

Midland

Questions for Davison's Deposition

(January 14-15, 1981)

11  
January 7, 1981

8408210421 840718  
PDR FOIA  
RICE64-96 PDR

## SUMMARY OF QUESTIONS

- HIS INVOLVEMENT IN JOB (OVERALL)
- HIS RECOMMENDATIONS FOR UNDERPINNING OF VARIOUS STRUCTURES
- DIESEL GEN BUILDING
  - BEFORE SURCHARGE, DURING SURCHARGE, SURCHARGE REMOVAL, BLDG CRACKS EVALUATION
  - ACCURACY OF SETTLEMENT DATA
  - UTILITY CONNECTION TO BLDG + SEWERAGE
  - SAFETY OF PIPES + CONDUITS
- WATER SERVICE PUMP STRUCTURE
  - GENERAL DETAILS OF UNDERPINNING
  - STATUS OF PILE LOAD TEST
  - SAFETY OF UTILITIES
  - PILING LEAKS EVALUATION
  - SEISMIC ANALYSIS
- TECH SPEC FOR PILES + CONCRETE
- TANK FARM
  - CRACKS OF RING GIRDELS
  - CONNECTION OF VALVE PIT & RING GIRDE
  - PIPING
- AUX BLDG
  - GENERAL DETAILS OF UNDERPINNING

- Is it correct that you have been retained by Bechtel Corporation as a consultant on Midland job.
- Since when?
- What has been your involvement on this project before December 1979.
- What other projects have you been involved in with Bechtel, as a consultant to Bechtel.
- Besides teaching and research at the University of Illinois, and other professional and private activities, how much time have you had at your disposal, say in 1980, for consultancy work.
- Of the time available to you last year for consultancy, what percentage of time did you devote for Bechtel projects including Midland.
- Over the last several years (say five), what percentage of your consultancy work came from Bechtel (dollar amount percentage)?
- Specifically, how much time you have devoted to Midland project consultancy work in 1980.
- How many site visits you made to Midland last year? Other site visits?
- How many meetings have you attended with Bechtel or Consumers or NRC that involved Midland project. Any other meetings on this subject. Phone calls? Any other communications?
- What documents have you received regarding Midland.
- Is it a fair statement that you have not been able to spend sufficient time on Midland to know all the details about all problems at Midland site? Or have you?
- Specifically, what is the scope of work for Midland that you are required to perform under contract with Bechtel?
- Is there any specified minimum amount of time that you are required to spend on this project under the terms of the contract.
- If Bechtel depended totally on you for a review of the underpinning effort at Midland, would you be willing to give it priority over your teaching and research work at U of I.
- Have you submitted any written reports or any other documents on Midland. Provide copies to NRC.

- LIST ALL STRUCTURES THAT SHOULD BE, WITH THE EXCEPTED STRUCTURES ARE ON FILL.
- OF THESE STRUCTURES, HOW MANY, IN YOUR OPINION, NEED REMEDIAL MEASURES.

• I <sup>WILL</sup> MENTION THE STRUCTURE NAME, AND I WOULD LIKE FOR YOU TO TELL ME THE LEVEL OF INVOLVEMENT THAT YOU HAD <sup>AS A CONSULTANT IN EVALUATING THE PROBLEM</sup> ALREADY <sup>FOR THE STRUCTURE</sup> INVOLVED. <sup>CONTRACTS & DESIGN</sup> ANY OTHER INVOLVEMENT THAT YOU HAD FOR THE PROPOSED REMEDIAL MEASURE OR UNDERWAY.

1. LITTON GENERAL BUILDING
2. SERVICE WATER MAINS STRUCTURE
3. SERVICE WATER STORAGE TANKS
4. ELECTRICAL PENETRATION DETAILS (AXIUM)
5. FEEDWATER ISOLATION VALVE FITS
6. DIESEL OIL STORAGE TANKS
7. UNDERGROUND
  - a) service water pipe lines
  - b) Sewer water pipe lines
  - c) Diesel Oil pipe lines
  - d) ELECTRICAL CUST BANKS

DIESEL GENERATOR BUILDING

- WERE YOU INVOLVED IN THE DECISION TO SURCHARGE THE DGB.

BEFORE SURCHARGE PLACEMENT

- WERE YOU AWARE THAT DGB HAD SHOWN SEVERAL CRACKS AND UNDERGROUND UTILITIES HAD UNDERGONE LARGE DIFFERENTIAL SETTLEMENTS.

TO YOUR KNOWLEDGE, WAS THERE ANY REASON TO BELIEVE THE SURCHARGE MAY WIDEN AND UTILITIES MAY DEFORM OR BE DAMAGED AS A RESULT OF SETTLEMENTS THAT THE BUILDING COULD BE DAMAGED AS A RESULT OF SETTLEMENTS.

- IF YES, HOW WERE YOU ADVISED.

- IF NO, WHY NOT.

Draft of NCAR 24, Interim Report 4, dated February 16, 1979 (Inside copy - page 3).

(EXHIBIT 1)

- "As of February 2, 1979, the maximum recorded crack width in diesel generator building, is approximately 28 mils, or approx 3 mils larger than what was first recorded December 5, 1978."
- Were you notified of this development.
- When did you find out that cracks are opening up as a result of surcharging.
- Did you anticipate this before start of surcharge program.
- To your knowledge, was there any criterion for crack widths, extent or length of cracks for DGB, that would have indicated unsafe conditions for the building.
- Have you recommended development of a criterion for other structures that are being planned to be underpinned in the future.

- HAVE YOU HAD ANY INPUT IN THE DESIGN ANALYSIS OF DGE.
- IN VIEW OF THE FACT THAT MANY OF THE CRACKS APPEAR TO BE CAUSED BY SHEAR, AND FORM POTENTIALLY WEAK SURFACES, DID YOU <sup>EVER</sup> RECOMMEND THAT STRUCTURAL SAFETY BE INVESTIGATED INCORPORATING THESE CRACKS IN THE MODEL OF DGE STRUCTURE WHEN SLICING LOADS EFFECTS ARE EVALUATED.
- IF NOT, WHAT WAS THE REASON FOR NOT INVESTIGATING THE CRACKS.

#### SURCHARGE REMOVAL

- WERE YOU INVOLVED IN THE DECISION TO REMOVE THE SURCHARGE LOAD FROM DGE.
- TO YOUR KNOWLEDGE, WHO ELSE RECOMMENDED THE TIMING OF SURCHARGE REMOVAL.
- ~~AS~~ AS AN EXPERT, DO YOU THINK IT WOULD HAVE BEEN <sup>OR WOULD</sup> BETTER IF SURCHARGE HAD STAYED <sup>IN THE</sup> A LONGER PERIOD <sup>OR TIME</sup> THAN IT <sup>ACTUALLY</sup> DID. OR WHY?
- ISN'T TRUE THAT DECISION TO REMOVE THE SURCHARGE WAS BASED MORE ON ~~ON~~ <sup>THE</sup> SCHEDULE OF PROJECT THAN TECHNICAL JUSTIFICATION.
- DID YOU REVIEW THE SETTLEMENT DATA AND PIEZOMETER DATA BEFORE SURCHARGE REMOVAL.

- ABOUT THE DATA
- TELL ME WHAT DATA YOU RECEIVED BEFORE DECISION WAS MADE FOR SUSPENSION OF PERSONAL.
  - IS THAT ALL THE DATA YOU RECEIVED?



SETTLEMENT MONITORING

EXH # 2

Refer to Fig. 27-54 (for marker DG-6) EXHIBIT 2.

Would you indicate on Fig. 27-54 the period indicated on the note from 3/22/79 to 9/14/79?  
(Should indicate the time of 54 days and 230 days)

The note on Fig. 27-54 indicates temporary markers were used during this period to ESTIMATE settlement?

Could you explain for us the procedure that was used to estimate the settlement? (Ask for details such as the installation of the temporary markers, how monitored, how settlement curve for DG-6 was developed based on the temporary markers, etc.)

*D. reads on his explanation* ) Could the large rebound (> 1 inch) which is indicated on Fig. 27-54 - actually not be a rebound but a result of the procedure which used temporary markers to estimate settlement during this period?

*D. reads on his explanation* Don't you think it is highly unusual that the most IMPORTANT portion of the settlement versus log time curve for ALL the building settlement markers which you have based your position on for being in secondary consolidation - that this portion of the curve is actually based not on directly measured settlements but on temporary markers whose adequacy is questionable?

Section for Dr. H. H. H.  
A-7

## SETTLEMENT MONITORING

Isn't it likely that the method ~~with its inherent assumptions~~ used to estimate the settlement during this period is inadequate?

Aren't your conclusions on reaching secondary consolidation and <sup>your</sup> future predictions of settlement during plant operation BASED on the shape of the settlement curve during this period where you were not directly measuring settlement of these matters but rather estimating settlement by another method whose adequacy is questionable?

Doesn't the request of the COE & the UPC staff to take undisturbed samples and perform laboratory consolidation tests on plant fill foundation soils offer a reasonable way to resolve these questions?

EXH # (3)

Page 3 of the meeting notes dated August 7, 1979 (EXHIBIT 3)

- Do you recall making a statement that "we should look hard at connections of utilities to the diesel generator and the building and that allowance should be made for a maximum of one-foot movement in any direction."
- What kind of connection design did you have in mind for buried utilities that would have allowance of one-foot movement.
- Did you follow-up on your recommendation.

Effect of Settlement on Safety Related Pipes & Conduits.

Do you recall what safety related pipes and conduits are founded in the plant fill near and beneath the Diesel Generator Building? (Attempt to have Dr. Beck identify the types of pipes, diameter and approximate location - NRC attorney can refer to Table 17-1 & Fig. 17-1 )  
EXHIBIT 4 + 5

What is the range in elevation that most of the Category I pipe inverts were placed at?

Have the borros anchors shown this range of <sup>foundation</sup> elevation to be the most compressible?

Does this give you concern that important safety related pipes were initially installed in a compressible foundation material which condition was aggravated when the surcharge load was imposed? If not - why not?

Were laboratory consolidation test results available to Bechtel and you on plant fill material BEFORE the SURCHARGE was placed? (Answer - yes)  
Did you review <sup>these</sup> lab. results?

Was a prediction of settlement made before surcharging based on these lab results?  
If yes - what was that prediction? Who made it?

If no - Ask why no prediction was made?  
Refer to 50.54 f responses - Vol. 3, Tab. 12, pg. 3  
/ EXHIBIT 6

## Effect of Settlement on Pipes

B-2

What is the basis for this range of settlement from 6" to 18" that <sup>was</sup> given in December 1978?

~~Pursue~~ how did he arrive at these values? It can't be just off the top of his head.

Are you aware that this range of settlement resulted in Bechtel's decision to disconnect the condensate line between the DGB & turbine building?

What maximum settlement actually occurred under the surcharge? (Approx. 3 1/2")

What is his explanation for the large difference between his Dec. 1978 prediction and what actually took place?

In your professional opinion do you consider it good engineering practice to have estimated the amount of settlement which was going to occur along the safety related pipes and conduits before the surcharge load was imposed?

Answer will be No

Why isn't it necessary?

Isn't there a differential settlement limit beyond which structures and components will be overstressed? Answer - Yes  
But yet Bechtel elected to go through with the surcharging program without even knowing what limit of differential settlement would not be acceptable. Isn't that correct?

Do you know today whether the DGB and safety related piping and conduits have been overstressed because of the settlements which have occurred at the Midland project?

Do you know today of any tolerable limits of total and differential settlements which have been established for the DGB? for safety related piping & conduits?

Do you know of any practical means for measuring future settlement of safety related piping & conduits while the plant is in operation? What are they?  
When will this information be provided to the NRC?

Refer to Fig 19-1, Vol. 1 50.5 (f) responses  
What does Fig 19-1 show?

EXHIBIT 7

Can you describe for us the procedure and instruments used to establish these profiles?

Do you know the level of accuracy which is obtainable with the instruments which are used to profile the buried pipes?

How do you feel the safety of the DGB and safety related pipes & conduits have been improved by employing the surcharge program?

Did surcharging reduce the amount of settlement?

## Effect of Settlement on Pipes

(2-1)

Didn't surcharging actually increase the amount of total and differential settlement as reflected by your settlement markers and plates?

In your opinion, did surcharging increase or decrease the level of induced structural stresses on the buried conduits & pipes? On the DGB?

Do you have an opinion as to the extent of cracking which could develop in the DGB structure and still permit the DGB to operate safely?  
(Purse - length of cracks, frequency, width of cracks)

In your professional experiences do you know of any structures that have been subjected to the extent of cracking because of settlement of compacted fill that the DGB has experienced?  
Request involved structures w/ brief details.  
Were the structures abandoned or safely reconstructed?

- Have you reviewed the proposed underpinning program for water service pump structure?
- Would you draw a sketch of proposed modification.
- To your knowledge, who is designing the underpinning operation for the service water pump structure?
- What information would you generally need if you were to design an underpinning operation such as that at the service water pump structure. (Soil properties, structural configuration, loads, proximity to other structures that may interfere with the operation, load carrying capacity of piles etc).
- To your knowledge, are all the required data available.
- Have you satisfied yourself that the underlying natural soil to which piles will be installed will be able to provide sufficient bearing capacity for the piles.
- How did you satisfy yourself. What data or test results did you use.
- Are you familiar with any other project on which scheme similar to that being proposed for the service water pump structure has been used.
- While reviewing the underpinning program, did you ask for any additional information from Bechtel, or you felt that they had provided you everything you needed?
- Did you ask for any additional borings in the area, or any soil testing?
- Did you discuss with your client any alternate proposals for underpinning the service water pump structure.
- Why were these rejected.
- TO YOUR KNOWLEDGE, WHAT IS THE CURRENT STATUS OF PILE LOAD TEST PROGRAM AND UNDERPINNING PROGRAM FOR THIS STRUCTURE.



Exhibit - Page 3 of Interim Report 3 (EXHIBIT 8)

1. Are you aware that underpinning was considered as an option for diesel generator building also?
2. What was the reason for rejecting that option? for DGB.
3. Do you agree that underpinning the building would not minimize the settlement of the utilities during the operation of plant.
4. Have you advised "Consumers" on the possible remedy for assuring the safety of the utilities in addition to that of the structure in case underpinning option is used for Service Water Structure?

5. ARE YOU AWARE THAT THERE ARE UTILITY & SERVICE WATER PIPE LINES BEHIND AUXILIARY BUILDING AND CON STRUCTURE AND ALSO BEHIND DIESEL GENERATOR BUILDING AND CON STRUCTURE.

6. HAVE YOU BEEN ADVISED OF THE POSSIBILITY OF UNDERPINNING THAT AFFECTS YOU THAT THE SETTLEMENT OF THESE PIPELINES WITH THE CON STRUCTURE BLDG WILL NOT BE AFFECTED DURING UNDERPINNING.

Figure 62 of Interim Report 5 (EXHIBIT 9)

1. Do you know that service water pump structure has shown cracks throughout the building to this date. To your knowledge, has there been any analysis to insure safety of the structure in its present state, considering the long term?
2. How will the proposed underpinning operation affect these cracks?
3. During the underpinning operation, if cracks start deteriorating do you have a criterion suggesting that if cracks exceeded that limit (the number of cracks, width of cracks, extent of cracks), that you would be concerned about the safety of the building.
4. Do you consider it to be good engineering practice to suggest installing predrilled bearing piles adjoining a badly cracked building.
5. What kind of precautions have you come across in Bechtel's proposal that assures that building will not be damaged any further because of pile installation during underpinning operation.
6. Do you get all the documents on Midland, or you get selected documents?
7. Do you feel it to be important that in order for you to provide Bechtel with proper guidance, you should receive from them all the pertinent information in a timely manner.
8. What has been your experience so far on Midland project about receiving complete information in a timely manner.
9. Exhibit- Bechtel forwarded to you on March 25 Tech Spec No. 7220-C-94 (Q) for furnishing, testing and installing closed end piles. The memo says that they plan to install test piles within 2-3 weeks.

EXHIBIT 9

- Did they send you complete information. (concrete specifications were missing as shown on next exhibit). - (EXHIBIT 11)
- Pursue to determine why conc. spec. were not sent with the spec. (Negligence on Bechtel's part).
- Did they give you enough time to complete your review, while they were planning to go ahead with installation of test piles in 2-3 weeks.
- Is it conceivable in the future that Bechtel may have some vital information regarding the job and you may not be sent that information for review because they sent you only selected documents.

10. Recently, have you been involved in any job on which you were a consultant to the NRC.
11. Would you provide some kind of scrutiny on Midland as you provided when you were a consultant to the NRC.
12. There is a proposal that piles at the service water pump structure will be tested individually to 150 percent of the load, but there would be no proof loading of piles as a group. Do you agree with this recommendation?
13. It is proposed that caissons at the auxiliary building will be proof loaded. Why not the piles at the Service water pump structure be subjected to similar tests.

Same Set - Page 4 of Consultants Report

3

- In the report of June 28, 1979, you along with other consultants requested certain information.
  - How important was it for you to obtain this information from Bechtel for your evaluation of the underpinning program.
  - Did you obtain this information, when, in what form, did you use it in your evaluation of underpinning?
  - WHAT WAS THE RESULT OF YOUR EVALUATION OF THE INFORMATION?
  - Did you follow-up on your request for additional information.

Same Set - Last but one page

EXHIBIT 3

- Do you consider that underpinning the service water structure with driven piles and a corbel is a positive solution?
- What is the basis for such a conclusion.
- Have you reviewed the seismic analysis of the service water structure? Who performed the analysis? When did you review it? What is your impression of that analysis.
- Have you considered lateral drag forces that might be imposed on the SW Structure in the event of liquefaction of sandy soils under the service water pump structure.

Exhibit - Tech Spec for Furn, Install, and Testing Piles — EXHIBIT II

- To your knowledge, who prepared these specifications?
- When did you first see these specifications.
- Do you believe that after incorporation of your comments in these specifications, these specifications meet same or higher standard than your recommendations at Bailly.
- Article 7.3.8 - why did you recommend to delete the words "approximately 10 feet." Don't you think it to be important to specify the minimum depth of penetration of piles into the bearing stratum.
- Do you have a criterion specified in these Tech Spec for "Restarting of Pile Driving after a Delay." (It is recommended that the pile be driven to full penetration before restarting)
- Why did you recommend to delete the last line of Tech Spec 7.3.6.
- What is the criterion for selecting the piles for load test. (Nitrogen or a full penetration test will affect selection process)
- Splice in test pile (section 5.1) - Since test pile will eventually be used as Production Pile, splice in upper 20 ft should not be allowed. Comment? (Splice is potentially weak and corrosion susceptible).
- To your knowledge, has the applicant made settlement estimates for the SW structure after the piles are installed.
- Did you recommend that such as estimate be prepared. When or why not? Results?
- In your Tech Spec, shouldn't THERE BE A SECTION ON STRAIGHTNESS OF PILES. (1/2 in. in 10 ft, 1/2 in. in 20 ft)
- Also on Allowable Plumbness (1/2 in. in 10 ft) over the entire length.

EXHIBIT 12 2 13

- DO YOU RECALL HAVING REVIEWED THE CONCRETE SPECIFICATIONS FOR MIDLAND JOB.
- EXHIBIT G - IS THIS THE INDICENT YOU REVIEWED WHO PREPARED THESE SPECIFICATIONS.
- YOUR COMMENT ON THESE SECS WAS THAT "WE CANNOT REASONABLY MEET SECT 11.5 AND SECTION 11.6. THIS SHOULD BE CLARIFIED". WHAT WAS YOUR COMMENT BY "THIS SHOULD BE CLARIFIED".
- IS THERE NO WAY YOU CAN MEET THESE SPECIFICATIONS
- HOW IMPORTANT IS IT TO MEET THESE SPECIFICATIONS BEING LISTED MORE THAN 5 FT. WHAT WAS THE INTENT OF NOT FOLLOWING THE SECTION <sup>11.5</sup> SPECIFICATION.
- DONT YOU THINK THAT BY NOT FOLLOWING THE SPEC, YOU WILL BE INTERFERING WITH THE ULTIMATE STRENGTH OF CONCRETE.
- IS IT POSSIBLE THAT YOU MAY CREATE VOIDS IN THE CONCRETE BY NOT FOLLOWING THIS SPECIFICATION
- THEN WHY DID YOU INDICATE INABILITY TO MEET SECTION 11.5 OF SPEC.

- HOW IMPORTANT IT IS THAT CONCRETE BE ADEQUATELY VIBRATED. WHAT WAS THE INTENT OF WRITING SECTION 11.6 OF THE SPEC.
- DON'T YOU THINK THAT BY NOT FOLLOWING SPEC 11.6 YOU WILL BE COMPROMISING WITH THE ULTIMATE STRENGTH OF CONCRETE.
- IS IT POSSIBLE THAT IF CONCRETE IS NOT VIBRATED ACCORDING TO SECTION 11.6, THERE MAY BE VOIDS IN THE CONCRETE.
- THEN WHY DID YOU INDICATE INABILITY TO MEET SECTION 11.6 OF SPEC.

- DO YOU KNOW IF YOUR RECOMMENDATIONS WERE FOLLOWED. DID YOU HAVE ANY FURTHER DISCUSSIONS ABOUT THESE WITH ANYBODY AFTER YOU MADE YOUR RECOMMENDATIONS ABOUT IMPLEMENTATION OF YOUR RECOMMENDATION.



## TANK FIRM

- ARE YOU AWARE THAT THERE ARE TWO CAT. I BOARED WATER STORAGE TANKS ON FILL.
- WOULD YOU <sup>CONFIRMATION</sup> DESCRIBE THE FOUNDATION & OF THESE TANKS.  
(TANKS ARE SUPPORTED ON CHISEL CONCRETE PIER FOUNDATIONS ENDING IN STRIP FOOTING) ON FILL
- IS IT TRUE THAT THE RING GIRDERS HAVE SHOWN CRACKS POSSIBLY BECAUSE OF DIFFERENTIAL SETTLEMENT OF FILL.
- IS IT TRUE THAT THE CAT. I BOARDS VALVE LINES ENTER THE TANK THROUGH VALVE PITS, AND THESE VALVE PITS ARE CONNECTED TO THE RING GIRDERS.
- WHAT KIND OF REMEDIAL MEASURES HAVE BEEN PROPOSED FOR TANK FOUNDATION + VALVE PITS.
- IN THE EVENT OF UNEVEN SETTLEMENT HOW THE SAFETY OF <sup>THE</sup> PIPE CONNECTION TO THE TANK IS ASSURED.
- ARE YOU AWARE OF THE SETTLEMENT OF THE PIPES <sup>PIPING</sup> & BETWEEN BOARED WATER STRUCTURE AND THE AUXILIARY BUILDING.
- ARE YOU AWARE OF ANY STATIC OR SEISMIC ANALYSIS OF THESE STRUCTURES + PIPING.

AUXILIARY BUILDING — ELECTRICAL PENETRATION  
AREAS — UNIT 1 + 2 + 3

- Have you reviewed the proposed underpinning program for ~~water service pump structure?~~ AUXILIARY BUILDING?
- Would you draw a sketch of proposed modification.
- To your knowledge, who is designing the underpinning operation for the ~~service water pump structure?~~ AUXILIARY BUILDING?
- What information would you generally need if you were to design an underpinning operation such as that at the ~~service water pump structure, Aux BLDG.~~ (Soil properties, structural configuration, loads, proximity to other structures that may interfere with the operation, load carrying capacity of ~~piles etc.~~ CAISSONS etc.).
- To your knowledge, are all the required data available.
- Have you satisfied yourself that the underlying natural soil to which ~~piles~~ <sup>CAISSONS</sup> will be installed will be able to provide sufficient bearing capacity, ~~for the piles.~~
- How did you satisfy yourself. What data or test results did you use.
- Are you familiar with any other project on which scheme similar to that being proposed for the ~~service water pump structure~~ <sup>AUX BLDG</sup> has been used.
- While reviewing the underpinning program, did you ask for any additional information from Bechtel, or you felt that they had provided you everything you needed?
- Did you ask for any additional borings in the area, or any soil testing?
- Did you discuss with your client any alternate proposals for underpinning the ~~service water pump structure.~~ AUX BLDG.
- Why were these rejected.
- TO YOUR KNOWLEDGE, WHAT IS THE CURRENT STATUS OF ~~THE~~  
~~UNDERPINNING PROGRAM FOR THE AUX~~  
~~BLDG.~~

Meeting notes dated October 3, 1980 - Page 2

- EXHIBIT 14
- In the meeting notes prepared by Mr. Brunner it is stated that "Davisson felt that additional borings would be useless and misleading". Is it a true statement of your feelings. Do you still feel that way?
  - Why did you feel that additional borings would be useless and misleading. How could borings mislead you.
  - DO YOU RECALL THAT IN THE SAME MEETING, MR. KANE OF NSC STATED (EXHIBIT 14) THAT THERE IS A CHANCE THAT THE NUMBER OF CAISSONS HAVE BEEN UNDERESTIMATED BECAUSE OF SPACE LIMITATIONS IN THE AREA. HOW DO YOU JUSTIFY USE OF ONLY 9 CAISSONS FOR ELECTRICAL PENETRATION AREA.
  - IN YOUR JUDGMENT, HOW THE NEGATIVE SKIN FRICTION HAS BEEN ACCOUNTED FOR WITH YOUR FEEL YOU NEED SOME SORT OF TESTING TO ACCOUNT FOR ACCOUNT FOR NEGATIVE SKIN FRICTION.

## LIST OF EXHIBITS

1. DRAFT OF MCAR 24 (ISSUED 9/7/78) INTERIM REPORT 4  
- FROM DOCUMENTS PRODUCED BY T. R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80
2. FIGURE 27-54, FROM 50.54(f) RESPONSE, VOL 2.
3. DRAFT OF MEETING NOTES FROM TC COOKE/RMW  
DATED AUG 6, 1979 "GENERAL MEETING WITH  
CONSULTANTS - FROM DOCUMENTS PRODUCED BY  
T. R. THIRUVENGADAM FOR DEPOSITION 12/11/80
  
- 4+5 TABLE 17-1 and FIGURE 17-1  
FROM 50.54(f) RESPONSES, VOLUME 1
  
6. MEETING NOTES - DATED DEC 12, 1978  
FROM 50.54(f) RESPONSES, VOLUME 3, TAB 12, PAGE 3.
  
7. FIGURE 19-1  
FROM 50.54(f) RESPONSES, VOLUME 1
  
8. MCAR 24, INTERIM REPORT 3, PAGE 3 - 10CFR 50.55(e)  
INTERIM REPORTS
  
9. MCAR 24, INTERIM REPORT 5, FIGURE 62 - 10CFR 50.55(e)  
INTERIM REPORTS
  
10. COPY OF LETTER FROM SS AFIFI TO MT DAVISSON DATED 3/25/80  
FROM DOCUMENTS PRODUCED BY T. R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80

LIST OF EXHIBITS (CONTL)

- 11 LETTER FROM MT DAVISSON TO SSAFIFI DATED  
3/29/80. ATTACHED IS TECH SPEC<sup>NO. 7220-C-94(Q)</sup> DRAFT WITH  
MTDAVISSON'S COMMENTS ON SPECIFICATIONS.  
— FROM DOCUMENTS PRODUCED BY T.R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80
- 12 LETTER TO SSAFIFI FROM MT DAVISSON  
DATED 4-15-80  
— FROM DOCUMENTS PRODUCED BY T.R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80
13. COPY OF DRAFT TECH SPEC NO. 7220-C-94(Q)  
— FROM DOCUMENTS PRODUCED BY T.R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80
- 14 MEMO TO FILE FROM JE BRUNNER, DATED  
OCT 3, 1980  
— FROM DOCUMENTS PRODUCED BY T.R. THIRUVENGADAM  
FOR DEPOSITION 12/11/80.

### Questions of Dr. Peck on His Testimony

Refer to page 2, Dr. Peck's response to Item 1 in Stamiris supplement to Contention 2

Are there detrimental effects, <sup>that could occur</sup> as well as beneficial effects when you surcharge a nearly completed, <sup>rigid concrete</sup> structure such as the conditions which existed at the Diesel Generator Building?

If answer is yes - ask

What are the detrimental effects? (answer should include causing the structure to crack, causing <sup>uneven settlement and</sup> distortion of pipes and conduits placed in the fill which were compressing under the surcharge, causing non-uniform settlement, <sup>of the structure</sup> because of highly variable foundation soils with widely varying compressibility characteristics

If answer was no - ask <sup>which of the DGB walls has exhibited the most</sup> To your knowledge - did cracks <sup>develop</sup> widen and new cracking develop when the surcharge was placed? If he indicates yes, but not to a point of concern - ask how he decides when cracking becomes a concern? If he indicates this is a structural concern, ask if CPCO structural people had made an analysis or knew during surcharging what extent of cracking was harmful?

Does CPCO know at this time whether the extent of the cracking of the DGB exceeds limits permitted by building codes? If yes, ask basis (e.g. analysis) & whether this has been submitted to the NRC?

Did the surcharging cause settlement and bending of the pipes and conduits within the surcharged area? To what extent?

Has the settlement of the DGB been uniform? What locations and to what extent has there been non-uniform settlement?

In your years of experience have you ever encountered a reinforced concrete structure which was founded on a compacted fill with the extent of cracking that the DGB has?

7/25/81  
2 of 5

### Questions of Dr. Peck (cont.)

Refer to page 3, Dr. Peck's response to Item 2 of Staminis Supplement Contention 2

- Can you explain for us what are the complexities in measuring piezometers when the soil is only partially saturated?  
(Answer should indicate piezometers would not give an accurate measurement of pore pressure since it would not be capable of measuring the pore air-pressure)
- So for piezometer measurements to be meaningful - the zone of soil being measured should be saturated - is that correct?
- Knowing the foundation conditions which exist beneath the DGB - is it possible that the piezometer readings were being influenced more by the pressures in the ~~soil~~ <sup>upper</sup> layers than by the more compressible clay layers which were only partially saturated at the time of surcharge and pond raising?

Did you ever have a concern, <sup>at any time</sup> in your work on Midland that the fill soils were placed dry of optimum moisture and that these soils may become compressible when eventually saturated by seepage developing off the pond?  
(Answer should be yes - that is why pond was raised)

So the concern related to the <sup>time of</sup> pond raising is not just restricted to having the tip of the piezometer below the water level - it also is related to causing the foundation soils above the piezometer tip up to the foundation level of E1.628 to become saturated from pond seepage - is that correct?

If the foundation soils of the DGB were only partially saturated at the time of surcharge - what settlement behavior could we expect when the surcharge load was applied?  
(Answer should indicate there would be <sup>an</sup> immediate compression or settlement as the ~~air pressure~~ <sup>air</sup> ~~gas~~ would be compressed and a volume decrease would result. Eventually the air pressure and pore water pressure would come to an equilibrium. With further consolidation under loading - the pore water pressure would decrease and the ~~air~~ <sup>air</sup> ~~gas~~ pressure would increase. This effect, due to partial saturation, causes the RATE of CONSOLIDATION to be less than if

7/25/81  
345

the material were saturated.)

~~If partial saturation causes a lower rate of consolidation under loading -~~

Could the <sup>settlement & piezometer</sup> behavior which was monitored at Midland - the rapid consolidation and <sup>then</sup> the low rate of consolidation - the low levels <sup>of pressure</sup> which the piezometers reached could these be indicating the surcharged foundation soils were only partially saturated?

---

Peck Testimony - Pg. 3

What would prevent the groundwater levels beneath the DCB from reaching a stable elevation if the maximum pond level were held for a long period of time

---

Refer to pg. 4, Dr. Peck's response to Item 3 of Stamiris Supplement Contention 2

Does your statement that the NRC "had no logical technical basis for believing secondary consolidation had not been achieved" refer to some time frame such as August 15, 1979 or December 6, 1979?  
(Anticipate answer will be no - even true at this time)

~~What technical information is important when measuring the effectiveness of the surcharge program?~~ <sup>and evaluating</sup>



Answer should include:

- The magnitude <sup>of</sup> and the manner in which the surcharge load is applied
- Piezometer readings
- Settlement readings

Did the piezometer readings rise to levels which you had anticipated prior to placing the surcharge load?

(Answer should be no - refer to 50.54(f) responses, Vol 4, Feb, 75 \*  
 in evaluating the piezometer data - how did you separate out the effect of the rising cooling pond from the excess pore pressures caused by the ~~and the amount of settlement~~ surcharge loading?

Did surcharging cause the magnitude of settlement that you had estimated prior to placing the surcharge load? \*

(Answer should be no - refer to 50.54(f) responses, Vol 3, Feb 12, p. 3)

~~Do you know what information had been provided to the NRC by Consumers prior to Dec. 6, 1979 with regards to piezometer and settlement records?~~

~~If answer is no - ask, wouldn't the lack of piezometer and settlement data which was available to you but not to the NRC Staff - be a logical technical basis for the Staff not to be able to conclude that secondary consolidation was reached? he is not certain.~~

~~If answer is yes - ask what records to his knowledge were provided to the Staff. (Answer will indicate piezometer & settlement records were provided but there were typical records and not the complete set of data which was eventually furnished in~~

In your opinion would it be good engineering practice to compute, before applying surcharge to a completed concrete structure, the maximum differential settlement or the extent of cracking which if exceeded, would be indicative of the structure or piping is being overstressed and there is a need to stop or modify the surcharge program?

Was there unusual behavior of certain piezometers which ~~with~~ you and ~~Dr. Hendrick~~ were unable to explain in your depositions in January of this year? (Answer should be yes - refer to pg. 74 of Jan 13, 1981 deposition (Peck))

The Staff therefore disagrees with your statement of "no logical technical basis" when in fact:

1. The piezometer behavior was not as anticipated.
2. The amount of settlement which actually occurred under the surcharge load was significantly less than estimated.
3. There was unusual piezometer behavior which could be interpreted as excess pore pressure.
4. There are reasonable doubts, because of the timing for raising the pond, that the DGB foundation soils were fully saturated at time of surcharge placement.

Dr. Peck have you read Mr. Kane's testimony that provides the NRC Staff response to Item 3 in Stamiris' supplement to Contention 2?

Do you have an opinion as to what reasonable acceptance criteria ~~would~~ <sup>should</sup> be for the DGB? for the seismic cat. II piping and conduits beneath the DGB?

Could reasonable acceptance criteria mean establishing maximum limits of differential settlement which if exceeded, would produce stresses in the ~~structures~~ <sup>DGB and in the pipes and conduits</sup> above these stress limits allowed by building codes?

If answer is yes - ask were these limits established before placing the surcharge?

If answer is no - does that mean ~~we~~ <sup>consumer</sup> were going to accept whatever the surcharge load inflicted on the DGB and piping and conduits and attempt to show that these structures were acceptable ~~after~~ <sup>no matter what</sup> ~~the~~ <sup>had</sup> ~~been~~ <sup>been</sup> ~~applied~~ <sup>applied</sup> ~~to~~ <sup>to</sup> ~~them~~ <sup>them</sup> ~~in~~ <sup>in</sup> ~~advance~~ <sup>advance</sup>?

12/84

Records requested from folders maintained  
by Joseph Kane entitled, "Deposition  
of Dr. Gould Dr. Davison";  
"Mixed - Deposition".

INDEX OF DR. DAVISSEON'S DEPOSITION

<u>Category</u>	<u>Sheet No.</u>
Involvement - Past and Future	1, 2
Comments on NRC	3
Important Statements w/Regards to Dates and Availability of Information	4
Bechtel's Procedure for Installing and Testing Piles @ SW Structure	5, 6, 7, 8
Pile Design	9
Midland - Bailly Comparisons	10
Comments on Other Structures (DGB, Elect. Penetrat. Area, Feedwater Isolation Valve Pits)	10
Davisson's Knowledge on Cracking and Piping	11
Comments on Request for Borings	12

Subject: Summary of Dr. Davisson's Deposition

Involvement - Past and Future

<u>Page</u>	<u>Line</u>	
9	18	Began in Spring 1979. Reason - To look at support for SW structure
10	17	Bechtel gave him no instructions or advice in meeting NRC
11	5	requirements or regulations
14	11	Now share responsibility of underpinning work for AUX. Bldg. w/others
16	11	Spent 10 full days in 1979. Includes review of info from borings and lab program
18	20	Spent 10 days in 1980. Spent 2 days in 1981 (day before and day of deposition)
23	6	In two year period - never gave written report. Gives advice which Geotech incorporates in memos and minutes of meeting.
24	3, 7	Davisson does not do design details. He recommends possible approaches to problem. Bechtel evaluates approaches, determines feasibility. Interaction w/Davisson required.
24	21	Not responsible for structural details of how pile is connected to structure.
40	20	On his concern for pile design - has been addressing them and expects to continue in future.
42	24	Expects to do consulting for Afifi in future - one aspect would be method of installation (Pg. 126, line 12).
64	10	Was not his job to study low blow counts and effect on compressibility, low shear strengths and liquefiable materials.
65	22	No responsibility for impact of underpinning on adjacent safety related piping (e.g., settlement)
69	4	Not responsible for evaluating effect of stress cracks on structure integrity.
72	16	Not responsible for criteria if cracking should develop in reaction to underpinning. Is project's structural responsibility.

<u>Page</u>	<u>Line</u>	
79	11	Expects to be involved w/Q-A assurance manual (procedures).
81	6	Either Davisson or his representative expects to be involved in monitoring the pile installation and testing.
89	23	Responsible for load carrying capacity and portions of deflections for piles under seismic loads.
90	10	Davisson does not have criteria on deflection of piles under seismic. His responsibility is to furnish information on pile stiffness under certain conditions. Bechtel projects is responsible for establishing deflections.
122	3	Corbel design is not his responsibility. It is Bechtel's project structural area.
128	13	Not involved w/decision to surcharge DGB.
128	19	Was not aware DGB had cracks before surcharging or of concern to widen cracks.
129	6	Not involved in decision to remove surcharge from DGB.
136	3	Not aware of settlement problem w/borated water tanks.
144	19	Uncertain of his future responsibilities in reviewing details proposed by contractor for electrical penetration area and feedwater isolation valve pits.

Summary of Dr. Davisson's Deposition (Cont.)

Comments on NRC

<u>Page</u>	<u>Line</u>	
11	18	Cat. I structures must function for "doomsday" requirements (earthquake, tornado)
12	3	along w/normal structure design requirements
53	22	Magnificantly overdesigned SW structure-combination bomb shelter and pill box.
54	11	SW structure is new and designed for "doomsday" type loadings
62	4	Under "doomsday" loadings.
106	18	Discusses check that representation to NRC about re-driving piles be made.
109	3	"Spoonfeeding the NRC" - refers to resolving details of load transfer system which in real world could be left to subcontractor.
110	1	Unhappy w/NRC requirements. Are unreasonable.
110	3	Unhappy spectacle of regulation by lower-level NRC employee. Bad taste
111	1	Requirements would not have been imposed if NRC higher level had decided.
113	5	No use for borings that are being imposed.
114	7	Boring request is an indefensible position. Just using brute force.
115	17	Davisson has trouble with competence of COE as NRC consultant. Based on boring request that came forward.
117	24	Does not know NRC requirements for pilings at Midland

Summary of Dr. Davisson's Deposition (Cont.)

Important Statements w/Regards to Dates and Availability of Information

<u>Page</u>	<u>Line</u>	
39	23	Based on December 1980 meeting, it appears there is now a better definition of pile loads.
45	25	Bechtel is in process of refining final design of piles (As of Deposition Date 1/14/81).
73	5	On March 25, 1980 Afifi transmits tech specs to Davisson (Is Exhibit 3) for furnishing, installing and testing closed end pipe piles for service water structure.
79	14	QA procedures w/respect to installation of piling do not exist as of 1/14/81.
94 95	22 7	Recent information on seismic load to be resisted by piles came to Davisson in December 1980.
96	7	Chen transmits revised tech specs to Davisson on 12/8/80 (Is Exhibit 6).
118 119	20 7	Davisson in fall of 1980 reviewed settlement estimate of piles at SW structure.
124	8	OPEN question (as of 1/14/81) needing resolution - how many installed piles can be concurrently pretested - Depends on reaction that the structure can withstand.



Summary of Dr. Davisson's Deposition (Cont.)

Bechtel's Procedure for Installing and Testing Piles @ SW Structure

<u>Page</u>	<u>Line</u>	
43	6	What are concerns on installing piles? Davisson - need procedure that is consistent with an acceptable load test to have assurance piles will have capacity after being driven - this is a QC procedure.
44	8	How would you test the pile to demonstrate load capacity.
47	also 2	Pile is driven, filled w/concrete, build deadload reaction above it (platform w/weights) insert hydraulic jack between platform and pile, use jack to apply load, observe settlement by various means, record pile settlement vs. time and load history.
45	1	How far will piles be driven into till? To a practical or refusal criterion for the hammer-cushion pile system - probably 20 blows/inch final driving resistance.
45	8	Davisson had someone make determination on driving criteria - this is basis for 20 blows/inch.
46	21	Procedure to be employed to avoid damaging walls of SW structure - predrilling.
47	8	Pile Load Test to be conducted, not in final location, but at adjacent representative nearby location (within 50 feet).
48	5	Pile Load Test will include both live load and seismic load.
48	13	Pile Test will be run to determine negative skin friction. Pile to go thru fill and stop at till. Test to be Pull Out to determine ultimate uplift load which will be used as measure of negative skin friction.
79	24	Piles at service water structure to be tested individually to 150% of the load.
80	1	No group loading of piles is contemplated.
87	14	Contractor who drives piles will be looked to as author of QA-QC operation in conjunction w/Bechtel procedures. Considerable effort will be needed.

Summary of C. Davisson's Deposition (Cont.)

Bechtel's Procedure for Installing and Testing Piles @ SW Structure (Cont.)

<u>Page</u>	<u>Line</u>	
96	7	Davisson's comments on current tech spec draft dated 12/8/80 from Chen
97	9	Is not final draft.
98	13	Project is reworking draft of tech spec. Several comments @ meeting on proposed December 1980 draft included:
101	23	Writer of spec lacked knowledge on operation of hammer - For example valve mechanism.
104	5	Incorrect to indicate in draft that rigid leads extend 2 feet above where pile enters ground since driving will be from top of SW structure.
104	15	A ridiculous requirement to limit handling stress to 21,000 psi
105	2	Davisson recommended against using bitumen to reduce negative friction because a "great deal of care" needed to install piles w/bitumen - Prefer to Eat load.
107	11	Need to correct percentage anchor piles in load test would take (from 300% to 100%).
107	22	Correct wording on pullout test - pile driven only in fill, not fill.
108	14	Need to rewrite paragraph on transferring load (109, 3 Spoonfeed NRC).
120	5	Need to revise spec since limit of six foot drop (Section 11.5) and vibration (Section 11.6) can not reasonably be met.

Summary of Dr. Davisson's Deposition (Cont.)

Bechtel's Procedure for Installing and Testing Piles @ SW Structure (Cont)

<u>Page</u>	<u>Line</u>	
122	22	Step by step procedure for underpinning SW structure.
123	4	Pile requirements as of mid-December 1980 are to have a compression ultimate test load = 300 tons.
123	8	300 ton load made up of net usable load of 270 tons plus 30 tons negative skin friction allowance. 270 ton load arrived at by having total load of 180 tons (includes earthquake) times 1.5 safety factor = 270 tons.
123	11	Factor of safety = 1.5 is consistent w/Bailly.
123	14	Several pile sections under consideration for 300 ton load. Both 14" and 16" and varying wall thicknesses (Pg. 41, line 3 need cross sectional area of steel to drive for needed load capacity).
123	18	Piles would be predrilled to till (approx. elev. 600).
123	19	Piles fabricated to length to stick up in air pass roof line so that leads in hammer can be operated above structure.
123	24	Drive piles to bearing in till.
124	2	Cut piles at elevation suitable for working below corbel.
124	5	Construct corbel in meantime and concrete piles.
124	6	Preload piles and pretest before fastening into the structure.
124	10	Unsure at present on how many piles can be pretested concurrently - depends on reaction that SW structure can make available. Obviously can not pretest all 16 piles or would tilt structure out of the ground.
124	13	Object of preloading - apply a series of load coupled w/a series of hold intervals on these piles.
124	23	Talking in terms of 210 ton load and cycling load several times. Then will hold load (perhaps 210 ton) constant and observe settlement versus time until relationship of settlement versus time develops that reasonable engineering can extrapolate in the future.

Summary of Dr. Davisson's Deposition (Cont.)

Bechtel's Procedure for Installing and Testing Piles (Cont.)

- 125      5      After test, pile will be Locked Off at a predetermined load into the structure. Purpose of preloading and cycling is to get rid of creep and consolidation deflections before the pile is locked off. This occurs for all 16 piles.
- 125      12      Whatever Bechtel structural details are needed for covering the heads of the piles will then be constructed.
- 125      16      Explain process of jacking in and locking in. Corbel (really pile cap) is in place.
- 125      21      Set of details have to be designed to allow insertion of jack and jacking of load against pile cap in manner that shim plates, spacers and shims can be inserted and welded in place before load is released from jacks.
- 126      2      Part of the control technique for effecting load transfer is to be able to observe the differential displacement between pile and gap and observe at what point a given load is attained. One can shim until upon release of the jacks this differential displacement is attained. Once attained, it can be welded in position and locked off final. (See Exhibit 8).
- 141      22      It will take several months to transfer the load to the piles.

Summary of Dr. Davisson's Deposition (Cont.)

Pile Design

<u>Page</u>	<u>Line</u>	
42	19	Now in stage where they need to drive a pile and load test and verify design assumptions. Load test is final determining factor on adequacy.
52	3	Structural group of project has ultimate responsibility for design of underpinning.
52	12	Dames and Moore original investigation at Midland gives information on till into which the piles will be driven.
52	20	Information Davisson used from Dames and Mocre report was description of till, results of SPT (exceeded 100 blows), his experience w/similar material on other projects.
139	1	Calculations establishing pile capacity have little value - these theories will result in a fairly wide variety of answers out of a group of competent engineers - full knowledge of fact that this is state of the art and best information will be obtained from tests.
139	19	If lab strength test were to be run - would you make test on soil in undrained or drained condition? His method of installation, as described, <u>clearly</u> provides you with a drained condition for each and every pile.
141	8	In the event of earthquake will condition of soil at pile tip be undrained? Yes - pardon me, take that back. It would be drained or at least on a reload.
141	16	What will cause soil to be drained? The method of installation and pretesting, longtime hold. I mean, for certain it will have been preconsolidated to 210 ton load and anytime it now exceeds 180 ton we will see it at least on reload or recycle.

Summary of Dr. Davisson's Deposition (Cont.)

Midland-Bailly Comparisons

<u>Page</u>	<u>Line</u>	
116	4	In your opinion are NRC requirements in Midland - do they exceed the requirements for Bailly?
117	16	First of all, they are different projects for different purposes. However, Davisson has been assuming the requirements would reasonably be consistent. He has not
118	5	heard that NRC has said what the requirements would be.
117	24	He does not know what NRC requirements are for pilings at Midland

Comments on Other Structures (DGB, Elect. Penet. Area, Feedwater Isolation Valve Pits)

<u>Page</u>	<u>Line</u>	
128	13	Not involved in decision to place surcharge in DGB area
129	8	Not involved in decision to remove surcharge.
129	22	Davisson's professional judgment is time that preload was left on is adequate for future projection of settlement.
131	19	Davisson judgement that secondary consolidation was reached under surcharge is based on shape of settlement versus log time curve.
143	9	At what stage is the development of the remedy for the Electrical Penetration Area?
143	21	He and Mueser-Rutledge are waiting for a little more definition what might be doing.
144	9	Specs have been developed and technique worked out between Gould and project and sent for bids.
144	15	Some details are to be contractor designed details - so design is not finished. Still a lot of work.
144	21	Davisson doesn't know if his responsibilities will include review of contractor details. Discussion with project on that matter has not been held yet.

Summary of Dr. Davisson's Deposition (Cont)

Davisson's Knowledge on Cracking and Piping

<u>Page</u>	<u>Line</u>	
31	12	He is unaware of any cracks requiring analysis. If cracks existed the analysis would be done by Bechtel's project.
33	15	Eliminating shrinkage cracks - it is his opinion that it would not be difficult to analyze reinforced concrete structure for stress cracks.
72	2	Expects jacking of pipe piles will close stress cracks that resulted from settlement of the cantilevered portion of SW structure.
65	8	He is unaware of pipes running under the SW structure.
65	21	Expects negligible effect on pipe settlement due to impact of underpinning.

Comments on Request for Borings

<u>Page</u>	<u>Line</u>	
58	2	Definitely don't need borings.
58	15	No conceivable use for additional borings at this point.
60	3	There is possibility one might find some use of information obtained from the borings in assessment of SW structure. Just not on table now.
114	10	Instead of borings - next piece of information requires is to drive some piles and run some blow tests and see what that provides us with. Much more useful than anything Mr. Kane could conceivably come up with.
133	18	In response to question 41:1 (page 136, line 12) Bechtel's reply does not serve a useful purpose (page 138, line 9) but a political purpose (line 13). Same foolishness as NRC request for borings.

At March 18, 1981 Deposition of J. Kane

Check  
w/D. Hood

Request from CPCc a copy of  
"Administration Building Foundation Settlement  
Along Column Line Point 4" (Oct. 1977)

SB13752



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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

NOTICE OF DEPOSITION

PLEASE TAKE NOTICE that pursuant to the January 29, 1981 order of the Atomic Safety & Licensing Board Consumers Power Company shall take the deposition on oral examination of the following named persons at the times, dates and locations indicated.

9:00 a.m.	Feb. 12, 1981	Maryland Natl. Bk. Bldg. 7735 Old Georgetown Rd. Bethesda, Md. 21202	John Gilray NRC Staff
9:00 a.m.	Feb. 13, 1981	Maryland Natl. Bk. Bldg. 7735 Old Georgetown Rd. Bethesda, Md. 21202	Harold Thornburg NRC Staff
9:00 a.m.	Feb. 17, 1981	NRC Region III 799 Roosevelt Rd. Glen Ellyn, Ill.	Kamalaker Naidu NRC Staff
1:00 p.m.	Feb. 17, 1981	NRC Region III 799 Roosevelt Rd. Glen Ellyn, Ill.	Gaston Fiorelli NRC Staff
9:00 a.m.	Mar. 18, 1981	Maryland Natl. Bk. Bldg. 7735 Old Georgetown Rd. Bethesda, Md. 21202	Joseph Kane NRC Staff

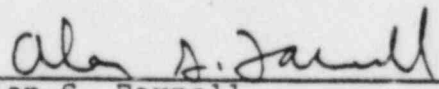
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Each deponent is requested to make available, prior to his deposition, the documents described in Appendix A of the Notice of Deposition dated September 22, 1980, as modified by agreement of the parties.

The subject matter of the depositions shall be matters, as limited by the January 29, 1981 order of the Atomic Safety & Licensing Board, relating to the issues set forth in the Order modifying Construction Permits, dated December 6, 1979 and the contentions set forth in the Appendix to the Prehearing Conference Order Ruling on Contentions and on Consolidation of Proceedings (October 24, 1980) and the contentions of Intervenors Marshall and Sinclair.

Sincerely,

  
\_\_\_\_\_  
Alan S. Farnell  
Counsel for Consumers Power Company

ISHAM, LINCOLN & BEALE  
One First National Plaza  
Suite 4200  
Chicago, Illinois 60603  
312/558-7500

bee

10/22/80

Bill,

The technical publication to which I referred to in my deposition hearing is:

"Design of Foundations for Control of Settlement"

American Society of Civil Engineers

Soil Mechanics and Foundations Division

Conference Held June 16-19, 1964 at Northwestern University

The title of this publication was requested by R. Zamarin, attorney for Consumers Power Company.

Joe Kane

~~provide~~ reference to surcharge program applied to structures substantial complete

reference used to understand surcharging & settlement problems

J. Kane  
Rec'd 9/25/80

*Handwritten notes in a circle:*  
16. Road  
19. 1/2  
Hord  
J. Kane  
Hypomania

ISHAM, LINCOLN & BEALE  
COUNSELORS AT LAW

ONE FIRST NATIONAL PLAZA FORTY-SECOND FLOOR  
CHICAGO, ILLINOIS 60603  
TELEPHONE 312-558-7500 TELEX 2-5286

WASHINGTON OFFICE  
1120 CONNECTICUT AVENUE, N.W.  
SUITE 325  
WASHINGTON, D.C. 20036  
202-633-9730

September 22, 1980

*Handwritten signature:*  
II  
Paton/Jones  
Olmstead  
FF

William D. Paton, Esq.  
Bradley Jones, Esq.  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear William and Bradley:

Per my telephone conversation with Bradley last Friday, enclosed are deposition notices for the individuals we have identified to date. Since the deponents' addresses are unknown to us, please forward a copy to each individual. We have enclosed copies for that purpose.

To the extent that the noticed dates are inconvenient we will make every effort to accomodate your schedule.

Thank you for agreeing to the notice procedure as this avoids the necessity of having to apply to the presiding officer for subpoenas. As I told Bradley, we will reciprocate and allow the notice procedure for Bechtel employees.

You will note that each deposition notice contains a request to produce documents. We would like to discuss any questions you may have regarding the scope of the request.

Sincerely,

*Handwritten signature of Ronald G. Zamarin*

Ronald G. Zamarin

RGZ:jp

~~8406070216~~

*Handwritten mark:* 1p

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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

NOTICE OF DEPOSITION

TO: Each person named in the attached Certificate of Service.

PLEASE TAKE NOTICE THAT Consumers Power Company shall take the deposition on oral examination of the following named persons at the times, dates and locations indicated.

9:00 a.m.	Oct. 7, 1980	Isham, Lincoln & Beale, Room 325 1120 Connecticut Wash., D.C. 20036	Darl Hood, NRC Staff
	<i>a.m. 7 MNBB 6507</i>		
	<i>p.m. 7 MNBB 7604</i>		
	<i>a.m. 8 MNBB 7604</i>		
1:00 p.m.	Oct. 8, 1980	Isham, Lincoln & Beale, Room 1120 1120 Connecticut Wash., D.C. 20036	Lyman Heller, NRC Staff
	<i>MNBB 640</i>		
1:00 p.m.	Oct. 9, 1980	Isham, Lincoln & Beale, Room 325 1120 Connecticut Wash., D.C. 20036	Joseph Kane, NRC Staff
	<i>MNBB 640</i>		
10:00 a.m.	Oct. 13, 1980 (To be changed) Changed to Oct. 14 @ 10 a.m. @ Detroit District Office	Isham, Lincoln & Beale, Room 4200 One 1st Natl. Pl. Chgo., Ill. 60603 <i>North Central Div. U.S. Army Corps of Engineers 536 So. Clark St. Chicago, Ill 60605</i>	James W. Simpson, Corps of Engineers Chief, Geot. Engr. Br. Engr. Div. North Central Division

NCD-ED-G

8009300023 Tpp

Hari Singh  
William Paton Chief Geotechnical Section  
Tech. Branch, Engineering Div.

Mail

U.S. Army Corps of Engineers  
Detroit District  
P.O. Box 1027  
Detroit, Mich. 48231

Office Location  
US Army Corps of Engineers  
Patrick McNamara Bldg.  
477 Michigan Ave.  
7th Floor  
Detroit, Mich. 48226

10:00 a.m.	Oct. 15, 1980	Dykema, Gossett, Spencer, Goodnow & Trigg, 35th Floor 400 Renaissance Ctr. Detroit, Mich.	William Lawhead, Corps of Engineers Asst. Chief, Technical Branch Engineering Division
10:00 a.m.	Oct. 16, 1980	Dykema, Gossett, Spencer, Goodnow & Trigg, 35th Floor 400 Renaissance Ctr. Detroit, Mich.	Ron Erickson, Corps of Engineers Geologist

Each deponent is requested to make available, five business days prior to his deposition, the documents described in the attached Appendix A.

The subject matter of the depositions shall be all matters relating to the issues set forth in the Licensing Board's Order of December 6, 1979, Order Modifying Construction Permits and the agreed to contentions of intervenors Stamiris and Warren.

Sincerely,

*Alan S. Farnell*

Alan S. Farnell  
Counsel for Consumers Power Company

ISHAM, LINCOLN & BEALE  
One First National Plaza  
Suite 4200  
Chicago, Illinois 60603  
312/558-7500

APPENDIX A

Definitions

The following definitions apply to the Request to Produce:

1. As used herein, "documents" includes, but is not limited to, papers, photographs, criteria, standards of review, recordings, memoranda, books, records, writings, letters, telegrams, mailgrams, correspondence, notes and minutes of meetings or of conversations or of phone calls, interoffice, intra-agency or interagency memoranda or written communications of any nature, recordings of conversations either in writing or upon any mechanical or electronic or electrical recording devices, notes, exhibits, appraisals, work papers, reports, studies, opinions, surveys, evaluations, projections, hypotheses, formulas, designs, drawings, manuals, notebooks, worksheets, contracts, agreements, letter agreements, diaries, desk calendars, charts, schedules, appointment books, punchcards and computer printout sheets, computer data, telecopier transmissions, directives, proposals, and all drafts, revisions, and differing versions (whether formal or informal) of any of the foregoing, and also all copies of any of the foregoing which differ in any way (including handwritten notations or other written or printed matter of any nature) from the original.

2. "Documents" refers to each document within the possession or control of the individual deponent as well as the possession or control of the organization by which said

deponent is employed or engaged (e.g., NRC Staff or Army Corps of Engineers).

3. The terms "relate to" or relating to" shall mean: consist of, refer to, reflect or be in any way logically or factually connected with the matter discussed.

4. The words "and," and "or" shall be read herein in the conjunctive or disjunctive or both, as the case may be, all to the end that the interpretation be applied which results in the more expansive production.

5. The term "soils matters at the Midland site" shall mean the issues set forth in the December 6, 1979 Order and all further related issues raised to date by the Staff and its consultants.

#### Request To Produce

Please make available to Consumers Power Company ("Consumers") for inspection and copying the following:

1. All documents referring or relating to the investigation conducted by Region III, Office of Inspection and Enforcement, referred to in the third paragraph of page 1 of the December 6, 1979 order.

2. All documents referring or relating to the assertion in the first full paragraph of the December 6, 1979 order that "This statement is material in that this portion of the FSAR would have been found unacceptable without further Staff analysis and questions if the Staff had known that Category I structures had been placed in fact on random



fill rather than controlled compacted cohesive fill as stated in the FSAR."

3. All documents referring or relating to the evaluation or consideration of the information submitted by Consumers in response to the (a) 10 C.F.R. §50.54(f) requests of the Staff, (b) soil settlement questions propounded by the Staff, (c) requests for additional information regarding plant fill, and (d) any other requests for information concerning the soils matters at the Midland site made by the Staff or its consultants and not encompassed by sections (a)-(c).

4. All documents referring or relating to each decision to seek initial information or supplemental information from Consumers pursuant to (a) 10 C.F.R. §50.54(f) requests, (b) soil settlement questions propounded by the Staff, (c) requests for additional information regarding plant fill, and (d) any other requests for information concerning the soils matters at the Midland site made by the Staff or its consultants and not encompassed by sections (a)-(c).

5. All documents referring or relating to the evaluation or consideration of the information with regard to the soils at the Midland site submitted by Consumers under 10 C.F.R. §50.55(e).

6. All documents referring or relating to the "review of the information provided by Licensee in response to the Staff questions," as that phrase is set forth in the first full paragraph of page 3 of the December 6, 1979 order.

7. All documents referring or relating to the Staff's position currently and at any time previously that the information provided by Consumers Company fails to provide "acceptance criteria" as that term is used in the December 6, 1979 Order, page 3.

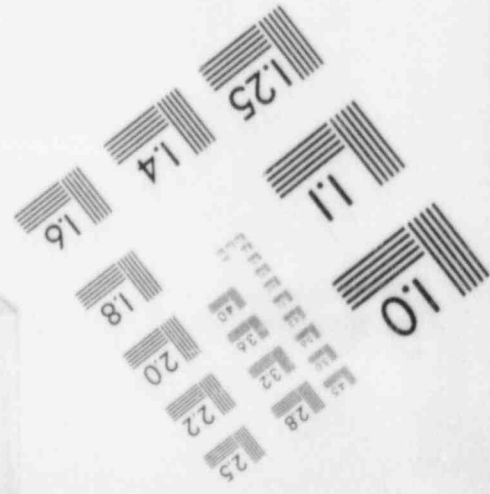
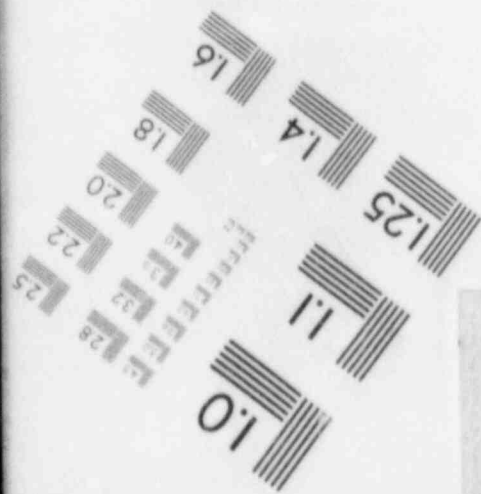
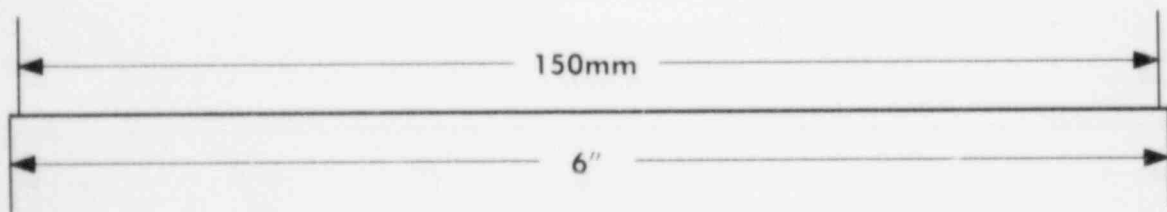
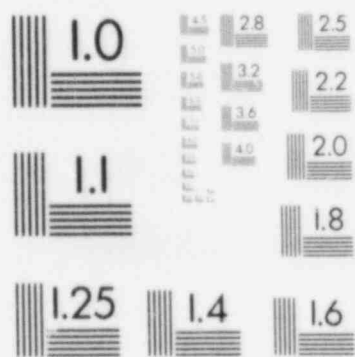
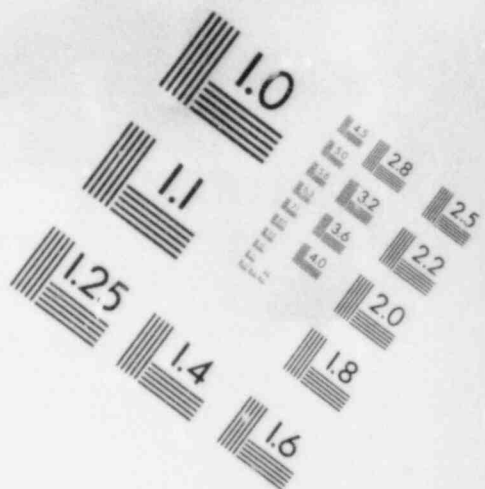
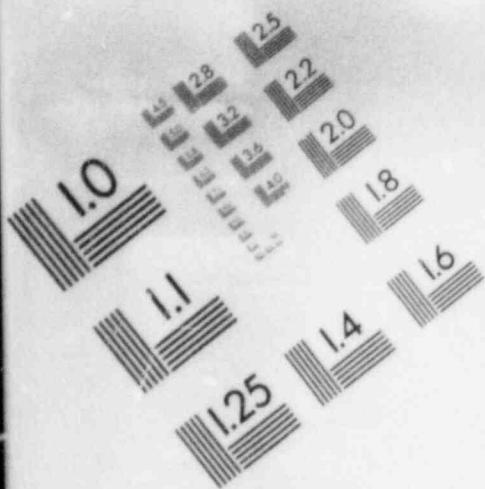
8. All documents referring or relating to the Staff's position currently and at any time previously that it cannot conclude that the safety issues associated with the remedial action taken or planned to be taken by Consumers to correct the soil deficiencies will be resolved.

9. All documents referring or relating to the Staff's position currently and at any time previously that it does not have reasonable assurance that the affected safety-related portions of the Midland facility will be constructed and operated without undue risk to the health and safety of the public.

10. All documents referring or relating to the Staff's decision to retain consultants in regard to the soils matters at the Midland site.

11. All documents referring or relating to any meetings or consultations, telephone communications or other communications between or among the identified deponent or to which he was a party or observer and anyone else, including without limitation, representatives of licensee, NRC Staff or others, with regard to or relating to the soils matters at the Midland site.

IMAGE EVALUATION  
TEST TARGET (MT-3)



12. All documents obtained by, provided to, or created by the deponent with regard to the soils matters at the Midland site.

13. All documents referring or relating to the decision to seek and the request for additional borings from Consumers, including any consideration or evaluation of Consumers' response thereto.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

\_\_\_\_\_  
In the Matter of )

CONSUMERS POWER COMPANY )

(Midland Plant, Units 1 and 2) )  
\_\_\_\_\_) )

) Docket Nos. 50-329-OM  
) 50-330-OM

CERTIFICATE OF SERVICE

I, Alan S. Farnell, hereby certify that a copy of Consumers Power Company's Notice of Deposition was served upon all persons shown in the attached service list by deposit in the United States mail, first class, this 22nd day of September, 1980.

*Alan S. Farnell*

\_\_\_\_\_  
Alan S. Farnell

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*Please arrange a conference room for 7 people for each of these 4 Days*

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

*11-5-80*

In the Matter of )  
 )  
CONSUMERS POWER COMPANY )  
 )  
(Midland Plant, Units 1 and 2) )

Docket Nos. 50-329-OL  
50-330-OL  
50-329-OM  
50-330-OM

*Paton Jones  
Olmstead  
FF*

NOTICE OF CONTINUATION OF DEPOSITIONS

PLEASE TAKE NOTICE that Consumers Power Company shall continue taking the deposition on oral examination of the following named persons at the times, dates and locations indicated.

*- Dec 3 Room P-422*

9:00 a.m.	Dec. 2, 1980	Maryland Natl. Bk. Bldg. 7735 Old Georgetown Rd. Bethesda, Md. 21202	Joseph Kane NRC Staff
	<i>(P-110)</i>		
9:00 a.m.	Dec. 4, 1980	Maryland Natl. Bk. Bldg. 7735 Old Georgetown Rd. Bethesda, Md. 21202	Lyman Heller NRC Staff

*2<sup>nd</sup> thru 5<sup>th</sup> (P-114)*

Sincerely,

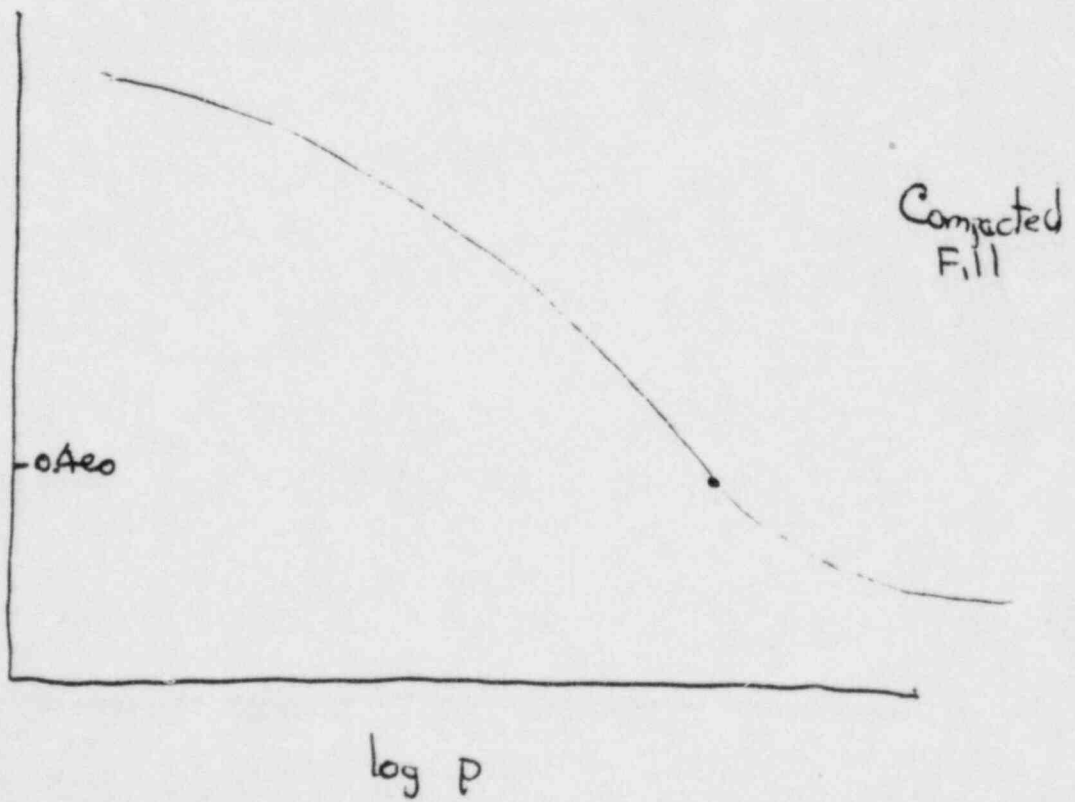
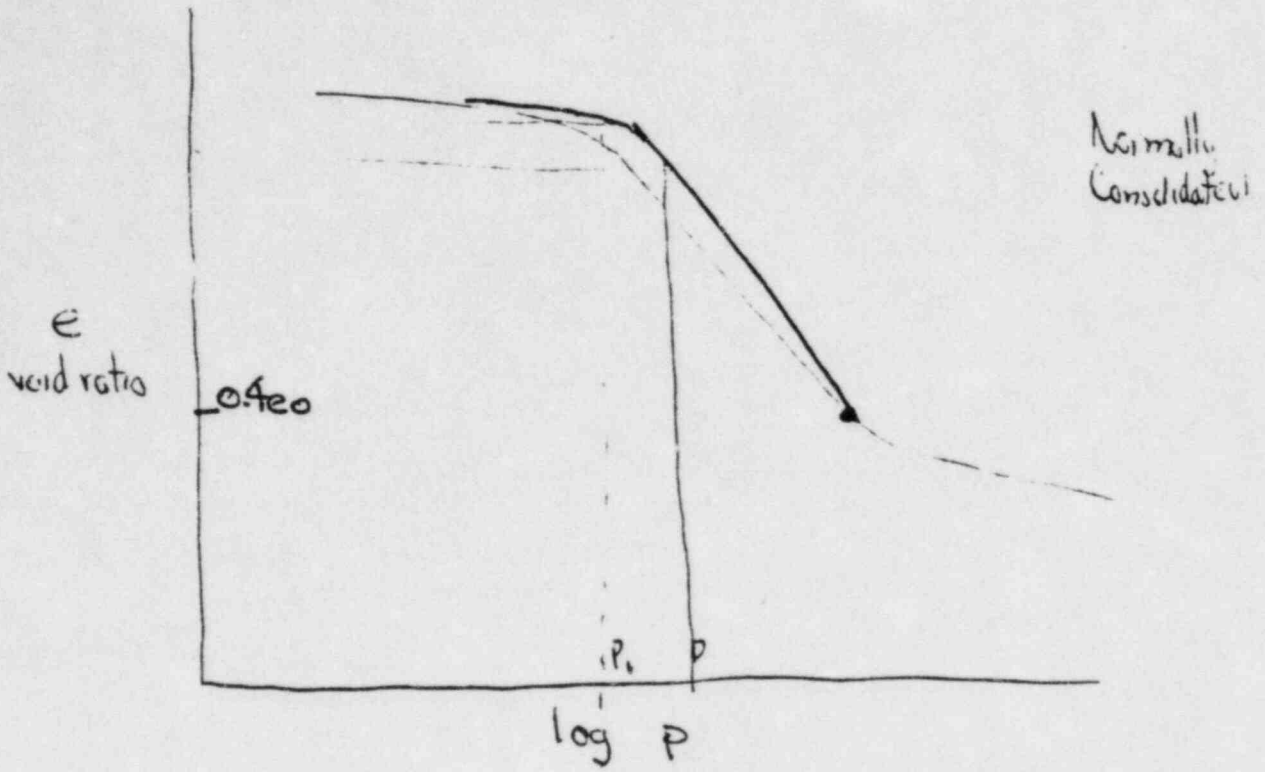
*Alan S. Farnell*  
Alan S. Farnell  
Counsel for Consumers Power Company

ISHAM, LINCOLN & BEALE  
One First National Plaza  
Suite 4200  
Chicago, Illinois 60603  
312/558-7500

*[Handwritten initials]*

*8011140047 3PP*

Consolidation Ex. 14 id  
12/2/80 (Kane)





Compare w/ J. Kane Exhibit # 19  
(5th Day of Deposition)

joint contact of long duration may create molecular intergranular bonds which are wholly absent in a remolded soil. Therefore, the relations between void ratio and pressure for remolded and undisturbed soils are likely to be different. They are discussed under separate subheadings.

**Compressibility of Crushed Minerals and Remolded Soils**

Typical  $e-p$  curves for various crushed minerals and remolded soils are shown in Fig. 13.2a, and the corresponding  $e-\log p$  curves in Fig. 13.2b. The effect of the shape of the grains on the compressibility of the grain aggregate is demonstrated by curves  $a$ ,  $b$ , and  $d$ , in Fig. 13.2a. Curve  $a$  corresponds to a mixture of 80% sand and 20% mica; curve  $b$  to 90% sand and 10% mica; and curve  $d$  to 100% sand. Each sample was initially compacted by rodding and vibrating (Gilboy 1928). These curves demonstrate that the compressibility increases greatly with increasing percentages of scale-shaped particles. Furthermore, Fig. 13.2a shows that the average slope of the curve  $d$  for dense sand is considerably flatter than that of curve  $c$  for the same sand in a loose state and that the void ratio of a loose sand, even under very great pressure, is greater than that of the same sand in a dense state subjected to no pressure.

Figure 13.2a also shows that the curve  $e$  corresponding to a remolded sample of a soft clay is very similar to that for a mixture of 90% sand

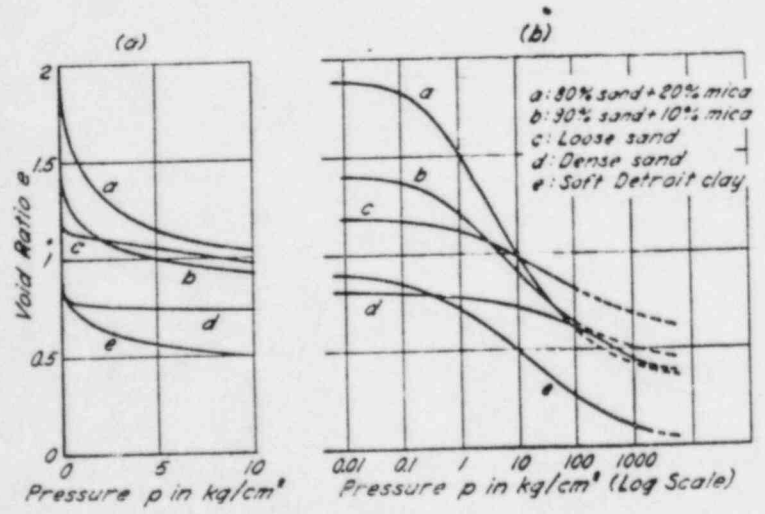


Fig. 13.2. (a) Typical  $e-p$  curves. (b) Corresponding  $e-\log p$  curves representing results of compression tests on laterally confined laboratory soil aggregates.

Subject - Record Sampling & Testing During Construction  
U.S. Army Corps of Engineers' Guidance

Vol. I  
pg. 54 - J. Kane's Deposition

References:

ER 1110-2-2300 (1 Mar. 1971)

"Fundamental Rock-Fill Dams, General Design & Construction, U.S. Army Corps of Engineers, Chapter 1, Construction

ER 1110-2-1725 (20 Aug. 1971)

"Field Control Data for Earth & Rock-Fill Dams

CHAPTER 7  
CONSTRUCTION

7-1. General.

a. The design of an earth or rock-fill dam continues until construction is completed. Much additional information on the characteristics of foundations and abutments is obtained during clearing, stripping, and trenching operations, which may confirm or contradict design assumptions based on earlier geologic studies and subsurface exploration by drill holes and test pits. Operations in the borrow areas and in required excavations also provide much data pertinent to characteristics of fill material and of excavated slopes. Weather and groundwater conditions during construction may significantly alter water contents of proposed fill material, or create seepage and/or hydrologic conditions, necessitating modifications in design. Sound knowledge, experience, and judgment are required in the field as well as in the design office. District and Division soils engineers and geologists should visit the construction site, particularly in the earlier construction stages, the duration of the visits being related to the complexity of the project. The performance of regularly scheduled inspections is one of the functions of the Divisions and Districts in accordance with ER 10-1-3, App. XIII, 1 May 1968, paragraph 1o and paragraph 3u. Emphasis is placed on these visits in paragraph 6 of General Cassidy's letter of 6 May 1969, subject: "Civil Works Construction Deficiencies," "With respect to our attack on this problem, I wish to stress again the essentiality of regularly scheduled, periodic visits to the project by senior engineers from both engineering and construction elements in District and Division offices. Due to the ever-present possibility of unforeseen developments, the design of a project cannot be considered complete until the project is finished. Thus, engineers familiar with the bases of design must be included in such visits to determine whether design modifications are required to meet the field conditions actually encountered. Division and District engineers should ensure that such visits by both engineering and construction elements are scheduled in advance and on a regular basis, and that there is a follow-up system to ensure that the schedules are met." The Resident Engineer's staff must be well informed on the various elements of the design and in basic considerations involved so that they can recognize any conditions developing during construction which necessitate reconsideration of certain design features.

b. Environmental considerations discussed in paragraph 1-8 must be given attention in construction operations.

c. Field construction control for earth and rock-fill dams is a

1 Mar 1971

complex subject embracing many aspects of foundation treatment and preparation, excavation, and fill operations. An Engineer Manual is being prepared on this subject, and only a few comments will be made here.

7-2. Visual Observations. Visual observations during all phases of construction provide one of the most useful means for controlling construction and assessing validity of design assumptions. It is not practical, for economic reasons, to perform enough field density control tests, to install enough instrumentation, and to obtain enough data from preconstruction subsurface explorations to ensure that all troublesome conditions are detected and that satisfactory construction is being achieved. While test data and instrument observations provide more detailed and quantitative information than visual observations, they serve principally to strengthen and supplement visual observations of the embankment and foundation as the various construction activities are going on. Field forces should be constantly on the alert for conditions not anticipated in the design, such as excessively soft areas in the foundation; jointing, faulting, and fracturing in rock foundations; unusual seepage; bulging and slumping of embankment slopes; excavation movements; cracks in slopes; and the like. It is particularly important to make observations during the first filling of the reservoir as weaknesses in a completed dam often show up at this time. Visual observations of possible distress such as cracking, the appearance of turbid water in downstream toe drainage systems, erosion or riprap, soft, wet spots downstream of the abutments or at the downstream toe or on the downstream slope, and other observations are important. Observations of instrumentation also yield valuable data in this respect.

7-3. Compaction Control.

a. Principal compaction control is achieved by enforcement of specifications relating to placement water content, lift thickness, compaction equipment, and number of passes for the various types of fill being placed. Experienced inspectors can quickly learn to distinguish visually the various types of fill materials to be placed, to judge whether the water contents are within the specified range for compaction, and to assess whether satisfactory compaction is being achieved. This ability is gained by closely observing the behavior of the materials during spreading and compacting operations.

b. A systematic program of field compaction control should be established and executed, involving determinations of in-place densities and water contents, and relating the results to specified or desired limits of densities and water contents. Special emphasis must be placed

in the compaction program on the need to obtain sufficient densities in each lift along the impervious core-abutment contact and in each lift on either side of the outlet conduit along the backfill-conduit contact to verify adequate compaction in these and other critical zones. If good correlations can be obtained between direct methods and nuclear moisture-density meters, the latter may be used to increase the number of determinations with a minimum increase in time and effort, but nuclear measurements cannot be used to replace direct determinations.

c. In order to check the adequacy of compaction in the various embankment zones and to confirm the validity of the design shear strengths and other engineering parameters, a systematic schedule for obtaining 1-ft-cube test pit samples at various elevations and locations in the embankment should be established. Samples so obtained will be suitably packed and shipped to Division laboratories for performance of appropriate tests.

7-4. Construction Records. Complete construction records must be maintained. Such records will provide useful data for designing alterations and additions to the structure, in assisting in determining causes of undesirable vertical or lateral movements or seepage, and in interpreting piezometric data. As-built drawings, construction photographs, description of foundation conditions encountered, various treatments, compaction data, and test data on record samples should be included in the records. The foundation report should be complete with such details as dip and strike of rock, faults, artesian conditions, and other characteristics of foundation materials. A complete history of the project in narrative form should be written, giving the schedule of starting and completing the various phases of the work, describing construction methods and equipment, summarizing quantities of materials involved, and other pertinent data. An accurate record should be maintained as to the extent and removal of all temporary riprap or stockpiled rock such as that used for diversion channel protection. Compaction control data, piezometric data, and observations of vertical and lateral movements must be maintained on the ENG forms referenced in ER 1110-2-1925. Details concerning the use and preparation of construction foundation reports are presented in ER 1110-1-1801.

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Pg. 151

J. Kane's Deposition

Subject: History of Events Related to Plant Fill Settlement Problem at the Midland Plant

Prepared by: J. D. Kane, GES, HGEB, DE

<u>Date</u>	<u>Event</u>
December 15, 1972 <del>1975-1977</del>	CP's issued for both Units 1 and 2 at Midland site. Plant fill was placed. Construction of DGB started.
August 22, 1978	CP Co. informs NRC Resident Inspector of unusual settlement of the Diesel Generator Building. (Was first observed by CP Co. in July 1978)
September 7, 1978	Under 10 CFR 50.55(e), CP Co. notifies Commission by telephone of settlement problem.
September, 1978 thru November, 1979	10 Interim Reports submitted by CP Co. on settlement problem.
February, 1979 to September, 1979	Surcharge program to preload Diesel Generator Building Area was completed
March 21, 1979	Director, ONRR, formally requested under 10 CFR 50.54(f), information to determine if CP should be modified, suspended or revoked.
April 24, 1979 thru November, 1979 <del>late Sept. 1979</del>	CP Co. responded in six letters, under oath, to NRC request for information CCE employed as NRC consultant NRC (I&E & NRR) issues show cause order that restricts construction associated with soil activities for structures founded in and on plant fill material. NRC cites reasons for need to issue order of failure to provide adequate criteria on various remedial measures, Q-A deficiencies, false statement in FSAR (App. B of Show Cause Order).
December 6, 1979	I&E findings in investigation from October 1978 to January, 1979, included:  1. Q-A Deficiencies relative to soil construction activities.  a. Failure to follow certain design and construction specifications on foundations material properties and compaction requirements.

Estimate of settlement (FSAR Fig. 2.5-42) for DGB was 2.8" to 3.2" during 40yr. plant operation period. Max. settlement experienced for DGB was 4.25" (as of 1/1979 which is before surcharging) and an additional 3.2" UNDER the surcharge load

- b. Lack of support between Contractor's engineering and construction offices.
- c. Lack of control and supervision of plant fill placement resulting in inadequate compaction of foundation materials.
- d. Insufficient corrective action on nonconformance items.
- e. FSAR contains inconsistent, incorrect and unsupported statements with respect to foundation type, soil properties and settlement values.

2. FALSE STATEMENT "All fill and backfill were placed according to Table 2.5-9". Show Cause Order states that it would be unacceptable to the NRC Staff for Cat. I structures to be founded on random fill rather than controlled compacted cohesive fill as stated would be the type of fill in the FSAR.

December 26, 1979	CP Co. filed a Request for Hearing
April 16, 1980	CP Co. filed Answer to Notice of Hearing
May 27, 1980	CP CO. filed motion for Partial Consolidation
June 30, 1980	NRC reiterates request for additional explorations. Recommends boring locations in DGB area, Auxiliary Building, Service Water Pump Structure and Embankment for Cooling Pond (Letter from A. Schwencer to J. W. Cook, CP Co.).
July 31, 1980	At insistence of CP Co., meeting held in Bethesda to discuss NRC request for additional explorations.
August 4, 1980	NRC (A. Schwencer letter to J. W. Cook, CP Co.) letter transmits COE report that summarizes their safety review to date to CP Co.
August 12, 1980	Notice of Meeting - CP Co. Appeal of Staff Position Requiring Additional Explorations and Testing
August 28 & 29, 1980	Plant site visit and meeting to hear appeal.
September 10, 1980	Special Prehearing Conference (To comply with ASLB Order of March 17, 1980).
Oct. 1, 1980	Meeting between NRC & COE on CP Co Appeal

John  
Rec'd from L. Heller  
on 11/15/79

MIDLAND SOIL SETTLEMENT/IA COMPANY

1. 50.54(f) sent to Consumers Power Company in March 1979. At that time IE recommended to NRR that a show cause be issued to stop construction. It was agreed (NRR/IE) that 50.54(f) would be sufficient.
2. General question of QA adequacy of Utility/AE was discussed internally by IE/NRR on August 16. IE was to ask region to make a finding as to adequacy of QA implementation. Special consideration was to be given soils settlement matter in relation to the reports of QA deficiencies in other areas.
3. Latest response to 10 CFR 50.54(f) follow-on questions regarding QA of plant fill received on 11/13/79. (Tentative QA Branch position suggests response still unsatisfactory.)
4. Review of Midland Soils Settlement submittals given to Corps of Engineers at end of October. (Tour of site made by Corps of Engineers & NRR staff November 14.)
5. To date, (5) Utilities' replies to 50.54(f) have not described acceptance criteria for remedial action, prior to such action. Applicant views the remedial actions as "proof tests" which preclude need for such criteria. Staff decision as to acceptability of remedial action must await completion of the program, and applicant must proceed entirely at his risk.
6. In a meeting on November 28, IE developed a new position:
  - a. Overall QA performance acceptable because it identifies QA deficiencies;
  - b. IE now raises question as to the acceptability of the design fix and draws the conclusion that the modification constitutes a departure from the principal architectural and engineering criteria;
  - c. IE suggests Stello/Denton meeting ASAP to develop a decision for enforcement actions relative to applicant's failure to comply with design approved by CP.



List of Exhibits @ J. Kane Deposition Keller

- | <u>No</u> | <u>Description</u>   |
|-----------|--|
| 1 ✓       | Professional Qualifications & Exp of J Kane  |
| 2 ✓       | J. Kane handwritten note of 6/18/80<br>Subject: Questions on NRC Review Policy of Cooling Panels<br>(4 items, last item incomplete)  |
| 3 ✓       | Large Plan View of Cooling Panel (centered in<br>Emergency Cooling Water Reservoir Area)<br>J. Kane located 3 sections where disc geometry<br>would encourage stability analysis |
| 4 ✓       | Letters from CCE to R Jackson<br>One dated 27 Mar 80 -<br>later dated 16 Apr 80 Subject Request for<br>Addtl Bearings & Existing Soil Data                                       |
| 5 ✓       | Deposition Form (from CCE) dated 1 Feb 80<br>Subject "Geotechnical Engineering Assistance<br>to NRC - Orientation Meeting @ Bethesda<br>7-8 Nov. 1979"<br>Kubinski to use File   |
| 6 ✓       | J Kane Note dated 7/25/80<br>"Understanding of NRC Position (in Anticipation of Rpt)"  |
| 7 ✓       | From <del>Thomas's</del> Deposition Papers<br>Hocutt's<br>Copy of CCE contract on Midland (Pages 2, 3, 4 & 5)  |
| 8         | Report dated Sept. 14, 1980 from CPLC<br>Entitled "Discussion of the Applicant's Position on the<br>Need for Addtl Bearings" etc   |

- | <u>No.</u> | <u>Description</u>  |
|------------|---|
| 9 ✓        | Report from CPCo dated Sept. 14, 1980<br>"Settlement Update for Midland Plant<br>Units 1 & 2," etc  |
| 10 ✓       | 4 Mar 80 Telephone Record (From C&E department documents)<br>From N. Gehring to P. Itadala  |
| 11 ✓       | J Kane handwritten pages 1 thru 4) + Lot of<br>dated 7/27/80<br>Vugraphs<br>entitled "NRC Position - Diesel Generator Bldg"                         |
| 12 ✓       | J Kane handwritten pages dated 9/27/80<br>entitled "CPCo Position - Diesel Generator Bldg"<br>19 pages including 15 Vugraphs                        |
| 13 ✓       | J Kane handwritten pages (no date)<br>(Prepared for Oct. 1, 1980 meeting)<br>Entitled "CPCo Position - Cooling Pond Dike"<br>1 page plus 4 Vugraphs |

List of Exhibits (cont.)

No.                      Description

14 ✓ Telephone Record dated 6/26/80 (From  
CWE  
Dyos  
Reports)

Subject: Midland Nuclear Plant -  
Letter Report  
J. Kane calling H. Singh

15 ✓ CCE Report to R. Jackson, dated 11 Apr. 80  
NCEED-G (24 Mar. 80) list. Inci.

From  
CWE  
Dyos  
Reports

Subject: Interagency Agreement No.  
NRC-03-79-167, Task No. 1, Midland  
Plant Unit 1 & 2, Subtask No. 1 - Letter  
Report (INTERIM)

From Gerchwin to Dist. Engr., Detroit

6 pages ~~4~~  
North Central Division

NCEED-G                      Reviewer: John F. Meilo  
James Simpson

8 pages  
NCEED-T

Subject: Interagency Agreement No. NRC-03-79-167  
Task No. 1, Midland Units 1 & 2  
Subtask No. 1 Letter Rpt (INTERIM)

Thru: Div. Engr. North Central

To: R. Jackson

16 ✓ Hand sketch by R. Zamarian w/ input  
by J. Kerse  
Shows surcharge loading & complications  
with installed concrete

#8 In Hood Deposition Minutes of Meeting?

---

#17 Disposition Form from COE (4 pages)  
Trix Report of Meeting 15 Jan 1980  
Dated 11 Feb. 1980  
From Lowhead to Chf. Engr. Div

Joint contact of long duration may create molecular intergranular bonds which are wholly absent in a remolded soil. Therefore, the relations between void ratio and pressure for remolded and undisturbed soils are likely to be different. They are discussed under separate subheadings.

**Compressibility of Crushed Minerals and Remolded Soils**

Typical  $e-p$  curves for various crushed minerals and remolded soils are shown in Fig. 13.2a, and the corresponding  $e-\log p$  curves in Fig. 13.2b. The effect of the shape of the grains on the compressibility of the grain aggregate is demonstrated by curves  $a$ ,  $b$ , and  $d$ , in Fig. 13.2a. Curve  $a$  corresponds to a mixture of 80% sand and 20% mica; curve  $b$  to 90% sand and 10% mica; and curve  $d$  to 100% sand. Each sample was initially compacted by rodding and vibrating (Gilboy 1928). These curves demonstrate that the compressibility increases greatly with increasing percentages of scale-shaped particles. Furthermore, Fig. 13.2a shows that the average slope of the curve  $d$  for dense sand is considerably flatter than that of curve  $c$  for the same sand in a loose state and that the void ratio of a loose sand, even under very great pressure, is greater than that of the same sand in a dense state subjected to no pressure.

Figure 13.2a also shows that the curve  $e$  corresponding to a remolded sample of a soft clay is very similar to that for a mixture of 90% sand

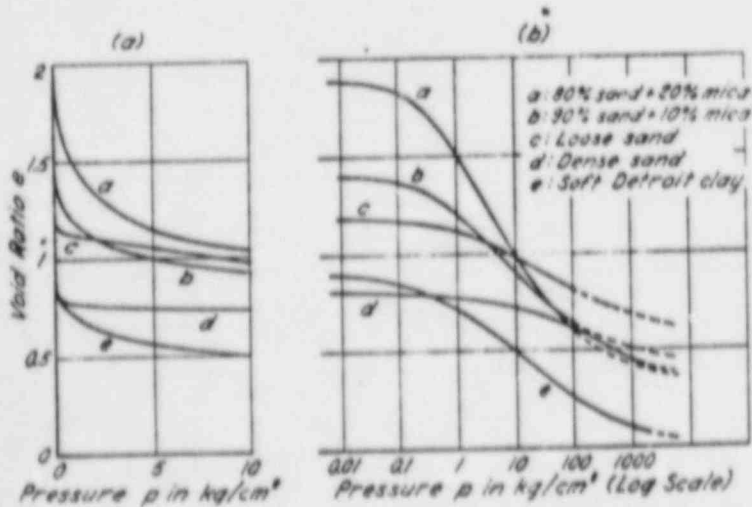


Fig. 13.2. (a) Typical  $e-p$  curves. (b) Corresponding  $e-\log p$  curves representing results of compression tests on laterally confined laboratory soil aggregates.

Requested COE to list questions for deposition of the following witnesses. Use previous transcripts & deposition documents. Speak to H. Siryk on 11/7/80

11/5/80  
J. Kane  
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Subject: Midland - Suggested Witnesses for Deposition

Name	Position	Purpose	Est. of Time for Deposition
<p>Walter Ferris</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;"> <p>Tentative Prepare Dec. 8 Deposition Dec. 9</p> </div>	<p>Chf., Geot. Engr. (S. Afifi Supervisor) San Francisco Office</p>	<ul style="list-style-type: none"> <li>✓ Determine performance <sup>and acceptance</sup> criteria of proposed remedial measures</li> <li>→ Understand Bechtel's recommendations for meeting NRC request of June 30, 1980.</li> <li>✓ Determine actual involvement of Bechtel Consultants.</li> <li>→ Understanding Bechtel's former plans for record samples in cooling pond area.</li> <li>✓ Bechtel's previous experience w/ surcharging</li> </ul>	<p>1/2 day</p>
<p>James Wanzeck</p>	<p>Coordinator between Construction &amp; Geot. Services of Bechtel Corp. (Ann Arbor Office)</p>	<ul style="list-style-type: none"> <li>• Attempt to understand why fill was poorly compacted &amp; why compaction criteria issue was unresolved for so long a period of time.</li> <li>- Distinguish difference between Canonge &amp; Bechtel fill placement limits. <sup>who did what</sup></li> <li>- Knowledge of settlement calculations before surcharge</li> </ul>	<p>1/2 day</p>
<p>B. Dahr</p>	<p>Civil Engineer (Structural) Bechtel - Ann Arbor</p>	<ul style="list-style-type: none"> <li>- Affiliat <sup>by 88</sup> - knowledge of sw. structure pile connection</li> <li>- Is responsible for grouting voids below foundations</li> <li>- Responsible for problems of conduit &amp; pipe settlements</li> <li>- Responsible for input into dynamic analysis (e.g. modulus of subgrade reaction)</li> <li>- Knowledge of settlement calculations on pile &amp; caisson ftns. How handled in structural analysis</li> <li>- Should be knowledgeable on structural studies that evaluate effect of cracking (Structural should)</li> </ul>	<p>1/2 days</p>
<p>P.A. Martinez former proj. mgr. John Rutgers (now)</p>	<p>Project Manager Bechtel - Ann Arbor</p>	<ul style="list-style-type: none"> <li>- Responsible for assuring that loose natural sands were removed as committed to in the DAR</li> <li>- Understand why input provided by S. Afifi (e.g. resolution of compaction criteria, shear wave velocity) was not incorporated into Bechtel design</li> <li>- Understand Bechtel's system for determining what soil parameters are needed and who determines</li> <li>- Understand position of responding only to questions &amp; not freely meeting SRP &amp; R.G.</li> </ul>	<p>1 day</p>

(Dahr to have add'l questions)

11/15/80  
J. Kane  
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<u>Name</u>	<u>Position</u>	<u>Purpose</u>	<u>Est. Time for Deposition</u>
Thiru-Thiruvengadam	Civil Engr. Cons. Power Co.	Understand his involvement in not accepting Bechtel's recommendation & for fulfilling NRC request	<del>1</del> day 1/2 day
Gil Keeley's Supervisor Thiru-Thiruvengadam's Supervisor	Stephen Howell Cons. Power Co.	Legal Status between Bechtel & CPCo Keeley's to provide info Understand CPCo position to respond only to NRC request rather than SRP & R.G.	1/2 day
Ralph Peck 5	Bechtel Consultants Surcharge - Oversee all fixes	Interrogatory with Afti's depositions give to Bill Paton Understand his involvement not to accept Bechtel's recommendations	1 day each
Alfred J. Hendron Jr. 4	Bechtel Consultants Surcharge	Understand their involvement with each remedial fix	1 day
M. Thomas Davison 3	Six Struttite Pile Design	Determine their expert opinions on adequacy of proposed fixes	1/2 day
C. H. Gould 2	Auxil. Bldg	Establish the basic geot. engr & fldm. engr. information that is needed for each of the fixes & determine if & when this information is to be provided to the NRC	1/2 day
R. D. Woods 1	General Consultant		1/2 day

→ Depose @ end

Possible top Q-A Management

PRIORITY (Discussed w/ Hari Singh on 11/3/80) Consumers Group

Ask CDE to write letter to George Lear. 12/3/80 (Kane)

- Indicate <sup>on map</sup> what SPT borings are still required (should refer ~~to~~ make  
to their previous letter <sup>as enclosure</sup> for basis of deleting the others)

~~New boring location maps w/ additions & deletions~~

- additional guidance <sup>if not covered by R.G. 1.132</sup> on where indust. sampling is needed  
(Impt to clarify <sup>where indust. sampling is</sup> still needed where SPT have been deleted)

## MIDLAND - Modified Request for borings

Deposition Questions - By 11/21/80

Prediction of settlement (lab tests before surcharging) - 11/278