 1004 and 2294. NCR M-01-5-9-012 has been partially resolved.

All compaction equipment being used at the site has been qualified for technique and can be included in the FSAR if required.

2) Temporary dewatering

In area 3 (see Attachment 1), all of the dewatering wells outside of the turbine building have been installed. Only a couple of wells, including observation wells, are left to be installed inside the turbine building. For the temporary construction dewatering in Areas 1 and 2 (see Attachment 1), almost all of the dewatering wells are installed.

The schedule for temporary dewatering is as follows (see Attachment 1):

October 15 - Start installing deep pump test well in Area 4
October 22 - Start pumping deep pump test well in Area 4 for 3 days
October 25 - Start pumping Areas 1 and 2
October 25 - Approval of Loughney procedures
November 1 - Start pumping Area 3

There are three more procedures from Loughney that must be reviewed by project engineering before dewatering in Area 3 can start. A meeting with project engineering, subcontracts and construction will be scheduled to discuss these and the other Loughney procedures.

3) Test program for permanent dewatering

Locations and directions for the borings for the well pump tests were established in the letter, BEBC-3299, sent on September 24, 1979. They were modified by letter BEBC-3311 on October 3, 1979, to expedite construction. This letter deleted and relocated some wells and established the test well diameter and requirements for piezometers and borros anchors. Based on the present schedule in Item 2 above (temporary watering), more piezometers are needed near Areas 1 and 2 prior to pumping. Their locations will be coordinated by the onsite geotechnical representative.

C) Status of Remaining Subcontracts

The status of the remaining subcontracts was not discussed as an individual item but was covered during the discussions on the various action items. The following is a summary:

- 1) Piling - Specification 7220-C-94 and Drawing 7220-C-2000 were issued on August 29, 1979, and September 4, 1979, respectively, for the piling subcontract. The service water building piles will be added to the underpinning contract. (See Items 5, 19, and 20 of the Review of Prior Action Items.)
- 2) Underpinning - The underpinning bid package was sent out in August 1979. The preaward meeting will be on October 22, 1979. Construction will review the insurance requirements concerning underground work. (See Items 22 and 23 of Review of Prior Action Items.)
- 3) Permanent dewatering - The consultant, R. Loughney, will submit a conceptual plan for the preliminary design and scope of work. The bid package will be issued by January 1980, and the contract will be awarded by March 1980. The Q-listed and non-Q-listed portions of the permanent dewatering system still have to be determined. (See Items 12 through 18 and 21 of Review of Prior Action Items.)

D) Cost Estimate and Schedule for Remaining Work

Schedules were provided for:

- 1) Service water pump structure piling (see Attachment 2)
- 2) Auxiliary building underpinning (see Attachment 3)
- 3) Permanent and temporary dewatering (see Drawings EP-101 and EP-102)
- 4) Overall cost and schedule status (see Attachment 4)

E) NRC 10 cFR 50.54(f) questions were not discussed.

F) MCAR Report

The scope of the MCAR will be limited to soil exploration and the diesel generator building. The settlement records and pipe profile figures will be submitted for the last time.

The MCAR will not contain the final results of the future predicted settlement because the meeting with J. Peck and A.J. Hendron, Jr. will not be held until October 25, 1979. No additional borings or cross-sections will be included because they will go into the January 1980 FSAR amendment.

The schedule section will be revised or shortened to one paragraph with no dates.

G) Diesel Generator Building

The grout requirements under the footings were discussed. Portions of the footings in Bays 3 and 4 were exposed and a maximum gap of 3/4 inch was found. The gap penetrated up to 2-1/2 feet under the footing. It was decided that more exploration would be performed and the information would be presented to J. Peck and A.J. Hendron, Jr.

H) Diesel Fuel Oil Lines

A design change notice (DCN) was issued requiring the diesel fuel lines to be buried 6 feet below grade. It was questioned whether the design requirements could be satisfied.

ACTION ITEMS:

- Project Engineering 1) Analyze the flexibility of piping connected to the borated water storage tanks assuming 4 inches of differential settlement. Set up meeting with stress group (K. Wiedner and J. Betts to attend) to discuss analysis. Investigate eliminating link seals at penetrations by October 30, 1979.
- Project Engineering 2) Evaluate stress conditions in the resurveyed pipes. The following two analyses were suggested:
- a. Difference between original design location and latest survey
 - b. Difference between first survey and latest survey
- Geotechnical Services/
Project Engineering 3) Issue program for load test of borated water storage tanks by October 15, 1979.
- Project Engineering 4) Revise and clarify the specifications and responses to the NRC's 10 CFR 50.54(f) questions to show requirements for a compaction of 95% ASTM D 1557 under buildings and 90% ASTM D 1557 at other locations.
- Consultant, R. Loughney 5) Submit conceptual design and scope of work for the permanent dewatering system.
- Geotechnical Services/
Project Engineering 6) Permanent dewatering system
- a. Design permanent dewatering system and have it reviewed in-house (SF) or by an outside consultant.
 - b. Issue bid package by January 1980.
 - c. Award contract by March 1980.
 - d. Establish a program to determine the reliability of the piezometers.
 - e. Determine Q-listed items for the following two options.

1. Complete cutoff wall, long recharge time (Q-listed monitoring of inspection procedure)
2. Partial cutoff wall with local grouting, shorter recharge time (all Q-listed monitoring and pumping equipment)

- f) Establish program to demonstrate capability to repair dewatering system during recharge time.
- g) Establish elevations and locations at which liquefaction would occur for 0.12 g and 0.20 g seismic events.
- h) Continue review of NRC regulations with respect to permanent dewatering.
- i) Continue docket search for information on permanent dewatering at other plants.
- j) Estimate costs for two options discussed in Item e above.

Construction

- 7) Determine terminology to be used for dewatering with respect to union jurisdictions and transmit to project engineering by November 1, 1979.

Construction

- 8) Review insurance requirements concerning underground work associated with underpinning and inform project engineering by November 1, 1979.

Geotechnical Services/
Project Engineering

- 9) Review diesel fuel tank settlements and issue release for removal of water from fuel tanks by October 15, 1979. Determine cleaning procedures that will be required.

Geotechnical Services/
Project Engineering

- 10) Establish a procedure and time period for running the diesel generators. Establish a settlement monitoring program including readings:

- a) Before placement of generators

- b) After placement of generators
- c) After operation of generators

- Geotechnical Services/
Project Engineering 11) Incorporate a summary of data from test pits and soil borings into the January FSAR amendment.
- Project Engineering 12) Disposition NCRs 1004 and 2294.
- Geotechnical Services 13) Resolve remaining portions Consumers Power Company NCR M-01-5-9-012.
- Project Engineering 14) Determine if compaction requirements for current onsite compaction equipment need to be included in the FSAR.
- Construction/
Subcontracts 15) Expedite U.S. Testing's response to Bechtel's Review of U.S. Testing's Field and Laboratory Construction Test Data on Soils Used as Fill.
- Geotechnical Services 16) Establish locations for more observation wells near the construction temporary dewatering areas.
- Geotechnical Services/
Project Engineering 17) Develop a combined schedule for the temporary dewatering and pump tests for the permanent dewatering.
- Construction/
Project Engineering 18) Schedule a meeting between project engineering, construction, and subcontracts to discuss Loughney Dewatering procedures.
- Project Engineering 19) Revise the schedules (Attachments 2 through 4) to reflect the interface with the temporary dewatering.
- Project Engineering 20) Provide a procedure for grouting under the diesel generator building footings by October 12, 1979.
- Project Engineering 21) Establish the requirements for additional investigation of gaps under the diesel generator building footings both inside and outside the building.

Project Engineering

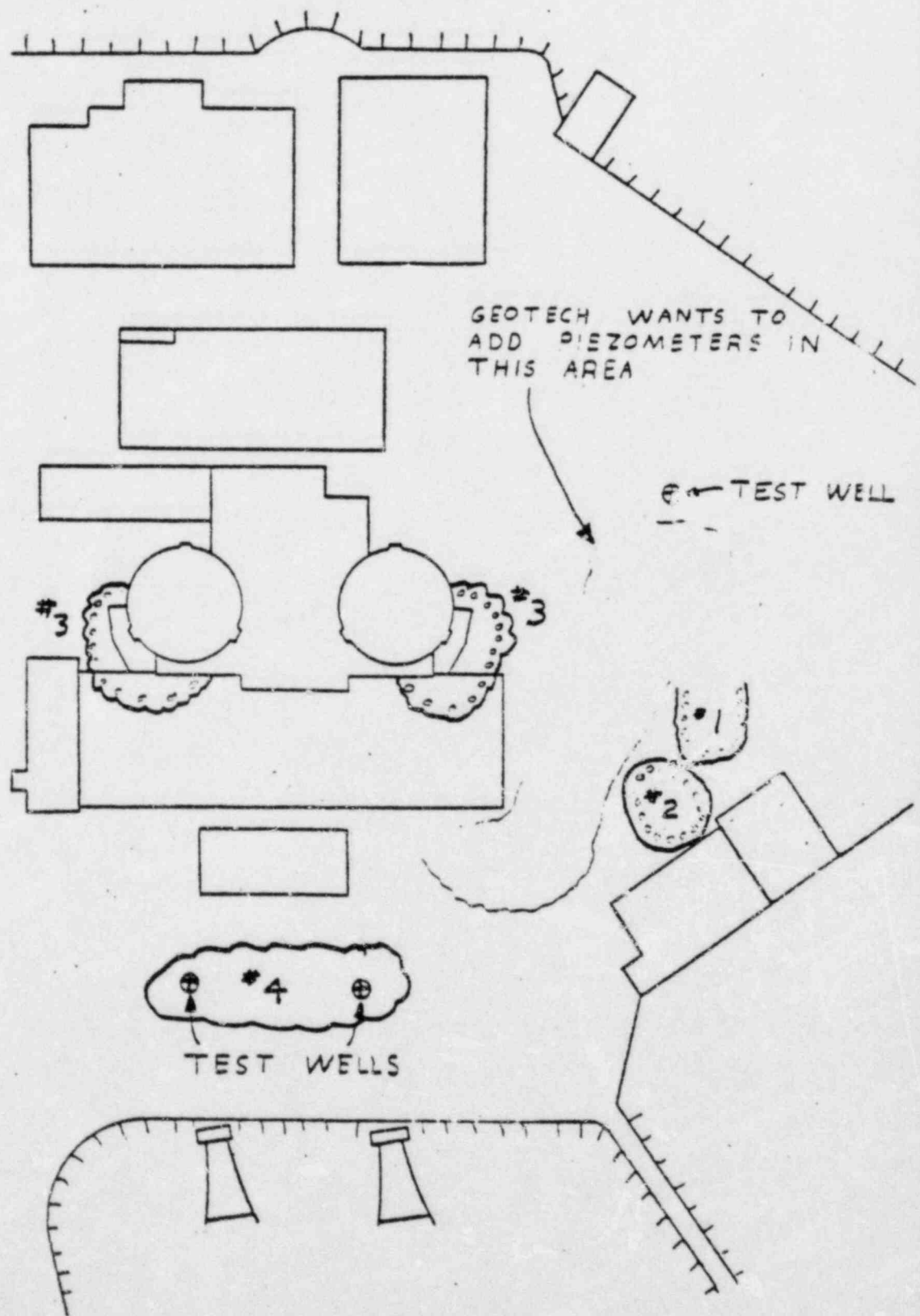
- 22) Review the design requirements for the diesel fuel lines and determine if the DCN is satisfactory as issued.

D. Reeves
D. Reeves

DR/js
10/17/7

- Attachments
- 1) Temporary dewatering and test well locations
 - 2) Schedule for service water pump structure piling
 - 3) Schedule for auxiliary building underpinning
 - 4) Overall cost and schedule status

Meeting Notes No. 1061
Attachment 1
Temporary Dewatering and
Test Well Locations



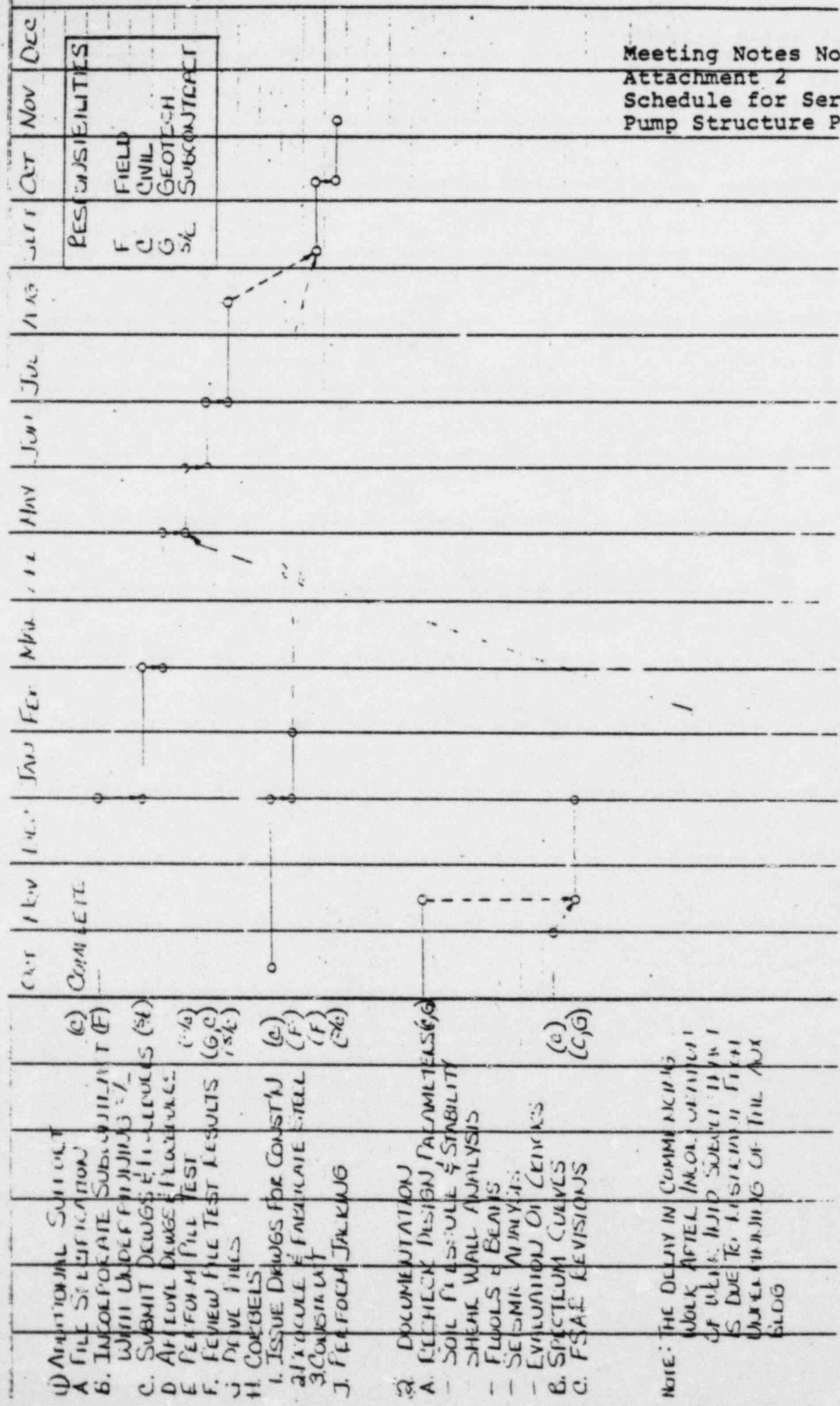
DRAWN BY D. REEVES

TEMPORARY DEWATERING
AND TEST WELL LOCATIONS

C.E.M
10/6/71

MATERIAL SCHEDULE
FEASIBILITY FOR SERVICE WATER PUMP STRUCTURE

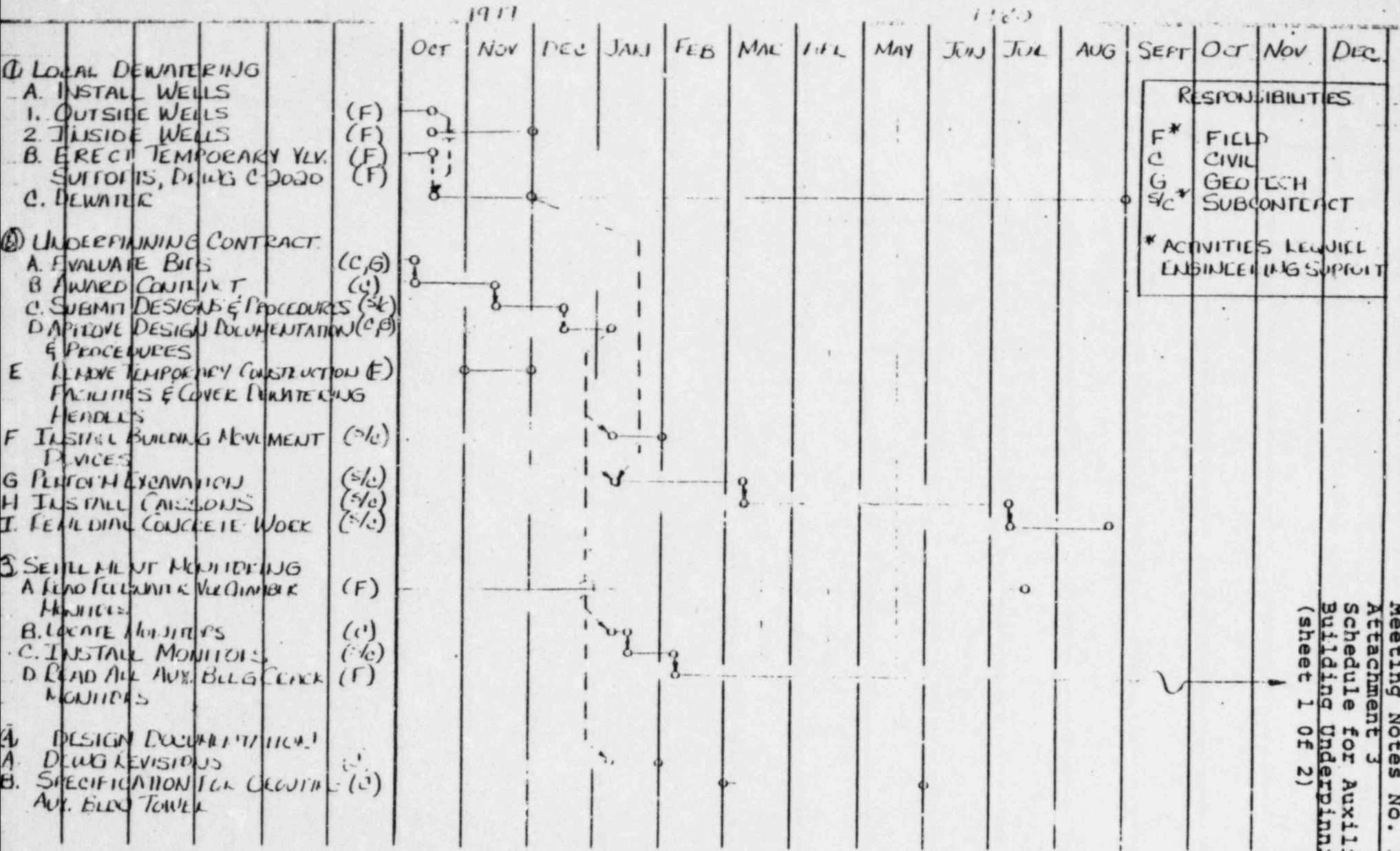
Meeting Notes No. 1061
Attachment 2
Schedule for Service Water
Pump Structure Piling



NOTE: THE DELAY IN COMMENCING WORK AFTER INCOMPLETION OF WORKING SUBMIT IS DUE TO MISSING OF THE AUX

C.E.M
10/4/79
LEV 1 10/11/79

MCAR 24 SETTLEMENT
UNDERPINNINGS OF THE AUX. ELEV.
ENGINEERING SCHEDULE



RESPONSIBILITIES	
F*	FIELD
C	CIVIL
G	GEO TECH
S/C*	SUBCONTRACT
* ACTIVITIES REQUIR ENGINEERING SUPPORT	

Meeting Notes No. 1061
Attachment 3
Schedule for Auxiliary
Building Underpinning
(sheet 1 of 2)

7 of 2

QUALIFICATION CONT'

Meeting Notes No. 1061
Attachment 3
(sheet 2 of 2)

1980

1981

DEC	
NOV	
OCT	
SEPT	
AUG	
JUL	
JUN	
MAY	
APR	
MAR	
FEB	
JAN	
DEC	
NOV	
OCT	

(c)
(c)
(4,6)

5 DOCUMENTATION
A. AUX. ELOG ANALYSIS
B. SPECTRUM CURVES
C. FSAR REVISIONS

COST AND SCHEDULE STATUS

COST

Total estimated cost has increased from \$14,500,000 to \$15,200,000.
This increase is due to:

- Item 1: Pricing increase on C-95, underpinning developed from bids received (\$400,000)
- Item 2: Change in seismic acceleration criteria for underpinning design (\$300,000)

The total estimated cost includes an allowance of \$6,000,000 for the investigation, design, procurement, and installation of a permanent plant dewatering system.

SCHEDULE

Corrective actions currently outlined for this MCAR are not expected to impact the construction and testing project schedule as now being formulated. However, since the licensing schedule necessary to support the anticipated revised fuel load will require final FSAR submittal on open items due to this MCAR by September 1, 1980. Consumers and Bechtel do not want any of these MCAR items still open at that time.

Specific corrective actions and surcharge requirement for the borated water storage tanks needs to be firmed up so a schedule can be developed.

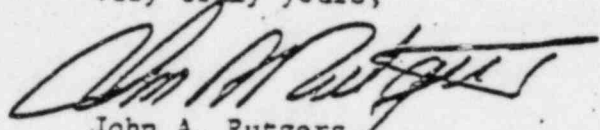
BLC-8167
Consumers Power Company.
September 17, 1979
Page 2

Bechtel Power Corporation

000256

Based on the foregoing it is evident that this work does not fall under Article 9 of the Bechtel/Consumers Power Company Contract.

Very truly yours,



John A. Rutgers
Project Manager

JAR/pp

cc: Mr. D. B. Miller

Question 362.2 (2.5.4.5.1)

000256

Question 1 and the resulting discussion on Page 8.00-1 included in Amendment Number 9 to your PSAR stated that all natural sands with relative densities less than 75% would be removed beneath all Class I structures and beneath non-Class 1 structures so sited that their failure could endanger the adjacent Class 1 structures. Discuss the methods employed in mapping and removing the sands having less than 75% relative density. Provide plan and sectional figures showing the areas where these materials were removed. Figure A9-2 of the PSAR which displays subsurface profiles of Class 1 piping should be updated to show removal of sands of less than 75% relative density and be presented in the FSAR. Figure 2.5-21 of the FSAR shows loose sands beneath the Class 1 tanks although they were to have been removed. Explain this inconsistency, and provide proper documentation of as-built conditions.

Responses

In 1970, 61 soil borings were made at the possible locations of Category I structures and systems to investigate loose surficial sands. These were shallow depth borings with depths ranging from 9 to 40 feet. The borings were designated D-1 through D-60 and are included in Appendix 2A. The locations of the borings are shown on FSAR Figure 2.5-17.

It is seen from Figure 2.5-42 that standard penetration blowcount values of 10 to 15 blows per foot are required at depths from zero to 15 feet for a relative density of 75%. Examination of Table 2.5-25 and the boring logs shows the D-borings had the blowcounts necessary for relative densities in excess of 75%. Standard penetration blowcounts were recorded at various depths in these borings. Blowcount values were in excess of 20 blows per foot with one exception. Borehole D-48 (refer to Table 2.5-25) indicated one blowcount of five at an elevation approximately 595 feet. However, borehole D-48A, located 5 feet away from D-48, showed a minimum blowcount of 20 at approximately 600 feet elevation.

Shortly after the D-borings were completed, project activities were postponed from 1970 to 1973 because soil borings under one of the Category I tanks were not made until 1978. The subsurface profile shown in Figure 2.5-21, Rev 1 (January 8, 1979), indicated the possible existence of loose sands.

During 1978, numerous soil borings were made in the tank farm area and elsewhere in the plant area. These borings are designated T, C, H_T, L_N, E, D, D_G, Q, and CT, and their locations are included in Figure 2.5-17. The boring logs are included in Appendix 2A.

The plant area now consists of man-made fill ranging from 25 to 35 feet high. Under this condition, standard penetration blowcount values of 20 to 25 blows per foot are required⁽¹⁾ for a relative density of 75% at depths between 25 to 35 feet as can be seen from Figure 2.5-42. The T-borings in the tank farm area register blowcounts more than the minimum for a relative density of 75% (refer to Table 2.5-25). Therefore, the sands can be classified as moderately dense to dense. Based on this, the subsurface profile, Figure 2.5-21, has been revised excluding the possible existence of loose sands.

000256

18

A few borings elsewhere in the plant area, namely DG-7, DG-28, and CT-1, indicate blowcounts of 9 to 17 blows per foot at elevations of 599 to 604 feet. These are isolated lenses and will not endanger the integrity of Category I structures.

Based on the facts discussed above, it is concluded that the surficial sands existing in the plant area have relative densities greater than 75%.

⁽¹⁾ H.J. Gibbs and W.G. Holtz, "Research on Determining the Density of Sands by Spoon Penetration Testing," Proceedings-Fourth International Conference on Soil Mechanics and Foundation Engineering, Vol I (1957), London, England, pp 35-39

15

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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

TCC
FILE

BECHTEL
CONSUMERS POWER COMPANY

RECEIVED
AUG 23 1979

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

August 21, 1979

BLC- 8051

Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

Attention: Mr. R.C. Bauman

Subject: Consumers Power Company
Midland Plant - Job 7220
Meeting Notes No. 979
Settlement Problem of
Seismic Category I Facilities
and Structures
File: 0270, 0279, C-1700, C-2645

MAY 30
NOTES

Gentlemen:

Attached is a copy of Meeting Notes No. 1001 for the meeting with CPCo in Ann Arbor regarding the diesel generator building causes and action items.

Very truly yours,

L. H. Curtis
for L.H. Curtis
Project Engineer

BCM/pd
8/11/1

Enclosure: Meeting Notes No. 1001

cc: D.B. Miller
T.J. Sullivan
T. Cooke

<input checked="" type="checkbox"/>	TCC
<input checked="" type="checkbox"/>	DWP
<input type="checkbox"/>	JJV
<input type="checkbox"/>	RLB
<input type="checkbox"/>	CLK
<input type="checkbox"/>	JTK
<input type="checkbox"/>	MHM
<input type="checkbox"/>	WFS
<input checked="" type="checkbox"/>	RMW
<input type="checkbox"/>	DEF
<input type="checkbox"/>	GL
<input type="checkbox"/>	JGB
<input type="checkbox"/>	WCS
<input type="checkbox"/>	EME
<input type="checkbox"/>	GWR
<input type="checkbox"/>	MFB
<input type="checkbox"/>	ISS
<input type="checkbox"/>	JJD
<input type="checkbox"/>	CMO
<input type="checkbox"/>	QAR
<input type="checkbox"/>	TC
<input type="checkbox"/>	PKV
<input type="checkbox"/>	ASP
<input type="checkbox"/>	SEC
<input type="checkbox"/>	CLERK
<input type="checkbox"/>	FILE

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1001

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: May 30, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Diesel Generator Building Possible Causes and Action Items
FILE: 0279, C-2645

ATTENDEES:

Bechtel

CPCo

K. Wiedner
J. Hook
G. Tuveson
J. Hink*
C. McConnel*
J. Wanzeck
A. Boos
G. Richardson
R. Simanek

D. Sibbald
R. Wheeler
D. Horn
T. Thiruvengadam
C. Hunt

*Part-Time

PURPOSE: The meeting was held in the Ann Arbor office to discuss the action items and possible causes of insufficient fill compaction included in Attachments 1 and 2 to Meeting Notes No. 934 dated March 12, 1979.

ITEMS DISCUSSED:

- A. Review of the status of the action items listed in Attachment 1 to Meeting Notes No. 934
 1. Confirmation of material compatibility adequacy - J. Wanzeck stated that placement of sand in trenches in the plant area fill is not a problem if the material has been properly placed. Geotech will provide a memorandum to close out this item.

2. Confirmation of low blow count on radwaste building - Three additional borings inside the radwaste building resulted in no low blow counts. This item is closed.
 3. Confirmation of electrical duct banks in the yard - Two additional borings near the duct banks between the service water structure and the turbine building and other borings have established the soil conditions. Any further items will be tracked by the response to Request 50.54f. This item is closed.
 4. Tabulated list of test results - Geotech has tabulated all compaction test results for the plant area fill and has issued a preliminary report for in-house review. Geotech will issue a draft report for CPCo review by June 11, 1979.
 5. Checking of water level around site - The installed piezometers around the site indicate an average water level of approximately 625.5 feet. This item is closed.
 6. Evaluation of who placed fill (Wheeler study) under all Seismic Category I structures - This is complete for the diesel generator building and service water structure. Review of other areas is in progress. Construction and CPCo are to complete this study by June 8, 1979.
 7. Checking of 1977 stockpile and rain data - Review of rainfall data indicates that the summer of 1977 was normal and not a dry year. This item is closed.
 8. Type of fill placed during the winter of 1976 - This item is being completed with Item 6.
 9. Review of work and testing in the time frame below elevation 615' - This item is being completed with Item 6.
- B. Review of the preliminary possible causes described in Attachment 2 to Meeting Notes No. 934 was accomplished. This resulted in revisions to the list. The revised list of preliminary possible causes is attached as Attachment 1 to these meeting notes.

ACTION ITEMS:

- | | | |
|-----------------|----|---|
| Bechtel/Geotech | 1) | Geotech will provide a memorandum to close out the question of sand in trenches in the plant area fill. |
| Bechtel/Geotech | 2) | Geotech is to issue a draft report on the tabulated list of compaction test results for the plant area fill for CPCo review by June 11, 1979. |

Construction/CPCo 3) Construction and CPCo are to complete the evaluation regarding who placed fill under all Seismic Category I structures (Wheeler study) by June 8, 1979. The study for the diesel generator building and service water structure has been completed.

Prepared by: Jay L. Reichen
Reviewed by: Karl Wiedner

CM/GR/js
7/11/11

Attachment: Preliminary Possible Causes of Insufficient Fill Compaction

34
May 30, 1979

ATTACHMENT 1

PRELIMINARY POSSIBLE CAUSES OF INSUFFICIENT FILL COMPACTION

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
1. Time difference between placement of fill and construction of facility	No	Cannot cause insufficient compaction
2. Placement method		
- Lift thickness	Yes	Investigation is continuing into capability of the equipment which was used to compact the plant area fill to compact a full 12-inch lift. ACTION: Geotech
- Moisture control	No	Material placed during the period when moisture control was not implemented is generally in the top 2 feet of fill which would not cause excessive settlement. Remaining areas are currently being investigated but are not considered a cause at this time.
- Compaction equipment	Yes	The equipment used during construction is being used to place 4-inch-thick lifts. The results obtained will be compared with the original standards used during fill placement. Thicker lifts will be made and evaluated up to a maximum thickness of 12 inches. ACTION: Geotech

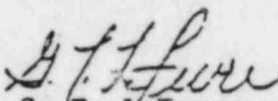
<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
- Types of material	No	Materials have been shown to be compactable and also compatible in test fills.
- Compactive effort	Yes	To be evaluated with lift thickness and equipment.
3. Theoretical comparison of BMP compaction versus settlement	Yes	Compare effects of different compaction levels. ACTION: Geotech
4. Specification C-211		
- General	Yes	Include with Action 2.
- Frost protection omitted	Yes	Investigate impact (refer to Part A, Item 6 of this report).
- Flooding of trenches	Yes/No	Possible cause in localized areas of sand fill areas; not a cause in clay fill.
5. Testing		
- Methods	Yes	Investigate impact. ACTION: Geotech
- Equipment		
- Results/reports		
- Retests		
- Reviews/evaluations		
- Personnel		
6. Increased test frequency and location for small areas	Yes	Investigation of frequency and distribution is in process. ACTION: Construction/CPCo
7. Different contractors		
- Personnel qualifications	No	Refer to Item 16.
- Different inspection methods	Yes	Refer to Item 15.
- Placement methods	Yes	Refer to Item 2.

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
8. Extensively reexcavated area	No	Additional investigation indicates similar problems in areas where reexcavation was not accomplished.
9. Moisture intrusion in ground	Yes/No	Not a problem if properly compacted; a possible problem if undercompacted and dry of optimum.
10. Lean concrete fill	No	
11. Pond filled March 1978	No	See Item 9.
12. Stockpiled material	No	See Item 13.
- Weathering		
- Drying out		
13. 1977 dry year	No	The year 1977 was not a dry one.
14. Own weight settlement (calcs)	No	Cannot cause poor compaction.
15. Inpection procedures after 3/17	Yes	Investigation into inspection procedures used by Bechtel and Canonie indicates that inspection of Bechtel operations was not as intense as for Canonie operations, especially after October 1976. Inspection callout was "S" (surveillance) and relied heavily on the test results to ensure proper placement.
16. Personnel	No	Review of personnel qualifications for Bechtel, Canonie, and U.S. Testing indicates the personnel probably had sufficient education, experience, and training to carry out the tasks assigned to them.
17. Effects of 1974-75 slowdown	No	

Bechtel Associates Professional Corporation
Inter-office Memorandum

To R. L. Castleberry
Date June 5, 1979
Subject Midland Units 1 & 2
Job No. 7220-101
Dewatering Meeting
From G. T. LaFevre
Of Geotechnical Services
Copies to S. L. Blue
1320, 3130
At Ann Arbor 10 D 5
7220-79-91

Attached are my notes on a dewatering meeting held in our office on 31 May 1979.


G. T. LaFevre

GTL/am
Attachments

ATTENDEES:

G. A. Tuveson
C. B. McConnel
J. G. Hook
K. Wiedner
P. K. Chen
S. S. Afifi
J. W. Wanzeck
E. M. Smith
A. B. Arnold
W. C. Paris
D. Sibbald
D. Loughney
D. Woods

To File
FROM TCCooke/RMW
DATE August 8, 1979
SUBJECT MIDLAND PROJECT GWO 7020 - MEETING TO DISCUSS CONSULTANTS' REVISED PROPOSAL - CHANGE TO PERMANENT DEWATERING - JUNE 22, 1979
File: B3.0.3 UFI#-00234 Serial: CSC-4297
CC Attendees
KCBrooks (2)

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

Attendees

Consumers Power Company

- T. C. Cooke
- G. S. Keeley
- D. B. Miller
- W. R. Bird
- B. W. Marguglio
- D. E. Horn
- T. R. Thiruvengadam
- D. E. Sibbald
- K. R. Kline

Bechtel Power Corporation

- S. Afifi
- R. L. Rixford
- G. L. Richardson
- L. A. Dreisbach
- J. Milandin
- G. Tuveson
- A. J. Boos
- D. Jinnett
- R. Simanek
- P. A. Martinez
- W. Jones
- J. Wanzack
- S. Blue
- T. Johnson

After lunch at a meeting in Ann Arbor on June 19, 1979, the consultants got together and decided that there may be some advantages to the Project in installing a permanent dewatering system as an alternative to some of the fixes transmitted to the NRC in conjunction with the 50.54f. questions. In the opinion of the consultants, this revised scheme would resolve all questions for potential liquefaction; and, therefore, eliminate the problems associated with the chemical grout. The consultants had noted that the chemical grout in the area of the Diesel Generator Building would not be completed until June or July 1980 at the earliest. They also discussed the problems with the grout penetrating building cracks, utilities, etc. The railroad bay grouting is not required and no longer needs to be considered. The consultants also requested that the need for complete mining below the Auxiliary Building wings be re-evaluated if liquefaction problems are eliminated.

They stated there is a possibility the remaining work would include shear velocity testing underneath the Auxiliary Building electrical penetration areas to estimate contact stresses with possible grouting of local void areas. Profiling of pipes before and after dewatering and duct bank checks and verification would also have to be made. The piling solution for the service water structures will remain

Page 2

File

Midland Project GWO 7020 - Meeting to Discuss Consultants' Revised Proposal
Change to Permanent Dewatering - June 22, 1979

File: B3.0.3 UFI#-00234 Serial: CSC-4297

August 8, 1979

unaffected. Resolution of whether or not permanent dewatering system would have to be a safety system and structure, the possibility of combining the permanent system with the temporary system, installation of Q-list monitoring wells, and a system to monitor the effluent for fines would be required. At the meeting on June 22, 1979, Mr. Tuveson also noted that he would have to recheck his design calculations on the buildings to see whether or not the removal of the buoyant forces would have any effect on the 40-year life of the structures.

The consultants apparently believe that the dewatering system would be easier to defend to the NRC and that it is a less complicated fix for liquefaction.

It was noted on June 22, 1979 that the consultants possibly did not consider the structural recheck required without the buoyant support or the FSAR revisions, which were primarily administrative in nature. W. Jones noted that the cost of total dewatering would be in the neighborhood of \$10 to \$15 Million with required redundancies. This was for a cased well with permanent submersible pumps considered. Dewatering for the Diesel Generator only would cost approximately \$2 Million. This would be balanced by a savings of \$2 Million for grouting, \$2.2 Million for underpinning, \$750,000 for dewatering, with nothing allowed for elimination of tie-up of the Diesel Generator area or mining obstructions.

As a sidelight, I&E Report 79-10 discussing Air Bubbles in the Tank Farm, was also suggested as a topic for the July 10 meeting with the NRC in Washington. Prior to the Thursday meeting with the consultants in Denver (June 28), a matrix should be drawn to show the advantages and disadvantages of various methods proposed to date. This would include not only our responses to the 50.54f. items and the consultants' latest proposal, but also some of the earlier alternates used which were previously discarded for one reason or another, since conditions have changed. These items will be discussed prior to the Thursday meeting with the consultants in Denver and at a meeting in Ann Arbor at 8:00 AM on June 27. It was also decided to send the MCAR 6 Interim Report with a copy letter noting that there are other evaluations being made at this time and mentioning the dewatering option.

To: File

FROM: TCCooke/RMW *[Signature]*

DATE: August 7, 1979

SUBJECT: MIDLAND PROJECT GWO 7020
 PRE-MEETING WITH CONSULTANTS *6/27/79*
 File: B3.0.3 Serial: CSC-4274 UFI#-00234-S-

**Consumers
 Power
 Company**

INTERNAL
 CORRESPONDENCE

CC Attendees
 GSKeeley, P14-408B
 DBMiller
 KCBrooks (2)

Attendees:

- Karl Wiedner, Bechtel Power
- Phil Martinez, Bechtel Power
- Sherif Afifi, Bechtel Power
- Dr. Ralph Peck, Consultant
- Dr. A. Hendron, Jr., Consultant
- Dr. M. T. Davisson, Consultant
- Tom Cooke, Consumers Power Company

There was a brief discussion on the various options. One of the main reasons for Option Five (Areal Dewatering) was that it grew to a large extent out of the dewatering process for Option One. The consultants expressed the opinion that we had to answer liquefaction questions wherever anyone might think they could occur (for example, the control tower at 6KSF loading). It could be a real thorn in the job at a later date, and areal dewatering is the only clean method. It is very hard to argue against dewatering, and it would be very difficult to prove the effectiveness of grouting. The question was asked about the water that could be trapped in clay. The consultants responded that over the long haul, it would drain with permanent drainage and could be proven by piezometers. While peripheral wells would probably do the job, there would be some intermediate wells. Any vein of water would be drained. Piezometers would convincingly prove that the area was dry. The construction dewatering process for the Auxiliary Building electrical penetration areas will assist in determining how much dewatering and how many wells, etc., are required. P. Martinez indicated that Bechtel would have to take another look at the design calculations in the foundation areas.

The Auxiliary Building electrical penetration area is a high narrow structure with a torsion box at the lower portion. The soil was designed to take the horizontal shear. The low soil blow counts values indicate that this structure is possibly being cantilevered to some extent off of the control tower. Dr. Peck expressed the need for the design basis for this structure. Dr. Hendron indicated that the borings were not necessarily indicative of what was beneath the structure. A parametric study for the structure should be made based on a range of soil properties. A quick rough analysis should first be done, followed by a detailed analysis. Karl Wiedner discussed the possible outer end settlement and his theory on how the structure had possibly picked up a cantilevered load during construction phases.

Page 2

File

Midland Project GWO 7020 - Pre-Meeting with Consultants

File: B3.0.3 Serial: CSC-4274 UFI#-00234

August 6, 1979

Tom Davisson then mentioned that, since we were thinking of permanent dewatering, a different underpinning method may be acceptable (one that would take vertical loads only). The Auxiliary Building control tower and the material below the electrical penetration areas have potential for horizontal shear resistance. The three options would be to: (1) do nothing, (2) supply something for vertical loads only, and (3) supply something for vertical loads and horizontal shear. The first step would be to check the horizontal shear resistance required. Possibly horizontal support could be picked up from the Reactor Building and/or Turbine Building. If we remove material and fix the end of the Auxiliary Building electrical penetration areas, we still would have to analyze for an unsupported mid span. Caissons were mentioned as another option. It was noted that even clay with an average blow count of three would have modest shear strength. The consultants noted that they did not have sufficient design information. Karl Wiedner and other Bechtel personnel present did not have all the answers on the design basis at the time of this meeting. However, at T. C. Cooke's suggestion, the consultants agreed to formulate their questions in writing for Bechtel response.

The consultants noted that in their opinion, \$3 Million for the underpinning of the Auxiliary Building electrical penetration areas was very low, especially when compared to the estimate of \$20 Million for permanent dewatering. They also stated that we definitely have a diesel-generator liquefaction problem although the sand would probably never actually liquefy during an earthquake. The problem was the difficulty in providing calculations which verify this and would not be subject to argument.

A brief discussion then followed concerning possible liquefaction regarding utilities, sand backfill around buildings, tank farm, railroad bay and control tower, etc. For the tank farm, railroad bay and control tower, a safety factor of 1.5 is generally acceptable. However, if for any reason, the acceleration criteria goes up in the future, Dr. Peck felt that it may be difficult to prove no liquefaction problems. The borings may not be completely satisfactory for the purpose of proving beyond a shadow of a doubt that everything was satisfactory because needlessly conservative decisions may be formulated on the "what if" type questions. The consultants noted that they were still in favor of a general dewatering program, especially in light of possibly more stringent seismic requirements in the future and the knowledge now available to the effect that generally speaking sand exists in more areas than originally anticipated in the power block area. The consultants believed that the permanent dewatering program, in general, was a must. The temporary dewatering system would show how the permanent system would work. The water can be lowered sufficiently to make the site acceptable in the new licensing arena. Dr. Peck stated that he could attend a meeting on the 18th of July in Washington to discuss the situation with the NRC.

8/1/79

TC ⁴³ Cooke

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1018
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

DATE: August 1, 1979
PLACE: Midland, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

J. Betts	C. McConnel	D. Horn
A. Boos	W. Paris*	D. Sibbald
P. Chen	D. Reeves	T. Thiruvengadam
B. Dhar	R. Rixford	R. Wheeler
W. Kinzer*	J. Smith	
S. Kirker	J. Wanzack	
J. Lillywhite*	K. Wiedner	

*Part-time

PURPOSE: The meeting was held at the Midland jobsite to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

ITEMS DISCUSSED:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on June 25, 1979, is as follows.

1) Action Item 6 of Meeting Notes No. 976

This item is closed. The data and drawings concerning separation of Canonia's work from Bechtel work by construction have been forwarded to geotechnical services for review.

- 2) Action Item 7 of Meeting Notes No. 976

This item is open. The density plots for one area are finished. The density plots for the dike area will be finished by August 3, 1979.

- 3) Action Item 8 of Meeting Notes No. 976

This item is closed. Surveillance requirements for Q-listed duct banks were established in Bechtel Letter BEEC-3053 dated June 27, 1979.

- 4) Action Item 9 of Meeting Notes No. 976

This item is closed as far as the July commitment. Additional information on time settlement will be incorporated into the FSAR after evaluation of rebound measurements and will be tracked as an action item to the NRC's 10 CFR 50.54(f) questions.

- 5) Action Item 10 of Meeting Notes No. 976

This item is closed. Drawing 7220-C-998, Rev 3, showing the design of the flexible pipe connections to the condensate tanks, was issued on May 25, 1979.

- 6) Action Item 11 of Meeting Notes No. 976

This item is closed. Review of differential settlement for pipes between structures will be reviewed on a case-by-case basis in accordance with Bechtel letter BEEC-3134 was sent on July 27, 1979.

- 7) Action Item 12 of Meeting Notes No. 976

This item is closed. Both condensate tanks are almost finished.

- 8) Action Item 13 of Meeting Notes No. 976

This item is closed. The response to Question 6 of the NRC's 10 CFR 50.54(f) was amended on May 31, 1979, to state that piping connections to the borated water storage tanks will be made before the load tests are complete.

- 9) Action Item 14 of Meeting Notes No. 976

This item is open. It was noted that the 4 inches of differential settlement is the total differential settlement between the borated water storage tanks and the auxiliary building, and is not a concentrated deformation. The stress analysis of the pipes will be completed by September 1, 1979.

- 10) Action Item 15 of Meeting Notes No. 976

This item is closed. Project engineering has passed the comments for FSAR Section 2.5 on to geotechnical services.

- 11) Action Item 16 of Meeting Notes No. 976

This item is open. Geotechnical services has all comments for FSAR Section 2.5 and will prepare an FSAR change by August 25, 1979.

- 12) Action Item 17 of Meeting Notes No. 976

This item is closed. An FSAR amendment was issued to incorporate all the changes known at that time. However, geotechnical services has further comments. See Action Item 8 of these meeting notes.

- 13) Action Item 19 of Meeting Notes No. 976

This item is open. The crack mapping has been completed. The drawings will be completed by August 17, 1979.

- 14) Action Item 20 of Meeting Notes No. 976

This item is closed. Identification of Q-listed portions of remedial work has been incorporated into the respective specifications.

- 15) Action Item 23 of Meeting Notes No. 976

This item is closed. The response to Question 12 of the NRC's 10 CFR 50.54(f) was included in Revision 1, issued on May 31, 1979.

- 16) Action Item 24 of Meeting Notes No. 976

This item is closed. The dewatering contract package was issued for bids on June 12, 1979, and a contract for temporary dewatering was awarded on July 13, 1979.

- 17) Action Item 25 of Meeting Notes No. 976

This item is closed. The requirement for chemical grouting has been deleted.

- 18) Action Item 26 of Meeting Notes No. 976
- This item is closed. The requirement for chemical grouting has been deleted.
- 19) Action Item 27 of Meeting Notes No. 976
- This item is closed. Specification 7220-C-95(Q) (underpinning) was issued for bids on August 2, 1979. The bid package will be transmitted by August 8, 1979.
- 20) Action Item 28 of Meeting Notes No. 976
- This item is closed. The requirement for a temporary support for the auxiliary building has been deleted.
- 21) Action Item 29 of Meeting Notes No. 976
- This item is closed. The requirement for a temporary support for the auxiliary building has been deleted.
- 22) Action Item 30 of Meeting Notes No. 976
- This item is closed. The permanent dewatering system will eliminate the liquefaction potential of the sands under the diesel generator building and other plant structures.
- 23) Action Item 31 of Meeting Notes No. 976
- This item is closed. The requirement for chemical grouting has been deleted.
- 24) Action Item 32 of Meeting Notes No. 976
- This item is closed. The sixth interim report for MCAR 24 was issued on June 11, 1979.
- 25) Action Item 33 of Meeting Notes No. 976
- This item is closed. The report on U.S. Testing's density tests has been completed and forwarded to project engineering.
- 26) Action Items 2 and 4 of Meeting Notes No. 1000
- These items are closed. A TWX was sent to Goldberg-Zoino-Dunnicliff & Associates (GZD) on July 17, 1979, defining the areas that required further surveying. GZD has completed the additional survey and has forwarded preliminary information to project engineering.

27) Action Item 3 of Meeting Notes No. 1000

This item is open. Evaluation of the stresses in the resurveyed pipes will be completed by August 25, 1979.

28) Action Item 5 of Meeting Notes No. 1000

This item is closed. Operation of the diesel generators for 2 months after their installation to vibrate the pedestals and the monitoring of settlements during this period will be incorporated into the technical specifications.

29) Action Item 6 of Meeting Notes No. 1000

This item is closed. Specification 7220-C-211, Rev 7 (structural backfill) was issued on June 27, 1979.

30) Action Item 7 of Meeting Notes No. 1000

This item is closed. The temporary dewatering contract package was issued for bids on June 12, 1979, and the contract was awarded on July 13, 1979.

31) Action Item 8 of Meeting Notes No. 1000

This item is closed. Specification 7220-C-95 (underpinning) was issued for bids on August 2, 1979. The bid package will be transmitted by August 8, 1979.

32) Action Item 9 of Meeting Notes No. 1000

This item is closed. The requirement for chemical grouting has been deleted.

33) Action Item 10 of Meeting Notes No. 1000

This item is open. The specification and drawings for the piling subcontract will be issued by August 24, 1979.

B) Status of Site Activities

1) Compaction Tests and Backfill Operation

a. Sand

Geotechnical services and construction reported that they have tested several pieces of compaction equipment and that they have three pieces qualified (two hand and one roller) for structural and yellow sand. They have been placing non-Q fill for the past month and, contingent upon approval of the quality control inspection program by CPCo, will begin placing Q fill August 1, 1979. The lift thicknesses that they have qualified for cohesionless materials are 4 inches for hand-operated equipment and 6 inches for the roller.

b. Clay

Geotechnical services and construction reported that they are having trouble qualifying compaction equipment for clay. They can obtain 95% BMP and 90% ASTM D 1557 100% of the time. However, they cannot consistently obtain 95% ASTM D 1557.

Project engineering agreed to review the Dames and Moore recommendations to see if the compaction requirements can be reduced in certain areas specified by construction to 90% ASTM D 1557.

2) Effect of Temporary Air Line Leak on Existing Backfill

Geotechnical services reported that four soil borings, one inspection pit, and two plate load tests had been done in the area of the air line leak. No significant difference was noted between these soil borings and previous soil borings in the area. Construction will grout the air line. Geotechnical services will write a report, including R. Peck's letter, concerning the air line leak documenting the acceptance of this fill area.

3) Test Pits and Borings

Data from test pits and soil borings in the tank farm area for evaluation of the fill near the air line leak shall be transmitted to project engineering and geotechnical services by August 3, 1979. Detailed information shall be included in the next MCAR 24 report. A summary shall be included in the FSAR.

43

C) Status of Response to 10 CFR 50.54(f) Questions

For the status of the responses to the NRC's 10 CFR 50.54(f) questions, see Attachment 1 to these meeting notes.

D) Contracts for Remedial Work

1) Temporary Dewatering

Approximately 60 to 100 holes through the turbine building base slab will be required for dewatering. The holes will be drilled from the floor at elevation 634'-0" to reduce the number of times that the drill rig must be dismantled. The drilling will be done on a cost plus basis. The additional estimated cost for the dewatering is \$580,000. M. Rung (Extension 425) will be in charge of the subcontract. All contact with the subcontractor will be made through him.

2) Permanent Dewatering

Laughney Dewatering Inc. will submit a preliminary design and scope of work for the dewatering by August 15, 1979. Project engineering will issue the bid package by November 1979 and award it by February 1980. Project engineering will determine what is Q and non-Q. A team made up of people from each discipline will be assembled to do this specialized work. A preliminary Q-list will be due September 1, 1979. A plan will be developed to determine the drawdown and recharge rates and quantity of ground water. A yard lighting power source might be used as a backup supply for the dewatering system. Construction is to determine the proper terminology to be used for this work. This determination is to consider appropriate union jurisdictions.

3) Underpinning

The specification has been written. It will be sent to CPCo for review and to Spencer and White and to Mergentime corporation for bids.

4) Piling

Construction recommended that the service water building piling contract be made part of the bridge contract. Recommendations as to where it should be kept separate will be provided to construction by August 10, 1979. The package will be issued for bids in September 1979. The contractor will not be Q so construction will have to review and approve its procedures and issue quality control inspection reports (QCIRs) to document the contractors work.

E) Results of July 18 Meeting with the NRC and Resulting Action Items

Some of the questions that were asked by the NRC during the July 18, 1979, meeting were discussed, and it was decided that a review of all existing reports and responses would be made to verify that all of the subject areas had been adequately covered. Any relevant subjects or questions not answered would be covered in the next MCAR 24 report.

F) Discussions on any Additional Agenda Items

Construction brought up the subject of service water line turnover. The valves would be installed as soon as the profiling was complete. If the lines needed to be reprofiled, then the valves would be removed again later. It was suggested that the service water lines be plugged at the location of the future meter pits between the service water building and the valve pits. This would allow the service water lines to the auxiliary building to be used without affecting work in the diesel generator building area.

Geotechnical services reported that it would take 2 months to revise the settlement calculations once the rebound data is received and the ground water elevation is determined.

G) MCAR 24, Report 7

It was decided that details on dewatering and piles will be touched only briefly in the next MCAR report. More detailed information will be provided in a future interim report. A revised schedule should be included in the next interim MCAR report.

When diesel generator building settlement evaluation is complete, all of the revised information and reports will be incorporated at one time into the FSAR.

ACTION ITEMS:

Project Engineering

- 1) Analyze the flexibility of piping connected to the borated water storage tanks, assuming 4 inches of differential settlement. Also investigate the feasibility of eliminating link sealing from the pipe penetrations in the wall to provide flexibility. Complete by September 1, 1979.

- Geotechnical Services/
Project Engineering

2) Prepare an FSAR change to incorporate comments on FSAR Section 2.5 by August 25, 1979.
- Project Engineering

3) Complete crack mapping in the areas of the railroad bay, feedwater isolation valve pit, and borated water storage tanks by August 17, 1979.
- Project Engineering

4) Evaluate stress conditions in the resurveyed pipes by August 25, 1979.
- Project Engineering

5) Issue specification and drawings for piling subcontract by August 24, 1979.
- Project Engineering

6) Issue program for release of borated water storage tanks for construction, including load test and water chemistry for the water to be used in the load test by September 1, 1979.
- Project Engineering

7) Review latest response to Question 6 of the NRC's 10 CFR 50.54(f) for a conflict between the first and second paragraphs on pipe connections.
- Geotechnical Services/
Project Engineering

8) Resolve comments by geotechnical services on engineering response to FSAR Q&R 362.15 by September 1, 1979.
- Construction

9) Provide engineering with proposed locations of backfill to be compacted to 90% of ASTM D 1557.
- Geotechnical Services/
Project Engineering

10) Review Dames and Moore recommendations to see if compaction requirements can be reduced to 90% ASTM D 1557 in the locations proposed by construction.
- Geotechnical Services

11) Finish report on results of soil test program for air line leak in tank farm by August 6, 1979. Include summary of R. Peck's letter.
- Project Engineering

12) Incorporate air line leak report into next MCAR report. Detailed data from test program will be included in subsequent MCAR reports.

- Laughney
Dewatering Inc.
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Project Engineering
- Construction
- Project Engineering
- Construction
- 13) Submit preliminary design and scope of work for permanent dewatering by August 15, 1979.
 - 14) Issue bid package for permanent dewatering by November 1979.
 - 15) Award contract for permanent dewatering by February 1980.
 - 16) Determine Q-listed items of permanent dewatering system by September 1, 1979. Assemble a team of people from each discipline to review the system, and prepare a schedule for this activity.
 - 17) Review NRC regulations with respect to permanent dewatering.
 - 18) Licensing group to do docket search for information on permanent dewatering at other plants.
 - 19) Estimate costs for all Q and part Q (instrumentation or monitoring) dewatering systems.
 - 20) Review construction recommendation to include service water building piles in bridge contract by August 10, 1979.
 - 21) Evaluate piling bids and send to CPCo for review by September 1979.
 - 22) Determine terminology to be used for dewatering with respect to union jurisdictions.
 - 23) Issue underpinning package to CPCo for review, and to Spencer and White and to Mergentime corp. for bids.
 - 24) Review insurance requirements concerning underground work associated with underpinning, Specification 7220-C-95.

- Geotechnical Services/
Project Engineering 25) Review diesel fuel tank settlements and investigate removing water by September 1, 1979.
- Project Engineering 26) Verify that the technical specification for diesel generators allows for operation of the diesel generators for 2 months after installation to vibrate the pedestals and for realignment in conjunction with results from settlement surveillance program.
- Construction 27) Investigate using diesel generator building surcharge sand as fill materials for Q areas.
- Project Engineering 28) Pile stiffnesses for service water building to be finalized by August 15, 1979.
- Geotechnical Services 29) Resolve comments noted in questions of July 18, 1979, NRC meeting on removal of 3 to 4 feet of fill from the tank farm.
- Construction 30) Grout temporary air line in the tank farm.
- Project Engineering 31) Incorporate a summary of data from test pits and soil borings into the FSAR.
- Construction/
Geotechnical Services/
Project Engineering 32) Develop a plan to determine permanent dewatering system parameters, drawdown and recharge rates, quantity of ground water, and recharge time.
- Geotechnical Services/
Project Engineering 33) Review questions asked at the meeting with the NRC on July 18, 1979. All items relevant to the MCAR scope that have not been covered in previous reports will be answered in the next MCAR report. (next MCAR report is due August 24, 1979)
- Project Engineering 34) Provide a schedule and procedure for the removal of the surcharge by August 15, 1979.
- Construction 35) Complete density plot for the dike area north of the auxiliary building by August 3, 1979.

M.D. Reeves
M.D. Reeves

MDR/js
8/7/3

ACTION ITEM NO.	50.54E RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DAT COMP
		From response to Question 1			
1	1-3 (Item 1)	Perform a final review and update of the PSAR commitment list.	J. Clements	1-1-80	
2	1-4 (Item 2)	Review sections of the FSAR determined to be inactive	J. Clements	1-1-80	
3	1-4 (Item 3)	Review EDP 4.22	R. Baltazar	6-29-79	6-1-
4	1-4 (Item 4)	Audit action items 1-3	L. Dreisbach	10-26-79	
5	1-4 & 1-5 (Item 2)	Review specifications not included in the specificity study initially	R. Baltazar	6-29-79	(see attach
	App. I I-8 (D.2.C)				
		FROM APPENDIX I			
6	I-6 (C.1.b)	Complete review of the Dames and Moore Report	J. Wanzeck B. Dhar	6-29-79	7-18-
7	I-6 (C.3)	Complete review of pertinent portions of the FSAR Sections 2.5 and 3.8	P. K. Chen B. Dhar	6-29-79	(see attach.
8	I-6 (C-4.a)	Correct settlement calculations and update FSAR	P. K. Chen	11-1-79	
9	I-7 (C.4.c)	Schedule audits of the geo-tech section on a six months basis.	L. Dreisbach	7-27-79 (first audit)	5-4-79
10	I-7 (C.5.b)	Review drawing for possible effect of vertical duct bank restrictions	C. McConnel	6-1-79	6-30-7 (see attach
11	I-7/8 (D.1)	Complete actions in response to DRVCL audit	R. Baltazar	5-18-79	(see attach

ACTION ITEMS FROM RESPONSE
TO
50.54E QUESTION NO. 1

ACTION ITEM NO.	50.54E RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPL
12	I-8 (D.2.d)	Revise EDP 4.49.1 to incorporate clarifications & instructions for use of SCN	M. O'Mara	5-1-79	5-4-7
13	I-8/9 (D.4)	Schedule audits of each design discipline calculations on a yearly basis.	L. Dreisbach	6-27-79	5-4-7
14	I-11 (C.1)	Re-evaluate construction equipment used for compaction	A. Boos	Prior to resuming soils work	(see attac)
15	I-11 (C.2.a)	Assign field soils engineer and soils engineer from the design section	J. Newgen	Prior to resuming soils work	5-1-7 (approx)
16	I-11 (D.1)	Review cons't. specs and procedures to identify equip. requiring qualifications	A. Boos	6-29-79	
17	I-11 (D.2)	Review Field Procedure FPG-3.000 to assure clarity and completeness.	A. Boos	5-31-79	7-3-79
18	I-16 (C.1.a) I-17 (C.3.b)	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	R. Simanek	Prior to resuming soils work	2-1-79
19	I-17 (C.3.a)	Complete indepth review of soil test results	S. Afifi	7-31-79	6-25-79
20	I-18 (C.4.b) (D.3.c)	Perform indepth audit of U.S. Testing	L. Dreisbach	5-31-79	4-26-7
21	I-18 (D.1)	Review all active QCI's for surveillance callouts and modify where necessary.	R. Simanek	6-29-79	(see attac)
22	I-13	Evaluate documentation callouts on QCIs	R. Simanek	6-29-79	(see attac)

ACTION ITEMS FROM RESPONSE
TO
50.54E QUESTION NO. 1

43

ACTION ITEM NO.	50.54E RESPONSE PAGE NO. (PARA.)	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPL
23	I-20 (D.5.f)	Incorporate scientific sampling plans for inspection	R. Simanek	10-19-79 (QCI for receipt by 5-15-79)	<i>(see attoc)</i>
24	I-22 (D.1.a)	Complete indepth review of the Bechtel Trend Program	J. Milandin B. Marguglio	6-1-79	5-25-79
25	I-22 (D.1.b)	Conduct QA Training	J. Milandin	5-1-79	6-1-79

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION CPCO ACTIONS	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPI
CPCo #1	I-11 (C.2.b) I-16 (C.1.c) I-17 (C.3.c)	Implement overinspection for soils placement and U.S. Testing Activities	CPCo - QA	Upon re- suming soils work	-----
CPCo #2	I-22 (D.2)	Conduct QA Training	CPCo - QA	6-1-79	6-1-79

50.54F QUESTIONS NO.	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
3	a	Clarify response to FSAR Question 362.12	J. Clements B. Dhar	5-79 -- FSAR Amend.	6-1-79
4	a	Provide Criteria for permissible residual settlement	B. Dhar S. Afifi	8-79	
	b	Provide details of treatment of loose sands	B. Dhar S. Afifi	8-79	<i>(see attoc</i>
	c	Take dynamic moduli measurements upon removal of preloads for D.G.B. and other buildings	S. Afifi	10-79	
	d	Use data (c) to evaluate the seismic response of these structures	B. Dhar	11-79	
	e	<u>Prepare additional response to NRC for items 4a and 4b</u>	B. Dhar S. Afifi	8-79	<i>(see attach for 4b</i>
6	a	Establish procedure & criteria for filling borated water storage tanks with water to demonstrate satisfactory subsoil condition.	B. Dhar	9-1-79	
	b	Deleted			
	c	Deleted			
	d	Evaluate settlement of diesel fuel oil tanks - provide precise corrective measures if required	S. Afifi	9-1-79	
7	a	Perform continuity check on duct banks after completion of preload program	A. Boos	11-79	
	b	(Included in a)			
	c	(Included in a)			

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	EAT COMP
8	a	Establish a requirement to Realign diesel generators if manufacture's tolerances for pitch and roll are exceeded	B. Dhar	9-15-79	
12	a	Complete one additional boring in middle of diesel fuel oil tanks area	J. Wanzeck	Open	4-23
	b	Complete three additional borings in the auxiliary building control tower area	J. Wanzeck	Open	5-79
	c	Complete table 12-1 for soils investigation and planned remedial measures. <u>Respond to NRC.</u>	B. Dhar	5-79	5-31- Rev.
13	a	Complete seismic reanalysis of D.G.B. to account for current lack of compaction	B. Dhar	10-79	<i>(see attach</i>
	b	Review D.G.B. design and Cat. 1 equipment, piping and elec. systems to the enveloped seismic responses	B. Dhar	12-79	
	c	Service water pump structure - Conduct a seismic reanalysis to account for revised soil - structure interaction. - Review structural design and Cat. 1 equipment, piping and elec. systems and incorporate the seismic responses of the reanalysis	B. Dhar	10-79 12-79	
	d	Auxiliary Building - If significant change of foundation properties results, conduct a seismic reanalysis. - Review structural design and cat. 1 equip, piping, and elec. systems and incorporate the seismic response of the reanalysis.	S. Afifi B. Dhar	12-79	<i>(see attach</i>

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
13	e	Underground Utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis	B. Dhar S. Afifi	12-79	
14	a	Review estimated settlement values for borated water storage tanks upon completion of load test program	S. Afifi	After Tank Comple- tion	
	b	For flexible buildings - analyze for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching and combine with loads from Question 15	B. Dhar	12-79	
	c	Examine auxiliary building, feed-water isolation valve pits and borated water storage tank ring foundations for cracks - map significant cracks.	B. Dhar	6-79	6-30-79
	d	Analyze building effected by differential settlement for observed differential settlement plus predicted differential settlement.	B. Dhar S. Afifi	8-79	
	e	<u>Prepare additional response to the NRC to provide analysis and evaluation</u>	B. Dhar	8-79	
15	a	For Seismic Category I structures evaluate differential settlements in accordance with ACI 318-71	B. Dhar	12-79	
	b	Expand the Midland structural design criteria for Class I structures to include the differential settlement effects.	B. Dhar	12-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	12-79	

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
16	a	Perform soils borings in the areas of buried pipes.	J. Wanzeck	8-79	4-13-
17	a	Complete evaluation of impact of the failure of non-seismic Category I piping on safety-related structures, foundations and/or equipment.	B. Dhar	6-29-79	7-9-79
	b	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs.	B. Dhar	9-1-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	6-29-79	7-9-79
18	a	Perform re-examination of stresses in seismic Cat. I piping connecting between buildings as part of normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement.	D. Riat	12-79	
19	a	Profile pipes in vicinity of D.G.B. after removal of preload-evaluate as described in Response 17.	C. McConnel	9-15-79	
	b	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data.	C. McConnel	9-15-79	
	c	Perform a complete evaluation of safety related piping after completion of the preload program.	D. Riat	12-79	
20	a	Analytically check affected pump and nozzle loadings. If necessary disassemble flange joints and evaluate separation.	D. Riat	6-29-79	7-9-79
	b	Verify piping support loads for systems subjected to settlement induced loads.		6-29-79	7-9-79
	c	<u>Prepare additional response to the NRC.</u>	D. Riat	6-29-79	7-9-79

43

STATUS OF 50.54(F)
ACTION ITEMS

50.54(f) Question 1, Action Item 5:

Specificity study done July 13, 1979. Comments to be resolved by July 29, 1979. Civil response completed July 30, 1979. Arch. (A-41) has held 2 weeks of discussion with Bechtel Coatings people - changes will be resolved shortly.

50.54(f) Question 1, Action Item 7:

Reviews by Civil & Geo.Tech. for those portions of Section 2.5 and 3.8 relative to soils have been done. ~~Need documentation from Civil for review of 3.8.~~ Need documentation from Geo.Tech. for review of both sections.

50.54(f) Question 1, Action Item 10:

Actions are completed. Need to complete documentation.

50.54(f) Question 1, Action Item 11:

Actions are completed. Need to complete documentation.

50.54(f) Question 1, Action Item 14:

Equipment for compacting sand is qualified. Equipment for compacting clay is still being evaluated.

50.54(f) Question 1, Action Items 21 & 22:

Review completed June 25, 1979. Resolution of review comments is in process - response expected from PFQCE week ending 8-3-79.

50.54(f) Question 1, Action Item 23:

Letter to B. Marguglio, June 26, 1979 (LAD-971) gave a schedule for completion. Currently trying to select a plan for implementation still plan to achieve implementation by mid-August, as scheduled.

50.54(f) Question 4, Action Item 6:

Details presented in meeting with NRC on July 18, 1979. Response due to NRC in writing August, 1979.

50.54(f) Question 13, Action Item a:

This reanalysis has been done as long as assumed soil properties are substantiated.

50.54(f) Question 13, Action Item d:

Reanalysis will be based upon caisson stiffness and shear wave velocity.

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 1000

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: June 25, 1979

PLACE: Ann Arbor, Michigan

SUBJECT: Meeting of the Diesel Generator Building Task Group

FILE: 0279, C-2645 w/a

ATTENDEES:

	<u>Bechtel</u>	<u>CPCo</u>
	S. Afifi	P. Martinez*
	A. Boos	R. Rixford
	R. Castleberry*	R. Simanek
	B. Dhar	J. Wanzeck
	A. Ganguly	K. Wiedner
	W. Jones	
		D. Horn*
		D. Sibbald*
		T. Thiruvengadam

* Part-time

PURPOSE: The meeting was held in the Ann Arbor office to discuss the items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill.

SUMMARY OF DISCUSSION:

A) Review of Prior Action Items

The current status of action items identified in the previous meeting held on May 16, 1979 is as follows.

1) (Action Item 1 of Meeting Notes No. 976)

This item is closed. After discussing with Goldberg-Zoino-Dunnicliff & Associates (GZD) a procedure has been developed for establishing accurate reference elevations for profiling of underground pipes in the plant area fill. Portions of pipes having sharp bends in the data points, as indicated by the results of previous profiling, will be resurveyed and investigated.

- 2) (Action Item 2 of Meeting Notes No. 976)

This item is closed. Five Scundex type borros anchors and four deep dial-gage type settlement anchors are being installed. Installation of these anchors will be completed by July 6, 1979.

- 3) (Action Item 3 of Meeting Notes No. 976)

This item is closed. Accuracy of settlement measurement by the optical method of surveying has been improved to 1/2000 foot.

- 4) (Action Item 4 of Meeting Notes No. 976)

This item is closed. Settlement readings from borros anchors are available for the last two weeks.

- 5) (Action Item 5 of Meeting Notes No. 976)

This item is still open. Geotech reported that the soil consultants would prefer to have a long enough data base to predict the precise settlement rate for plant life. Scheduling of the removal of surcharge will be a major item of discussion with the consultants during the meeting in Denver, Colorado on June 28, 1979.

(Writer's Note: At this point in the meeting it was decided that only the urgent action items from Meeting Notes No. 976 and from items in the agenda (Attachment 2) would be discussed in this meeting. During the rest of the meeting, a matrix summarizing the various options of corrective actions for Seismic Category I structures on fill was prepared. This matrix will be used as the basis for discussion with the consultants in the June 28, 1979, meeting.)

- 6) (Action Item 18 of Meeting Notes No. 976)

This item is closed. The service water pump structure wall has been analyzed for the effect of liquefaction for an SSE condition. Results of the analysis indicated that the structure is adequate. No further analysis is required for this condition.

- 7) (Action Item 21 of Meeting Notes No. 976)

This item is open. The requirement in Specification 7220-C-211 for a minimum number of roller passes must be resolved. The specification will be issued by June 27, 1979.

- 8) (Action Item 22 of Meeting Notes No. 976)

This item is open. The problem of the broken compressor air line under the tank farm will be an item of discussion with the NRC in the meeting to be held in Washington, D.C.

B) Status of Response to the NRC's 10 CFR 50.54f Questions

For the status of responses to the NRC's 10 CFR 50.54f questions, see Attachment 1 to Meeting Notes No. 976. Completion dates for open action items listed in this attachment will be assigned by July 6, 1979.

C) Contracts for Remedial Work:

- 1) Dewatering: The bids for the dewatering contract are due June 25, 1979. Approximately 2 days will be required for bid evaluation. A letter of intent for the award of the contract will be sent by June 29, 1979. The dewatering contract will be coordinated through construction.
- 2) Underpinning: Project engineering reported that the underpinning consultant, C. Gould, suggested that the turbine building base slab, along column line K (south of the auxiliary building penetration areas), must be underpinned also. This will be discussed in detail with C. Gould on June 26, 1979. Assuming there is no change in the present scope of work, the bid package will be issued by July 6, 1979.
- 3) Chemical Grouting: All comments, including those from CPCo, will be incorporated. The bid package, a technical services agreement (TSA), will be issued on June 29, 1979.
- 4) Piling: Piling as a solution for the service water structure has been accepted by CPCo. Professor Davisson, the piling consultant, indicated that it is not a complicated solution. The subcontract package for this piling work will be prepared and negotiated as an add-on item to the piling subcontract for the bridge piles.

D) Analysis of options for corrective actions:

Five options were discussed in detail, comparing their relative advantages and disadvantages and their impact on schedule and on cost. A summary of the analysis is in Attachment 1 to these meeting notes. - This summary will be presented to CPCo at the meeting in the Bechtel Ann Arbor office on June 27, 1979. It will also be the basis for discussion with the consultants on June 28, 1979.

ACTION ITEMS:

- | | |
|--------------------------------------|---|
| All Task Group Members | 1) Complete the previous action items listed in Meeting Notes No. 976, but not covered in this meeting (Items 6-17, 19, 20, 28-33). |
| Construction | 2) Resurvey pipes having sharp bends. |
| Project Engineering | 3) Evaluate stress conditions in the resurveyed pipes. |
| Project Engineering | 4) Send TWX to construction stating which lines are to be resurveyed. |
| Construction/
Project Engineering | 5) Investigate feasibility of shaking the diesel generator foundation as a means of determining settlement due to shakedown. |
| Construction/
Project Engineering | 6) Resolve comments on Specification 7220-C-211 and issue it by June 27, 1979. |
| Project Engineering | 7) Coordinate dewatering contract with construction and issue letter of intent for award of the contract by June 29, 1979. |
| Project Engineering | 8) Issue underpinning bid package by July 6, 1979. |
| Project Engineering | 9) Issue TSA on chemical grouting by June 29, 1979. |
| Project Engineering | 10) Issue specification and drawings for piling subcontract by July 6, 1979. |

A. Ganguly
A. Ganguly

AG/js
7/10/8

Attachments: 1) Analysis of Options for Corrective Actions
2) Agenda

BUILDING		OPTIONS (See Sheet 2 for descriptions and explanations of letters in parentheses)									
		1		2		3		4		5	
I Diesel generator building and foundations	Plan	Preload and chemical grouting		Preload, temporary dewatering, and underpinning		Preload and permanent local dewatering system (building)		Remove structure and soil and then replace		Preload and permanent dewatering system (plant)	
	Advantages	1) No dewatering 2) In progress		Licensing		1) No grouting 2) No removal of material 3) Licensing		Licensing		1) No liquefaction problem 2) Licensing for liquefaction	
	Disadvantages	1) Licensing 2) Extent of grouting 3) Buried utilities		1) Dewatering 2) Extent of underpinning		1) Plant operation 2) Additional analysis required 3) Licensing dewatering system design and operation		Schedule		1) Licensing system design and operation 2) Extent of dewatering 3) Additional analysis required	
	Easis	8/79(a)	10/79(a)	8/79(a) Loose Sand Area Total Area		8/79(a)	10/79(a)	8/79(a)	8/79(a)		
	Schedule delay	2-4 months	4-6 months	1 month	1 month	1 month	3 months	15 months	1 month		
Cost (b) (millions)	\$7(c)+ \$75(d)	\$7(c)+ \$125(d)	\$7(c)+ \$25(d)	\$8(c)+ \$25(d)	\$8(c)+ \$25(d)+\$5(e)	\$8(c)+ \$75(d)+\$5(e)	\$20(c)+\$375(d)	\$20(c)+\$25(d)+ \$20(e)			
II Auxiliary building penetration areas and feedwater isolation valve pits	Plan	Temporary local dewatering and underpinning								Permanent dewatering system and possible cement grouting	
	Advantages	1) In progress 2) Licensing 3) No impact on system completion								No impact on system completion	
	Disadvantages	Potential impact on structures								1) Licensing 2) Potential grouting 3) Structural reanalysis	
	Schedule delay	No delay(f)								No delay(i)	
Cost (b) (millions)	\$3(c) + \$0(d)								\$1(c) + \$0(d)		
III Railroad bay	Plan	None unless g value changes								Permanent dewatering system (plant)	
IV Service water pump structure	Plan	Piling									
(Costs of Items I and II)		\$10(c)+ \$75(d)	\$10(c)+ \$125(d)	\$10(c)+ \$25(d)	\$11(c)+ \$25(d)	\$11(c)+ \$25(d)+\$5(e)	\$11(c)+ \$75(d)+\$5(e)	\$23(c)+\$375(d) (= \$398)	\$21(c)+ \$25(d)+\$20(e)		
Grand Total of Cost (millions)		\$85	\$135	\$35	\$36	\$36+\$5	\$86+\$5	\$400	\$46+\$20		

ANALYSIS OF OPTIONS -- Continued

NOTES:

- (a) Assumed date of surcharge removal
- (b) Total cost since the beginning of problem identification
- (c) Construction cost
- (d) Additional cost for schedule delay
- (e) Estimated operational and maintenance costs for CPCo
- (f) See assumptions below.

Description of Options

- Option 1 Corrective actions as indicated in Table 12-1 of response to NRC's 10 CFR 54(f) request (22 questions)
- Option 2 Instead of chemical grouting in the diesel generator building area, remove and replace unsuitable (loose) sand, and provide additional temporary dewatering system as necessary
- Option 3 Same as Option 1, except provide permanent dewatering system for the diesel generator building area instead of chemical grouting
- Option 4 Same as Option 1, except remove existing diesel generator building and foundation and soil, then replace
- Option 5 Permanent dewatering system for the entire plant, excepting service water pump structure (no removal of soil or structure)

Assumptions

For the auxiliary building penetration areas and feedwater isolation valve pits there will not be any schedule delay only if:

- a) Temporary structural steel support for the auxiliary building is not used
- b) Remedial actions for both units are done simultaneously

ATTACHMENT 2
TO
MEETING NOTES No. 1000

AGENDA FOR
MIDLAND DIESEL GENERATOR TASK GROUP MEETING
Ann Arbor Office
June 25, 1979

- 1. Review of previous action items All
- 2. Status of site activities Boos/Wanzeck
 - a. Compaction tests
 - b. Pump tests
 - c. Test pits
 - d. Temporary air line leak
- 3. Status of responses to 50.54f questions All
- 4. Contracts for remedial work Dhar/Afifi
 - a. Dewatering
 - b. Chemical grouting
 - c. Piling
 - d. Underpinning
- 5. K-T analysis All
- 6. Plan and preparation for July 10, 1979 meeting with NRC All

Present Status of Site Investigation

TCCooke, Consumers Power Company, Project Superintendent at the Midland Site

A. Two slides were presented. The first one depicted the location of the Midland Nuclear Project with respect to the City of Midland, Tittabawassee River and Dow Chemical.

The second slide depicted the location of the various major structures in the power block area.

B. The investigative program included meetings with the consultants to discuss the options for remedial action as noted by Mr. G. S. Keeley, discussions concerning the NRC findings, investigation of the various remedial actions, preparation of a 50.55e Report, etc. As part of the investigative program, approximately 31 meetings have been held on this subject since September, 1978. Various consultants participated in 11 of these meetings while the NRC attended approximately 8 of these meetings. Consumers Power Company attended a majority of the meetings, also. During this time we also investigated causes and prepared responses to the 50.54 f. questions. The major portion of the investigative program was the investigation of the entire site soil conditions, which included 161 soil borings, 14 dutch cone tests and 5 test pits. (refer to slides showing locations for soil borings and typical soil boring cross sections). During this period of time, an investigative program was also launched to monitor all cracks in major class I structures associated with plant area fill. Strain gauges were also utilized. (See slide on typical section through Service Water Building) It should also be noted that an independent firm (GZD) was utilized for profiling pipes to determine settlement (See slide on pipe profiling typical section) A rabbit check of electrical duct work was also utilized for continuity (See slide on typical rabbit). Of course, during this period of time the settlement monitoring of the Diesel Generator Structure was also increased.

C. Settlement - It is very important to note that the Diesel Generator Building is the only Class I structure that was observed to have excessive settlement; however, as a result of the boring program we did find some areas with questionable soils beneath the structures. These areas were: Diesel Generator Building, Service Water Building overhang portion only, Auxiliary Building electrical penetrations and Feedwater Isolation Valve Pits. To fix the Diesel Generator Building it was decided to preload to consolidate the soils and accelerate the total settlement (See overall site layout of the power block). A slide was then presented showing the settlement of the four Diesel Generator pedestals vs. the application of the surcharge. It was noted that at the completion of the surcharge application the settlement appeared to be leveling out. Two slides ~~was~~ ^{we} then shown on the total settlement for the Diesel Generator Building. These slides were profiles looking north and looking ⁱⁿ the east-west direction. Another slide was then presented which high lighted the contours of the elevations of the Diesel Generator Building showing the differential settlement existing between the Southeast corner of the building and Northwest corner of the building. Another slide was shown representing the various utilities beneath the building. It was noted that the Diesel Generator Building was ^{initially} partially hung up on these utilities and that ^{after} when they were freed the building settled in a more or less uniform fashion over the last few months. A slide was then shown on the instrumentation utilized to monitor the settlement of the building. This slide included ^{boreholes} ~~bore~~ anchors, plate anchors, bench marks, sondex instruments and the locations of the various piezometers which were utilized during the preload program to determine when the ^{pore} ~~power~~ pressure had decreased to normal ~~amounts~~.

D. For the areas of questionable soil it was decided to provide vertical support for the Service Water Building Overhang and improve the support of the Auxiliary Building wingwall and Feedwater Isolation Valve Pits. Elimination of the liquefaction potential in the sand areas turned up as a result of the investigative program with chemical grout and possibly underpinning the Diesel Generator Building was the initial remedial action plan; however, after reviewing the situation,

various concerns led to ~~another decision~~ ^{a better solution}. It appears that while the grouting would sufficiently remedy the situation, it would be difficult to prove that ~~one~~ ^{one} had uniformly grouted all areas. ~~There were~~ It was noted that there were discontinuous sand lens ^{and} fine grain sands, and furthermore there were access problems. Underpinning of the Diesel Generator Building ^{also} presented ~~other~~ problems with shoring, support of utilities and schedule, so it was decided very recently (approximately June 19) that in order to provide a better overall remedy we would dewater the entire site. This dewatering would be an extremely conservative solution. All questionable soils areas would be covered, and liquefaction question would be eliminated in any sitaarea in the power block whether or not we had determined that there was a potential for a liquefaction problem. It was also noted that dewatering would further consolidate the soils. The slides presented to discuss the various fixes under this portion of the discussion were; the site layout, the section of the Service Water Building and slide of the Diesel Generator Building showing the utilities below the building. At the conclusion of this presentation, it was noted that the individuals presenting the next portions of the agenda would discuss details of the basic plans as it has just been reviewed. It was also noted that figures or slides shown during the discussions will be passed out at the end of the presentation except some that may have been missed ~~probably~~ but were probably transmitted ~~to~~ to the NRC previously as part of the response to the 50.55 e-Report or the 50.54 f. Questions. (Later, ~~on~~ copy facilities ~~weve made~~ ^{weve made} available and a complete set of slides, ~~copies~~ ^{copies} were made available to the NRC)

schedule. It was also pointed out that approximately six months had been allocated in the schedule for dewatering the power block area to the design depth and about three months had been allowed after that time for recharge rate testing. This would allow all activities to complete prior to Unit 2 fuel load, and again, would not impact the overall project schedule. The major problem being that of site congestion and interference with other site activities. This is a construction problem and one that does not seem to be a major obstacle at this time. ~~XXXXXXXXXXXX~~

2.0 Present Status of Site Investigation (TCCooke - Consumers Power Company Construction Superintendent at the Site)

~~2.1 Meeting With Consultants and Options Discussed (Historical)~~

A. Description of Site Layout

~~B. Discovery of Settlement Problem July 1978 and Notification of~~

~~NRC via 50.55e Report~~

~~C. Obtain Services of Consultants~~

~~D. Discussion of Options~~

~~Remove and Replace~~

~~Preload~~

~~Do nothing~~

~~Underpin~~

~~Grout~~

B Program included:

Consultants meetings/options (GSX)
NRC FINDINGS DISCUSSIONS
REMEDIAL ACTIONS
50.55e report
~~50.54f response~~

As part of the

2.2 Investigative Program

A. Meetings held since September 1978 31

Consultants participated 11

NRC attended 8

We also

B. Investigated Causes and Received 50.54f Questions

THE MAIN PORTION OF THE PROGRAM HOWEVER WAS THE

C. Investigated Entire Site Soil Conditions

which included:

161 Soil Borings

14 Dutch Cone Tests

5 Test Pits

Crack Monitoring/Strain Gauges (typical)

Profiling of Pipes (Independent GZD) to determine settlement

Rabbit check of duct work for continuity

Increase settlement monitoring of the D/G Structure

2, 3

6

5

4

2.3 Settlement

IT IS VERY IMPORTANT TO NOTE THAT OF THE

A. Class I Structures- D/G Building - only building observed for excessive settlement.

HOWEVER WE DID FIND SOME

B. Questionable Soil (Boring Program)

These areas were the

- Service Water Overhang
- Diesel Generator Building
- Auxiliary Building Electrical Penetrations
- Feedwater Isolation Valve Pits

AS A RESULT OF THE

Now, to fix the D/G Building, it was decided to:

C. Preload to consolidate the soils and accelerate total settlement

- 7 Rates of Settlement
- 10, 11 Settlement vs. Surcharge
- 8, 9 Differential Settlement

12

Prediction

FLAY

blow / test UNIFORM OVER LAST FEW INCHES

13

To measure the settlement at various elevations, we utilized the following

FOR THE AREAS OF QUESTIONABLE SOIL, WE

2.4 Recent Revisions and Fixes DECIDED TO PROVIDE:

6

- A. Vertical support for Service Water Overhang
- B. Improvement of support for Auxiliary Building Wingwall and Feedwater Isolation Valve Pits

9

C. Sand Areas turned up as result of Investigative Program

Elimination of the liquefaction potential in the

with Chemical Grout and possibly Underpinning Diesel Generator Building

~~E. Problems~~

HOWEVER WE HAD SOME CONCERNS OVER

A

- Proving uniformity of grouted areas because of DISCONTINUOUS LENS of sand
- Prevention of grout entrance into utilities, building walls, etc.
- FINE GRAINED SANDS
- Prevention of grout blowout
- ACCESS
- Possible environmental problems

B

- Underpinning/support of utilities
- Schedule

So ---

to provide a better overall remedy we made a -

F. Decision to Dewater entire site

Extremely conservative solution

All questionable soils covered

Elimination of liquefaction question in any site area

Dewatering further consolidates soils

Individuals following this presentation will discuss details of the basic plan as it has just been reviewed. Figures shown will ~~not~~ ^{TODAY} be passed out ~~if they have already~~ ^{@ end of the presentations} ~~been~~ ^{except some which may have been missed but which were probably} transmitted to you as part of the responses to the 50.55e Report or the 50.54f

Questions. Are there any questions?

Figures Shown

- 1 Site Layout
- 67 Boring Locations and Test Pits
- 3 69 Boring Log
- 4 7-3 Rabbit
- 5 60 Pipe Profile (portion)
- 6 62 Crack Mapping
- 7 Settlement vs. Surcharge
- 8, 9 9 Settlement Contours/Utilities
- 10, 11 13 & 14-1 Settlement Data
- 12 Recent Settlement
- 13 Instruments

1718779
DRAFT
7-18-79

Questions asked by the NRC during the discussion.

1. Agenda Item 2 - It is possible that the condensate line or other utility are still providing support to the Diesel Generator Building? (Lyman Heller, Darl Hood)
2. Agenda Item 3 - Have provisions been made for the train bay tracks loading effect on the borated storage tank lines? Darl Hood
3. How does dewatering tie into the load test of the borated water storage tanks (time frame)? Lyman Heller
4. How much settlement of the borated water storage tanks is acceptable? Lyman Heller
5. Has any concrete pipe been profiled? Ron Lipinski

It was noted at this time that there is no Class I concrete pipe in the fill.

6. What is the limiting factor in the design of the concrete duct banks? Lyman Heller

It was noted that duct banks were considered somewhat elastic.

What is the basis for the assumption that no further remedial action is required for the duct banks? Ron Lipinski

Bechtel responded that settlement monitoring would continue probably through cable pulling.

Ron Lipinski noted that duct banks are a category one structure the same as any other structure on the site.

Did we analyze the load associated with a large crane parked over the duct bank which may have a void below it? Lyman Heller

Carl Weider discussed the flexibility of the electrical duct bank and the structural analysis.

7. Is there any corrosion protection for stainless steel Class I pipes? Darl Hood

8. Chuck Goulds Presentation - Question concerning the valve pit caissons going through construction pads and reinforcement of caissons for transfer of horizontal loads. Ron Lipinski

It was noted that various tools would be used for demolition which would deliver about 1,000 foot pounds per blow and that this would not damage any of the other structures. It was also noted that the valve pit crane pad was about 2½ feet thick.

9. Sherif Afifi's Presentation - With ½" to 1" as the upper limit for seismic settlement, would there be no effects on other structures due to dewatering?

Lyman Heller

It was noted to be a small general settlement to be evaluated by Sherif.

Why do we feel that a 1.5 factor of safety is adequate? Darl Hood

It was noted that primarily this was due to the fact that 7.5 earthquake value was too large.

10. Where exactly are the liquefaction potential problem areas? Lyman Heller

in the
Sherif responded that the small zone/railroad bay was not a problem.

The borated water storage tank line was not a problem.

We have not analyzed all your areas yet; however, this is in reality a hypothetical question since dewatering will answer the potential liquefaction questions in any area in the power block.

11. Dick Loughney's Presentation - Would the Service Water Building be outside the perimeter of the dewatering system? Lyman Heller

When would the clay dike cutoff in front of power block be in place? Lyman Heller

Will this comply with the new Reg Guide? Ron Lipinski

What will be the systems discharge rate? Gene Gallagher

It was noted that it would be less than 400 GPM.

12. General Question on electrical ^lbackout. It was noted that it would be low since the horsepower requirements for the pumps are small. D. Hayes

13. Expressed a general interest on getting test pit information. Gillan (specific)

14. Ted Johnson's Presentation. Please comment ^{on} ACI 349 which includes settlement with dead load and wind, earthquake, etc. Gene Gallagher

Bechtel noted that they had done a similar consideration. They also noted that they would probably seal all cracks greater than 15 mils because of potential ^erosion problems and that they were still pursuing an analysis in this area.

15. Exactly what all will the cussions support? Henderson

It was noted that Bechtel had not completed the horizontal support analysis in this area.

16. Sherif Afifi's Presentation - Will the Diesel Generator sand surcharge be removed prior to dewatering? Lyman Heller

How much lower than the construction water would dewatering operation go? Lyman Heller

It was noted that it would be a minimum elevation of 600 feet (existing till), and that it was still under evaluation.

17. Are we confident that the material below the borated water storage tank is acceptable?

Lyman Heller

It was noted that it is mainly clay and with minimal amounts of sand.

18. Considering the settlement to the southeast side of the Diesel Generator building, what accounts for this impact?

There also appears to be some concerns on conduit supporting the building.

It was noted that there is more sand on the north side of the building.

Lyman Heller

19. Interim Report #6 to the MCAR 24 (50/55e Report) stated that we would be removing the top 3-4 ft of soil. Why? Gene Gallagher

It was noted that this was to take care of weathering that the soil had experienced and also possibly the bubbling of air through that portion of the soil.

20. The post. loca shown on the drawings as a dotted line is no longer part of the design. Darl Hood

The control room pressurizer is in the location proposed, but how will it be determined that the soil will be acceptable for any new Class I structures? Darl Hood

It was noted that borings would verify the acceptability of the soil.

21. Since we have eliminated chemical grout what about the control tower area void?

Gillan

Sherif responded that this was an insignificant area and would still probably be pressure grouted.

22. Dr. Peck Presentation - How would the Diesel Generator surcharge improve the bearing capacity of the fill? Lyman Heller

It was noted that long term bearing capacity was based on the friction of the material, and the load has increased the settlement capacity.

23. Why are we testing the cassions at 1.5 times the working load? Lyman Heller

It was noted that this was to avoid any unanticipated settlement in the adjacent areas.

24. TCooke Presentation on Schedule - When will the cutoff wall be established?

It was noted that there would be no cutoff wall at the south end of the power block area, since the rate of flow of water to the sands and/or clays was expected to be minimal. However, if necessary, a slurry trench or chemical grout could be utilized in this area.

25. Phil Martinez's Presentation - If there is too much reliance on testing during the plant area fill what did the dike people rely on? Ron Lipinski

26. Why do you say re-excavation was not a cause? Lyman Heller

27. How can you possibly say there was not a problem with people qualifications?

28. Can you say that there was a bona fide soils engineers on site? Gene Gallagher

29. How can you possibly say that you have achieved corrective action with no yes " on personnel as a cause?

How can you say there are bad test procedures when personnel was not involved as a cause?

The NRC disagrees with qualifications of personnel as not being a cause.

Gene Gallagher.

30. How can you say the procedures were not bad?

31. Why was the Spec not included as a cause? Gene Gallagher

32. D. Hayes also disagrees with the QC people not being a cause. If the people were qualified, many of the five most probable causes would have been eliminated.

Gene Gallagher

33. How come in some areas QC identified problems, but nothing happened? D. Hayes

Martinez noted that the Administration Building bore holes were taken.

34. He commented that there were also problems with moisture density relationship.

Phil said that moisture did not cause the problem.

35. Does the applicant endorse the most probable causes? Darl Hood

Yes - per GS Keeley, after checking with Don Horn.

36. How then do people enter into the analysis? Darl Hood

It was noted that Don Horn's presentation would cover this.

37. Don Horn's Presentation -

Why are we no longer using the Nuclear Densometer? Gene Gallagher

It was noted that because of moisture problems found in the sand and clay.

38. What does generic mean? D. Hayes

It was noted that this means U. S. Testing in some cases.

39. What was the source of the air bubbles at the tank farm at elevation 611' and bubbles at 627'? Lyman Heller

40. Has the tank farm test pit (inspection pit 20 X 20) confirmed boring information?

Lyman Heller

It was noted that it has not been compared yet, but the material appeared good below the top four feet.

Was there clay in both pits or was there sand? Lyman Heller

41. What other plants improvements will be made as a result of the soils experience?

Will there be a topical report? Lyman Heller

42. Who pays the on-site GEOTEC man? Lyman Heller

43. Is QC separate and does it have authority to stop work? Lyman Heller

44. What is the criteria for acceptability on the borated storage tank ring tank, ring foundation?

45. Lyman Heller was concerned with the flexure of the ring beam.

It was noted that the tank bottom transfers load to the soil.

Lyman also seemed concerned about the fact that the borated storage tank had no baffles. He was really looking for a ~~measurement~~ ^{in membrane} measurement stretching.

Darl Hood noted that this was the basis for 50.54f questions.

46. Since air bubbles may have travelled horizontally, how can borings confirm that there are not problems?

Dr. Peck noted that in all likelihood the air passages were already there and that the only evidence of air leaking up with the bubbling at the surface.

Will the fact that the air line condition existed two months be part of the decision on what to do with the tank farm soil? Gene Gallagher

Dr. Peck noted that you could expect some surface disturbance, but he believes there would be little damage to the underlining soil.

TCCooke then noted that the piezometers could have provided paths for the air bubbles leaking to the surface.

47. Has Consumers Power Company applied lessons to other sites? D. Hayes

48. How are the procedures now reviewed? D. Hayes

49. Question on Structure mat vs. spread footing - It was noted that it would have to be rechecked to see that the design would have to be satisfactory. The 50.54f response was confusing to Ron Lipinski.

It was noted that this was a settlement calculation only.

50. What load or elevation will the underpinning be made to? Lyman Heller

How will we decide what load has to be applied to each pile during jacking?

It was noted that we would calculate the theoretical reactions.

How will we transfer load from the jacks to the structure? Ron Lipinski

51. What about earthquake vibration? Ron Lipinski

52. Who runs the show on underpinning? Lyman Heller

It was noted that Bechtel would do the design with Chuck Gould acting as a consultant.

Consumers Power would then review it.

GSKeeley's Presentation-

53. Darl Hood noted that the staff was aware of the confusion they may have created by attacking the soil problem from several directions, and were trying to compensate for same.

54. Darl Hood wanted Keeley statement on his confidence that the deficiencies were sufficiently understood and the corrective actions taken to preclude repetitions in this area.

55. Darl Hood also wanted to know whether all problems have been understood prior to remedial action. That is, ~~should not~~ ^{should not} the problems again show up during the remedial activities. For example, flooding was noted to have been removed from the specification by Rev. 7.

56. Will all remedial action be accomplished by the Consumers Power Quality Assurance Program? Gene Gallagher

57. Will dewatering be part of the Quality System? This has to be responded in accordance with criteria 2. Gene Gallagher

The NRC is reviewing the standard review plan and we will look for compliance.

Darl Hood

58. Documentation is needed. Jim Knight

It was noted that there is more information in existing reports and that the narrative of today's discussions will take approximately two weeks to prepare for Mr. Knight.

He also noted that there appeared to be much positive progress in the Diesel Generator and he would appreciate having the documentation very quickly.

Jim Knight

TELEPHONE CALL

Midland Project

GWO 7020

COPY
~~Notes~~

GSKeeley
DBMiller

By Ron Lipinski Of NRC Washington

PAMartinez
JFNewgen/ABoos

To TCCooke Of CPCo

KWiedner
TRThiruvengadam

Date July 3 19 79 Time 9:40 AM

DHorn

Subject _____

File _____

Mr. Lipinski was returning TCCooke's call of July 2, 1979 and noted that he was in the process of reviewing the April 24 or May 31 response to the 50.54f questions (both dates were mentioned by Mr. Lipinski). TCCooke briefly discussed the discovery of the problem and subsequent 50.55e notification to the NRC and the fact that the latest response to same was dated June 25, 1979 (Interim Report 6). The discussion then settled around the recent changes to the various fixes resolving soils questions at the Midland Site, since Mr. Lipinski stated that he was somewhat familiar with the background and had visited the site in conjunction with soils questions recently. During the discussion, Mr. Lipinski had the following questions:

1. Since we were making some changes to the Auxiliary Building wingwall design, how will it be modeled? A new analysis will be required. TCCooke noted that the vertical load would be supported by cussions and that the horizontal load will probably be taken up by a tie to the Turbine Building slab unless we found it necessary to complete the underpinning operation as originally planned (mining and lean concrete backfill).
2. Mr. Lipinski wondered how we arrived at the conclusion that nothing was required beneath the railroad bay. TCCooke noted that it was done by Bechtel Ann Arbor Engineering via their analysis of the soils beneath the railroad bay and the structure itself.
3. Mr. Lipinski questioned whether the original design was for saturated fill or not and received an affirmative response. TCCooke noted that our recent analysis indicates that there will be no detrimental effects going to the dry fill and that it would enhance overall site conditions.
4. The fact that the Diesel Generator settlement will be on the subject of the hearings on the 18th. (How will we proceed on this area).
5. Mr. Lipinski again noted that he was reviewing the responses to the 50.54f questions and that hopefully he will have reviewed everything in sufficient depth prior to the meeting on the 18th. TCCooke noted that the total site dewatering concept and other fixes revisions should be in Mr. Lipinski's hands next week.

6. Mr. Lipinski noted that he was still concerned on the response to question 15 in that settlement stresses were self-limiting and did not affect the structural integrity of the plant. He noted that he had discussed this with Mr. Ted Johnson during his recent site visit, and that re-analysis was very important in that stress results from settlement were locked into the structure in case of an earthquake or any other load. He further noted that the analysis will have to account for these stresses. TCCooke then noted that the Diesel Generator Building was the only building where differential settlement was noted and again stated that we are taking a super-conservative approach in effecting remedial action for all areas of the plant based on questionable material (found during soil boring program) and not settlement. Furthermore, our total dewatering program is designed to eliminate any questions that could arise concerning liquefaction in any area of the site. Mr. Lipinski generally concurred with the concept and again noted that he is mainly concerned over any area of stress.

During the discussion Mr. Cooke discussed the tentative agenda and noted that probably the following people would be attending the soils meeting on the 18th:

Consumers Power Company

GSKeeley
TCCooke
TRThiruvengadam

Bechtel Power Corporation

PAMartinez
SAfifi
CWeidner
BDahr
and others

DRAFT

June 27, 1979

Pre-Meeting With Consultants

Present:

- Karl Wiedner
- Phil Martinez
- Shariff Arifi
- Dr. Ralph Peck
- Dr. A. Hendron, Jr.
- Tom Davisson
- Tom Cooke

There was a brief discussion on the various options. One of the main reasons for option five was that it grew to a large extent: out of the dewatering process for option one. The consultants expressed the opinion that we had to answer liquefaction questions wherever anyone might think they could occur. (for example, the control tower at 6KSF loading). It could be a real thorn in the job at a later date, and it is the only clean method. It is very hard to argue against dewatering, and it would be too complicated to get the NRC to accept grout. The question was asked about the water that could be trapped in clay. The consultants responded that over the long haul it would drain with permanent drainage and could be proven by piezometers. While peripheral wells would probably do the job, there would be some intermediate wells. Any vein of water would be milked. Piezometers would be proof positive that the area was dry and we could convince any lawyer of that fact. The construction dewatering process for the Aux Building wingwalls will determine how much dewatering and how many wells, etc. will be required later. A disadvantage is that although no additional analysis is required, P. A. Martinez indicated that Bechtel would have to take another look at the design calculations in the foundation areas.

The Auxiliary Building wingwall is a high narrow structure with a torsion box at the lower portion. The soil was supposed to take the horizontal shear. The low soil blow counts make one wonder whether or not this structure is possibly being cantilever to some extent off of the control tower. Dr. Peck expressed the need

for the design basis for this structure. Dr. Hendron indicated that the borings were not necessarily indicative of what was beneath the structure. A parametric study for the ground and the structure should be accomplished. A quick rough analysis should first be done followed by a detailed analysis. Karl Wiedner discussed the possible outer end settlement and his theory on how the structure had possibly picked up a cantilever load during construction. Tom Davisson then mentioned since we were thinking of deleting the recharge of water maybe a different underpinning method would be acceptable. (One that would take vertical loads only) The Aux Building control tower and the material below the wingwalls are worth something for horizontal shear. The three options would be to: 1) do nothing, 2) supply something for vertical loads only, and 3) supply something for vertical loads and horizontal shear. The first step would be to check the shear resistance required. Possibly horizontal support could be picked up from the Reactor Building and/or Turbine Building. If we remove material and fix the end of the Auxiliary Building wingwall, we still would have to analyze for an unsupported mid span. Cassions were mentioned as another option. If the structure hits the Reactor Building wall during the seismic event, this was believed to be no problem by the consultants. It was noted that even clay with an average blow count of three would supply modest shear strength. The consultants noted that they did not have sufficient design information. Karl Wiedner and other Bechtel personnel present didn't have all the answers on the design basis at this time, however, at T. C. Cooke's suggestion the consultants agreed to formulate their questions in writing for Bechtel response.

(see)

The consultants noted that in their opinion three million dollars for the Auxiliary Building wingwalls was very low, especially when compared to the estimate of twenty million dollars for permanent dewatering. They also stated that we definitely have a diesel generator liquefaction problem although the sand would probably never actually liquify during an earthquake. The problem being the difficulty in providing calculations which verify this and ^{was} not be subject to argument in a contested hearing.

A brief discussion then followed concerning possible liquefaction regarding utilities, sand backfill around buildings, tank farm, railroad bay, and control tower, etc. For the tank farm, railroad bay, and control tower, a safety factor of 1.5 is generally acceptable; however, if for any reason the ^{1.5}acceptation criteria goes up in the future, Dr. Peck felt that it may be difficult to prove no problems to the intervenors. The borings may not ^{be} completely satisfactory in a court of law, i.e.; could they prove beyond a shadow of a doubt that everything was satisfactory, because the lawyers, T.V. or whatever, might cause people to make needlessly conservative decisions on the "what if" type questions. The consultants noted that they were still pushing for a general dewatering program. Especially in light of possibly more stringent seismic requirements in the future, and the knowledge now available to the effect that generally speaking, substantial sand conditions exist throughout the power block area. They believed the dewatering program, in general, was a must. The temporary dewatering system would show how the permanent system would work. The water can be lowered sufficiently to make the ^{site} acceptable in the new licensing arena. Dr. Peck stated that he could make a meeting on the 18th of July in Washington to discuss the situation with the NRC.

To File
FROM TCCooke
DATE June 13, 1979
SUBJECT MIDLAND PROJECT GWO 7020 -
NRC SITE TOUR AND OBSERVATION OF TEST PITS
File: 0460.2 Serial: CSC-4138

6/17 Talk

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

CC *Attendees GSKeeley, P14-408B
DBMiller JJZabritski, P14-416
*Bechtel and Consumers attendees only.

I. Individuals Present:

Sherif S. Afifi	Bechtel Assistant Chief Soils Engineer
R. E. Lipinski	DSS/NRC
J. P. Knight	DSS/NRC
Daniel M. Gillen	DSS/NRC
C. A. Hunt	Consumers Power Executive Civil Engineer
P. A. Martinez	Bechtel Project Manager
*A. J. Boos	Bechtel Project Field Engineer
*R. J. Cook	Resident Inspector/NRC
*T. E. Vandel (Entrance only)	US NRC Region III
Lyman Heller	US NRC NRR
T. E. Johnson	Bechtel Chief Civil/Structural Engineer
K. Dhar	Bechtel Supervisory Engineer
T. C. Cooke	Consumers Power Project Superintendent
D. E. Sibbald	Consumers Power Senior Construction Advisor
K. Wiedner	Bechtel Engineering Manager
*D. Horn	Consumers Power Quality Assurance Group Supervisor/Civil
R. M. Wheeler	Consumers Power Civil Section Head

*Part time

II. Discussion Tour Comments

- A. The individuals from the NRC were extremely interested in cracks in the Auxiliary Building, Service Water Building, and Diesel Generator Building. Many questions were asked regarding differential settlement. They seem to be under the impression that there was a great deal of building settlement other than the Diesel Generator Building and that large cracks exist somewhere on the site. We continually had to reiterate the fact that remedial actions were based on soil borings which showed questionable material and not settlement problems. Mr. Lipinski, in particular, was very interested in why we had cracks and analysis regarding same.
- B. During the tour it was apparent that the NRC's questions were oriented towards seismology aspects. They were also interested in whether or not we had re-reviewed the different seismic conditions in the light of our

concrete backfill revisions for the Auxiliary Building, wing walls, etc., since the addition of concrete could cause new reactions and forces requiring reanalysis. It was noted that the concrete backfill would be separated from the structures by styrofoam and not tied to the structures. The NRR alluded to possibly more stringent earthquake requirements.

- C. When observing the test pits, Mr. Heller expected more sand in the "random fill". It was noted that sand was used primarily around utilities and next to buildings.
- D. Mr. Heller appears to be of the view that the simpler engineering fix on the service water overhang, such as concrete backfill as opposed to more complex remedial action, would stand a much better chance of passing review, due at least partially to the fact that much of the available manpower in Washington was involved with Three Mile Island and also because simple straightforward engineering practices will be much easier to discuss in any hearing process. The NRR was informed that piling at the Service Water structure was only for vertical load and that no moments were involved. It appears that possibly Mr. Knight's staff has been reduced from about fifty to near eight, with the forty people being tied up on Three Mile Island activities. There will be a corresponding cutback in the normal amount of licensing activities that will be undertaken by his staff over the next several months.
- E. NRR noted that they should receive copies of any Diesel Generator (total site related) material that is being transmitted to Region III directly from the licensee. It also appears that Mr. Knight is more interested in resolving the Midland fill problems in the near future on a "real time basis" as opposed to later review and approval functions such as might be found in going the FSAR route. (Note: Consumer Power Company has been attempting for weeks to arrange a meeting with NRR but it was not until the week of June 4, 1979 that we were able to set a meeting date with them of July 10, 1979.) He recognized that presently the licensee was involved in answering the same or possibly similar questions on three fronts, namely the I&E questions, 50.54f responses and future FSAR revisions, and agreed that it would be beneficial to all parties to consolidate these areas. During the tour it also appeared that in the future NRR may become much more deeply involved in the details in all licensing aspects than they have in the past.
- F. It would appear that we should provide more rationale and better arguments for support of duct bank and pipes and man holes, valve pits, etc. during the seismic event. We have to verify or prove that duct banks, for example, will not shear during the earthquake. Mr. Heller was of the opinion that our responses on the safety aspects concerning the borated water storage tank lines will have to be extremely conservative, and that at this point in time for our responses to be accepted, he would be inclined to say that questionable material should be removed and fixed rather than going through some complex explanation as to why it was "acceptable as is" since this was a Category One item which would be required during the postulated accident conditions.

Generally, the NRR personnel appeared to find the information gathered during the tour and observation of the test pits to be of value and the type of information which would expedite their decision making process.

plw

Mr Lee discussed that he had
Mr Gallagher then commented on IE Bulletin No 79-02 covering expansion anchors. The bulletin requires that face plate flexibility be addressed and reiterated the criteria of the bulletin for determining whether or not a plate is flexible. The required safety factor of 4 for wedge type or 5 for shell type anchors must be addressed and he cautioned that the response to the bulletin be based on the criteria and be fully responsive. His comment was apparently based on the ITT Grinnell position towards the NRR requirements. If something other than that required by NRR is presented, enough data for the NRC to evaluate needs to be included.

The procedure for expansion anchors was reviewed with regard to the tension and torque methods of testing. It was noted that the tension method provided for two times the design load but that the IE bulletin required 4 or 5 depending on the type of expansion anchors. He also noted that there was no correlation between torque values and ultimate tensile loading that he had seen. Mr Gallagher stated that the NRC had observed inconsistencies relative to torque values which are provided by anchor suppliers and cautioned about using manufacturer torque values. (Mr Gallagher did review expansion anchor installation during this inspection and no discrepancies were noted.)

The inspector also received an update on the status of safety related soils. The leaking air lines in the tank farm area are a concern to the NRC and he also noted that Bechtel Geo-Tech was concerned. He expressed concern that CPCo upper management had needed to get involved prior to anything happening with this item. TCCooke noted that a letter had been issued on the subject and that much work had been in process to resolve the item. DBMiller noted that all excavating had been stopped. It was also indicated that some borings in the tank farm area were in question due to the air leaks and that DEHorn had the details.

Mr Gallagher stated, in summary, that he had the one item on FSAR conflicts that he would discuss with his management to determine if it was an item of noncompliance relative to Criterion III. He also realized a review of the "inactive" FSAR sections was to be done per the commitment in the 22 question response and indicated that the FSAR was in dire need of technical scrutiny. All other concerns of his relative to post-tensioning he considered covered by the stop work.

Mr Lee indicated that he reviewed piping and welding for Bechtel and B&W and that he had no items of noncompliance or deviation.

He indicated that he had reviewed the deviation on the main steam lines and that he would leave the item open pending resolution of remaining Bechtel/CPCo QA questions. He indicated that there appeared to be no problem based on the UT measurements. He noted that in some cases the nominal 2.375 pipe was measured to be 2.750 which was approximately 10% over the nominal. He indicated that the additional weight may not affect the stress but could affect reactions at nozzles. He suggested that the actual weights of the spools be sent to design for analysis.

He indicated some concerns with Bechtel. There appeared to be a lot of rework on the site and that there appeared to be some contributing factors that included such items as the use of hand drawn sketches and pipefitters not having clear direction on when to stop grinding, cutting lengths, etc. He recognized that these type items were project management areas but there was an indirect safety concern that if a pipe bevel or length was close to requirements, it would be cold sprung to make it fit. It was indicated that cold springing is being addressed at flanged connections.

Mr Lee discussed that he had observed a welding purge gas flow rate of 65 CFH which, while high, was in accordance with procedures. He suggested that field welding engineers closely monitor such parameters to assure compliance.

He had observed two stainless steel spools that had mud spattered on them. It was pointed out that these were non-Q.

During observation of welding, a weld was observed that had apparent root concavity. While the amount of concavity was acceptable, the welder, when questioned about it, did not appear to know what to do if it had been unacceptable. He suggested that instructions should be provided to the welders on what to do in those cases.

Some concerns with B&W were then discussed. North reactor coolant pump B in Unit 2 had grind marks on the casing. Mr Lee inquired if any UT checks were performed. Also, the pump had wood on half of the top of the pump for people to walk on but not on the other half which people were also walking on. The top of the pump was also open. It was indicated by B&W that it was open for ventilation purposes and that it is closed when work is not in progress.

Weld WJ6-3 on the reactor coolant hot leg of Unit 2 had been radiographed but the locator did not appear to be etched on the pipe. B&W and CPCo QA will check on this item.

Also, arc strikes had been observed during the cladding operation. He indicated arc strikes needed to be minimized.

As a last item, he asked to have himself or RJCook notified when B&W PWHT started.

Gallagher expressed concern on the proposed dewatering of the power block area for remedial work under the east and west feedwater isolation valve pits and east and west penetration rooms in the Auxiliary Building because of possible additional settlement of existing structures during the draw down of the water.

Gallagher also expressed concern that the remedial action plans had not been presented to NRR for their comments. Tom Cooke stated NRR had been contacted and the earliest NRR could review the proposed remedial action would be three to four weeks. Gallagher stated he would try to expedite the meeting with NRR.

Gallagher stated that when the meeting with NRR is held, proposed specifications, procedures, design calculations, drawings, etc should be presented to justify the remedial actions to be taken.

Gallagher stated he would want to do in-process inspections during the remedial work.

Gallagher acknowledged the fact that Q-listed soil would not resume until Consumers' 13 items of concern are addressed.



MEETING NOTES NO. 979
MIDLAND PLANT UNITS 1 & 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: May 11, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Soils Resolution Plan
FILE: 0279, C-2645

ATTENDEES: Bechtel CPCo

S. Afifi	T.C. Cooke
A. Almuti	D.E. Horn
B. Dhar	C.A. Hunt
W. Ferris	G.S. Keeley
R. Hermeston	D.B. Miller
W.G. Jones	T. Thiruvengadam
P.A. Martinez	
B.C. McConnel	
J. Newgen	
G.L. Richardson	
J.O. Wanzeck	
K. Wiedner	

PURPOSE: To inform CPCo of the planned remedial actions relating to Seismic Category I facilities and structures other than the diesel generator building, as well as a brief status report on the diesel generator surcharge (agenda attached)

ITEMS DISCUSSED:

1) Resumption of backfill operations

The NCRs affecting the backfill operations are being resolved on a priority basis. The items discussed in the minutes of the May 4, 1979 meeting (attached to J. Newgen's memorandum to P. Martinez, dated May 4, 1979, BCM-460) are being resolved. The first priority area is the tank farm. The remaining priorities are being established by Bechtel construction.

2) Brief review of the diesel generator building settlement

The maximum settlement is approximately 7 inches with a minimum of 3-1/4 inches. The diesel generator building wall settlement history drawings were visually examined. The north and south walls show uniform settlement since December 15, 1978. There is no indication that the condensate lines are impeding the long-term building settlement.

An estimated date for surcharge removal can be made 4 to 6 weeks after establishing a settlement slope. The settlement rate is so small at the present time that more accurate survey methods are being developed. The new methods are anticipated to have an accuracy of ± 0.02 inch.

3) Planned remedial actions for structures

a) Service water structure

The northeast portion of the building will be supported by 100-ton piles driven to till. The piles will be designed to support vertical loads only. Horizontal forces will be resisted by the portion of the structure supported on natural soil.

b) Main feedwater isolation valve pits

The questionable soil will be removed and replaced with concrete. A temporary support will be provided and will span from the tendon access pit to the turbine building wall.

c) Auxiliary building electrical penetration room

The questionable soil will be removed and replaced with concrete for both Unit 1 and 2 penetration rooms. The extent of the excavation will be the only difference in the actions taken for each unit. Temporary support provisions are being designed for the Unit 1 electrical penetration room during dewatering. The actual need for the temporary support is still under investigation.

A perimeter dewatering system will be installed to allow excavation in a dry condition. The system will go from the Unit 1 reactor building south, around the turbine, administration, and diesel generator buildings, and then north to the Unit 1 reactor building.

d) Auxiliary building railroad bay

The loose sands susceptible to liquefaction will be chemically grouted. A grouting test program will be performed to develop required spacing, pressure, gel times, and the most effective type of chemical grout.

5) Tanks

a) Emergency diesel fuel oil tanks

There are no anticipated remedial actions. Two locations on each tank are being monitored for settlement. To date, there has been essentially no settlement observed.

b) Borated water tanks

There is no anticipated remedial action. There will be no surcharge placed. The tanks will be constructed, filled with water, and monitored for settlement. The monitoring will be continued until a long-term settlement trend has been determined. The borated water lines will be evaluated for settlement effects. The system turnover and startup requirements are being studied by the task force.

c) Condensate tanks

There is no anticipated remedial action. Connection details to the tank will permit settlement without impacting piping through the use of a metal bellows which will allow up to 6 inches of vertical movement, 1/2 inch of lateral movement, and 1-1/2 degrees of rotation. Due to the low number of loading cycles, the bellows are expected to last as long as the material. The lead time is expected to be 6 weeks.

6) Other structures

a) Service water valve pits

There is no anticipated remedial action. The valve pits serve no structural purpose other than protection for the service water valves from tornado missiles and the surrounding soil and water. At present the valve pits are covered by the diesel generator building surcharge. The valve pits will be monitored as part of the FSAR site monitoring program.

b) Transformer foundations

1. Unit 1 transformer area

Surcharge will be placed over the transformer area and selected points will be monitored.

2. Unit 2 transformer area

There is no anticipated remedial action.

c) Guardhouse

The sand drain in the area has been investigated. The foundation design will not use piles but has been modified to reduce the soil pressure.

d) Retaining wall

There is no anticipated remedial action. The retaining walls will be monitored as part of the FSAR site monitoring program.

7) Underground utilities

a) Piping

1. Service water pipe

All profiling requested from Goldberg-Zoino-Dunnicliff & Associates (GZD) has been completed. Markers are being installed along the top of the line to allow the profiles to be measured in zones where the GZD device could not be used.

2. Borated water pipe

Markers are being installed along the top of the line to allow the profile to be measured.

3. Emergency diesel fuel oil pipes

The present design requires a sloped return to the oil tanks and engineering is investigating the need for this requirement. The diesel oil lines will be surveyed in the future.

4) Condensate water pipes

All profiling requested from GZD has been completed. Engineering is investigating the area immediately below the diesel generator building. This investigation will account for the data from the profiles, borros anchors, settlement plates, building settlements, and condensate line settlement.

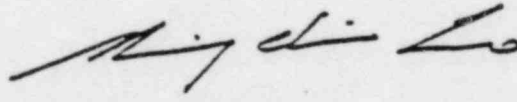
b) Electrical duct banks

A formal plan is being coordinated between engineering and construction to include functional monitoring, continuity checking, and a review of existing pulling history.

8) Cost, schedule and contracts

a) Cost - see Attachment 1

b) Schedule - see Attachment 2


for B.C. McConnel

CBM/js
5/25/1

CONSUMERS POWER COMPANY.

RECEIVED

MAY 09 1979

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



May 4, 1979

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: T. C. Cooke

Job 7220 Midland Project
Soils Meeting With CPCo
BCCC-3995

Dear Mr. Cooke:

Find attached a set of meeting minutes from the April 24, 1979 meeting with Consumers concerning the resumption of Q-listed backfill. All "planned" action items included in these minutes were entered as action items at the April 26, 1979 Diesel Generator Tank Group meeting.

Very truly yours,

J. F. Newgen
J. F. Newgen

copy

JFN/AJB/jas

Attachments

cc: R. Wheeler
D. Horn

TC	
BHP	
DJV	
ALB	
DAK	
JSK	
MMH	
WFS	
RMW	
DES	
GBJ	
JGB	
WCS	
FNAE	
GWR	
MFB	
JCS	
JJD	
CMD	
DAR	
TC	
PN	
ASP	
SEC	
CLERK	
FILE 0130	

MEETING MINUTES
MIDLAND UNITS 1 & 2

Date: April 24, 1979
Time: 10:00 a.m.
Place: Midland Jobsite
Subject: Resumption of Q-listed Backfill Placement

Attendees:

<u>Bechtel</u>	<u>Consumers</u>	<u>U.S. Testing</u>
P. Martinez	D. Horn	J. Speltz
K. Wiedner	G. Black	
G. Richardson	D. Sibbald	
A. Boos		
J. Betts		
B. Dhar		
S. Kirker		
T. Lieb		
S. Afifi		

Minutes: The meeting minutes are summarized on the attached chart. All "planned" action items are to be entered as action items at the next Diesel Generator Task Group meeting scheduled for April 26, 1979.

Prepared by:
A. J. Boos

SUMMARY OF MEETING MINUTES
 "RESUMPTION OF Q-LISTED BACKFILL PLACEMENT"
 MIDLAND UNITS 1 & 2
 APRIL 24, 1979

CPCO ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
1. Identify all conflicts within PSAR, within the PSAR, or between the PSAR and the FSAR, and correct these inconsistencies via official changes to the appropriate documents.	Project Engineering and Geo Tech have revised FSAR Section 2.5.4 to correct inconsistencies pertinent to soils placement.	Project Engineering and Geo Tech will perform a review of other subsections of FSAR section 2.5 pertaining to back-fill operations to eliminate inconsistencies, etc. (May 6, 1979)	Yes (As it applies to completion of review and changes to specification not processing of FSAR amendment.)	P.E. and Geo Tech
		Project Engineering and Geo Tech will perform a review of the Dames & Moore Soil Report and the	Yes (As it applies to completion of review and changes to specification not processing of FSAR amendment.)	P.E. and Geo Tech

CPCO ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
		<p>"PSAR Commitment List" pertaining to backfill placement to assure specs and FSAR are in conformance or are modified.</p>		
		<p>The review of "inactive" FSAR sections committed to in Appendix I, Section 1, Item C-3 (page 1-6) of the response to the NRC's 22 questions will identify and correct discrepancies in FSAR sections other than 2.5 which discuss backfill placement (Sept. 1979)</p>	<p>No</p>	<p>P.E. Geo Tech Construction</p>
		<p>Discuss and implement (as required) CPCo-PMO comments on FSAR Section 2.5.</p>	<p>Based on a preliminary review of the CPCo-PMO comments, the only restraint to resumption of backfill work is a revision to Spec. C-210 allowing the use of imported sands for Zone 2 Random Fill (May 6, 1979)</p>	<p>P.E. Geo Tech CPCo-PMO</p>
<p>2. Identify any inconsistencies between the PSAR/FSAR and the</p>		<p>CPCo-QA will prepare their comments on Specifications C-210 and C-211 for discussion in conjunction with the CPCo-PMO comments listed in 1) above. (May 13, 1979)</p>	<p>Yes (As it applies to revising specification not processing of FSAR amendment.)</p>	<p>P.E. Geo Tech CPCo-QA</p>

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
detailed specifications or drawings, and correct these inconsistencies via official changes to the appropriate documents.				
3. Identify any inconsistencies or omissions within the specifications and correct these inconsistencies via official Specification Change Notices.	— SAME AS ITEM # 2 ABOVE —			
4. Re-evaluate the appropriateness of the continued use of "random fill" in Zone 2 areas.		Specification C-210 and C-211 will be revised to redefine random fill with special emphasis on soils supporting structure (May 6, 1979)	Yes	P.E. Geo Tech
5. Provide a flow diagram of the steps which are needed for the quality control and assurance		A combined flow chart will be prepared illustrating the backfill process and the responsibilities of Bechtel Field Engineering, Bechtel Quality Control,	Yes	Construction

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
	<p>of soils work and assure that for each step there is a designation as to the specific organization primarily responsible for the action; a designation of the specific procedure to be used; and a designation of the specific acceptance criteria for the step.</p>	<p>and U. S. Testing. (May 6, 1979)</p>		
<p>6. Assure that all "clarifications" and "interpretations" are resolved via official Specification Change Notices.</p>		<p>EDPI 4.4.9.1 will be revised. (May 4, 1979)</p>	<p>No</p>	<p>P.E.</p>
<p>7. Establish a single individual at the site to be responsible for each of the following: directing the construction aspects of the soils</p>	<p>The following positions have been established</p> <ul style="list-style-type: none"> a) Soils Field Engineer b) Geo Tech Soils Engineer (Assigned to Job 7220) c) Soils Q.C. Field Engineer 			

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
work; directing the design aspects; and directing the quality control aspects.	Their responsibilities are defined in the flow chart described in 5) above.			
8. Institute 100 percent inspection of each lift placement with a corresponding Inspection Record documentation of the specific characteristics inspected in each case.		Bechtel Q.C. will work with CPCo-QA to finalize the revised Q-IR for backfill placement. (CPCo-QA has a draft of the revised QCIR which calls for Surveillance (5) of backfill work by a fulltime Q.C. Soils Engineer with generation of daily reports) May 6, 1979	Yes	Bechtel Q.C. CPCo-QA
9. Re-evaluate the capability of the equipment being used in relation to the maximum allowable lift thickness and the compaction requirements.		Project Engineering has received the procedure for test pad placement from Geo Tech. Project Engineering will forward said procedure to Construction for initiation of pad placement by 4/27/79. (April 27, 1979)	Yes	P.E. Construction
10. Re-evaluate the appropriateness of the continued use of the nuclear densometer, with	The use of the nuclear densometer has been discontinued for inspection of record use.			

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
its measure- ment accuracy being question- able relative to the moisture content specifi- cation limits of "plus or minus two percent of optimum".				
11. Re-evaluate the SAR's, specifi- cations and pro- cedures relative to their adequacy in specifying the points in the process at which the measurements or tests are to be made, the frequen- cies of these measurements or tests, and the conditions under which new labora- tory standards must be acquired.		Geo Tech will review specification C-210 and C-211 requirements as related to adequacy of specified process and testing controls (May 6, 1979) An audit will be performed on U.S. Testing by Bechtel to determine the adequacy of their soils testing procedures (April 26, 1979)	Yes Yes (Results of audit will have to be evaluated.)	Geo Tech P.E. Geo Tech Bechtel QA
12. Assure that there is a method, on a three dimensional and volumetric basis, for identifying	— SAME AS ITEM # 8 ABOVE —			

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
the specific lifts which are inspected and tested.				
13. Assure that each nonconformance report (regardless of the type of report) is dispositioned.		For each Q-listed area where backfill is to be placed all Discrepancy Reports and NCR's (Bechtel and CPCo) will be fully dispositioned and closed out prior to placement of backfill.	Yes (As it relates to areas on an individual basis where backfill work is to be performed.) Note: This is an existing quality program requirement.	P.E. Construction Bechtel QC
		Additionally, P.E. will release areas for backfill which are listed in MCR 24 as questionable areas on a case by case basis by memo or TWX.	Yes	P.E.

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48105



MEETING NOTES NO. 920
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

DATE: February 15 and 16, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645

ATTENDEES:

	<u>Bechtel</u>	<u>CPCo</u>
Engineering		
	K. Wiedner	*J. Milandin
	B. Dhar	*W. Jones
	C. McConnel	*J. Wanzeck
	R. Marl	S. Afifi
	A. Ganguly	A. Marshall
	*P. Martinez	G. Richardson
Construction		
	A. Boos	C. Hunt
	J. Betts	R. Wheeler
		D. Horn
		T. Thiruvengadam
		D. Sibbald

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to review the progress on the resolution of the diesel generator building settlement problem and to discuss action items initiated in the January 23, 1978, meeting at the Midland jobsite.

The following notes document the discussion on the agenda items.

ITEMS DISCUSSED:

- 1) Amendments to the January 23, 1978, Meeting Notes - No amendments to the Meeting Notes No. 907 were made.
- 2) Review of Prior Action Items - Action items from the January 23, 1979, meeting were reviewed with the following current status.

1. The diesel generator building model, including mechanical equipment, large piping, and HVAC, is essentially complete. It is estimated that the small field-run piping and electrical work will take an additional 2 to 3 weeks. Construction stated that they would like the model to be sent to the jobsite as soon as the present work is complete. It was agreed that the model will be shipped to the jobsite after the present information is added to the model.
2. This action item is complete. The DCN was issued February 6, 1979, showing counterfort design.
3. This action item is complete. An FCR was generated and approved February 6, 1979, showing a steel brace in lieu of a counterfort at turbine building column line 8.0.
4. Project engineering has reviewed the double wood form design submitted by construction. However, geotech should evaluate the passive soil pressure values used in the analysis. Geotech agreed to respond to this item by February 15, 1979.
5. Geotech has contacted the soil consultant regarding defrosting of the frost protection prior to surcharge. There will be no need to defrost any material above final grade. This action item is closed.
6. This item is still open. Drawing C-1141 will be revised by February 21, 1979, to show monitoring of the condensate line at hold points IV, VI, and VII.

Profiling of the 8-inch service water line was discussed. Results indicated that the lowest point in the present position of the line is 16 inches off the position shown in the design drawings. Profiling of other Q-listed pipelines was also discussed, and questions were raised as to whether any action is immediately required. It was agreed that project engineering will meet with the mechanical and stress groups and identify the functional requirements of the Q-listed pipelines (stress, allowable curvature, etc). Construction will review installation procedures and records to determine how accurately Q-listed pipes were placed. Construction will also review the feasibility of profiling all other Q-listed pipelines in the plant fill and report to project engineering.

7. This item is complete. Pipe profiling completed to date has been received from Goldberg-Zoino-Dunncliff & Associates (GZD).
8. This item is still open. Project engineering will issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979.

9. This item is complete. Geotech has notified engineering of the necessary scope changes for the GZD contract.
10. This item is complete. Geotech has confirmed that the geology group will assist in taking piezometer readings. However, as long as continuous readings are necessary, GZD will perform this task.
11. This item is complete. The engineering and construction schedule for the diesel generator building was issued on January 26, 1979.
12. This item is still open. A preliminary cost estimate has been issued. The revised cost estimate is now scheduled for issue by March 2, 1979. The total estimate is now \$3 million for all corrective work on the diesel generator building. It was agreed that a cost estimate review will be an agenda item for the next task group meeting.
13. Engineering stated that they have responded to the FSAR questions. Some of the questions have only partial responses. These responses will be completed as criteria are developed and data from surcharge are available. This action item is closed.
14. This item is still open. A response to Gallagher's questions is now scheduled for March 2, 1979.
15. This item is complete. Interim report 4 for MCAR 24 was forwarded to CPCo on February 16, 1979.
16. This item is complete. The soil boring logs around the Class 1 structures have been completed for the MCAR report and were submitted to the FSAR.
17. This item is complete. The cover letter transmitting Meeting Notes No. 901 dated December 4, 1978, covering the meeting with the NRC was signed on March 1, 1979.
18. This item is still open. A list of milestone dates to be shown on the settlement drawings has been developed. It was agreed that the digging of the test pit in the diesel generator building and removal of surcharge should also be included in the milestone dates.
19. This item is complete. A time-history settlement drawing for the diesel generator building has been developed.
20. This item is still open. The location of the strain gage has been reviewed and revised. This information will be shown on Drawing C-1141 by February 21, 1979.

21. Construction will identify to engineering which rods used the turn-of-the-nut method of tightening and what procedure was used. This action item is closed.
22. This item is still open. Geotech is still working on evaluating liquifaction potential between the diesel generator building and the turbine building. The evaluation is expected to be sent to the consultant within 1 week. After concurrence from the consultant, a response will be forwarded to project engineering. Geotech will require additional borings to complete this evaluation.
23. This item is closed. The turbine building wall deflection monitoring will utilize dial gages. The amount of surveillance and monitoring of the turbine building wall was discussed. It was agreed that project engineering will review the monitoring program given in Specification C-83 and attempt to relax the present criteria.
24. Geotech will allow a 12-inch tolerance in lieu of the present 6-inch tolerance. Drawing C-1141 will be revised to show this by February 21, 1979. Drawing C-1141 will also be revised to allow 50% of the counterfort design strength prior to surcharge Step III.
25. Project engineering will resolve this at a later date. It was agreed that this action item should be removed from the task group's responsibility because it is a normal project engineering action.
26. This item is still open. Construction has completed seven drawings showing test locations down to el 620'-0". Each drawing shows 3 feet of fill. Construction asked if the entire plant area fill should be plotted to el 619' prior to plotting the diesel generator building area to the original grade. It was agreed that the plotting should be done in phases, with the two southern main plant areas and the area east of the power block plotted to el 619' first. Geotech will define the next phases of work after receipt of the Phase 1 work. Construction will attempt to define Canonie's work versus Bechtel's work on the plots.
27. This item is still open. An acceptance procedure has been developed by geotech. However, this acceptance procedure must be reviewed by the soil consultants. It was agreed that geotech will send a copy of its acceptance procedure to project engineering concurrently with sending it to the consultant.
28. This item is complete. Pile capacity data has been supplied to engineering.

29. The condensate tank foundation options were discussed. Engineering has estimated that 100 piles will be needed at a total cost of \$250,000. Engineering prefers the surcharge option. Construction stated that surcharging the condensate tank area to a height of 20 feet would jeopardize turnover to CPCo and would result in a claim from Chicago Bridge & Iron Co. It was agreed that a cost estimate of the two options would be developed by March 5, 1979, and that surcharge would be placed after a decision to follow this method has been made.
30. Project engineering discussed the surcharging of the Unit 1 transformer pad. It was agreed that the transformer area should be surcharged with 5 feet of fill without the transformer load as soon as possible. Construction stated that the Unit 1 stator will be moved over this same area in July 1979. Engineering agreed to investigate this potential problem and provide necessary directions to construction.
31. Plugging of drilled holes in the transformer basin will be done after surcharge. It was agreed that this action item should be treated as a regular construction item and should be removed from the task group's list of action items.
32. The corrective action on the tank farm was discussed. It was agreed that the borated water storage tank will be constructed as scheduled and then filled with water to observe settlement. Engineering will issue a memorandum to the field on this. No piping or any other utility should be connected to the tank at this time. The area should be backfilled to grade level as early as possible.
33. The corrective action on the guardhouse was addressed. It is engineering's intent to lower the foundation 2 feet and remove the central column. Engineering will discuss this plan with geotech. A minimum of three settlement plates will be installed below frost level to monitor settlements. CPCo stated that they are concerned about the possibility of a plugged sand drain in the guardhouse area. Geotech agreed to evaluate this problem and determine what remedial measures may be needed.
34. Response to Gallagher's questions. Project engineering's questions have been answered. This item is complete.
35. Comments on the potential cause list have been forwarded to QA. This item is complete.
36. This item is open. Some comments have been received by engineering on FSAR Section 2.5. However, comments are still required from CPCo and construction. Project engineering will resolve these comments, arrange for a meeting if necessary, and issue an FSAR change notice on any discrepancies or necessary changes.

Investigation of Cause

A Kepner-Tregoe problem analysis was presented to the task group by Bechtel management. This is a method of analysis which attempts to set the groundwork for establishing possible causes to a particular problem. The investigation of the diesel generator building settlement problem was presented and discussed using the Kepner-Tregoe analysis.

NCR 1004

Nonconformance Report 1004, which has remained open since November 1977, was discussed. It was agreed that engineering will analyze the service water pump structure section on plant fill to see if it can be supported by cantilever action without any support from fill. Geotech will provide the soil characteristics and conditions. Construction will provide the excavation drawing (plan and sections) used for the construction of the pumphouse foundation. Geotech will evaluate the liquifaction potential of the sand material adjacent to and/or below the structure. The civil resident engineers will perform a visual inspection of the structure for cracking and provide project engineering with the results of this inspection. Geotech will make additional borings required to evaluate the NCR.

- 3) Review of Construction Progress - The status of construction was presented. Step 1 of the surcharge placement will be completed by February 17, 1979. The monitoring of the turbine building wall may hold up surcharge Step 2. Step 2 can start on February 26, 1979, if the monitoring is complete. Step 3 may be delayed by 1 week due to the construction of the counterforts. However, Step 3 can be started on March 5, 1979, if 50% of the concrete strength is achieved on the counterforts.

The last walls in the diesel generator building were poured on February 20, 1979, with the placement of 550 yd³ of concrete. The roof is expected to be completed in mid-March.

- 4) Cost and Schedule Estimate - The cost and schedule will be reviewed at the next task group meeting.
- 5) Other Structures and Facilities - The following other Class 1 structures on plant fill were discussed.
 - a) Service Water Lines - The recent borings taken in the service water line area were discussed. One boring could not be filled with grout and had to be plugged by bridging the hole with concrete. CPGCo expressed concern about this boring and requested that Bechtel investigate conditions that could affect these lines. Geotech agreed to pursue this problem

further with construction and possibly make borings, pending the results of pipe profiling. Engineering agreed to check the secondary stresses and requirement for slopes in the service water pipelines.

- b) Diesel Fuel Tanks - It was agreed that settlement or movement of the diesel fuel tanks should be monitored. A base survey will be performed as soon as possible, the tanks will be filled, and then the tanks will be monitored for settlement. Depending on the movement after filling, engineering and geotech will decide if additional surcharging is necessary. Construction will investigate and confirm that the tanks can be filled. It was noted that the original boring logs qualifying the area as Q have been lost. Construction will attempt to relocate these borings. Geotech will make borings if the old borings cannot be located.

It was agreed that the next task group meeting would be held in approximately 2 weeks.

ACTION ITEMS:

- | | | |
|---------------------|----|--|
| Geotech | 1) | Look at passive pressure values used by construction in the double-wood form design and respond to engineering by February 15, 1979. |
| Project Engineering | 2) | Meet with stress and mechanical groups to identify functional requirements for Q-listed pipeline. |
| Construction | 3) | Review installation records and procedures for Q-listed pipe to determine how accurately the profiled pipelines were placed. |
| Construction | 4) | Review the feasibility of profiling all other Q-listed pipelines and give this information to project engineering. |
| Project Engineering | 5) | Issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979. |
| Cost and Schedule | 6) | Issue a revised cost estimate by March 2, 1979. |
| Project Engineering | 7) | Provide CPCo with a response to Gallagher's questions by March 2, 1979. |
| Project Engineering | 8) | Show milestone dates on settlement drawings by March 2, 1979. |

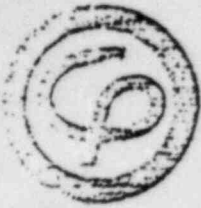
- Project Engineering 9) Show revised strain gage locations on Drawing C-1141 by February 21, 1979.
- Construction 10) Inform project engineering by February 20, 1979, of the locations where hydraulic jacks can not be used on the tie rods (i.e. where turn-of-the-nut method was used) and provide procedure for turn-of-the-nut tightening.
- Geotech 11) Forward results of liquifaction evaluation to the soil consultant by February 28, 1979, prior to responding to engineering.
- Project Engineering 12) Review the monitoring program in Specification C-83 and attempt to relax the requirements.
- Project Engineering 13) Revise surcharge tolerances and concrete strength requirements on Drawing C-1141 by February 21, 1979.
- Construction 14) Plot density tests for plant fill for the two power block areas and the one area east of the power block prior to plotting any other areas. Construction will also attempt to separate Canonie's work versus Bechtel's work.
- Geotech 15) Define the next phase of plotting to be performed after receipt of the Phase 1 plotting.
- Geotech 16) Send a copy of the surcharge acceptance procedure to project engineering concurrently with forwarding it to the soil consultant.
- Cost and Schedule 17) Develop a cost comparison for the pile option versus the surcharge option for the condensate tanks by March 5, 1979. Engineering will provide necessary direction to construction regarding surcharging of the condensate tank area. *3/11/50 of Piling 1/20/50*
- Construction 18) Surcharge the condensate tank area with 10 feet of fill as soon as possible, after engineering's decision has been made.
- Engineering/
Construction 19) Place 5 feet of surcharge in the Unit 1 transformer areas as soon as possible after engineering evaluates the effect of 5'-0" fill in the transformer area and directs construction to do so.
- Project Engineering 20) Investigate the proposed Unit 1 stator loads in the transformer area.

- Project Engineering 21) Issue a memorandum to construction on the release of the borated water storage tank without any piping connection.
- Project Engineering 22) Get geotech's concurrence on the proposed corrective action on the guardhouse.
- Geotech 23) Review the plugged sand drain problem and provide recommendations for remedial work.
- Construction/CPCo 24) Forward their comments of FSAR Section 2.5 to project engineering.
- Construction 25) Provide an excavation drawing of the service water pumphouse to project engineering.
- Geotech 26) Provide project engineering with the soil conditions and characteristics around the service water pumphouse which were found in the recent boring program.
- Geotech 27) Evaluate liquifaction potential of the loose sands around the service water pumphouse.
- Project Engineering 28) Analyze the pumphouse as a cantilever and see if the pumphouse can be supported independently of support by the fill.
- Civil Resident Engineer 29) Inspect the pumphouse for cracking and provide results to engineering.
- Geotech/Construction 30) Evaluate the potential fill support problems in the service water line area.
- Project Engineering 31) Check the secondary stresses in the service water pipe lines and also investigate if there is a need for slope in these lines.
- Construction 32) Investigate and confirm that the diesel fuel tanks can be filled.
- Construction 33) Attempt to locate the original borings made in the diesel fuel tank area.

R. Mar/A. Ganguly

R. Mar/A. Ganguly

RM/AG/js
2/21/4



Consumers
Power
Company

TCC

Midland Project: P.O. Box 1963, Midland, Michigan 48640 - Area Code 517 631-0951

January 31, 1979

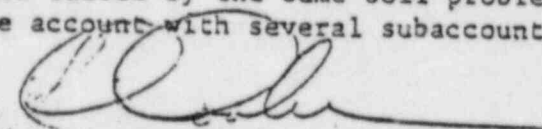
Mr. J. F. Newgen
Bechtel Power Corporation
P.O. Box 2167
Midland, MI 48640

MIDLAND PROJECT GWO 7020 - SOIL
PROBLEMS AND RELATED BUILDING SETTLEMENT
File: 0130 Serial: CSC-3797

Reference: Letter T. C. Cooke to J. F. Newgen, Serial 3369

On August 21, 1978 we were notified of the excessive settling of the Diesel Generator Building and the Generator Foundations. Since this time, a survey and a boring program has indicated other areas of concern, (Condensate Tanks, Guard House, Tank Farm, etc.). It was requested in our referenced letter to have a separate account set up for all additional work and related expenses. We now request that other problems or costs discovered and incurred during or after conclusion of these programs also be included in separate accounts, as they may fall under the provisions of Article 9 of the Bechtel Power/Consumers Power Company contract regarding defective work.

The basis for this request is that all the above problems are being or have been caused by the same soil problem, and therefore, should be considered as one account with several subaccounts.


T. C. Cooke
Project Superintendent

TCC/DES/sd

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 895
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: Thursday, December 21, 1978.
PLACE: Midland Jobsite
SUBJECT: Task Group Meeting on the Diesel Generator Building

ATTENDEES:

<u>Bechtel Engineering</u>	<u>Bechtel Construction</u>	<u>CPCo</u>
K. Wiedner	J.P. Betts	L. Sibbald
C. McConnel	A.J. Boos	
D. Reeves	W. Netzela	
J. Moravek		
R. Marl		
B. Dhar		
G. Richardson (QA)		
S. Afifi (Geotech)		
W. Jones (Cost & Schedule)		

PURPOSE: The meeting was held at the Midland jobsite to review engineering and construction progress on the resolution of the diesel generator building settlement problem and to finalize unresolved items such as turbine building modifications, surcharge sequence, and monitoring of underground facilities. It was decided that the task group would be meeting as necessary to ensure that the surcharge of the diesel generator building progresses as quickly as possible. The next meeting is to be held in Ann Arbor on January 4, 1979.

The following notes taken during the meeting are listed in the order in which the items were discussed in the meeting and as shown on the agenda.

ITEMS DISCUSSED:

1) Diesel Generator Building Construction

Construction gave a brief summary of the status of construction on the diesel generator building and stated that construction was proceeding as fast as possible with two shifts being used.

The duct bank excavations were completely filled and that structural sand fill inside the building was in process. Bays 3 and 4 are filled to el 634' with bays 1 and 2 lagging only a few days behind. Also, the slab at el 664' in three bays has been poured with the slab in the fourth bay scheduled to be poured next week.

2) Turbine Building and Diesel Generator Building Modifications

Proposed modifications to the buildings were discussed. Modifications of the turbine building Q line wall are to be shown on Drawing C-1040 and are briefly described as follows:

- A) From column line 5 to column line 7 the modification is to include shimming the wall to the concrete slab at el 631'-0" plus adding a 7'-6" high by 4'-0" wide corbel at el 614'-0".
- B) Between column lines 4 and 5 and between column lines 7 and 8 the modification is to add 2-inch \emptyset steel rods as tie backs from the Q line to the diesel generator building plus adding a 7'-6" high by 4'-0" wide corbel at el 614'-0".
- C) Steel braces are to be added at column lines 3, 4, and 9.
- D) Concrete counterforts are to be added to column lines 3.5, 8.0, and 8.5 with the possibility of substituting steel for concrete at the 8.0 line.

3) Retaining Wall Above Grade

The field presented a scheme for a retaining wall between the turbine building and the diesel generator building for holding the surcharge above el 634'-0". The scheme consisted of a row of concrete blocks 30" x 8'-0" x 16'-0" stacked on top of each other with wide flange beams between the blocks. The blocks were to be tied back to the diesel generator building to prevent them from sliding.

It was determined that the concept of moving the blocks in with a crane and the amount of tie backs required would take approximately 1 month to construct. It was also determined that no blocks can be

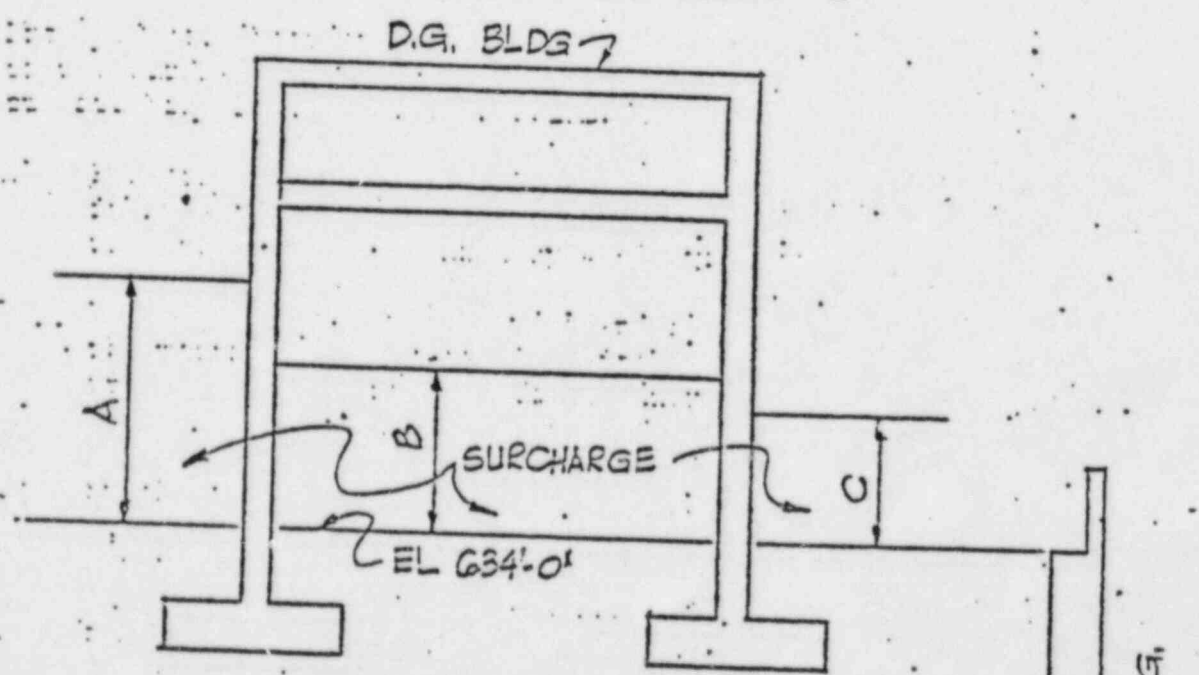
stacked until the turbine building wall is modified as described in Item 2. Therefore, the concept of the concrete block does not look advantageous for getting the surcharge load on as quickly as possible.

4) Surcharge Sequence

A review of the consultants' recommendations showed that the consultants recommended surcharging in a uniform manner and not having more than a 5-foot differential in surcharging across any wall of the diesel generator building.

In view of the amount of work involved in supporting the turbine building wall and building a retaining wall, it was decided that a more indepth surcharging sequence would be required.

The following sketch shows the proposed surcharging sequence and the approximate dates they could be completed, assuming that the retaining wall above grade will be the stacked concrete blocks, four high, as mentioned in Item 3 above.



HEIGHT OF SURCHARGE			FORECAST DATE
A	B	C	
5'	5'	0	1/15/79
10'	5'	0	1/21/79
10'	10'	0	1/29/79
10'	10'	18'*	3/1/79 START 3/15/79 C
10'	10'	10'	3/15/79 START 3/22/79 C
15'	15'	18'*	3/29/79

* LOCAL - CONC. BLOCK
 ** MULTIPLE AREA

5) Underground Facilities and Adjacent Structures

Since cutting the duct banks loose, there has been no movement on the south side of the diesel generator building and 3/8-inch movement on the north side of the building. It was decided that the two 20-inch \emptyset and two 6-inch \emptyset condensate lines are to be cut at the first elbow outside the turbine wall so as to prevent damage to the pipes. On the south side of the diesel generator building, no action is required on the condensate lines. This point will be monitored with the present instrumentation.

The service water pipes, circulating water discharge lines, and electrical duct banks were also discussed.

A) Project engineering stated that the design calculations of the circulating water discharge lines were reviewed for the effects of the surcharge load and that there is a possibility that the additional load could produce ovaling of the pipe exceeding the original criteria. The ovaling is greatly dependent upon the condition of the backfill at the sides of the pipe. It was decided that a survey of the out-of-roundness of the pipe would be made to determine if internal supports would be needed during the surcharge period.

B) It was agreed that the conduit continuity was the only requirement for the electrical duct banks. The rupture of a conduit — due to soil settlement therefore does not cause a problem as long as continuity is checked.

6) Instrumentation and Monitoring

Instrumentation and monitoring of the turbine building wall was also discussed. Project engineering stated that a specification will be prepared. It was also agreed that a decision on whether to preload the transformer pads would be made based on the behavior of the diesel generator building.

7) Schedule

A schedule is to be developed for surcharging showing the combined construction and engineering effort on major items only. This schedule is to be completed by January 12, 1979, and is to be developed for the placement of 10 and 15 feet of surcharge.

The forecast schedule for the remainder of the civil/structural activities for the original building construction will be completed by January 12, 1979.

A schedule for mechanical and electrical activities after completion of soil consolidation will be completed by May/June 1979.

8) QA and QC

It was decided that the surcharge operation and Specification C-81 would remain non-Q. However, notes will be added to Drawing C-1060 calling for protection of the instruments and showing hold points on monitoring the surcharge application.

ACTION ITEMS:

- Project Engineering 1. Project engineering is to issue a memo releasing concrete placement for the diesel generator building above el 664'-0" (reference MCR 1482).
- Project Engineering 2. Project engineering is to issue a DCN adding channel embeds on the inside of the diesel generator building walls for HVAC, cable tray support, etc.
- Project Engineering 3. Project engineering is to issue a DCN adding structural backfill notation to Drawings C-1007 and C-1008 to call out the type of backfill.
- Field Engineering 4. Project engineering is in the process of building a 3/8-inch scale model of two full bays of the diesel generator building showing equipment, piping supports, field run piping, etc. Construction is to inform R.L. Castleberry as to what they would like to include in the model. Also, consideration is to be given to the construction of a 1/2-inch scale model.
- Project Engineering 5. A DCN is to be issued enlarging the hole diameters to be drilled into the diesel generator building and turbine building for skewed 2-inch ϕ tie rods.
- Project Engineering 6. A DCN is to be issued on the steel attachment for securing the 2-inch ϕ rods to the northwest corner of the diesel generator building. Project engineering is to investigate why the corner is enlarged and if it can be core drilled.

Project Engineering

- 7. A DCN is to be issued revising rebar grid in the corbel at el 614'-0" plus showing the reinforcing in the wall at an angle so as to make it easier for grouting. Project engineering is to investigate the feasibility of issuing a DCN giving the field the option to use rock anchors in lieu of reinforcing in the slab at el 614'-0" for the turbine building wall corbel.

Project Engineering

- 8. A DCN is to be issued revising the limits of surface preparation on the turbine building wall for the corbel plus specifying that bush hammering and/or chipping is to be done.

Project engineering is to check with the chief engineer for the necessity of obtaining 1/4-inch amplitude on the surface preparation.

Project Engineering

- 9. A DCN is to be issued showing design and surface preparation required for concrete counterforts in the turbine building. Project engineering is to look at the local layout effects of the counterforts and investigate to see if removal is required.

Project engineering is to coordinate with CPCo to determine if the corbel braces and counterforts can be left in place permanently or whether they must be taken out. The task group's recommendation is that those items be left in place and removed in the future if necessary.

Project Engineering

- 10. Project engineering is to release the steel quantities and material requirements for the steel braces in the turbine building.

Project Engineering

- 11. Project engineering will attempt to issue the drawings and DCNs showing the design for the above corbel, braces, and counterforts by December 29, 1973.

Field Engineering

- 12. Bracing between column lines 3 and 4 as shown on DCN 1 to Drawing C-542 must be in place prior to construction of counterforts. The field is to expedite this activity.

Field Engineering

13. Construction is to look at the following alternatives for the retaining wall:

- a. Concrete blocks stacked four high as discussed in Agenda Item 3
- b. Concrete blocks stacked two high then filling with sand and then coming back and adding two more blocks plus sand
- c. Wood forms (single and double forms)

Geotech

14. Geotech is to investigate the concept of having four blocks high next to the turbine building with no fill between the blocks and the diesel generator building and to advise of the feasibility of this action.

Project Engineering

15. Project engineering is to review and comment on the final scheme of the retaining wall (Action Item 11).

Geotech

16. Geotech is to obtain consultants' concurrence on the surcharging sequence and also get the consultants' recommended hold points on the depth of surcharge. Geotech will also investigate the length of time the surcharge is to remain in place before additional fill can be placed.

Project Engineering

17. Project engineering is to investigate surcharge limits prior to certain elements of the turbine building wall modification being completed.

Field Engineering

18. The field is to defrost the present frost protection as required outside the diesel generator building.

Geotech

19. Geotech is to get consultant confirmation that this 15 feet is sufficient. The possibility of defrosting less than 15 feet should also be addressed.

Project Engineering

20. Drawing C-1040 is to be released for surcharging. The surcharging sequence is to be included on the drawing along with established consultant hold points.

- Project Engineering 21. A note shall be added to Drawing C-1040 calling for the protection of the instrumentation.
- Project Engineering 22. Project engineering will revise Specification C-81, Section 6.4.3, regarding removal of granular fill and will clarify the specification to say that soil testing is for informational purposes only. Section 6.1.3 will also be reviewed for the possibility of changing the 5-foot surcharge differential requirement.
- Project Engineering 23. Project engineering is to look at placing 5 feet of fill between the turbine and diesel generator buildings with support for the turbine building wall only from the tie rod installation.
- Project Engineering 24. Project engineering is to issue a DCN to cut four condensate lines outside of the turbine building wall.
- Field Engineering 25. The field will provide service water pipe profiles before and after surcharging only. From the west valve pit, the pipe is to be profiled to the turbine building and also south of the diesel generator building for approximately 270 feet. Profiles of the services water pipe are to be provided in both directions from the valve pit.
- Field Engineering 26. The field will provide profiling of the service water pipes at the east valve pit as shown on Drawing C-1040.
- Project Engineering 27. The field is to furnish ovality readings of the circulating water discharge lines to project engineering for evaluation.
- Project Engineering 28. Project engineering is to inform the field if a TV camera is to be run through the conduits of the electrical duct banks.

Project Engineering

29. Project engineering is to issue a specification on the monitoring of the 2-inch ϕ rods in the turbine building and on the monitoring of the deflection of the turbine wall.

Geotech

30. Geotech is to check on the delivery of the probe for monitoring of the underground utilities.

Field Engineering

31. The field is to expedite getting a TV camera for monitoring the service water lines and the condensate lines.

Project Engineering

32. Project engineering is to issue a memo stating that the resident engineer is to read the strain gages which Dunnicliff installed.

Cost and Scheduling

33. The cost and schedule group is to develop schedules by January 12, 1979.

Cost and Scheduling

34. The cost and schedule group is to develop revised cost estimates as methods firm up. By February 1, 1979, a new cost estimate will be developed on the total surcharge operation.

Project Engineering

35. Drawing C-1040 is to be made Q-listed. This, with the revisions discussed under Agenda Item 4, will hopefully satisfy the QA/QC requirements.

Project Engineering

36. New questions on the FSAR need to be answered by project engineering.

Project Engineering

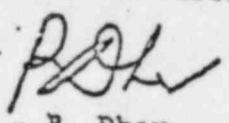
37. An answer to Gallagher's report is to be in draft form within 2 weeks after receipt of the NRC report from the current interviews being performed.

Quality Assurance

38. Quality assurance is to discuss with W. Bird (CPCo) to obtain NRC concurrence that the response to Gallagher's report need not be submitted until after receipt of the NRC report from the interviews.

Project Engineering

39. Project engineering will prepare the next interim report for MCAR #24 which is due in February.



B. Dhar

BD/bob
1/2/5

30. [Faint, illegible text]

31. [Faint, illegible text]

32. [Faint, illegible text]

33. [Faint, illegible text]

34. [Faint, illegible text]

35. [Faint, illegible text]

36. [Faint, illegible text]

37. [Faint, illegible text]

38. [Faint, illegible text]

Midland Project - Settlement of Diesel Generator Bldg.
Meeting in Champaign, IL November 6, 1978.

TCC/DBA
see P. 6 3, 5

People present:

- | | |
|-----------------|------------|
| Chuck McConnell | T. Cooke |
| Neil Swanberg | D. Sibbald |
| Austin Marshall | R. Wheeler |
| Phil Martinez | D. Horn |
| Mike Rothwell | C. Hunt |
| Sherif Affifi | |
| Walter Ferris | |
| Jim Betts | |
| Y K. Liu | |
| Stan Blue | |
| Skif Henderson | |
| Ralph Beck | |

- ① NRC to be contacted @ 10:30 A by telephone.
- ② Boring logs have been drawn on sketches showing cross-section of the auxiliary generator building.
- ③ No changes in trend.
- ④ The six options for future grouting modify to meet for pre-load (surcharge) from mat + previous underpinning. Remove + replace foundation.

Offici: Pre-meeting discussion with consultants
talked pre-load as preferable.
Why other options to be rejected

Reck. Boring show what was originally known
Some fill - settling by its own weight
Preload is only way to densify -
considering nature of material
Piezometric readings and consolidation
tests will reveal the degree of
consolidation achieved. The
time to terminate the load
will be known. Data will be
available to assure the NRC that
the foundation is adequate.
No need to go into all detail of settlement.
Time rate of development will reveal
what we should do about pipelines &
duct banks.

Anderson: Discussed the objections to the other
options.
That's all and that's nothing. It's
will go on for years - Trouble was
not start for, say, 10 years some
corrections will be hard to make. Some
should not have cut into correction
(problem.)

(3)

Cannot estimate the future settlement since method of construction left material more heterogeneous than would ever be found in nature.

Settlement will occur "relatively" rapidly after preload is put on. Cannot predict time required. Nature

✓ Compress fill first then bring up water level to saturate the fill. ~~to improve~~

Red - Preload will make the best possible fdu - could not say if NEC will be impressed. But knowledge of the action under preload will surely convince NEC (Lyons/Hella) and technical people. (QA people have been looking over previous settlement calculations - a useless activity now)

Bldg cannot be underpinned until the subsoil is improved. Therefore the preload would be required in any event. Future underpinning might be required if uneven settlement

(14)

occurred to damage the bldg (not expected by any means). Peak effects pre-load to be rapid and decisive results can be expected early.

Hudson - No bearing problem dynamic or static.

Bearing capacity failures ^{would} show shear failure with soil rising above footings, whereas the lifting of ^{footings} ~~indicates otherwise~~.

A bearing pressure of 5 times unconfined compression tests leads one to suspect bearing capacity.

Sampling is biased toward ~~soil~~ material.

May have to demonstrate capacity by test pits.

Disruption of small volumes will not affect entire mass.

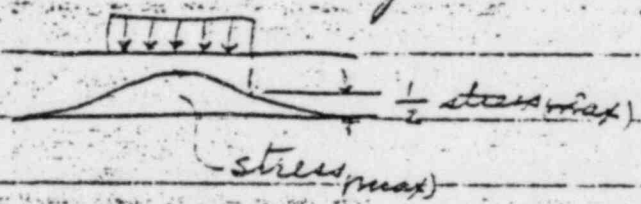
~~Some time could save s. with in.~~

(5)

Settlement gages at varying depths should be installed at once to reveal behavior of soils at over the full depth.

[LENGTH OF TIME BETWEEN COMPLETION OF FILL AND START OF GENERAL CONSTRUCTION? HOW MUCH CONSOLIDATION IN INTERIM? SHOULD NOT THE EDN HAVE BEEN SUSPECT?]

make the stress diagram beneath preload.



Thus, limiting preload on north side because of turbine building will not give results desired

Sequence of loading: Piers fill up evenly to, say, 10 feet and take readings for a week. Then continue a few weeks more at 20' depth. This will cause settlement under 30' depth of fill for shorter time.

Subsequent boring and testing program
 after preloading to convince NRC
 would ~~not~~ be advisable since
 we ~~are now~~ ^{would then} be looking at the
 entire ydu picture, - not isolated
 pockets. }

Last operation will be grouting
 under ~~the~~ spread footing to
~~an~~ established contact.

Also, grout before the building is
 cut loose from ducts to prevent
 sudden racking of the building. (Bechtel
 will still take this recommendation under
 advisement).

THEORIES OF SOIL BEHAVIOR ARE BORN
 TO EXPLAIN FAILURE OF QUALITY CONTROL.

Conference call by
 talked to Carl Hood of NRC and
 Lyman Heller
 Dates for site visit and conference
 December 3 and 4, 1978.

Localized problem of loose sand on the north side of the Diesel Generator Bldg susceptible to liquefaction.

be
pressure

Instrumentation

1. Settlement gages on structure footings and machinery foundations.
2. Borvis anchors in fill at various depths and into native substrata. About 50 gages contemplated with 2 or 3 remote gages for reference.
3. Settlement of representative piping to be measured by drawing a liquid-filled tube with a pressure gage in the end through the piping with readout of pressure at the accessible end of the probe



4. Inclinoimeters to be installed adjacent to piping to indicate lateral movement of piping. ~~Eight inclinometers~~ to be installed on the north, south, and east of the Diesel Generator Building.

CONSUMERS POWER COMPANY
RECEIVED
NOV 03 1978

TCC
Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640



MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

October 23, 1978

Consumers Power Company
P.O. Box 1963
Midland, Michigan 48640

Attention: T. C. Cooke.

Job 7220 Midland Project
Removal of Loose Natural
Sands
BCCC-3587

Dear Mr. Cooke:

Reference: T. C. Cooke letter to J. F. Newgen, dated 10/6/78
(CCBC-1590).

This letter is written in response to your letter referenced above on the subject loose sands. Per your request we have established a separate account for costs associated with additional borings and any future corrective work measures. As regards your comment on why these sands were not removed and the applicability of Article I of the contract, we would prefer to wait until such time as our Geo-Tech group completes its investigation of the matter before we provide Consumers with a comprehensive response.

Very truly yours,

J. F. Newgen
for J. F. Newgen

JFN/AJB/ems

TCC	BHP	DIV	RUB	DAX	MSW	PCS	V.3	CR1	JGB	V. B	EME	GOK	EDJ	EJ	JID	JSS	CMB	IC	PKW	ASP	PAT	VICKI	PEGG	FILE 0130
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	-----	-----	-----	----	-----	-----	-----	----	-----	-----	-----	-------	------	-----------

cc: GSX
JL Bacon



Consumers
Power
Company

TCC

Midland Project P.O. Box 1963, Midland, Michigan 48640 - Area Code 517 631-0951

October 6, 1978

Mr. J. F. Newgen,
Bechtel Power Corporation
P.O. Box 2167
Midland, MI 48640

MIDLAND PROJECT GWO 7020 -
REMOVAL OF LOOSE NATURAL SANDS
File: 0130 Serial: 3478

FSAR question number 362.2 relates to a loose sand layer which was to be removed if the natural sands exhibited relative densities less than 75%. In late September, 1978, it was brought to our attention that Bechtel has been unable to confirm that subject sand layer was removed or that in place tests were performed to confirm greater than 75% relative densities.

Failure to resolve this matter and fulfill the FSAR commitment has, and will, result in costs to be incurred for additional borings and possible future corrective work measures. We request that a separate account be established for these costs since the above mentioned work may fall under the provisions of Article 9 of the Bechtel/CPCo contract regarding repair or resolution of this problem at the expense of Bechtel (engineering and construction costs).

To determine the liabilities involved, we request your comment on why this was not completed prior to filling over the area and whether you agree that this work falls under Article 9 of the contract.

T. C. Cooke
Project Superintendent

TCC/RMW/pw

BCC: GSKeeley
JLBacon

CONSUMERS POWER
RECEIVED
FEB 10 1978

MIDLAND PLANT PROJECT
MIDLAND, MICHIGAN

Bechtel Power Corporation

TCC

Post Office Box 2167
Midland, Michigan 48840

February 1, 1978

U. S. Testing Company, Inc.
1415 Park Avenue
Hoboken, New Jersey 07030

Attention: Mr. D. Edley

Job 7220 Midland Project
Subcontract 7220-C-208
Failure of Fill Supporting
Administration Building Grade
Beam at Column Line 0.4
C-208-B-286

BECHTEL
BHP
DIV
RLB
DAK
RAW
DES
WFS
GBJ
JGB
WLB
SAB
GWR
DDJ
ZAU
JJD
JSS
CHD
TC
PKW
ASP
PAT
VICK
PEGG
FILE

Reference: Telex Number C-208-B-283 Dated December 30, 1977 From J. F. Newger

Dear Mr. Edley:

Pursuant to the referenced Telex, we have conducted an evaluation of the subject failure condition. Our engineering analysis has determined that the failure was caused by insufficient compaction of the fill which was placed in May and June of 1977. A careful review of the test data provided by U. S. Testing Company indicates that this fill was erroneously reported to be in conformance with Bechtel Specification requirements by U. S. Testing Company. This conclusion is supported by the following facts.

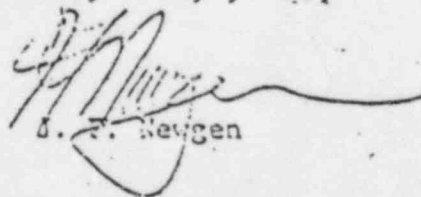
1. A summary of fifteen (15) compacted fill density tests taken by U. S. Testing to evaluate the subject fill as it was compacted is provided in Table #1. The location of each test is plotted in Figure #1. Although several initial tests indicate test failure due to insufficient compaction, each failure is properly cleared by a passing test at or near the location of the failure.
2. Maximum laboratory dry density values (from Bechtel Modified Proctor Tests) used as the standards for evaluating acceptability of fill compaction were selected by U. S. Testing Lab Technicians. In a Jobsite meeting with F. Teague and B. Check of Bechtel, J. Speltz of U. S. Testing stated that the testing technician uses a visual comparison between soil characteristics (primarily color) of the in-place sample and bottled samples of material with known maximum laboratory dry density, to select the appropriate standard. Visual examination by Bechtel soils engineers of the subject fill during the subsequent grade beam removal indicated the material was uniform in appearance with minimal variation in soil characteristics (color and plasticity) over the full extent of the fill placement.

3. The value of maximum laboratory dry density selected for comparison of the in-place dry densities in the subject fill varies between 132.9 lb./ft.³ and 116.0 lb./ft.³. This variation includes most of the full range of maximum laboratory density standards which represent significantly differing soil characteristics of the clay soils in use on this project. A graph of the maximum laboratory dry density plotted with the corresponding in-place dry density for each test is given in Figure #2. Note that for three compacted fill density tests (1469, 1494 and 1498) taken within a few feet of each other and at the same elevation, two significantly different maximum laboratory densities were used as the compaction standard by the same U. S. Testing technician.
4. Testing during removal of the subject fill was conducted by U. S. Testing in accordance with Bechtel direction and Specification 7220-C-203 requirements. A summary of test data and results is given in Table #2. The results of compacted fill density tests taken during subject fill removal confirm dry density values taken during initial fill. Bechtel modified proctor tests taken during fill removal in three locations (one at the north and south edges of the fill and one approximately in the center) confirm that the maximum laboratory dry density was uniform as the appearance of the material indicated. In addition, the subsequent testing indicates the value of maximum laboratory dry density was between 130.5 lb./ft.³ and 133.1 lb./ft.³. From these test results it is apparent that the lower maximum laboratory dry density standards selected during the original fill testing were not appropriate. As shown in Table #2, this error resulted in actual compaction in the range of 33.1% to 90.5% of optimum for three areas of the subject fill, a substantial deviation from the 95% of optimum compaction required by Specification 7220-C-203.

In conclusion, the U. S. Testing Company failure to report deviations from specified compaction requirements which was the result of repeated erroneous selection of compaction standards by U. S. Testing Company employees represents a violation of the Specification 7220-C-203, Section II, requirements, and U. S. Testing Company is therefore liable for costs associated with the subsequent failure of the fill. Such costs include but are not limited to the cost of removal and investigation of the original beam and its supporting fill in addition to all replacement costs which amounts to a total of \$134,600.00. An outline itemizing these costs is provided as Attachment #2 of this letter.

We trust U. S. Testing Company, Inc. will fulfill its contractual obligations with respect to this matter in a timely manner.

Very truly yours,



D. F. Newgen

JFN/CWC/JB/djs

Attachments

cc: P. A. Bechtel
T. C. Cooke
R. Hernston
P. A. Martinez
J. Speltz

DENSITY

MOISTURE

STATION COUNT	COUNT ONE		COUNT ONE	
	COUNT TWO		COUNT TWO	
	COUNT THREE		COUNT THREE	
	COUNT FOUR		COUNT FOUR	
	TOTAL		TOTAL	
	AVERAGE COUNT	426	AVERAGE COUNT	403

AREA: \$ ADMEN, BLUD.

IDENTIFICATION	TEST NUMBER				
	DATE OF TEST	9/22/77	9/22/77		
	STATION OR LOCATION	0.4 PA	0.4 PA		
	OFFSET FROM CENTERLINE	E. EDGE	W. EDGE		
	ELEVATION	613	613.0		
	DEPTH OF TEST	6"	6"	6"	6"
	ZONE NUMBER	1	1		

DENSITY	DENSITY COUNT	460	433		
	COUNT RATIO (DENSITY)	1.080	1.093		
	WET DENSITY #/Fc ³	138.5	144.5		
	TOTAL DENSITY DRY #/Fc ³	118.7	127.5		

MOIS.	MOISTURE COUNT	336	290		
	COUNT RATIO (MOISTURE)	2.19	1.720		
	MOISTURE FROM MANUAL CHART #/Fc ³	19.2	17.6		
	MOISTURE %	16.7	13.3		

DATA	PROCTOR CURVE NUMBER	BMP-270	BMP-269		
	MAXIMUM DENSITY #/Fc ³	124.6	127.3		
	OPTIMUM MOISTURE %	11.1	10.0		
	% DENSITY REQUIRED	95%	95%	95%	95%
	MOISTURE TOLERANCE REQUIRED				
	% FIELD DENSITY	95.7	101.6		
	P=PASS F=FAILURE	F-M	F-M		
	RETEST	NO	NO		
AREA OF TEST	PLANT	PLANT			

REMARKS: INFO ONLY
 CAUGE NO. 2932
 JERRY MORRIS NOTIFIED OF RESULTS 9/22/77 @ 10:00 By R.S.
 CHECKED BY: SEE

TESTED BY

APPROVED BY

STANDARD CO	DENSITY		MOISTURE	
	COUNT ONE	432	COUNT ONE	430
	COUNT TWO	431	COUNT TWO	428
	COUNT THREE	434	COUNT THREE	442
	COUNT FOUR	429	COUNT FOUR	431
	TOTAL	1726	TOTAL	1731
AVERAGE COUNT	432	AVERAGE COUNT	433	

IDENTIFICATION	AREA:				
	TEST NUMBER				
	DATE OF TEST	9/19/77			
	STATION OR LOCATION	2' E. SIDE OF FUTURE 2' S. OF N. SIDE NK 0.4 Mp 0.4 PA 0.4			
	OFFSET FROM CENTERLINE	SIDE OF ADMIN. BULD. BERM ADMIN. BULD.			
	ELEVATION	622	622	622	622
	DEPTH OF TEST	6"	6"	6"	6"
	ZONE NUMBER	1	1	1	1

DENSITY	DENSITY COUNT	529	464	478	447
	COUNT RATIO (DENSITY)	1.225	1.074	1.106	1.035
	WET DENSITY #/Fc ³	130.0	139.0	137.0	141.5
	TOTAL DENSITY DRY #/Fc ³	108.5	119.2	117.5	121.7

MOIST.	MOISTURE COUNT	381	338	350	353
	COUNT RATIO (MOISTURE)	.880	.781	.808	.815
	MOISTURE FROM MANUAL CHART #/Fc ³	21.5	18.8	19.5	19.8
	MOISTURE "	19.5	15.7	16.6	16.2

DATA	PROCTOR CURVE NUMBER	BMP-218	BMP-270	BMP-262	BMP-262
	MAXIMUM DENSITY #/Fc ³	117.04	124.6	123.9	123.9
	OPTIMUM MOISTURE %	15.2	11.1	11.8	11.8
	% DENSITY REQUIRED	95%	95%	95%	95%
	MOISTURE TOLERANCE REQUIRED	± 2%	± 2%	± 2%	± 2%
	% FIELD DENSITY	92.7	95.7	94.8	98.2
	P= PASS F=FAILURE	F-HD	F-M	F-HD	F-M
	RETEST	NO	NO	NO	NO
	AREA OF TEST	PLANT	PLANT	PLANT	PLANT

REMARKS: GAUGE NO. 2932

INFO ONLY
SOIL REMOVED

R Smith

TESTED BY

APPROVED BY
CHECKED BY *EC*

7220 MIDLAND 1A2
CPC6

(To be Paid to ABC Co.,
Overseas Citicorp.)

TAKOFF BR/OH. APPROVED
PRICED BR/OH. DATE 1-6-78

QUANTITY	UNIT	UNIT COST		MATERIAL	LABOR	TOTAL	TOTAL COST
		MAT'L	L/C				
3,100	SF	1.73		5,270	15,810	21,080	
14	T	340		4,760	3,570	8,330	
380	LB	0.80		300	4.10	710	
1105	CY	36.00		5,940	5,200	11,140	
585	CY	33.00		19,310	2,530	21,840	
610	CY	2.10		12,800	5,760	18,560	
SIT DIRECT							
DISTRIBUTABLES (ESTIMATE)							
MANUAL LABOR @ 30% DIRECT LABOR							
NON-MANUAL @ 35% (W/ L.A. 10%)							
MATERIAL @ 20% DIR. LABOR & MATERIAL							
S/TOTAL DIRECT							
S/TOTAL							
SOIL TEST BORINGS							
DATE 30 SEPT 77 AMMUND INTL							
ON FILL CONC							
ION TEST'S ON ABOVE SAND FILL							
TOTAL							
ROUND OFF							
TOTAL							

Summary of Compacted Fill Density Test Data

for

Administration Building Original Fill

(Tests Grouped by General Area and Date of Test)

TEST NO.	DATE TAKEN	TESTED BY	LOCATION	ELEV.	IN-PLACE DRY DENIS.	MAX. LAB. DRY DENIS.	% COMP.	REMARKS
911	5-23-77	SM	2' N. of N. Steam Tunnel Wall - 25' W. of Turb. #1	614.5	133.1	132.9	100.2	Pass
914	5-24-77	SM	2' N. of Steam Tunnel Wall - 50' W. of Turb. #1	614.6	125.7	123.9	101.5	Fail - Moisture (Too Dry - 9%)
1403	6-3-77	RS	4' N. of N. Wall Steam Tunnel - 15' W. of 1.0	621.5	111.0	116.0	95.7	Pass
1404	6-3-77	RS	5' N. of N. Wall Steam Tunnel - 24' W. of 1.0	623.0	115.7	121.0	95.6	Fail - Moisture (Too Dry - 10%)
1362	5-27-77	SM	10' N. of Steam Tunnel - 4' E. of E. Side	615.5	114.2	117.0	97.6	Pass
1422	6-8-77	BS BT	8' E. of E. Steam Tunnel - 24' N. of N. Steam Tunnel	622.0	117.7	123.9	95.0	Pass
1491	6-13-77	BG	8' S. of Hk line - 4' E. of E. Steam Tunnel Wall	617.0	115.2	127.3	90.5	Fail - Comp.
1494	6-15-77	RS	8' S. of Hk line 4' E. of E. Steam Tunnel Wall	617.0	118.2	117.0	101.0	Pass - Retest Clears 1469, 1
1498	6-15-77	RS	8' S. of Hk line 3' E. of E. Steam Wall	617.0	112.2	127.3	88.2	Fail - Comp.
1491	6-15-77	BT	8' E. of E. Steam Tunnel Wall - 46' N. of N. Steam Tunnel Wall	618.0	113.0	127.3	88.3	Fail - Comp.
1517	6-16-77	BT	5' E. of E. Steam Tunnel Wall - 60' N. of N. Wall	620.0	119.7	123.0	96.6	Pass
1519	6-16-77	BT	8' E. of E. Steam Tunnel Wall - 48' N. of N. Wall	618.0	124.0	127.3	97.4	Pass - Retest Clears 1491
1492	6-15-77	BT	38' W. of 1.0 - 5' N. of N. Steam Tunnel Wall	626.0	116.2	127.3	91.3	Fail - Comp.
1518	6-16-77	BT	38' W. of 1.0 - 5' N. of N. Wall	626.0	122.7	127.3	96.4	Fail - Moisture
1519	6-16-77	BT	38' W. of 1.0 - 5' N. of N. Wall	626.0	122.7	127.3	96.4	Pass - Retest Clears 1492, 15

Summary of Test Data and Results

for

Fill Below Original Beam at 0.4 Line

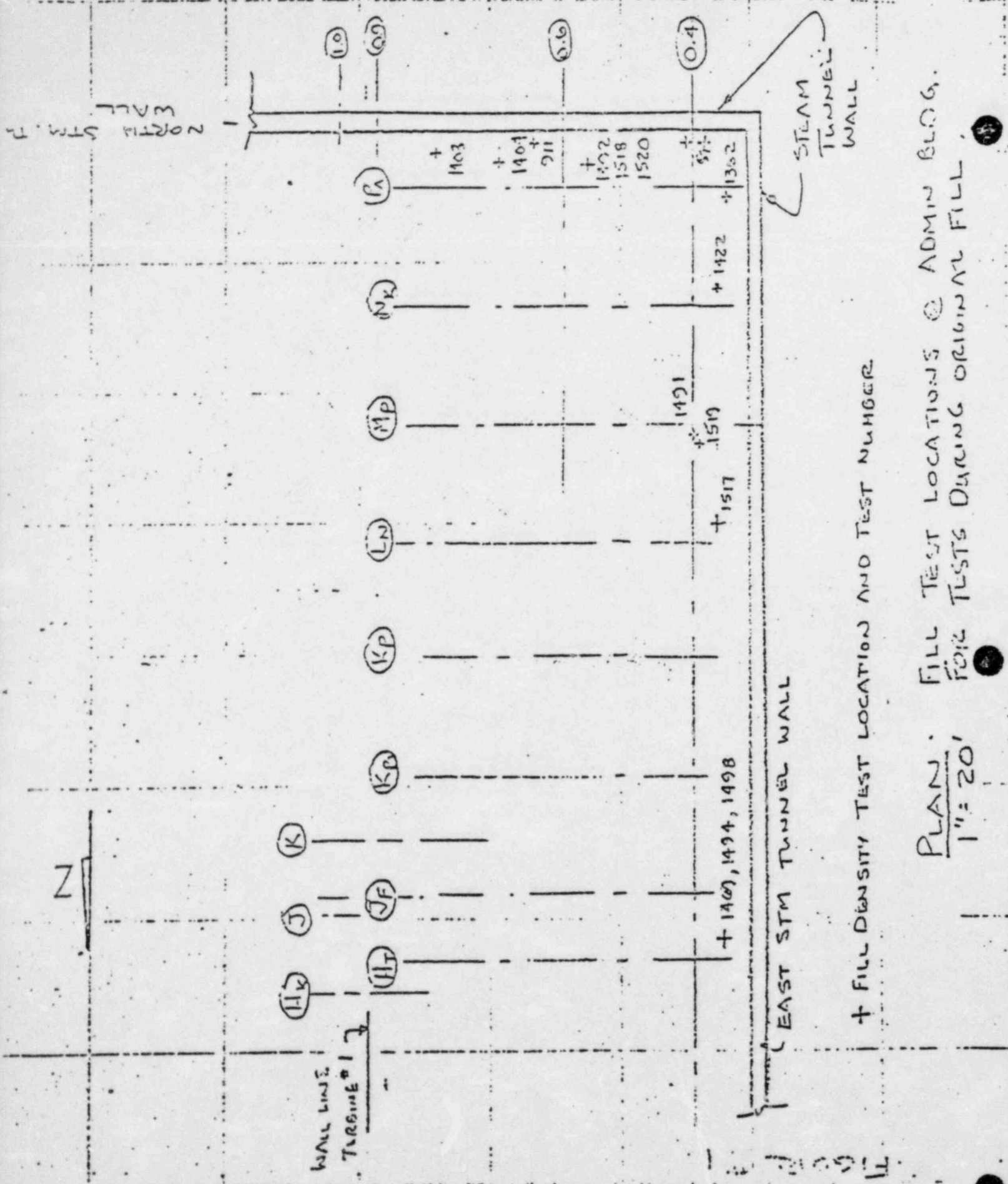
Administration Building (All Tests by U. S. Testing)

DESCRIPTION OF TEST	ELEVATION OF TEST	TEST RESULTS AT COLUMN HT	TEST RESULTS AT COLUMN LN	TEST RESULTS AT COLUMN PA
1. Initial Compacted Fill Density Test	617' ±	In-Place Dry Density = 118 lb./ft. ³ Test No. .494	In-Place Dry Density = 119.7 lb./ft. ³ Test No. 1517	In-Place Dry Density = 114.2 lb./ft. ³ Test No. 1362
2. Proctor Selected by U.S.T. Technician for Item No. 1 Tests	617' ±	BMP - 278 Max. Lab. Dry Density = 117 lb./ft. ³	BMP - 262 Max. Lab. Dry Density = 123.9 lb./ft. ³	BMP - 278 Max. Lab. Dry Density = 117 lb./ft. ³
3. In-Place Proctor After Beam Removal	617' ±	BMP - 300 Max. Lab. Dry Density = 132.2 lb./ft. ³	BMP - 299 Max. Lab. Dry Density = 133.1 lb./ft. ³	BMP - 298 Max. Lab. Dry Density = 130.5 lb./ft. ³
4. Reported Z Compaction	617' ±	101%	96%	97.6%
5. % Compaction Using In-Place Proctor	617' ±	89.3%	89.9%	87.5%
6. Compacted Fill Density Tested After Beam Removal	617' ±	*Dry Density = 119.7 lb./ft. ³	1p & 0.4 Dry Density = 117.5 lb./ft. ³	Dry Density = 108.5 lb./ft. ³
7. Z Compaction Using In-Place Proctor & Dry Density Taken After Beam Removal	617' ±	90.5%	88.3%	83.1%

*Average of Three Tests at This Location

Note Code:

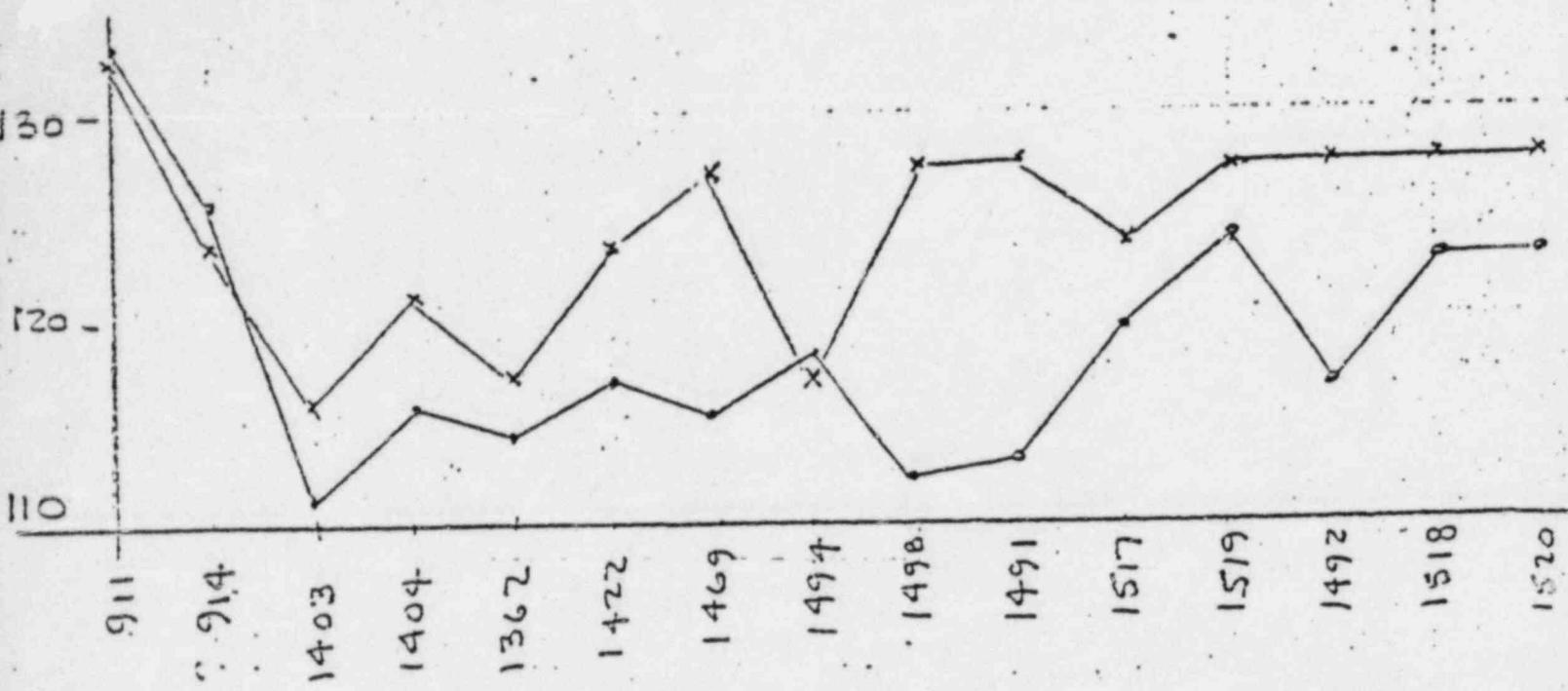
- A. Test Results do not include failing tests which were cleared by retest
- B. Reported % Compaction during initial fill compaction
- C. Actual % Compaction calculated using Item No. 1 tests divided by Item No. 3 proctor information
- D. Tests taken after footing removal were not numbered by U.S.T., and were submitted for information only to Bechtel. Copies of reports are included as Attachment No. 1



+ FILL DENSITY TEST LOCATION AND TEST NUMBER

PLAN: FILL TEST LOCATIONS @ ADMIN BLDG.
 FOR TESTS DURING ORIGINAL FILL
 1" = 20'

FILL NO. "2"



COMPACTED FILL TEST NUMBER

x-----x MAX. LAB. (PROCTOR) DRY DENSITY SELECTED BY THE U.S. TESTING TECHNICIAN DURING ORIGINAL TESTING OF COMPACTED FILL

o-----o IN PLACE DRY DENSITY TAKEN DURING COMPACTION OF ORIGINAL FILL



Consumers
Power
Company

TCC

Midland Project: P.O. Box 1963, Midland, Michigan 48640 - Area Code 517 631-0951

August 25, 1978

Mr. J. F. Newgen
Bechtel Power Corporation
P. O. Box 2167
Midland, MI 48640

MIDLAND PROJECT GWO 7020 -
DIESEL GENERATOR BUILDING SETTLEMENT
file: 0130 Serial: 3369

On August 21, 1978, we were notified of the excessive settling of the Diesel Generator Building and the generator foundations. Inasmuch as these items could fall under the provisions of Article 9 of the Bechtel Power/Consumers Power Company contract regarding defective work (Engineering and Construction), we request that there be a separate account set up for all additional work done in this area concerning this settlement.

In your response to this letter, please include what effect this will have on the scheduled completion and turn over of this building.

T. C. Cooke
Project Superintendent

TCC/DES/bd

