

NUCLEAR REGULATORY COMMISSION

Rec'd 11/5/81
ORIGINAL

In the Matter of:

CONSUMERS POWER COMPANY)	DOCKET NOS 50-329 OM
)	50-330 OM
(Midland Plant Units 1 & 2)	50-329 OL
)	50-330-OL

DEPOSITION OF WALTER R. FERRIS

DATE: December 10, 1980 PAGES: 1 thru 172

AT: Chicago, Illinois

ALDERSON  REPORTING

400 Virginia Ave., S.W. Washington, D. C. 20024

Telephone: (202) 554-2345

1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

3 BEFORE THE ATOMIC SAFETY LICENSING BOARD

4 In the Matter of:)
5 CONSUMERS POWER COMPANY) Docket Nos 50 329 OM
6 (Midland Plant Units 1 & 2)) 50 330 OM
7) 50 329 OL
8) 50 330 OL

7 Offices of Isham, Lincoln and Beale
8 One First National Plaza
9 Chicago, Illinois

9 December 10, 1980

10 Deposition of:

11 WALTER R. FERRIS

12 the deponent called for examination by the staff of the
13 Nuclear Regulatory Commission pursuant to notice, at 9:30
14 a.m.

15 PRESENT ON BEHALF OF THE RESPECTIVE PARTIES:

16 For the Nuclear Regulatory Commission

17
18 Mr. William Paton
19 Counsel for NRC

19 Mr. Joseph Kane

20 Hari Singh

21 Jim Morrison

22 For the Consumers Power Company

23 Mr. Alan S. Farnell
24 and Mr. Ronald G. Zamarin
25 Isham, Lincoln & Beale, Counselors at Law
One First National Plaza
Chicago, Illinois 60603

(Witness sworn.)

WALTER R. FERRIS

called as a witness herein, having been first duly sworn was examined and testified as follows:

EXAMINATION

BY

MR. PATON

This is the deposition of Walter Ferris of the Bechtel, San Fransisco office being conducted pursuant to notice sent by the staff November 25th, 1980.

Mr. Ferris, please state your full name and your employer for the record.

A My name is Walter Ronald Ferris, and I work with Bechtel, Incorporated in the Hydro & Community Facilities Division.

Q All right, the name of the corporation you work for is Bechtel; it's Incorporated; is that correct?

A Bechtel, Incorporated.

Q And is the organization that is located in Ann Arbor, Michigan also Bechtel, Incorporated?

A In Ann Arbor, there are Bechtel, Incorporated personnel in the geotechnical group.

Q Now, you say the geotechnical group, are you acquainting that to the hydro and community facilities division?

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1 A Yes, they are members of the hydro and community
2 facilities division.

3 Q Do you acquaint these -- is the geotechnical
4 the same as the hydro and community facilities?

5 A No, it is not.

6 Q What is the difference?

7 A The geotechnical group is a sub-group within
8 the hydro and community facilities division.

9 Q What is your position within the hydro and community
10 division in San Francisco?

11 A I'm the chief soil engineer.

12 Q Are you Dr. Afifi's boss?

13 A Technically I am his superior or supervisor.

14 Q I'm looking at a document that you gave me that
15 apparently is your resume, and I'm going to mark it Staff
16 Exhibit 1, December 10, 1980. And I'll mark it Ferris
17 Deposition.

18 (At which time the document was marked.)

19 And I notice you have a degree from Harvard;
20 is that June of 1955?

21 A That's correct.

22 Q Soil mechanics?

23 A That's correct.

24 Q Is that a Bachelor Degree?

25 A No, that is a Master's Degree. At that time Harvard

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1 called it a "SM" but it is in fact a Master's Degree.

2 Q Okay. On your resume, it says December, 1941
3 to January, 1942, Royal Engineers, UK, (United Kingdom)
4 am I correct, that that is two months?

5 A No, you are not correct, I was in the Royal Engineers
6 from December, 1941 until January of 1948 -- a little over
7 six years.

8 Q Okay, I'm sorry, but do you see your resume,
9 it says from and to, does that not say January '42?

10 A It appears to be a typographical error.

11 Q So, you would make that a '48; is that correct?

12 A That's correct.

13 Q Would you tell me in your judgment what Dr. Afifi's
14 responsibilities are?

15 A Dr. Afifi is the assistant chief soil engineer
16 in the geotechnical group in the Ann Arbor office.

17 Q Assistant chief engineer in the what?

18 A In the Ann Arbor Office of Bechtel.

19 Q But you indicated the group, geotechnical group.

20 A He is with the geotechnical group.

21 Q Did you read his deposition?

22 A Yes, I have.

23 Q Can you tell me what his responsibilities were
24 with respect to the soils problem at the Midland site?

25 MR. FARNELL: Currently, right?

1 BY MR. PATON:

2 Q What they have been and what they are now.
3 Tell me what they are now.

4 A He is now providing to the Midland Project Engineering
5 Group information in relation to the questions from the
6 NRC, which relate to the technicians for the problems that
7 occurred.

8 Q What kind of information is he providing?

9 A Just the soil information.

10 Q Tell me what you mean by that.

11 A Oh, soil perimeters that would be used by them
12 for design.

13 Q I didn't hear the first word.

14 A Soil perimeters.

15 Q Okay; is that all?

16 A Yes, at the moment, yes.

17 Q You say he is providing soil perimeters to project
18 engineering; is that the extent of his responsibility at
19 the present time?

20 A No, you asked me on the Midland job. He is providing
21 it on the Midland Project.

22 Q Yes, I do mean to limit it to the Midland Project.

23 A That is what his job is.

24 Q Does he have any responsibility to see that the
25 information he provides to project engineering is properly

1 authorized.

2 MR. FARNELL: Would the court reporter read back that
3 question.

4 (At which time the aforementioned
5 question was read back.)

6 MR. FARNELL: I think we need some clarification of
7 "properly authorized." I just don't understand. I think
8 it is vague.

9 BY MR. PATON:

10 Q Let me ask the witness. Do you understand what
11 I mean by that question?

12 A I'm not quite clear what you mean by it.

13 Q Okay. He provides soil perimeters to project
14 engineering, right?

15 A Right.

16 Q What do they do with it?

17 A They use it for specific design purposes.

18 Q Does Dr. Afifi have any responsibility to see
19 that the information he has provided to project engineering
20 is appropriately used for specific design purposes?

21 A Only in the event that the project would ask him
22 to review something that they had done in his area of expertise.

23 Q So, his responsibility is limited to providing
24 information and it ends there -- providing information
25 requested by the project to the best of his ability in his

1 area of expertise. Does he ever volunteer information prior
2 to its being asked?

3 Q I really don't know how to answer that.

4 Q Well, you said he responds to questions.

5 A That's correct.

6 Q Does he ever give them information that they
7 haven't asked him for?

8 A I don't know how he would know about it without
9 being asked.

10 Q So, your answer is no?

11 MR. FARNELL: I think that's not what he said.

12 BY MR. PATON:

13 Q Do you know whether he ever volunteers information?

14 A I do not know.

15 Q In reading his deposition, do you recall the
16 exchange between myself and Dr. Afifi concerning the proper
17 compaction standards?

18 A I recall there was some discussion on that.

19 Q And do you believe that there was any confusion
20 within Bechtel over a period of several years with respect
21 to the proper compaction standard to be used at the site?

22 MR. FARNELL: Is this being tied to the transcript
23 or is this kind of --

24 MR. PATON: He can base his answer on anything he
25 wants. His reading of the transcript or his general knowledge.

1 MR. FARNELL: Would the court reporter read back the
2 question.

3 (At which time the aforementioned
4 question was read back.)

5 MR. FARNELL: What year? Are we talking about any
6 year?

7 BY MR. PATON:

8 Q I asked him for several years.

9 MR. FARNELL: I want to make sure we are talking about
10 the same thing. That's why --

11 WITNESS: Based on my reading of the transcript, there
12 was confusion. I had been aware that there was some confusion
13 prior to that time.

14 Q Do you understand Dr. Afifi's responsibilities
15 to include clarifying that confusion?

16 A Yes, I do believe that if he is aware of the
17 confusion.

18 Q But only if he is aware of the confusion; is
19 that correct?

20 A How could he know otherwise?

21 Q In other words, you don't see any responsibility
22 on his part to verify that the information he provided
23 was being properly used?

24 A If he was not provided with information that
25 permitted him to know that, I don't see how he could possibly

1 have responded to it.

2 Q Okay, you agree he did give them advice on the proper
3 compaction standard to be used at one point?

4 A Yes, I have seen a memo.

5 Q And after he gave that advice, there was still
6 confusion on the proper compaction standard?

7 A I'm not familiar with that area.

8 Q Okay, you read his deposition, but you don't
9 recall having read the deposition as to whether the confusion
10 came after he gave them advice; is that correct?

11 A I believe the confusion existed beyond that,
12 I don't know anything about the detailings of it.

13 Q And you don't see Dr. Afifi's responsibilities
14 as including the duty to go out and try to find out whether
15 the advice that he gave us was being followed?

16 A No, I don't believe so unless he is specifically
17 asked by the project to.

18 Q Okay, now you answered a question a short time
19 ago as to what Dr. Afifi's present responsibilities are
20 with respect to Midland.

21 A Yes.

22 Q What have his responsibilities been for the past
23 three or four years? Do they differ in any way from what
24 you just said his present responsibilities are?

25 A No, as far as I recollect, Dr. Afifi being in

1 Ann Arbor he has been essentially working as my assistant
2 chief in the geotechnical group of hydro and community
3 facilities division which is located in the Ann Arbor office.

4 Q Your answer is that his duties for the past three
5 or four years have been the same as you have just indicated
6 they are presently?

7 A Right.

8 Q How often over the last three or four years,
9 approximately, how often do you talk to Dr. Afifi?

10 A I talk to him quite frequently. Probably two
11 times a week, by telephone.

12 Q Mr. Ferris, I want to show you a document that
13 is dated June 30, 1980, that has already been designated
14 in these proceedings as deposition exhibit number 4 in
15 the deposition of Mr. Lyman Heller. And I'll hand it to
16 you and you can look at any part of it you want. But I'm
17 directing your attention to Enclosure 1, the last paragraph
18 of number 36 which is four lines long. You can look at
19 any part of that document that you want. My question will
20 be addressed to that paragraph.

21 Q Could you point out again the particular paragraph
22 that you want me to address?

23 Q Yes. And in fact, I'll tell you the question,
24 it may help you with your review of the document. But
25 the paragraph I'm referring to is the four-line paragraph

1 that appears at the end of number 36 on the page that is
2 parked "Enclosure 1."

3 Q Mr. Ferris, I want to tell you the question then
4 you can read the document a little better.

5 This sentence I'm directing your attention
6 to is really the second sentence of the four-line paragraph
7 of the end of 36. And it reads, "Also provide the locations,
8 boring logs and availability testing data of any exploration
9 completed in 1979 and 1980 which has not yet been submitted."

10 And the question I'm going to ask you is
11 did you at some time after that letter submit the information
12 referenced in that second sentence that I just read?

13 A I personally did not.

14 Q Do you know if it was submitted?

15 A I do not know if that has been completely compiled
16 with as yet.

17 MF. FARNELL: Also he doesn't know if there is any
18 such information.

19 BY MR. PATON:

20 Q I'll ask the witness. Do you know if there is
21 any such information?

22 A I'm aware at this time that there were boring
23 logs that the NRC had not seen, but I do not know if those
24 have been as yet sent to Anderson.

25 Q Who within Bechtel should know that?

1 A The project engineer.

2 Q And who is that?

3 A Currently, it is Curtis.

4 Q In July, 1980, who was the project engineer?

5 A I don't recall.

6 Q All right, now would Dr. Afifi know whether that
7 information had been provided, is that within his responsibility?

8 A He would know what he had provided to the project
9 so indirectly he might know what was available to go to
10 the NRC.

11 Q Do you know anything about the information contained
12 in boring logs and available test data of any exploration
13 completed in 1979 and '80 that had not been submitted to
14 the NRC in June of 1980? Do you know what that information
15 was?

16 A I don't recall precisely, no.

17 Q Who within Bechtel would know that information?

18 A The project engineer would know it.

19 Q If the NRC asked for that information, whose
20 responsibility is it to determine whether it will be provided
21 to the NRC?

22 A I believe the applicant is responsible for that.

23 Q When you say "project engineer" do you mean Bechtel
24 or Consumers?

25 A The Midland Bechtel project engineer would know

1 what Bechtel had available.

2 Q I'm trying to think of how to word this question
3 and I'll do the best I can. The question is this way:
4 it seems unusual to me -- and please respond or comment
5 on my statement -- I'm not trying to argue with you, but
6 it seems to me that the chief soil engineer for Bechtel
7 does not know whether when the NRC makes a request for
8 boring logs and availability test data of any exploration
9 completed in 1980 that that information was not ever provided.

10 MR. FARNELL: That's not even a question.

11 BY MR. PATON:

12 Q Does that seem unusual to you?

13 MR. FARNELL: That is unreasonable.

14 BY MR. PATON:

15 Q Is that within the scope of your responsibilities --

16 A I have no direct contact with the NRC.

17 Q Do you have any responsibility with respect to
18 a question from the NRC -- strike that.

19 With respect to the particular sentence
20 that I asked you to direct your attention to, did you have
21 any responsibility?

22 A Only in reviewing the data that would be sent.

23 Q Did you review the data that would be sent?

24 A I do not recall all of the data that I have reviewed
25 specifically.

1 Q Do you recall whether you specifically reviewed
2 this data?

3 A I recall having reviewed some borings that were
4 not available to NRC on June 30th.

5 Q Did the data that you reviewed indicate poor
6 foundation conditions in the areas of the electrical penetration
7 rooms?

8 A Which data are you referring to?

9 Q The data you just indicated that you reviewed.

10 Q I do not recall that.

11 Q Have you reviewed Volume 8 of the responses to
12 the NRC 50.54(f) questions?

13 A I have reviewed the responses that Afifi has
14 prepared for the project and therefore, those portions
15 that are contained in Volume 8, I would have reviewed,
16 just the soil portions.

17 Q Do you know if the information requested in this
18 sentence that I have referred you to in Heller Deposition
19 Number 4 is contained in Volume 8 of the 50.54(f) responses?

20 A I do not.

21 Q Do you have in your office Volumes 1 through
22 8 of the 50.54 (f)?

23 A Yes, I do.

24 Q Now, with respect to the information that's indicated
25 in the sentence in the Heller Deposition to which I have

1 referred you. do you have any recollection as to whether there
2 was any indication or information indicating poor condition
3 foundations anywhere on the site.

4 A I do not know specifically what is in the borings
5 referred to there, so I cannot answer your question.

6 Q All right.

7 A I don't recall what is in them.

8 Q Let me ask you this, do you remember whether
9 or not you ever reviewed this information at any time?

10 A I think I just answered that.

11 MR. FARNELL: It has been asked and answered.

12 BY MR. PATON:

13 Q I know you said you don't remember, but did you
14 ever look at it?

15 A I think I told you I recall seeing some of that
16 information, but what I don't know is whether I see all
17 that's referred to in that general sentence.

18 Q You said you saw some of --

19 A I believe I have.

20 Q So, you are fairly clear that you saw some of
21 it, but not all of it?

22 A Right.

23 Q As to the "some of it" do you recall anything
24 about it?

25 A I do not recall stuff relating to electrical

1 penetration area, it may have been there, but I don't recall.

2 Q Do you remember anything about -- did it indicate
3 anything about foundation conditions at the feed-water
4 isolation valve pits?

5 MR. FARNELL: That has been asked and answered.

6 BY MR. PATON:

7 Q No, I asked about the electrical penetration.

8 A Well, I don't recall that either.

9 Q Mr. Ferris, with respect to the information that
10 is referred in this sentence in the Heller Deposition that
11 you indicated you had at one point seen some of, do you
12 know any reason why that information was not submitted
13 to the NRC prior to the NRC asking for it?

14 A No, I do not.

15 Q Okay. Are you aware of any information -- and
16 my question relates to the Midland case and the soil problem --
17 are you aware of any information Bechtel has provided to
18 Consumers for the purpose of forwarding to the NRC that
19 has not been sent by Consumers to the NRC?

20 A No, I do not.

21 Q Do you have any reason to believe that there
22 is any bias or lack of objectivity in the staff's review
23 of the safety issues in the Midland project -- I'm limiting
24 this to the soils issue.

25 MR. FARNELL: Would the court reporter read back

1 last question.

2 (At which time the aforementioned
3 question was read back.)

4 MR. FARNELL: I think that's -- are you talking about
5 any one individual or are you talking about everybody that's
6 reviewed it? Are you talking about attorneys? It is too
7 broad of a question.

8 MR. PATON: I'm asking if he has any reason to believe --
9 I think the question is clear.

10 MR. FARNELL: I object to the form.

11 MR. PATON: Either he does or he doesn't. Maybe he
12 does, maybe he doesn't know.

13 MR. FARNELL: You are talking on balance, are you
14 talking one individual? I mean the staff is composed of
15 a lot of different people that's what my objection is.

16 BY MR. PATON:

17 Q Do you believe that within the staff there is
18 any individual that is involved in the review of the Midland
19 Facility and that person is biased or has a lack of
20 objectivity?

21 A I have no reason to believe that.

22 MR. FARNELL: Would the court reporter read back the
23 last question.

24 (At which time the aforementioned
25 question was read back.)

1 BY MR. PATON:

2 Q In view of your knowledge of the settlement projects
3 at Midland, do you think the staff should require a closer
4 than normal scrutiny of the geotechnical engineering aspects
5 of the Midland design?

6 A I don't know why.

7 Q Is there a soils problem at the service water
8 structure?

9 A Yes, there is.

10 Q What is the problem?

11 A There is some bore filling beneath the inboard
12 end of the service water structure and there is a plan
13 to underpin that end of the building.

14 Q I don't remember a word you used -- you said
15 bore fill under the something.

16 A Under the inboard end of the service water structure.

17 Q Tell me what you mean by "bore filling."

18 A The expirations indicate low blow counts in the
19 standard penetration test.

20 Q Is that the extent of the investigation that
21 was conducted? You made standard penetration tests and
22 determined that there were low blow counts; is there anything
23 else? Strike that question.

24 Did you conduct any other investigation
25 besides standard penetrations?

1 MR. FARNELL: Of the fill beneath the service water
2 structure?

3 MR. PATON: Yes.

4 WITNESS: My recollection is standard penetration
5 tests.

6 BY MR. PATON:

7 Q And you indicate the problem is low blow counts,
8 do you recall any of the specifics?

9 A I don't recall the numbers.

10 Q And describe the proposed remedy.

11 A It's planned to underpin the end of the building
12 with piles.

13 Q Now, you said underpin. The piles would be attached
14 to the side of the building; is that correct?

15 A That is correct.

16 Q Okay. Tell me what needs to be known before
17 that underpinning is designed?

18 MR. FARNELL: I'm not sure that we have got any foundation
19 that this is something that he has knowledge.

20 It also needs to be known by who. It is just too open-
21 ended of a question.

22 BY MR. PATON:

23 Q You indicated that generally speaking the remedy
24 is to underpin the end of the building.

25 A That's correct.

1 Q Do you know what kind of information -- strike
2 that.

3 Describe the discipline of the person who
4 would make that design -- design the remedy..

5 A There is not one person.

6 Q All right, tell me what disciplines would be
7 involved.

8 A Well, the pile part of it, the recommendation
9 for that will be made by soil engineer and then the overall
10 analysis of the building would have to be carried out by
11 a structural engineer.

12 Q Okay, is there a discipline called "foundation
13 engineering"?

14 A Yes. A soil engineer carries out foundation
15 engineering.

16 Q And you are a soil engineer?

17 A I'm a soil engineer, yes.

18 Q Now, can you tell me what information you would
19 need about that fill to provide your input into the design
20 of the underpinning?

21 A You would need to know the soil conditions at
22 the structure.

23 Q Okay, tell me what you mean by that.

24 A You would need to know what type of soil is there.
25 What its consistency is.

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Q Anything else?

A You would need to have some assurance that there is a stratum to which you can carry the building load safely.

Q That would frequently be the till?

A In this particular instance, it is the till.

Q Anything else?

A No, I think those are basically it.

Q Okay, by type, do you mean sand or clay?

A Yes, the soil stratification.

Q What kind of a determining would you make other than the fact that it is either sand or clay?

MR. FARNELL: Are you talking about type of information?

MR. PATON: You said type of soil --

WITNESS: I meant soil clarification.

BY MR. PATON:

Q All right, can I change that.

A You can change that to soil clarification.

Q Now, within soil clarification what are the possible clarifications?

A Gravel, sand silt and clay.

Q You would determine that in your soil clarification. You would determine that the soil was made up of gravel, sand or silt or clay or what it was. Now, would you determine how much of each of those if there was more than one of those involved, would you determine how much of each one of

1 those was there?

2 A My intention would be to get the soil stratification,
3 which is what I mentioned initially to you.

4 Q Is soil stratification part of the soil clarification?

5 A I would clarify each stratum.

6 Q Clarify each, okay. And would you do that down
7 to the point where you got to the till or whatever you
8 felt was the foundation?

9 A It would go into good foundation, the soil.

10 Q What do you mean by consistency?

11 A Soft or stiff.

12 Q How is that measured, what perimeter?

13 A In its very crudest method by standard penetration
14 test.

15 Q Now, stratum, I'm not sure I understand stratum.
16 That part of this clarifying -- each stratum -- is that
17 what you meant when you used that term?

18 A It is the soil layering, each layer is a stratum,
19 so the subject surface consists of strata of different
20 materials.

21 Q How would you go about determining those things,
22 where would you get your information?

23 A From borings.

24 Q What kind of borings?

25 A Normally, soil borings.

1 Q Well, what I mean is standard penetration tests would
2 be one.

3 A That's one method of doing it.

4 Q Now, that would give you disturbed samples, right?

5 A Yes. They would be disturbed.

6 Q And then you would also take undisturbed samples?

7 A You could if you so desired.

8 Q Do you have any idea whether that would be done
9 under the service water structure?

10 A I do not recall if it was done.

11 Q Do you have any opinion as to whether or not
12 it should have been done?

13 MR. FARNELL: For what purposes?

14 MR. PATON: For the purpose we are talking about.

15 WITNESS: Well, I believe it need not have been done.

16 BY MR. PATON:

17 Q I want to make sure, Mr. Ferris, when you say
18 it need not have been done, were you referring to undisturbed
19 samples?

20 A Yes, right.

21 Q Why do you say that? That maybe it need not
22 be done.

23 A It depends on what your underpinning procedure
24 is.

25 Q Doesn't the information that you are going to get

1 about the soil condition determine what your underpinning
2 procedure is going to be?

3 A Yes, you would make a decision at that point.

4 Q Okay, but then you just said your underpinning
5 procedure would determine whether or not you are going
6 to take undisturbed samples. It seems like a vicious circle
7 to me.

8 A You can get information on the underpinning procedure
9 by other procedures.

10 Q For example?

11 A A load test on the pile.

12 Q And do you know whether the plan is to rely on
13 load tests for piles in this case?

14 A I do not recall that it is specifically to rely
15 on that.

16 Q Do you know if it was ever planned to do that?
17 Was it ever planned to do that?

18 A What do you mean when you say -- what is your
19 actual question?

20 Q Was there ever a plan to rely on load tests for
21 piles in place of taking undisturbed samples?

22 MR. FARNELL: I don't think those things are mutually --
23 he testified that those things are mutually exclusively.

24 Q Well, if they are not that's fine, he can tell
25 me that.

1 A I do not recall.

2 MR. FARNELL: That was inherent to your question.
3 I don't think there is a foundation for it.

4 MR. PATON: Okay.

5 BY MR. PATON:

6 Q Now, I was asking how you get the information
7 to help you determine things such as soil clarification,
8 clarifying soils and the gravel, sand and clay and silt
9 and you were telling me that you would take borings. Would
10 you take standard penetration tests which would give you
11 disturbed samples, you might take undisturbed samples,
12 what other means would you use to determine soil conditions?

13 A In this particular instance, you would make a
14 load test on a pile, that would give you information.

15 Q Would you determine the area and depth of the
16 problem of the bad soil conditions?

17 A You would determine the depth of the pore soil
18 conditions.

19 Q Would you not also determine the area?

20 A Not necessarily.

21 Q Is that because you would assume that bad soil
22 conditions extended under all areas of the structure was
23 affected?

24 A You could make that assumption, I don't know.

25 Q All right. Now, I'm talking about what you would

1 need to know to design the underpinning and my question to
2 you is --

3 MR. FARNELL: We are just talking about the surface
4 water building now?

5 MR. PATON: I'm still talking about the surface water
6 structure and my specific question is I'm addressing what
7 you need to know to design your underpinning and my question
8 is would you need to know the maximum static and dynamic
9 loads to be imposed?

10 WITNESS: The soil engeineer would not necessarily
11 need to know that.

12 BY MR. PATON:

13 Q Would the structural engineer need to know the --

14 A The structural engineer must know that.

15 Q Would the structural engineer or the foundation
16 engineer have to know the load bearing capacity of the
17 piles?

18 A Could you repeat that question, please?

19 Q For whoever is designing the underpinning, is
20 it necessary to know the load-bearing capacity of the piles?

21 A Yes, it is.

22 Q Is it necessary to make a settlement prediction
23 for the piles?

24 A Yes. You would need to know.

25 Q Now, with respect to the information that you have

1 said you would need to know, how much of that information
2 did Bechtel know on December 6th, 1979 -- and I'll volunteer
3 to you that that is the date of the order modifying construction
4 permits that was issued by the NRC.

5 MR. FARNELL: Just for convenience, why don't we do
6 them one at a time because there are a lot of factors here.

7 WITNESS: I would like to have your question again,
8 please, because it sounded long to me.

9 BY MR. PATON:

10 Q Okay, that's fair. Let me first just state a
11 little background, I'm going to ask you with respect to
12 a lot of information and I'll take the information one
13 at a time.

14 A For the surface water structure?

15 Q For the surface water structure for Midland for
16 the soils problem. How much of this information was in
17 the possession of Bechtel on December 6th, 1979, and the
18 reason I'm asking you that question, is that's the date
19 of the order modifying construction permits. What I want
20 to try to find out from you is when that order was issued.
21 What did Bechtel know about the design of these remedies?
22 That is the purpose of my question.

23 A And are you going to ask me specifically the
24 items that you want to know about?

25 Q I think your attorney wants me to do that, and I'll

1 do that.

2 A Okay, fine.

3 Q Starting with maximum static and dynamic loads to
4 be imposed, I believe you indicated to me that you must
5 know that in the design of the underpinning and my question
6 to you is what was the status of the review -- strike that.

7 What did Bechtel know about the maximum
8 static and dynamic loads to be imposed for the underpinning
9 at the surface water structure on December 6, 1979.

10 A I don't know. That's a structural matter. I
11 don't know the answer.

12 Q All right. For the structural people to know
13 that, wouldn't they have to have some information from
14 you as a soils engineer?

15 A Yes, they would.

16 Q What kind of information would they have to have
17 from you?

18 A The information you asked earlier about the soil
19 conditions.

20 Q All right, now on December 6, 1979, had you provided
21 the structural engineers with information that you described
22 under the heavy soil conditions?

23 A To the best of my recollection we had boring
24 data at that structure at that time.

25 Q Okay, you had boring data. But for example, had

1 you clarified the soils in the surface water structure into
2 gravel, sand, clay or silt?

3 A I believe so.

4 Q Had you on December 6, 1979, determined the consistency
5 of the soil in that area?

6 A I believe we were aware that there were low blow
7 counts there.

8 Q Had you come to any conclusions with respect
9 to stratification?

10 A I can't recall that precisely, but I believe
11 we knew where the till was and we knew where the fill was,
12 so at least to that extent, we knew the stratification.

13 Q When you talked about stratification, didn't
14 you mean that you would determine the layering in the till?

15 A If there was any.

16 Q Do you know whether there was any?

17 A I do not recall that.

18 MR. FARNELL: Let's go off the record.

19 (At which time a brief discussion was
20 held off the record.)

21 BY MR. PATON:

22 Q Mr. Ferris, I'm returning to the question that
23 we left off on, concerning what you would have to know
24 to design the underpinning at the surface water structure
25 and am I correct that one of those you would have to know,

1 the engineer that was designing it, would have to know would
2 be load-bearing capacity?

3 A Right.

4 Q To know load-bearing capacity, am I correct that
5 you would have to know the sheer strength of the soil?

6 A Not necessarily.

7 Q You would not?

8 A For the par.

9 Q And is that because you would do load tests later?

10 A That's correct.

11 Q Is it good engineering practice to make load
12 tests for piles after they are installed as opposed to
13 determining their load bearing capacity prior to installing
14 them?

15 A I did not say that the load test would be done
16 after they were installed.

17 Q When do you do the load test?

18 A You have to install a pile to load test it.

19 Q When do you load test it then?

20 A After you have installed it, but it does not
21 have to be one of the piles that was in the structure.

22 Q You say in some instances, you could determine
23 load-bearing capacity by knowing the sheer strength prior
24 to the installation of the pile; is that correct?

25 MR. FARNELL: I don't think that's what he testified.

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WITNESS: I didn't.

BY MR. PATON:

Q You didn't say that?

A I guess maybe you can read back what I answered to that question.

MR. FARNELL: My notes say that he didn't necessarily need to know it.

BY MR. PATON:

Q Do you understand the NRC's position with respect to the installation of piles at the surface water structure to be that it is appropriate to first analyze by methods that will estimate bearing capacity prior to installing the piles?

MR. FARNELL: Would the court reporter read back the last question.

(At which time the aforementioned question was read back.)

WITNESS: I don't understand that comment completely, could you either show me or elaborate on that?

BY MR. PATON:

Q Let me ask you a question, do you have any knowledge of what the NRC's position is with respect to the files and what kind of information you should have before installing the piles?

A Yes, I believe I do.

1 Q Please state what that is.

2 A I believe they had requested to evaluate the
3 capacity of the pile using sheer strength perimeters.

4 Q And do you believe that is appropriate in this
5 case?

6 A No, I do not.

7 Q Why not?

8 A I do not believe it is the best way to determine
9 the capacity of the pile. It's not the most reliable.

10 Q You are indicating that a load test for the pile
11 is more reliable.

12 A Yes, I am.

13 Q Now, you said something awhile ago that I didn't
14 understand. When do you make the load test for the pile,
15 when do you plan to make the load test for the pile in
16 this case?

17 A I do not recall precisely when it was to be made.

18 Q Do you know how many piles you are going to install
19 in the underpinning of the surface water structure?

20 A I believe it is 16.

21 Q And how many of those are you going to load test?

22 A I did not say we were going to load test those
23 piles.

24 Q That's the confusion. You are going to conduct
25 a load test, but you are not going to load test these piles?

1 A We will load those piles, but not in the same manner .
2 that the load test is carried out.

3 Q You are going to conduct your load test in some
4 area other than the precise place in which the piles are
5 going to be installed; is that correct?

6 A It will be in the area of the surface water intake
7 structure but will not be one of these piles.

8 Q And your statement is that those load tests about
9 their being more reliable results than following the procedures
10 suggested by the staff?

11 A Yes.

12 Q Considering the fact that we are -- strike that.
13 Is the surface water structure a categoric I structure?

14 A Yes, I believe it is.

15 Q What does that mean?

16 A That means it is essential for the safe shut
17 down of the plant.

18 Q Considering that the surface water structure
19 is a categoric I structure, do you agree that it would
20 be prudent even assuming that the load tests give more
21 reliable results to learn shear strength prior to the installation
22 of piles to determine its load bearing capacity.

23 MR. FARNELL: Would the court reporter read back the
24 last question.

25

(At which time the question was read back.)

1 BY MR. PATON:

2 Q Can you tell me why?

3 A I have already answered that.

4 Q Okay. I understand that your testimony is that load
5 tests would give a more reliable result. Is it your opinion
6 that you wouldn't learn anything by attempting to learn
7 the sheer strength of the pile prior to the installation
8 of the piles?

9 A You would learn something, obviously because
10 you have obtained some information.

11 Q But your judgment is that it is not worthwhile
12 getting that information?

13 A That's correct.

14 Q Is it based on some kind of cost benefit, I mean
15 for example, if obtaining that information cost a dollar;
16 would you go ahead and get that information?

17 A No, it's based on good engineering practice,
18 current good engineering practice.

19 Q You say, "current." Has it changed?

20 A Yes, it has changed.

21 Q Was there a time when it would have been good
22 engineering practice to get sheer strength first?

23 A There is a time when some engineers would have
24 believed that was the way to do it.

25 Q Give me some idea about time. Are we talking about

1 five years, ten years ago?

2 A Probably ten years ago or more.

3 Q Could you tell me anything about why engineers within
4 the last ten years have undergone a change of anything
5 in this regard?

6 A Much more reliable procedures for installation
7 and checking the loads and piles have been developed.

8 Q So, that within the last 10 years load testing
9 to your knowledge has become much more reliable.

10 A Load testing has always been reliable, but there
11 are additions to that work that are done that make it even
12 more reliable.

13 Q Can you just tell me briefly what you are referring
14 to when you said "additions to that work"?

15 A Well, things that you do in addition to the actual
16 loading of the pile.

17 Q Can you give me an example?

18 A Yes, use of the waive equation which was developed
19 about 10 years ago.

20 Q Could you give me one more example?

21 A That is the basic.

22 Q And in your opinion of the waive equation and
23 other I think you described as additions, make the load
24 tests so reliable now that in your engineering judgment
25 whatever you would learn from obtaining sheer strength is

1 just not worthwhile going after.

2 A That is correct. The combination of the load test and
3 waive equation analysis when properly done by somebody
4 who understand it is far superior.

5 A Okay, now, you do the load test obviously before
6 you install the piles?

7 A That's what I said.

8 Q Before?

9 A Before you install the piles for the structure.

10 Q Can you design the piles before you do the load
11 tests or do you have to wait until after the load tests?

12 MR. FARNELL: Are you talking about the piles -- I
13 think there is problem.

14 MR. PATON: Can you design the piles that are going
15 to be installed prior to doing the load tests?

16 WITNESS: What aspect of the design do you refer to?

17 BY MR. PATON:

18 Q Load-bearing capacity.

19 A I believe it is possible to state that a pile
20 of capacity can be driven up the side.

21 Q Let me get away from what is possible. Do you
22 know what your plan is in this case?

23 A Yes, I do. My understanding is that it is to
24 drive 110 capacity piles that utilize but use only 75 tons
25 of them.

1 Q I heard you say "drive 110 ton capacity piles"
2 and I didn't hear the rest.

3 A Well, the actual required capacity should be
4 75 tons, that is my understanding, but for conservatism,
5 the piles will be driven as 110 piles.

6 Q I don't know what you mean by they are driven
7 as 110 piles.

8 A They are driven to a sufficient depth to allow
9 a 110 allowable capacity.

10 Q But you have determined that the load bearing
11 capacity is 75 tons.

12 A Presumably a structural engineer has provided
13 that information. That's what I understand.

14 Q How did he do that prior to conducting the load
15 test?

16 A He did that from his structural analysis.

17 Q What kind of information did he use?

18 A Presumably the weight of the structure and whatever
19 design perimeters go into the structure.

20 Q Doesn't he know sheer strength of the soil to
21 know that?

22 A No, he does not.

23 Q Mr. Ferris, the 75 tons, is what the structure
24 will impose; is that correct?

25 A That is my understanding. I have not made that

1 calculation but that's what I have been told.

2 Q Did you say you plan 16 piles?

3 A That is my understanding.

4 Q So, the total load would be somewhere in the
5 vicinity of 16 tons?

6 A Yes, I don't have a calculator.

7 Q Well, whatever that is?

8 A That's my recollection, yes.

9 Q I'm not pressing you on those numbers. That
10 is the load to be imposed now what I want to ask you about
11 is the ability of the soil to support a pile that is carrying
12 75 to 110 tons. And my question is don't you need to know
13 the sheer strength of the soil to know whether the soil
14 can support 16 piles, each of which is carrying between
15 75 and 110 tons?

16 MR. FARNELL: I think it was 75 without 110.

17 MR. PATON: All right, 75.

18 WITNESS: I believe I have already answered that.
19 You do not need to know the sheer strength of the soil.

20 BY MR. PATON:

21 Q Do you need to know the sheer strength of the
22 soil to know how many piles are required?

23 A Not in my opinion.

24 Q Mr. Ferris, in your experience within the last
25 five years, have you first estimated bearing capacity by

1 analytic methods? In other words, have you followed the
2 procedure that's suggested by the staff as opposed to using
3 load tests?

4 A I personally have not.

5 Q Do you know of any instance where it has been
6 done?

7 A It may have been done, I can't recall.

8 Q To your knowledge, do you recall now?

9 A I do not recall right now.

10 Q In the last five years, approximately how many
11 instances do you recall in which load tests were used instead
12 of first analyzing bearing capacity by analytical methods?

13 A I can recall three right now.

14 Q Okay. Could you describe those three briefly?

15 A Yes. I can tell you the project, Bellrich project,
16 which is being done out of the Ann Arbor office and two
17 specific contracts on the Hope Creek, Nuclear Plant Fernon
18 Categorical I structures.

19 Q Does waive equations involve an analytical approach?

20 A Yes, it does.

21 Q Is it used in connection only with load tests?

22 A No, it doesn't have to be used, you need to know
23 the load tests to use it, but there are aspects beyond
24 that where every time you use a waive equation you don't
25 have to have a load test.

1 Q Does waive equation use sheer strength?

2 A No, it does not.

3 Q Is the waive equation approach reliable in hetero-
4 generous soil deposits?

5 A Yes, I believe it is.

6 Q Does the pile load test permit you to determine
7 long-term settlement?

8 A No, the pile load does not permit you to do that.

9 Q Do you make any determining of settlement of
10 the piles?

11 A I believe the piles were being installed conservatively
12 so that not a problem.

13 Q Does that mean that they are driven down to the
14 till?

15 A The piles must be driven into the till.

16 Q And once they are driven into the till, does
17 that mean you can forget about settlement?

18 A No, I did not say that.

19 Q Okay, tell me what concerns you have, if any
20 when the piles are driven into the till with respect to
21 settlement.

22 A If they are driven sufficiently deep into the
23 till, I don't have a concern for settlement at the loads
24 we are discussing.

25 Q Approximately how deep do you mean?

1 A We will have to determine that.

2 Q How do you determine that?

3 A You do it as a result for your valuation of the
4 load test and the waive equation.

5 Q Then I thought I started out asking you does
6 a pile load test permit you to determine long-term settlement?

7 A I'm talking about capacity, the pile load test
8 determines capacity.

9 Q Does a pile load test tell you how much of the
10 pile is going to settle?

11 A It does under the immediate load, it does not
12 tell you the long-term settlement.

13 Q That's what I'm concerned about. The long-term
14 settlement. Do you have any concerns about long-term settlement?

15 A No, I do not in this particular instance.

16 Q Why not?

17 A Because I believe I told you that the piles are
18 going to be installed for a higher capacity than is required
19 and that provides your margin of safety.

20 Q You mean you have determined that 75 tons each
21 pile supports approximately 75 tons?

22 A Right.

23 Q But they will be conservatively placed so that
24 they will support 110 tons and therefore you are not concerned
25 about settlement?

1 A That's correct.

2 Q Will the load tests allow you to determine a
3 down drag or negative skin friction and I'm equating those
4 two.

5 A The load test will not, the load test that I
6 have been discussing with you will not.

7 Q How will you determine that?

8 A I do not know precisely how that's being done.

9 Q Do you know whether it has been done?

10 A I do not know that either.

11 Q Do you know -- you stated there was a determination
12 that each pile would support approximately 75 tons, do
13 you know when that determining was made? The precise date.

14 A Who is going to design the piles?

15 A We are authorizing a consultant to assist us
16 with design.

17 Q What is the name of that consultant?

18 A That's Dr. M. T. Davisson.

19 Q Do you know when he was retained?

20 A Sometime in 1979, prior to the end of June, 1979,
21 I can't recall the precise date.

22 Q And is it Dr. Davisson that determined that you
23 were going to need 16 piles that would support 75 tons
24 each?

25 A No, I believe we went through all that. The

1 structural engineer provided the loads that the piles have to
2 carry.

3 Q Do you know who the structural engineer was?

4 A I do not know who that was at that time.

5 Q So, the structural engineer provides that information
6 to Dr. Davisson, right?

7 A He provides it to Sherif Afifi.

8 Q And does Dr. Afifi add any information to that
9 when he passes it on to Dr. Davisson?

10 A I don't know any reason why he should.

11 Q Dr. Afifi doesn't he add any information to it? .

12 A With regard to the load-bearing capacity?

13 Q No. That's not what I mean. I mean within Dr.
14 Afifi's area of expertise and responsibility, what does
15 he add to the information he got from the structural engineer
16 before he passes it on?

17 A He would provide the soil data at the structure,
18 the boring logs, whatever information he had, water table
19 level.

20 Q Would he provide all the information we talked
21 about before under the heading of soil conditions, for
22 example, clarifying the soil into gravel, sand, clay and
23 silt.

24 Q A Well, he would provide the boring logs and
25 any evaluation of those logs that he made.

1 Q From which someone else could determine the soil
2 clarification into gravel, sand, clay and silt.

3 A I believe, Dr. Afifi will have a clarification
4 for the soils on the boring logs.

5 Q You say he will have --

6 A Or he has.

7 Q Do you know whether he has or whether --

8 A He has on all the boring logs that he has seen.
9 I don't know why it should be different here.

10 Q Do you know when he obtained that information
11 here?

12 A At the time of the drilling.

13 Q Which was when?

14 A I don't recall the precise date when those borings
15 were made.

16 Q Do you know whether it was before December 6,
17 1979?

18 A I believe so.

19 Q Do you know whether Dr. Davisson is now designing
20 the pile foundation?

21 A I don't know.

22 Q Will Dr. Davisson address long-term settlement
23 of the piles; is that his responsibility?

24 A I believe he will comment on that.

25 Q Do you have any idea whether he has made any

1 conclusions in that respect yet?

2 A I don't recall that either.

3 Q Did you ever talk to Dr. Davisson?

4 A Yes, I do.

5 Q How frequently?

6 A Well, I talked to him last Thursday.

7 Q Well, that doesn't help me too much. Approximately
8 how many times a week do you talk to him?

9 A Probably once a week, but not necessarily
10 Midland.

11 Q Okay, with respect to Bechtel and Dr. Davisson,
12 who is the principal contact for Dr. Davisson?

13 A Afifi in Ann Arbor.

14 Q With respect to this problem, with respect to
15 the Midland Project?

16 A With respect to the Midland project.

17 Q Mr. Ferris, I may have asked you this question
18 before, and I just don't recall your answer. I want to
19 ask you on December 6, 1979, what did Bechtel know about
20 the maximum static and direct flows to be imposed on the
21 piles to underpin the surface water structure?

22 A You would have to ask a structural engineer that.

23 Q And you are not -- do you know who the structural
24 engineer is?

25 A The project structural engineer, whoever that

1 is, the Midland Project Structural Engineer.

2 Q The Bechtel --

3 A Bechtel.

4 Q Not Consumers?

5 A No, Bechtel.

6 Q Mr. Ferris, did you bring any files with you today?

7 A No, I didn't.

8 Q Can you tell me why you didn't?

9 A Because I don't have any personal files on the
10 Midland Project.

11 Q No notes?

12 A No, any notes that I had, I sent to the project.
13 To Sherif Afifi.

14 Q When did you do that?

15 A After meetings.

16 Q You mean right after any meeting you would send
17 him the notes?

18 A I would send him the notes to be incorporated
19 into the notes of the meeting.

20 Q So you have no personal notes?

21 A No, I have no personal notes. I do a lot of
22 projects. I don't keep personal individual files.

23 Q Can you describe what kind of records are kept
24 at Bechtel in San Fransisco with respect to the Midland
25 soils problem?

1 A I can only -- just those that are in our geo-
2 technical group there.

3 Q Yes.

4 A And I receive copies of correspondents, the reports
5 that you mentioned earlier, things like that, and those
6 are filed in the geotechnical files in San Fransisco.

7 Q How many people work in the geotechnical?

8 A We have about a dozen soil engineers.

9 Q And are you --

10 A I'm in San Fransisco.

11 Q Right, and do you supervise that group?

12 A Yes, I do. That's one of my responsibilites.

13 Q These files are kept in a file for a group that
14 you supervise?

15 A No, I supervise their individual work, I work
16 for a manager of soil engineering who is overall in charge
17 of the soil treatment.

18 Q Who do you work for?

19 A Harris Burk.

20 Q You don't consider those files to be under your
21 control?

22 A No, I don't, I consider them to be under Mr.
23 Burk's control. I have access to them.

24 Q What kind of information is in those files other
25 than correspondents that you received?

1 A There would be correspondents that we have received
2 or sent, that's essentially all.

3 Q Okay, are the files that concern themselves,
4 are the papers that concern themselves with the soils problem
5 in Midland kept in a discrete file or are they mixed in
6 with other papers?

7 A They are -- the file we have is for the Midland
8 Project and the reports, volumes of reports that you referred
9 to are kept in a separate place from that particular filing
10 cabinet.

11 Q Okay, by that you mean the 50.54(f) responses?

12 A Yes, the hard-bound three-ring binders.

13 Q Right. Ignoring for a minute, the volumes that
14 contain the 50.54(f) responses, what is the quantity of
15 material that you have in the Bechtel office that concerns
16 the soils problem, the Midland for example, could it all
17 be placed in one drawer of a file cabinet?

18 A It's about a drawer and a half to the best of
19 my recollection. I'm not absolutely sure, I don't do the
20 filing.

21 Q And can you give me any kind of idea how far
22 back that file goes in time to some year, '75, '74?
23 If you know.

24 A I don't know how far back, most of it I'm sure
25 goes back to 1978.

1 A Do you mean at least to 1978?

2 A I said the bulk of the correspondence in that
3 is from August of '78 up to the present.

4 Q How long have you been assigned to the San Francisco
5 office?

6 A 21 years, a little over 21 years.

7 Q I want to ask you about contracts between Bechtel
8 and other organizations with respect to the piles in the
9 surface water structure and I want you to ignore the contract
10 that you made or have with Dr. Davisson, do you have knowledge
11 of any other contracts between Bechtel and anyone with
12 respect to those piles?

13 A I don't believe I have any contract documents.

14 Q Okay. I didn't ask you if you have any documents,
15 I'm asking you do you have any knowledge as to any contracts
16 between Bechtel and anyone with respect to it?

17 A I don't recall that at all, I don't recall seeing
18 it.

19 Q In the normal course of your business, would
20 you expect that there was a contract for the purchase of
21 these bills by this time?

22 A I would expect there was if they had been contracted
23 for it.

24 Q I'm afraid your answer to me sort of --

25 A I don't know. I haven't seen the contract to the

1 best of my recollection.

2 Q In the ordinary course of your experience, you have
3 been with Bechtel for 21 years in the San Francisco Office,
4 and you are now in the Midland site and the soil problems
5 there. What would be your estimate of when Bechtel ordinarily
6 would have contracted for the purchase of those piles?

7 MR. FARNELL: Are you talking about as the design
8 or the pile or are you talking about some point in time
9 or some --

10 MR. PATON: No, I'm talking about his knowledge of
11 this case and to estimate approximately when --

12 WITNESS: I don't know anything about the contract
13 for the piles.

14 BY MR. PATON:

15 Q I understand that, and I'm clear on that. I'm
16 asking you in your 21 years of experience with Bechtel.

17 A On a general basis?

18 Q On a general basis, when would they ordinarily
19 contract for piles, bearing in mind your knowledge of this
20 case, approximately when?

21 A Ordinarily on a job you would contract shortly
22 before you drive the piles.

23 Q Do you mean maybe six months before?

24 A Could be on that order.

25 Q Then you would not be surprised to learn that Bechtel

1 has not yet contracted for these piles?

2 A They are not doing work so it wouldn't surprise
3 me.

4 Q If you had to guess, would you say they probably
5 have not --

6 A I don't know.

7 Q Mr. Ferris, is there a problem with the fill
8 material in the electrical penetration area?

9 A Yes.

10 Q Would you please describe that problem?

11 A Again, borings in that area indicate low blow
12 count.

13 Q Do you remember precisely what the blow counts
14 were?

15 A No, I don't.

16 Q Is there any other indication of pore fill in
17 that area?

18 A There is principally low blow counts.

19 Q What conclusions have you reached as a result
20 of obtaining low blow counts in that area?

21 A As proposed to underpin the penetration areas?

22 Q What I mean by my question is what conclusions
23 have you reached as to the conditions of the soil?

24 A Well, there is loose material there.

25 Q Have you reached any other conclusion other than

1 there is loose material there?

2 A I don't know what you mean.

3 MR. FARNELL: By a "problem" what do you mean?

4 MR. PATON: I mean do you agree that there is pore
5 fill in that area?

6 WITNESS: There appears to be based on the blow count.

7 BY MR. PATON:

8 Q And I'm asking you what you know about the fill
9 and you have indicated to me that there are low blow counts
10 and that indicates -- did you say -- loose fill --

11 A Loose or less dense than we had anticipated.

12 Q And I'm asking you, are there any other indications
13 of the inadequacies of that filled material?

14 A I'm not aware of any.

15 Q Please describe the remedy that's proposed and
16 I'm now talking about the electrical penetration area.

17 A It is proposed to underpin the ends of the electrical --
18 I guess they are called the wings of the auxiliary building.
19 Is that the same place that you are talking about?

20 Q Can you describe in a little more detail what
21 the proposed remedy is to this soils problem in the electrical
22 penetration area?

23 A Well, they are going to carry the load at the
24 end of each wing of the auxiliary building down into the
25 glacial till by means of caissons, so they are going to

1 transfer the load at that end to the till so that the fill
2 is not supporting it. In the process of doing that, they
3 also have to support one of the column walls of the Tushen
4 building which is an adjacent building, or locally they
5 have to column lines.

6 Q What is going to support the other end of the
7 wing that is going to be supported?

8 A The control building.

9 Q Is this proposed remedy going to impose additional
10 loads on the control building?

11 A I believe it will.

12 Q Was that taken into account in the design of
13 the control building?

14 A I do not know that.

15 Q Is that not within your area of expertise?

16 A No, it is not.

17 Q What was in the original design? What was to
18 support this wing that is now going to be supported by
19 the caissons?

20 A Fill.

21 Q Okay. Do you consider the change from the support
22 from the fill as in the original design to caissons resting
23 on till; is that in your opinion a significant design change?

24 A It would change the design to the extent that
25 a structural engineer should look at the design.

1 Well, he should look at the design, he should evaluate
2 the design.

3 Q Doesn't it require a fairly substantial amount
4 of redesign?

5 A I'm not a structural engineer.

6 Q Within your area of expertise, do you consider
7 this a significant change in the design?

8 MR. FARNELL: I think he answered.

9 WITNESS: I believe it is a change.

10 BY MR. PATON:

11 Q Well, my question was whether it is a significant
12 change.

13 A I don't know what significant means.

14 Q Then describe to me the design change, it has
15 more significance than painting a building a different
16 color, I assume; is that correct?

17 A Yes, there is no connection with that at all.

18 Q I'm trying to get your expert opinion on whether
19 this is a minor change of design or a major change of design.

20 A It has changed the support condition for the
21 wing walls.

22 MR. FARNELL: Could the court reporter read back the
23 last question and answer.

24 (At which time the aforementioned
25 question and answer were read back.)

1 BY MR. PATON:

2 Q Do you have any idea of the dollar cost of the
3 proposed remedial action for the electrical penetration
4 area?

5 A No, I don't.

6 Q Do you have any idea of the proposed cost of
7 the remedies that are proposed to resolve the soils problem
8 at the Midland site?

9 A No, I don't.

10 Q Is there anyone in Bechtel that would address
11 that subject?

12 A I'm sure there must be, but I don't know who
13 that would be.

14 Q Do you have any idea who that would be, for example,
15 the comptroller or there must be someone who addresses
16 problems like that.

17 A Well, the project engineer probably knows, but
18 I don't know for sure.

19 Q Do you mean the project engineer --

20 A Of the Midland Project.

21 Q The Bechtel Project Engineer?

22 A The Bechtel Project Engineer.

23 Q And is this the gentleman that's on the site?

24 A No, he is the man in the office in Ann Arbor.

25 Q And is this Mr. Curtis? Did you ever hear anyone

1 in Bechtel discuss the cost of any of the remedial actions
2 that are proposed at the Midland site?

3 A I do recall hearing a cost discussion once.

4 Q What did that consist of?

5 A It was a discussion of some analysis of different
6 procedures for correcting the diesel generator building.

7 Q Do you remember any dollar figures that were
8 mentioned?

9 A No, I do not remember precisely any figures.

10 Q Who was at that meeting?

11 A The person that I recall discussing it was Carl
12 Wiedner. It was a personal communication.

13 Q You have been with Bechtel for 21 years. Can
14 you tell me generally how Bechtel resolves matters similar
15 to this where an obvious error has been made and there
16 is some substantial cost to remedy that error, how is that
17 generally resolved as between Bechtel and the Applicant?

18 MR. FARNELL: Would the court reporter read back the
19 last question.

20 (At which time the aforementioned
21 question was read back.)

22 WITNESS: I don't know.

23 BY MR. PATON:

24 Q In 21 years, have you seen any other situations
25 like this where an obvious error has been made and remedies

1 of substantial portions and remedies have to be proposed
2 and made?

3 A Yes, I have recalled other occasions.

4 Q Can you tell me briefly what was the most recent
5 one like this that you can recall?

6 MR. FARNELL: I'm going to put an objection on the
7 record, I think this is just totally, completely outside
8 the scope of any permissible discovery in this case. I'm
9 going to let him answer it, but I think it is a waste of
10 his time and our time. And also, I'm going to ask him
11 to not disclose any discussions he has had with attorneys
12 within Bechtel with regards to these matters.

13 MR. PATON: Since you have stated on the record that
14 you think this is a waste of time, I think it is appropriate
15 that I make some response. I have been --

16 MR. FARNELL: That may be more of a waste of time,
17 but go ahead if you want.

18 MR. PATON: I don't know why we are getting into the
19 same acrimonious --

20 MR. FARNELL: I'm smiling.

21 MR. PATON: Okay, good, you are smiling. I have been
22 attempting to find out from some Bechtel personnel, it
23 seems extremely obvious that an error of major proportions
24 has been made here, and I would have to assume that there
25 is some arrangement between Bechtel and Consumers as to who is

1 going to pay for this. And I'm merely trying to discover
2 anything I can about that, because I think it would clearly
3 lead to discoverable evidence. With respect to how this
4 problem came about, and the proposed remedies and etc. --
5 that's the purpose of my inquiry.

6 BY MR. PATON:

7 Q I believe you can answer my question as to the
8 most recent instance that you recall similar to this where
9 a major error has been made, remedial action is required.

10 A Could you say what you mean by "similar"? Do
11 you mean that something happened that should not have happened?

12 Q Yes.

13 A The most recent that I can recall right away was
14 at a mining project in Utah.

15 Q And was this work done by Bechtel?

16 A Yes, it was.

17 Q And something happened that shouldn't have happened?
18 Briefly describe that.

19 A Okay, it was a settlement, more settlement than
20 was anticipated by the people at the building structure.

21 Q And was the problem remedied?

22 A Yes, it was.

23 Q Is it clear to you the cause of the problem?

24 A Yes, I believe it is.

25 Q What caused the problem?

1 A I believe the sequence of construction was not
2 the sequence that we -- that my group's personnel had recommended
3 and that resulted in additional settlement.

4 Q And was that construction done by Bechtel?

5 A It was managed by Bechtel.

6 Q Do you have any idea in that instance the cost
7 of the remedial actions?

8 A No, I don't.

9 Q And you have no idea as between Bechtel and the
10 people they were contracting with to do that work, who
11 paid for that remedial action?

12 A No, I do not.

13 Q And your statement is that in 21 years -- strike
14 that. In 21 years, can you estimate approximately how
15 many instances you have seen similar to that where work
16 was done on a contract with Bechtel and a major error was
17 made requiring remedial action?

18 A Okay, I can only recall two other occasions.

19 Q And in your 21 years with Bechtel, you don't
20 can't give us any information on how these matters are
21 resolved as with regard to who pays for those remedial
22 actions?

23 MR. FARNELL: You have asked him that at least twice,
24 he has answered it at least twice, which is in my opinion
25 totally outside. I think you are really pushing limits here.

1 BY MR. PATON:

2 Q Okay, well, I gather your answer is no, you don't have
3 any idea.

4 A I don't now.

5 Q Now, with respect to the electrical penetration
6 area, you have described the proposed remedies underpinning
7 the wing, which are the electrical penetration areas with
8 caissons; is that accurate?

9 A It is underpinning the outer ends of the wings.

10 Q What is the difference between a caisson and
11 a pile?

12 A Size, I guess is the most, and the method of
13 installation.

14 Q Just tell me, which is bigger, etc.

15 A Well, generally speaking, a caisson is bigger,
16 and depending on how it is installed, it could be installed
17 by hand, or it could be installed by drilling process.

18 Q Why are you using caissons here and piles in
19 the case of the surface water structure?

20 A In the case of the electrical penetration it
21 is because of the access to the work, you could not drive
22 piles there, and also, in that particular instance, we
23 do wish to investigate the stratum to which we go and make
24 sure that the caisson is seated in the glacial till.

25 Q In the case of the surface water structure, you are

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not going to investigate the stratum to be sure that it is installed?

A I did not say that.

Q Okay, we are doing it by another procedure, which I discussed earlier, now, when I asked you a similar question to what I asked you with respect to the surface water structure, and that is: what do you need to know about the soil before you design the caissons that will underpin the electrical penetration areas.

A Okay, the stratum that we are going to -- we already have a lot of information on. The glacials till in which the major structure is under, the main concern is that the caissons being sent into that till, so we need to inspect the bottom of the caissons to make sure we are in that till.

Q My question was what do you need to know about the soil before you design the caissons?

A You need similar information to that, that I mentioned at the surface water, we need to know the soil stratification, what is fill and where is the till.

Q Do you need to know for example, the soil conditions, is your answer the same as before that you need to know soil conditions and that would include soil classification which is gravel, sand, clay and silt; is that correct?

A That's correct.

1 Q What is the source of the information that you
2 have with respect to the till?

3 A The Dames and Moore Reports?

4 Q What is the approximate date of that Dames and
5 Moore Report?

6 A My recollection is that there are two and I believe
7 they were in the late '60s, 1969 or 1970.

8 Q You indicate there are two Dames and Moore Reports.

9 A I believe there are two, I was not working on
10 the project at that time.

11 Q Do you know if those reports have been provided
12 to the NRC?

13 A I would assume so, but I don't know for my own
14 personal knowledge. I believe there were appendices to
15 the PSCR in which case the NRC would have them.

16 Q Do you know whether there are any cracks on the
17 penetration area structure?

18 A No, I don't know that. I don't recall it any-
19 way.

20 Q How often do you visit the site?

21 A Very seldom.

22 Q In the last two years, how many times have you
23 been to the site?

24 A Well, that's '79 and '80?

25 Q Yes.

1 A Probably three or maybe four times.

2 Q And in those three or four times, when you go
3 to the site, approximately how long did you stay there?

4 A Usually for a day or two days.

5 Q And when you go there, do you go just to meetings
6 or do you go around and inspect and make a physical inspection
7 of the site?

8 A The purpose of my visit has been to attend meetings,
9 I take the opportunity of looking at those areas that I
10 can see just for personal interest point of view.

11 Q In the last two years, how much time have you
12 spent other than at meetings out looking at the site itself?

13 A Could you repeat that question please?

14 Q Yes. You indicated that in the last two years,
15 you have been to the site either three or four times.

16 A Yes.

17 Q And I want you to tell me how much time you have
18 spent outside meetings, in other words, I'm not asking
19 you about meetings, I'm asking you about how much time
20 have you spent on the site looking at or inspecting areas
21 of a site and the structures on the site.

22 A I don't know precisely, but I would say maybe
23 half a day each time I have been there.

24 Q When is the last time you looked at the electrical
25 penetration area?

1 A I believe I have only been once in the electrical
2 penetration area and that would have been some time in
3 1979, I believe.

4 Q Around -- '79?

5 A '79 or late '78.

6 Q And do you not recall any cracks at that time?

7 A I do not recall having seen any cracks.

8 Q Okay, now my question is do you have a distinct
9 recollection that there was not any cracks?

10 A I would not say that.

11 Q Do you have any knowledge of any contract with
12 Bechtel concerning the underpinning of the electrical penetration
13 area?

14 A I'm not aware of any current contract for underpinning
15 there.

16 Q Are you aware of any negotiations or conversations
17 concerning a proposed contract?

18 A It's my understanding that there were negotiations
19 with the potential low bidder -- or I'm not sure if it
20 was a low bidder, but a selected sub-contractor, sometime
21 about the time that the stop-work order came through.

22 Q By the "stop-work order " --

23 A I mean the December 6th letter or whatever it
24 is.

25 Q All right, December 6, 1979?

1 A '79.

2 Q What was the status of that contract at that
3 time, I mean was it just being discussed or negotiated
4 or did it exist or what?

5 A I really don't know that. It's not something
6 that I wouldn't normally be aware of.

7 Q Okay, who did you hear talking about it?

8 A I believe the first person who told me was Dr.
9 Davisson whom I mentioned earlier.

10 Q Do you recall anything more about what he told
11 you other than what you have just said?

12 A Not really.

13 Q Do you recall who the other party to the contract
14 was?

15 A Yes, I believe it was with a firm and I'm not
16 sure of the complete title of the firm, but it had Mergantile
17 in it.

18 Q Do you know whether that contract included the
19 design of the caissons?

20 A I really don't recall that.

21 Q Who in Bechtel would know about this contract?

22 A The project would know -- the project engineer.
23 Mr. Curtis.

24 Q Mr. Curtis spent his time in the office in Ann
25 Arbor?

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A Yes, Mr. Curtis is part of the Ann Arbor Division of Bechtel Power Corporation.

Q Briefly tell me the difference between Bechtel Power Corporation and Bechtel Incorporated. Just generally, what does each one do. Why are they different?

A Bechtel Power Corporation consists of several divisions, and I'll have to read them off to you, San Francisco Power Division, Ann Arbor Power Division, Gaithersburg Power Division, and Los Angeles Power Division.

Bechtel Incorporated consists of a number of divisions also of which Hydro and Community Facilities Division is one, Mining and Metals Division is another -- and I don't recall the others right now.

Q All right. And is Bechtel Incorporated headquartered in San Francisco?

A Hydro and Community Facilities is in San Francisco. There may be facilities of Bechtel Engineering that are not. I don't know that precisely.

Q All right. Thank you. Do you know whether Dr. Afifi has any knowledge or input into that contract that we have just been discussing?

A Do you mean the contractual discussions?

Q Yes.

A I do not know.

Q Now, referencing the contract that you indicated was

1 with an organization that had the name Mergantine in the
2 the title and --

3 MR. FARNELL: I don't think there has been established
4 that there was a formal contract.

5 MR. PATON: I think you are correct.

6 BY MR. PATON:

7 Q It was at least some discussions of a contract;
8 is that correct?

9 A I think what I said was that I had heard that
10 there had been negotiations but I don't know what the status
11 was.

12 Q And to your knowledge, that contract concerned
13 the electrical penetration area?

14 A That is correct, the underpinning of the electrical
15 penetration.

16 Q Do you know whether Dr. Afifi provided any input
17 such as plans and specifications or any other input with
18 respect to that proposed contract?

19 A I do not know the extent to which he might have
20 submitted information.

21 Q Now, I'm returning to the question of what you
22 need to know to design the caissons in the area of the
23 electrical penetration area, and your first response was
24 you would have to know the conditions of the soils, the
25 soil conditions.

1 A Soil stratification.

2 Q Okay. You would have to know soil classification?

3 A Stratification, yes, which would include the
4 classification of each stratum.

5 Q Okay, stratification and within each stratum
6 the classification of the soil?

7 A Right.

8 Q And you would also want to know the consistency
9 of the soil?

10 A Right.

11 Q Generally whether it is soft or stiff?

12 A Right. But primarily you would want to know
13 where the surface of the fill is because that is the stratum
14 to which you are carrying a load.

15 Q But you do need to know the soil conditions in
16 the fill?

17 A You need to know the fill.

18 Q But don't you need to know -- you said the depth
19 of fill, didn't you just tell me that you need to know
20 the soil stratification?

21 A Stratification and classification. In my reference
22 to the fill, I was considering that to be one stratum.

23 Q Do you mean that the fill is one stratum?

24 A I was considering it to be one stratum.

25 Q That is in fact not the case, is it?

1 A It is a rather heterogeneous stratum in some
2 areas.

3 Q It is one stratum made up of a lot of different --

4 A Lenses.

5 Q -- a lot of different types of soil?

6 A Several different types of soil.

7 Q And you consider that one stratum?

8 A I was considering it in the way I was using it
9 in the way I was when I responded to your question.

10 Q Do you have to know what the make-up of that
11 stratum is? In other words, do you have to know what percentage
12 of gravel, what percentage of sand, what percentage of
13 clay, etc?

14 A Not necessarily in this case.

15 Q All right, then I think you are telling me that
16 all you need to know really is the depth of that what you
17 consider one stratum?

18 A The most important thing is the depth to the
19 till stratum and in this area you need to know the depth
20 to the water table because that is also something that
21 must be taken care of in construction.

22 Q Did Bechtel know those things on December 6,
23 1979?

24 A Yes, I believe they did.

25 Q Do you know whether they had conveyed that information

1 to the NRC?

2 A I do not know that.

3 Q Would you have to know the maximum static and dynamic
4 loads to be imposed on the caissons?

5 A I wouldn't have to, but somebody who is designing
6 the caissons would have to.

7 Q Whoever designs the caissons would have to know
8 that?

9 A Yes.

10 Q Did Bechtel have that information on December
11 6, 1979?

12 A I believe so.

13 Q Do you know whether the NRC has provided the
14 applicant and Bechtel with any recent seismic requirements
15 that may be different from those of the construction when
16 the construction permit was issued?

17 A I have been told that there is classification
18 in given to changing the SSC.

19 Q If that in fact happens, would that affect the
20 analysis of the maximum static and dynamic load to be imposed?

21 A It would not change the static loads, but it
22 would change the dynamic loads.

23 Q Right, do you know to what extent Bechtel has
24 addressed any change in dynamic load caused by different
25 seismic requirements?

1 MR. FARNELL: Are we talking about one building or
2 all buildings?

3 MR. PATON: I'm still talking about the electrical
4 penetration.

5 WITNESS: No, I'm not aware of what has been done.
6 BY MR. PATON:

7 Q To design the caissons, you have to determine
8 the load-bearing capacity of these caissons, don't you?

9 A Would you please reword that question?

10 Q Yes, I think I better. In order to design the
11 caissons, do you have to know the sheer strength of the
12 soil on which the caissons will rest?

13 A In order to determine the factor safety against
14 the sheer failure, yes.

15 Q And how do you --

16 MR. FARNELL: Would the court reporter read back the
17 last question and answer.

18 (At which time the aforementioned
19 question and answer was read back.)

20 BY MR. PATON:

21 Q On December 6, 1979, did Bechtel know the sheer
22 strength of the soil on which the caisson was to rest?

23 A Yes, I believe I answered previously that we
24 had all of the data that Dames and Moore produced.

25 Q This is the data that Dames and Moore produced

1 in 1969 and 1970?

2 A For the till.

3 Q And that related to the till?

4 A Yes, which is the bearing strata for the caissons.

5 Q Is it correct that the sheer strength of the
6 soil in the fill -- is it correct that the sheer strength
7 of the soil in the fill is not in consideration here?

8 A Well, there could be -- again there could be
9 a small down drag load on the caissons.

10 Q Other than the down drag load; is that the only
11 significance?

12 A That would be the only significance.

13 Q Okay. For the record, let me finish. That would
14 be the only significance of the sheer strength of the soil
15 in the fill is the down drag, right?

16 Does the fill material provide any lateral
17 support for the caissons?

18 A I could not believe that that is taken into account
19 in the design, but I'm not absolutely sure.

20 Q Mr. Farris. I believe you indicated that
21 prior to December, 1979, you knew the sheer strength of
22 the soil in the till.

23 A Right.

24 Q And you obtained that information from Dames
25 and Moore Reports dated approximately 1969 and 1970?

1 A I think what I said was that that information
2 was in the Dames and Moore report.

3 Q Okay. Prior to December 6, 1979, did Bechtel
4 ever put that information about the sheer strength of the
5 soil in the till into an analysis to estimate the load
6 bearing capacity of the caissons in the electrical penetration
7 area?

8 A I don't recall for that specific date. I would
9 assume if it was done , if there was negotiations for contract,
10 but I don't now that for sure.

11 Q Would that have to be done prior to the contract
12 being let?

13 A I'm sure somebody would have looked at that.

14 Q The point is you would have to apply that information
15 to determine what kind of caissons you were going to buy;
16 is that correct?

17 A Not kind, what size.

18 Q What design? Do you participate in any discussion
19 as to any alternative remedy for the problem at the electrical
20 penetration area?

21 A I don't recall having discussed an alternative
22 there.

23 Q To your knowledge, did anybody in Bechtel ever
24 consider any alternative to the use of caissons to
25 underpin the electrical penetration area.

1 A I don't recall that.

2 Q Wouldn't it be normal engineering practice to
3 consider some alternative to a proposed fix?

4 A My answer was that I don't recall. I did not
5 say that it had not been done.

6 Q In the normal course of your responsibilities,
7 do you think you would have participated in such discussions
8 if they took place?

9 A Not necessarily.

10 Q Who would make a determination like that?

11 MR. FARNELL: Determination of what?

12 MR. PATON: As to possible alternative remedies to
13 the --

14 MR. FARNELL: Determining --

15 MR. PATON: Possible alternative fixes or proposed
16 remedies to solve the problem at the electrical penetration
17 area.

18 WITNESS: The project structural engineer.

19 BY MR. PATON:

20 Q Okay, I believe you indicated you don't know that
21 person's name?

22 A I'm not certain of his name and that's why I'm
23 unwilling to mention it.

24 Q It's not Mr. Dahr, is it?

25 A It could be Mr. Dahr.

1 Q Whoever this person is as far as you know, his
2 office is in Ann Arbor?

3 A That's correct.

4 Q Do you recall any discussions by anyone within
5 Bechtel as to alternative remedies in the surface water
6 structure for the surface water structure?

7 A Yes, I do recall discussions, I do not recall
8 who they were with, but I do recall discussions.

9 Q Do you recall any possible alternative to the
10 underpinning that was discussed?

11 A Yes, I do recall that there was discussion on
12 alternatives.

13 Q But, you don't recall --

14 A I don't recall who it was with.

15 Q Was the question of cost included in those
16 considerations?

17 A I do not believe cost entered into the discussions
18 that I recall.

19 Q You don't have any clear recollection that cost
20 was not considered.

21 Q I don't recall that either.

22 Q The usual practice would be to give some consideration
23 to cost, would it not?

24 A Yes, of course, good engineering practice would
25 require a consideration of cost.

1 Q And good business practice?

2 A Good engineering practice requires it.

3 Q Good business practice would also require it
4 wouldn't it?

5 MR. FARNELL: It has been asked and answered.

6 MR. PATON: He didn't answer it -- that is specifically
7 what he didn't answer.

8 MR. FARNELL: I object. There is no foundation that
9 he is a business man.

10 MR. PATON: He is a chief soils engineer for Bechtel
11 and has been with Bechtel for 21 years. If he doesn't
12 have an opinion, that's fine with me.

13 MR. FARNELL: I'm still objecting, no foundation.

14 BY MR. PATON:

15 Q Do you have an opinion?

16 A Well, I believe good business practice would also.

17 Q Would also consider that you would consider cost
18 of good engineering?

19 A Good engineering practice means you are designed
20 to meet the designs criteria at the lowest cost. So, from
21 an engineering point of view, consideration is of great
22 importance.

23 Q And you have answered as of engineers and I'm
24 asking is that also as of good business practice?

25 A I just answered that, I believe it is also good

1 business practice.

2 MR. FARNELL: He already answered that.

3 Would this be a good time to break for lunch?

4 MR. PATON: Yes.

5 (At which time a one-hour lunch break
6 was taken. And the deposition was resumed
7 after lunch.)

8 BY MR. PATON:

9 Q Mr. Ferris, sometime ago, I believe you indicated
10 to me in response to the surface water structure that it
11 was your opinion that it was not good current engineering
12 practice to estimate load bearing capacity of the soil
13 prior to load test; is that what you said?

14 A I don't believe I said it in those words.

15 Q Would you say it in your own words?

16 A Yes. I think what I said was there are better
17 ways of evaluating that.

18 Q Better ways of evaluating what?

19 A Load bearing capacity.

20 Q And is that better way by load testing?

21 A Load testing combined with the waive equation
22 analysis.

23 Q And this is again, a better way to estimate load
24 bearing capacity of piles; is that what you said?

25 A Yes, better way to estimate the load capacity of piles.

1 Q Did you indicate that at one time it was the practice
2 to estimate the load bearing capacity of the soil first
3 before you install?

4 A I would like to correct what I just said there,
5 I'm talking about the load capacity of the soil, the load
6 being transferred through the pile.

7 Q All right. Fine, would you say load bearing
8 capacity?

9 A If you would like to call it that, that's fine.
10 It doesn't bother me.

11 Q Again, you indicated that it has been determined
12 now, currently, that it is not considered the best way
13 to determine to estimate load bearing capacity of the soils.
14 It is current practice to do that prior to load testing.
15 There are better ways to estimate load bearing capacity.

16 A I don't remember my precise words, but I believe
17 what I was indicating was my -- It's my belief that the
18 procedure that I described using the waive equation and
19 the load testing was a much more reliable way to evaluate
20 the load bearing capacity of a pile in soil.

21 Q And did you indicate that there had been some
22 change in engineering thinking in this area in the last
23 ten years?

24 A I think I said it was more than 10 years, I believe
25 the waive equation was developed in the '50s.

1 Q Okay.

2 A And since that time these procedures have started
3 to be used.

4 Q What is your source of information that indicates
5 to you that change in thinking in the last ten or fifteen
6 years? How do you know that?

7 A Major source?

8 Q Yes. I would like to know all of your sources.

9 A Basically, discussions with Dr. Davisson.

10 Q Discussions on work with Dr. Davisson, would
11 you say primarily your discussions?

12 A Right.

13 Q Mr. Ferris, have you read the December 6, 1979
14 order?

15 A You just showed me that, I believe; is that the
16 one you just showed me this morning?

17 Q No.

18 Q Then I probably have, but I don't remember.

19 Q Do you rememebr the term "acceptance criteria"
20 in that order?

21 A I don't remember in what context it was used.

22 Q Does the term "acceptance criteria" mean anything
23 to you?

24 A It does to me. I think you need to tell me in
25 what respect you were using it.

1 Q With respect to the proposed remedies, the remedies
2 that are proposed by the applicant, say for example, on
3 the surface water structure, does the word acceptance criteria
4 have any meaning to you with respect to that proposed remedy?

5 A Yes, I believe there are proposals -- in fact,
6 I know there are proposals to do things there to satisfy
7 us, that we have appropriate capacity in piles.

8 Q You said there are proposals to do things there
9 to satisfy us that we have --

10 A It's my recollection that in a meeting with the
11 NRC at Midland in about February last year, that there
12 was a discussion of what was to be done at the surface
13 water structure.

14 Q For the purpose of satisfying the NRC's review?

15 A Our primary purpose is to satisfy ourselves and
16 the intention is, of course, to reach agreement with NRC.

17 Q Do you know what particular -- can you give me
18 an example of an acceptance criteria as you understand
19 it?

20 A Yes. It is my recollection that each of the
21 piles at the surface water structure was going to be tested
22 to one and a half times it's capacity, it's working capacity.

23 Q And when was that to be done?

24 A After the pile was installed, and before the
25 pile load was -- before the load of the building was transferred

1 to the piles.

2 Q Now, bearing in mind the word "acceptance criteria"
3 if the test -- did you say the piles were to be tested
4 to one-and-a-half times the working load?

5 A That's my recollection.

6 Q And that would be to determine the acceptance
7 of the pile?

8 A That's correct.

9 Q The acceptance of the pile at the working load?

10 A You are overloading the load to make sure that you
11 have it satisfactory.

12 Q And what -- has that been done?

13 A As far as I know the piles have not been installed.

14 Q The proposed remedy, when was this proposed remedy
15 sent to the NRC?

16 A I do not know that date. What I just said was
17 that I recall it being discussed with the NRC and I believe
18 Mr. Kane was present at that discussion. And I believe
19 it was about February of last year.

20 Q February of this year?

21 A I beg your pardon, not last year. I think I
22 might have said last year, but I mean 1980.

23 Q Okay, February?

24 A Of 1980.

25 Q That's when the proposed remedy for the surface

1 water was discussed in early 1980?

2 A In February of 1980 it was my recollection.

3 MR. FARNELL: Are you saying that was the first time
4 it was proposed?

5 MR. PATON: I just asked him what was said --

6 WITNESS: To clarify the record, what I said was I
7 did not recall when it was first discussed with the NRC,
8 but I do recall it being discussed with the NRC at a meeting
9 at which Mr. Kane was present in Midland in February of
10 1980.

11 BY MR. PATON:

12 Q Now, this proposed remedy is before the NRC,
13 now you have sent it to the NRC?

14 A It was discussed with them. I do not have anything
15 to do with sending stuff to the NRC.

16 Q But it has been proposed to the NRC to your knowledge?

17 A Yes, it may have been sent, but I don't know.

18 Q And this acceptance criteria that the piles would
19 have the ability to bear one-and-a-half times the load
20 that was expected, that test is going to be conducted sometime
21 in the future; is that correct?

22 A Yes, when the piles are driven, after the piles
23 are driven.

24 Q And the NRC will not know whether they meet that
25 requirement until after the piles are driven -- you won't know

1 that either?

2 A That is correct. This is an acceptance criteria. It
3 is an acceptance of each individual pile in the building.

4 Q Well, under that set of circumstances, since
5 the NRC will not know until you perform this test, which
6 is sometime in the future, that the piles meet that test,
7 then is there any way that NRC could accept these piles
8 at this time?

9 MR. FARNELL: I'm going to object to that, I don't
10 know what the NRC can do. They can prove they can do a
11 lot of things, but that one I'm not sure about.

12 MR. PATON: If this is within your understanding of acceptance
13 criteria, it would be acceptance for what purpose?

14 WITNESS: Construction.

15 BY MR. PATON:

16 Q And are you using that in the context of saying
17 that the NRC would after receiving this information approve
18 your proposal for construction?

19 A No, I have said other things to you about this,
20 that isn't the only thing I said to you about it.

21 Q All right, but let's talk about this one.

22 A As far as the installed piles in the building,
23 individually being accepted, that is my understanding of
24 the acceptance criteria.

25 Q Okay, do you propose that the NRC accept this

1 proposal prior to determining whether or not it meets this
2 acceptance criteria of one and a half times the expected
3 weight.

4 MR. FARNELL: Would the court reporter read back the
5 last question.

6 (At which time the last question
7 was read back.)

8 BY M.R. PATON:

9 Q The proposed remedy for the surface water structure --

10 MR. FARNELL: I don't think that question makes sense.

11 WITNESS: It doesn't to me on the basis of what I
12 have discussed with you.

13 BY MR. PATON:

14 Q All right. We have been talking about the word
15 acceptance criteria.

16 A That's correct.

17 Q Focus on the word acceptance.

18 A Yes.

19 Q What does tht mean in the context --

20 A In the context that I have been discussing it
21 with you? I have been discussing the acceptance of the
22 individual piles which are going to be used for proposed --
23 to be used for underpinning the surface water structure.

24 Q Have you been using it in the context of acceptance
25 by NRC?

1
2 A Acceptance by anybody, Bechtel, our client and
3 NRC.

4 Q Well, then you would not expect the NRC to accept
5 it until after this test has been accomplished.

6 A Accept what?

7 Q Well, does the NRC when you send them information,
8 do you send them a proposal for the surface water structure;
9 is that correct?

10 A Right.

11 Q What do you expect them to do with that proposal?

12 A Expect them to evaluate. This is one item in
13 that proposal.

14 Q Isn't the objective of your submitting that proposal
15 that they evaluate and accept it?

16 A My feeling is that they should not accept it
17 on one item out of that structure.

18 Q I think we can go through the same exercise with
19 all the proposals I want to see how this particular one
20 works. Would you expect NRC to accept it on whether or
21 not it met the criteria?

22 MR. FARNELL: What do you mean? I'm confused.

23 MR. PATON: He has just told me precisely what he
24 means by acceptance.

25 WITNESS: If you don't mind, I would like to answer
it as I understand it. I believe we have told you the

1 acceptance criteria that are proposed to be used and I believe
2 that's one of the items that the NRC should review in their
3 review of that structure. Now, the acceptance of individual
4 piles will be based on that acceptance criteria that the
5 NRC has reviewed and hopefully accept it.

6 BY MR. PATON:

7 Q Okay, that is an acceptance criteria, can you
8 think of another example of an acceptance criteria with
9 respect to the remedy for the surface water structure?

10 A Well, that is the principle acceptance criteria.
11 I'm having problems with what you are asking.

12 Q I think a lot of people have trouble with that
13 subject.

14 MR. FARNELL: The questions you are asking?

15 MR. PATON: Yes.

16 BY MR. PATON:

17 Q Our maximum dynamic loads to be imposed are they
18 acceptance criteria?

19 A Not in the pile driving portion, the insulation
20 of the piles, the maximum dynamic loads have to be taken
21 care of in the design of the structure, which may lead
22 to the capacity of the pilings being a specific number
23 of tonnage or whatever.

24 Q Well, for anybody to evaluate the piles that
25 are proposed to be used at the surface water structure, don't

1 they have to know what the dynamic loads are to be imposed
2 on that pile?

3 A Somebody would have to satisfy themselves that
4 we have enough piles in the structure to take care of the
5 loads that are coming on the structure.

6 Q Well, then are dynamic loads to be imposed an acceptance
7 criteria?

8 A Not for the installation of the piles as such.
9 As I understand your question.

10 Q Do you agree that you have to make that determination
11 at some time?

12 MR. FARNELL: Which determination?

13 MR. PATON: The dynamic load to be imposed on the
14 pilings.

15 WITNESS: That must be included on the design.

16 BY MR. PATON:

17 Q Before installation?

18 A Certainly, before you come up with a design for
19 the foundation you must know what it is you are designing
20 for and the loads is one of the most important things.
21 Those are one of the most importhant things.

22 Q Did Bechtel know on December 6, 1979 what the
23 dynamic loads were to be proposed on the piles for the
24 proposed surface water structure?
25

1 A I do not know. That is not in my area of expertise.

2 Q Does the 75 ton pile load capacity incorporate
3 seismic loading?

4 A I don't know the answer to that, what I gave
5 you is my recollection of what I heard in the meeting in
6 February of this year.

7 Q Have you heard any discussions among any people
8 at Bechtel as to the meaning of acceptance criteria?

9 A The word is used very often. I don't recall
10 being party to a specific discussion in it.

11 Q In your professional experience, excluding for
12 a minute NRC's use of that term, is that a term that you
13 understand other than its use in connection with the
14 NRC?

15 A Well, I would understand that use of terminology,
16 but it would have to be in some context.

17 Q Okay. Do you consider demonstration of an adequate
18 margin of safety against bearing capacity failure to be
19 necessary to accept your proposed remedial measures?

20 MR. FARNELL: Could the court reporter read back the
21 last question.

22 (At which time the aforementioned
23 question was read back.)

24 MR. FARNELL: Are you talking all remedial measures?

25 MR. PATON: Surface water structure.

1 MR. FARNELL: I guess I have a vagueness objection.
2 I don't know what adequate margin of safety is.

3 MR. PATON: That's in his opinion, I mean if he doesn't
4 have an opinion, that's up to him.

5 WITNESS: There may be other criteria that I'm not
6 aware of, but that is certainly one of the important criteria.

7 BY MR. PATON:

8 Q Okay, so that in your opinion, demonstration
9 of that margin you consider that necessary?

10 A Yes, I believe I have already stated that several
11 times today.

12 Q Would you say the same thing for demonstration
13 of an adequate margin of safety against liquifaction failure?

14 A Yes. It's our normal practice to have a factor
15 of safety against potential for liquifaction.

16 Q Would you say the same thing with respect to
17 unacceptable elements of settlement?

18 A I would not be able to discuss that with you
19 as such, because it combines structural analysis as well.
20 It depends on the function of the structure.

21 Q Can you tell me what process Bechtel followed
22 in selecting its consultants?

23 MR. FARNELL: For the Midland project?

24 MR. PATON: For this Midland soils project.

25 WITNESS: I can tell you with respect to some of the

1 consultants, I'm not sure that I can tell you with respect
2 to all of them. On the first trip that I made to Midland,
3 following the problem that we have been discussing here today,
4 the settlement problem of the diesel generator building,
5 I was asked by Phil Martinez to nominate consultants in
6 the area of soils.

7 And I had a discussion with him at which
8 we discussed the possibility of Dr. Peck being the consultant.
9 I pointed out to Mr. Martinez that Dr. Peck is very busy,
10 much sought after consultant, and I thought there was a
11 very good chance that he could not spend as much time on
12 his job as was possibly required.

13 And so I made a suggestion to him, to Martinez,
14 that we ask both Dr. Peck and Dr. Hendron to be consultants
15 in the area of soils for the evaluation of the diesel generator
16 building on the understanding that Dr. Hendron would be
17 the more available of the two and he and Dr. Peck when
18 they could would review their work amongst themselves and
19 then provide us with their evaluation of those areas that
20 we requested.

21 I believe Sherif Afifi was present with
22 me when I had the discussion with Martinez and I believe
23 it was in the Ramada Inn in Midland is where we had the
24 discussion.

25 BY MR. PATON:

1 Q You have indicated, however, that it was your
2 idea.

3 A It was Mr. Martinez's idea that they required
4 a consultant and he asked me to recommend one to him. I
5 did and he accepted the recommendation that I made.

6 Q Did the name Dr. Peck come to mind because of
7 your knowledge of his reputation in the area?

8 A Of course, Dr. Peck is one of the best known
9 soil engineering consultants in the world.

10 Q Do you know how many hours your consultants such
11 as Dr. Peck and Dr. Hendron had spent on the Midland Soils
12 Problem? I mean do you keep records like that?

13 A I don't keep records like that.

14 MR. FARNELL: All consultants?

15 MR. PATON: Let me stick with Dr. Peck.

16 WITNESS: I personally do not keep those records.

17 BY MR. PATON:

18 Q Does anybody keep records like that?

19 A I believe that there may be records like that.

20 Q I gather from the answer you don't really know
21 for sure.

22 A Well, Dr. Peck bills us for his work and I believe
23 you could from looking at his bills over the past two years
24 determine the number of days of work that he has done on
25 the Midland Project. But I don't keep those bills myself.

1 Q Do you know who does?

2 A Yes, our accounting office would, but I don't
3 know how long they keep them.

4 Q I assume you don't have any way to estimate how
5 many days Dr. Peck for example --

6 A Not right now, I don't.

7 Q And would your answer hold generally true for
8 other consultants like Dr. Hendron and Dr. Davisson, you
9 don't know? You can't estimate for example, the number
10 of days they have spent on the project?

11 A That is right. I could not tell you today how
12 many days he spent on that specific project.

13 Q You stated before you have read Dr. Afifi's deposition.

14 A Yes, I did.

15 Q Have you read any other depositions in this case?

16 A The only other deposition I read was Mr. Kane's
17 deposition -- or a portion of it.

18 Q We finished one portion of Mr. Kane's deposition
19 that took place on three separate days --

20 A That's probably the time.

21 Q As far as you know it was three different transcripts?

22 A I can't recall that, but it was more than one
23 volume, and probably it was over two or three days.

24 Q Now with respect to Dr. Afifi's deposition --

25 A Yes.

1 Q Does anything come to mind right now that you
2 disagreed with in his deposition?

3 MR. FARNELL: I'm going to object to that.

4 MR. PATON: That exact question was asked by other
5 counsel on your side of the case.

6 MR. FARNELL: I'm still going to put my objection
7 in.

8 MR. PATON: Fine.

9 MR. FARNELL: I object to the form, compound.
10 You can answer it if you recall.

11 WITNESS: I don't recall anything that I objected
12 to.

13 BY MR. PATON:

14 Q How long ago did you read Dr. Afifi's deposition?

15 A Probably a couple weeks ago.

16 Q With respect to Mr. Kane's deposition, the same
17 question.

18 MR. FARNELL: The same objection.

19 MR. PATON: Do you recall anything in Mr. Kane's deposition
20 that you disagreed with?

21 WITNESS: I would have to say yes, there were some things.

22 BY MR. PATON:

23 Q Please do your best to tell us what you can recall
24 right now that you disagreed with.

25 A I can't remember in detail but I believe that his

1 evaluation of some of our proposed analysis is not in agreement
2 with my evaluation.

3 Q All right. I would like very much to get whatever
4 detail I can, for example, tell us what evaluations.

5 A Okay, I guess we should go through them one-
6 by-one then.

7 Q Yes, sir.

8 A Why don't you call it out and I'll tell you what
9 I recall.

10 Q I don't know what it is that you disagreed with.

11 A I believe to start with the service order, intake
12 structure, he wanted to evaluate pile capacity using soil
13 perimeters as we discussed earlier. I believe our evaluations
14 for pile capacity is a better way to do it.

15 On the diesel generator building, his evaluation
16 of the effect of the preload is not consistent with my
17 evaluation, it affected the preload on the compacted fill.

18 Q I would hope you would go on and tell us in what ways.

19 A I believe he has some concern about whether or
20 not the preload was kept on long enough and I believe the
21 data showed that it was. And I don't recall anything on
22 the other facilities that were to be corrected. I did
23 not agree that there was a signed technical basis for requiring
24 the additional borings that are requested by the court
25 engineers and of course, Mr. Kane has defended in his deposition.

1 I think those are probably the most significant
2 ones that I can recall at the moment.

3 Q I want to ask you a few questions about the items
4 that you have just discussed starting with the diesel generator
5 building.

6 A Sure.

7 Q You indicated that you believe the surcharge
8 was left on long enough.

9 A Yes, I do.

10 Q What is your basis for that?

11 A My basis would be the results of the piezometer
12 and settlement analysis, settlement ratings, I mean.

13 Q What was it about the piezometer readings?

14 A The excess pore pressure had dissipated which
15 ordinarily is the manner in which you determine the primary
16 consolidation has been completed.

17 Q And you also said the settlement data?

18 A Yes. When the settlement data are plotted on
19 a semi-log plot of settlement versus time, they do reach
20 straight line portion and that straight line portion extended
21 for a sufficient length of time to indicate to me that
22 secondary consolidation was taking place.

23 Q Was that about a year?

24 A No, it was not a year, it was less than that.
25 The complete load was on in early April of 1979 and the load

1 was taken off about the middle of August of 1979, so it was
2 about four months.

3 Q Do you understand from the deposition what Mr.
4 Kane's position is with respect to the need for additional
5 borings?

6 A Yes, I do.

7 Q What is his position?

8 A As I understand it, he wants to take undisturbed
9 samples and evaluate the preconsolidation pressure of the
10 material in the fill beneath the diesel generator building.
11 And he also wants I believe to predict what settlement
12 might occur. But as I understood his deposition, he was
13 primarily interested in the preconsolidation pressure to
14 compare that with the preload fill.

15 Q Is it your understanding from reading Mr. Kane's
16 deposition that he thought the information from the borings
17 was more significant than the information to be obtained
18 from the surcharge program?

19 A It is my impression that he needed that information
20 before he would have believed the other.

21 Q And is it your thought that the information obtained
22 from the surcharge program -- strike that. In your opinion,
23 is it possible that some valuable information would be
24 obtained from the additional borings?

25 MR. FARNELL: What is your definition?

1 MR. PATON: I'm going to ask "possible" and then I'll
2 ask the next step. I assume it is possible.

3 MR. FARNELL: Anything is possible, I'm talking about
4 value.

5 MR. PATON: He is the expert.

6 MR. FARNELL: That's too vague. I'm going to object
7 to it. Could the court reporter --

8 MR. PATON: I'll strike the question.

9 In your opinion, is it possible that there
10 could be some information obtained from the borings that
11 would assist in interpreting the information obtained from
12 the behavior of the surcharge program?

13 MR. FARNELL: Would the court reporter read back the
14 last question.

15 (At which time the aforementioned
16 question was read back.)

17 WITNESS: My answer to that would have to be no.

18 BY MR. PATON:

19 Q Okay, that's very interesting. You are saying
20 that that's not even possible; is that correct?

21 A As I understand your question, you asked me,
22 would the boring give some data that would aid in evaluating
23 the preload.

24 Q Well, actually what I asked you was is it possible
25 that you could obtain some information that would be useful

1 in that regard.

2 A I don't believe that's possible.

3 Q And can you tell me why? Is it due to the heterogeneous
4 nature of the fill?

5 A I can try to explain why. First of all, the
6 preload fill is a full scale loading of the soil, so it
7 is independent of whether or not the fill is heterogeneous.

8 Q I apologize for interrupting you, could you start
9 again?

10 MR. FARNELL: Would the court reporter read back the
11 last question.

12 (At which time the last question
13 was read back after a brief
14 interruption.)

15
16 BY MR. PATON:

17 Q Does that complete your answer?

18 A No, it doesn't. That was the first item. The
19 second item, we have checked that the preload fill has
20 done what we intended it to do, that is take out the primary
21 consolidation that's been done in two ways, one by the
22 piezometers and that is -- the piezometers show that the
23 excess pore pressures have dissipated and secondly, the
24 settlement carved on the semi-log plot has reached secondary
25 consolidation.

1 The next item is that in my experience in
2 dealing with preconsolidation as determined in the laboratory
3 on soil samples that that is very much affected by samp
4 disturbance, and it may also be affected by the soil itself.
5 Whatever manner it has, whatever factors it has undergone
6 to reach the state at which you sampled it.

7 And I would be very concerned that Mr. Kane
8 would take samples and find out from those samples that
9 he had a preconsolidation pressure that is being equal
10 to the overburden pressure at the sample depth, prior to
11 any preload being there at all.

12 Q You indicated some problems or proficiencies
13 with the laboratory testing that would be done.

14 A Sample disturbances and laboratory testing and
15 the valuation of the laboratory test.

16 Q Is there something about the particular instance
17 that the diesel generator building that makes you more
18 apprehensive about using laboratory tests than other situations,
19 I mean laboratory tests are very commonly used and have
20 been used on this site for other determinations, right?

21 MR. FARNELL: Could the court reporter read back the
22 last question.

23 (AT WHICH TIME THE AFOREMENTIONED
24 QUESTION WAS READ BACK.)

25 MR. FARNELL: I'm going to object to the form of that.

1 You can answer it.

2 WITNESS: The objections I have to the sampling disturbances
3 and the laboratory testing would apply to any of the sampling
4 and testing that's been done at the site. However, the
5 previous sampling and testing that was done prior to construction
6 of the plant was the only information that we had available
7 to us.

8 We didn't have any preload fill, any full
9 scale load tests, we didn't have the benefit of those other
10 factors. What I'm telling you is that in my opinion, the
11 preload fill is a better way to evaluate the settlement. .

12 BY MR. PATON:

13 Q It is a better way, but apparently, you feel
14 that it is so much better that I believe you testified that
15 it wouldn't even be possible that by taking samples and
16 performing laboratory tests, you could gain any information
17 that would help you interpret what has happened to the
18 surcharge program.

19 MR. FARNELL: The record will speak for itself.

20 WITNESS: The concern that I have is that when the
21 samplings are taken and tested that you will end up with
22 a range of values of preload and not know really where
23 you are. Mr. Kane would be just as much in the dark after
24 that as he apparently is today.

25 BY MR. PATON:

1 Q In reading Mr. Kane's deposition, did you get
2 the impression that he would take the information that
3 he would obtain from borings, the borings that he has requested
4 that have not been supplied, with respect to the diesel
5 generator building, and make some kind of a worse case
6 analysis?

7 In other words, that if he received a range
8 of information that he would use the worse information
9 to make his evaluation? Did you get that impression?

10 A I do not recall that I got that impression.
11 I would like to recall that I don't recall one way or the
12 other.

13 Q It could be then. Are there any weaknesses or
14 deficiencies at all that you are aware of with the preloading
15 method of the surcharging method?

16 A What do you mean by weakness?

17 A That's what I'm asking you, and is it a perfect
18 method to accomplish what you are trying to accomplish.

19 MR. FARNELL: Are we talking in general? Are we talking
20 about Midland diesel generator?

21 MR. PATON: I'm talking about Midland soils surcharge
22 program, diesel generator building.

23 MR. FARNELL: That wasn't the way the question was
24 formed.

25 MR. PATON: Strike it all. I'll ask it again.

1 BY MR. PATON:

2 Q With respect to the surcharge program, applied
3 to the diesel generator building at Midland, are you aware
4 of any weaknesses or deficiencies in that program?

5 A Deficiencies in what respect?

6 Q In accomplishing what it is you are trying to
7 accomplish.

8 A Yes, the preload will not compact the sand portion
9 to the same extent that it will compact a clay portion.

10 Q Are there sand portions below the diesel generator
11 building?

12 A Yes.

13 Q Can you describe the extent to which there are
14 sand portions below the diesel generator building?

15 A It is my recollection that on the north side
16 of the building there is a fair amount of sand and particularly
17 in the northwest corner.

18 Q Okay.

19 A There is also evidence of sand backfill along
20 some pipelines that are under there.

21 Q Did you take any steps to accommodate that problem
22 that the preloading program may not have compacted the
23 sands?

24 A Yes.

25 Q What steps did you take?

1 A The corrective action proposed, our main concern
2 is that the preload may not have compacted that sand sufficiently
3 to preclude liquifaction in the case of loose sand, and
4 our recommended corrective action for that is to lower
5 the water table in the plant area, so as to preclude the
6 possibility of liquifaction and any sand left.

7 Q That's to your knowledge, that will be taken
8 care of by permanent de-watering?

9 A That is what is proposed.

10 Q To your knowledge, is that permanent de-watering
11 proposed solely in connection with sand at the diesel generator
12 building or is it also proposed with sand in other areas?

13 A It was made as a general de-watering program
14 to take care of any sand that might be located in the plant
15 that were loose.

16 Q Has Bechtel had any meetings with Dr. Peck in
17 the last three months?

18 A Do you mean meetings that I attended?

19 Q That you are aware of.

20 A The last time that I met with Dr. Peck on the
21 Midland project was at the end of August in Midland. I
22 don't know if that's three months.

23 Q Okay. That's probably more than three months,
24 pretty close. Have you had any meetings with Dr. Hendron
25 in the last three months since August -- After August?

1 A I have not met with Dr. Hendron.

2 Q Have you met with Dr. Davisson after August?

3 A I think I told you earlier today I met with him last
4 Thursday and talked to him.

5 Q You said you talked to him.

6 A But not on the Midland project. You are right,
7 I did say that I talked to him. I actually met him and
8 talked to him.

9 Q Are there pipes and conduits beneath the diesel
10 generator building now that are not connected to the diesel
11 generator building?

12 A I don't recall that, that are not connected to
13 the diesel generator building?

14 Q Let me ask you, are there any under the diesel
15 generator building that are connected to the diesel generator
16 building?

17 A I don't really recall where the pipes and conduits
18 go to.

19 Q So, you don't know whether there are any that
20 are connected or any that are not connected?

21 A I just do not remember that.

22 Q How is the effectiveness of the surcharge program
23 affected by the fact that they are below the generator
24 building that there are less compressible soils and more
25 compressible soils?

1 MR. FARNELL: Would the court reporter read back the
2 last question.

3 (At which time the aforementioned
4 question was read back.)

5 WITNESS: Are you talking about the clay soils below
6 the generator diesel building?

7 BY MR. PATON:

8 Q Clay and sand.

9 A Then I'll address both. In the clay, if there
10 was prior to preloading a difference in compressibility
11 in the clay, then the preload would tend to make the condition
12 more uniform, it would stiffen the less compressible soil
13 so that overall, you would have more uniform, you would
14 tend towards more uniform compressibility of the clay
15 soils.

16 In the case of the sand soils, the preload
17 would stiffen the sand soils to the extent that they would
18 be able to support the static loads, but it does not densify
19 the loose soils sufficiently to preclude the possibility
20 of liquifaction in some of the loose sand that we know
21 are located there.

22 Q Do you plan to verify the effectiveness of your
23 surcharge program at the diesel generator building?

24 A We are doing that right now by instrumentation.

25 Q And are you doing it partially by watching settlement

1 curves?

2 A That is part of the instrumentation. The records from
3 the settlement points are plotted on curves. I'm not plotting
4 them personally if that is what your question is.

5 Q No, no. And you are also doing that by watching
6 the behavior of the piezometers?

7 A Yes. That is correct.

8 Q Do you recall a settlement curve testing designated
9 DG-3?

10 A Not right now I don't.

11 Q Okay. Are you aware, Mr. Ferris, that there
12 is of the request for addition of borings, that the staff
13 has made that has not been responded to or that the applicant
14 has not responded to date the question of our June 30th
15 letter?

16 MR. FARNELL: I think the applicant has responded
17 to it.

18 MR. PATON: Okay, fine, the applicant has responded
19 to it with no boring information.

20 WITNESS: You showed me the letter today, earlier.

21 BY MR. PATON:

22 Q And what is your position with regard to that
23 information, I mean is it that the staff doesn't need
24 it or was it your position?

25 MR. FARNELL: Your position with regard to the request?

1 Is that what you mean?

2 MR. PATON: Yes.

3 WITNESS: I think there is no technical basis that indicates
4 that those borings are required.

5 BY MR. PATON:

6 Q Then that's for the staff's evaluation.

7 A That's who is asking for them.

8 Q Okay, now, what I'm getting at is you made a
9 judgment as to the staff's need for that information.

10 A Okay, I'm telling you from my point of view,
11 I see no technical basis that would require those borings
12 to evaluate what we have done.

13 Q No need on a technical basis is obviously, you
14 don't think the staff needs that information; is that correct?

15 A I think we have provided the staff with a signed
16 basis for reevaluating the preload fill and what it has
17 done.

18 Q Did piezometer elevations reach anticipated values
19 under the surcharge program?

20 MR. FARNELL: Anticipated by whom?

21 MR. PATON: All right, I'll back up and ask you a
22 previous question.

23 BY MR. PATON:

24 Q Did you prior to imposing the surcharge program,
25 did you make any estimate as to what piezometer elevations would

1 be after you put the surcharge program on ?

2 MR. FARNELL: By "you" are you referring to Mr. Ferris?

3 BY MR. PATON:

4 Q Did Bechtel do that?

5 A I did not do that. I'm not aware that such an
6 estimate was made and I would like to recall that there
7 was one other portion of Mr. Kane's testimony that I disagree
8 with. And that was the 30-foot rise -- 30-plus feet rise
9 in the piezometers. I don't agree with that.

10 Q Okay. Do you have any idea how he made that
11 estimation? Did he explain that?

12 A I think I know how he made it and I don't think
13 those conditions exist underneath the building.

14 Q It had to do with the height of the surcharge
15 and the weight of the cubic feet of water.

16 A It is my impression that he assumed that the
17 soil below the diesel generator building was completely
18 confined like in a consolidation test and then the preload
19 fill was placed on it. Under those circumstances, the
20 pore-water pressure would initially reach a height equivalent
21 to the weight of load added.

22 Q And would that be under those circumstances approximately
23 35 feet?

24 A I haven't calculated, but it is very roughly
25 that.

1 Q You would start with the height of the surcharge,
2 which was --

3 A Well, it is 20 feet times the weight of soil
4 divided by the unit weight of water, which is 62.4, so
5 I don't have a calculator here, but I think that will come
6 right around 35.

7 Q 62 pounds per cubic foot?

8 A 62.4.

9 Q And you indicated that the conditions that Mr.
10 Kane might have assumed when he mentioned that rise in
11 piezometer elevation of 35 feet did not exist; is that
12 correct?

13 A That is correct.

14 Q And tell me, how actual conditions differed from
15 what you think he might have assumed?

16 A Well, first of all there is nothing to confine
17 the water and the soil beneath the building in the sense
18 that I just mentioned like having a consolidation ring
19 in the laboratory.

20 Secondly, there are sand lenses and layers
21 there that act as drainage paths which would permit the
22 water pressures to dissipate quite rapidly. There are
23 some other factors as well. You have learned enough salt
24 mechanics today.

25 Q I appreciate your answer, but what are some of those

1 other factors?

2 A Well, the development of the pore-water pressure in
3 the soil due to a load is rather complicated and it's
4 merely just the load that's supplied as though the water
5 can dissipate. There is deformation in the soil and that
6 can affect pore-water pressures. It's quite a complicated
7 deal.

8 Q I may not ask you all of the factors, but are
9 there other factors that you haven't mentioned?

10 A Yes, I believe there are. There could have been
11 openings in the fill, that may have been, I'm just hypothisizing.
12 It could be that there were drainage paths even within
13 the clay fill.

14 Q Okay, is it not good engineering practice or
15 would it have been good engineering practice in that case
16 for you to have made an estimate of the elevation in the
17 piezometer -- in piezometer elevation prior to imposing
18 the surcharge?

19 A With such a heterogeneous fill, I don't believe
20 that such an estimate would have been very reliable. What
21 we were looking for was to see when the excess pore-pressure
22 dissipated completely and that is one way of telling that
23 you have completed primary consolidaton.

24 The other way I mentioned earlier, is to
25 look at the settelment card.

1 Q If the soil there had not been heterogeneous
2 as it is, would you have made an estimate of the anticipated
3 piezometer elevation prior to imposing the surcharge?

4 A Probably not. If it was me.

5 Q What if the soil was homogeneous, would you have
6 done it in that case?

7 A Probably not.

8 Q If it had been homogeneous and if you had made
9 an estimate, wouldn't you be interested in determining
10 how close you came to your estimate to verify the performance
11 of the surcharge program?

12 MR. FARNELL: That's got two assumptions in there.
13 None of which is relevant to this case and I just don't
14 see it. I don't even understand the question.

15 WITNESS: I think I can answer your question. I think
16 the thing that you have to realize is what we were looking
17 for was when the excess pore pressure dissipates, we were
18 not interested in the maximum level to which the pore pressure
19 reached.

20 BY MR. PATON:

21 Q Okay, try it just one more time. Your interest
22 in knowing when the excess pore pressures had dissipated,
23 related to your interest in knowing when you had reached
24 secondary consolidation; is that a true statement?

25 A Well, when you finish primary consolidation,

1 then you get into secondary consolidation and I would be
2 willing to accept that those two points would be about
3 the same.

4 Q All right. you just don't see any way that your
5 prior estimate. what would happen to piezometer level you
6 don't see that that would have helped your determinations
7 at all?

8 A It would not have helped our determination of
9 when the primary settlement would be complete.

10 Q Does the level to which pore pressures -- pore-
11 water pressures would rise have an impact on stability
12 of the deposit being loaded?

13 A Yes.

14 Q But even in place of that, but that doesn't indicate
15 to you that you should estimate prior to the surcharge
16 what your piezometer elevations are going to be?

17 A The preload was put on in steps and those increments
18 of loads were small enough that we were not concerned about
19 failure of the fill.

20 Q Mr. Ferris, I'm going to hand you a document
21 on the letterhead of Soil and Rock Instrumentation, dated
22 October 19, 1979, a letter addressed to Dr. Sherif Afifi,
23 signed by John Dunacliff and it has attached to it three
24 pages and ask you -- and I have marked it as Staff Exhibit
25 2 and it does indicate that a carbon copy was sent to Walter

1 R. Ferris and ask you have you ever seen that before?

2 A I don't recall a clear recollection of having
3 seen it before. It says a copy was sent to me, so I probably
4 did see it, but I don't recall.

5 Q In your opinion does that letter reflect a problem
6 with survey accuracy with the Borris Anchors?

7 A I can't tell that from the information that's
8 here. I don't know what the purpose of the letter was originally.
9 I know he is making a review. I can't recollect the subject
10 and I don't recall having discussed it with anybody.

11 Q Well, this chart on the back here, review of
12 settlement below.

13 A Yes, he makes some statements there, but without
14 looking at additional data, I don't believe I would want
15 to draw any conclusions from that.

16 Q In other words, your statement is there is not
17 enough information in that letter for you to conclude whether
18 or not it concludes a problem with survey accuracy in the
19 Borris Anchors?

20 A Yes, I think you should talk to somebody else
21 about that. I did not make any study as a result of that.
22 I don't recall the letter.

23 Q Is your statement that you have read the letter
24 sufficiently so that you can't tell whether it reflects
25 a problem with survey accuracy or you haven't had enough time

1 time to read the letter?

2 MR. FARNELL: It's been asked and answered.

3 WITNESS: I have read through the thing and there appears
4 to have been some questions with this survey, but it is
5 not clear to me what those questions were and whether or
6 not these are significant comments.

7 BY MR. PATON:

8 Q In line one of the letter, it says, "I have reviewed
9 your plots of initial elevation versus settlement on the
10 14 Borris Anchor and settlement platt for the customers
11 sent to me on September 20th" (Reading)

12 Do you know whether those plots have been
13 supplied to the NRC?

14 MR. FARNELL: I'm going to object to --

15 WITNESS: No, I don't.

16 MR. FARNELL: -- the questions on the base of the
17 document, he said he hasn't read it, he doesn't recall
18 reading it, this is going to be purely speculation.

19 BY MR. PATON:

20 Q Well, I did show him the document and give him
21 time to read it, the letter is addressed to Bechtel and
22 it indicated a carbon copy was sent to him. And if he
23 needed some more time to read the letter, he can certainly
24 take more time to read the letter.

25 MR. FARNELL: No --

1 WITNESS: I think I answered -- I told you the comment
2 I have on it. I'm not familiar with the subject and I
3 believe I would not want to discuss the items here without
4 knowing more about this matter.

5 MR. FARNELL: That was the substance of my objection.
6 BY MR. PATON:

7 Q Do you have any other knowledge outside of this
8 letter with respect to the accuracy of the survey, accuracy
9 of the Borris Anchors at the Midland site?

10 Do you have any other knowledge that there
11 is any other inaccuracies?

12 MR. FARNELL: I don't believe he said there were
13 inaccuracies.

14 WITNESS: I don't recall that. I do recall that prior
15 to or towards the end of the preload fill, there were additional
16 instruments put in that were more accurate than the initial
17 Borris point. Whether that related to some problem at
18 the Borris point or not, I do not recall.

19 BY MR. PATON:

20 Q Do you know who would know that?

21 A Sherif Afifi.

22 Q Do you know whether there has been a problem
23 with respect to building settlement markers, the accuracy
24 of building settlement markers?

25 A Which building settlement markers?

1 Q On the diesel generator building.

2 A Ones that have been installed since August of
3 1979 or something prior to that time?

4 Q I'm not sure where you got that date, but that
5 is fine.

6 A I really don't know. Something may have been
7 discussed with me, but I don't recall. I do recall that
8 we discussed getting more accurate instrumentation to evaluate
9 the second settlement portion of the--

10 Q All right, who was that conversation with?

11 A I believe that was in the meeting that we had
12 with at least one of the consultants in Midland.

13 Q Do you recall who?

14 A I would think it was Dr. Hendron, but I'm not
15 absolutely sure of that.

16 Q Do you know whether Dr. Afifi would know about --
17 was he present at that conversation?

18 A I do not know that he was there, but he ought
19 to have been, that's his office -- Ann Arbor.

20 Q To clarify the record, the meeting was at Ann
21 Arbor?

22 A Ann Arbor but the meeting was a Midland meeting.

23 Q And you are not positive if Dr. Afifi was there,
24 but you think he might have been?

25 A I'm sure he was there for part of the meeting,

1 but I'm not sure when that specific topic was discussed
2 that he was present. I would also think that John Dunaclyff
3 was present, but I don't know that for sure either.

4 Q And you reference some inaccuracies and instrument
5 by that, would you refer to two things and that is one
6 being the Borris Anchors and the other being building settlement
7 markers --

8 MR. FARNELL: I don't think he testified that.

9 WITNESS: I think what I said was we discussed a more
10 accurate way of measuring the settlement.

11 MR. PATON: What other type of instrumentation would you
12 use to measure your settlement, other than Borris Anchors
13 or building settlement markers?

14 MR. FARNELL: Is this just a general question?

15 BY MR. PATON:

16 Q At the diesel generator building.

17 A What we are using?

18 Q On the Midland site diesel generator building?

19 MR. FARNELL: Could have used -- did you use?

20 MR. PATON: Did you use.

21 WITNESS: That I'm sure has been discussed with the NRC, I
22 don't recall the precise name of the equipment, but the
23 points were put in and I'm sure that that has been discussed
24 with the NRC in the meetings with NRC.

25 BY MR. PATON:

1 Q Do you know of any other instrumentation other
2 than building settlement markers or Borris Anchors?

3 A I know that initially they were using scribe
4 marks that had been put on when the form work for the diesel
5 generator building was constricted and that's the basis
6 for evaluating that this building had settled more than
7 it should have.

8 Q What is a "scribe mark"?

9 A Just a pencil mark, just your every day mark.

10 Q Since August, 1978, -- let me interrupt and ask,
11 you, I believe, got that date, August '78, does that mean
12 something to you because that's when the problem was first
13 discovered.

14 A It was early in August of 1978, I believe I may
15 have mentioned it to you earlier today, that I was informed
16 by Sherif Afifi that the settlement of the diesel generator
17 building was approaching the predicted settlement differing
18 at PSAR.

19 Q Since August, 1978, are you familiar with what
20 type of instrumentation was used at the site at Midland
21 for example, the diesel generator building to measure the
22 settlement?

23 A Initially, Borris Anchors were put in the ground.
24 I believe settlement plates were put on the ground as well,
25 and then as I mentioned, sometime around about May or so of

1 '79, I'm not sure of the precise date, there was additional,
2 more accurate settlement instrumentation installed in the
3 building.

4 Q In the building?

5 A For measuring the settlement of the building,
6 yes.

7 Q Is that building settlement markers or is that
8 some other type?

9 A It was another type of instrumentation, I cannot
10 recall the precise details but I'm sure that is in the
11 response to questions to the NRC.

12 Q Is the accurate measurement of settlement anything
13 you have discussed with Dr. Afifi in the last six months?

14 A I don't recall to be specifically -- if we specifically
15 have or have not discussed that.

16 Q Is this a matter that you leave more to his responsibility
17 or was this a matter that you would expect to discuss with
18 him considering your relationship with Dr. Afifi?

19 A The day-to-day work of the geotechnical, the
20 soils group and the geotechnical department in Ann Arbor
21 is Dr. Afifi's responsibility. I expect him to keep me
22 informed of the work that is going on, but I do not expect
23 that I'm involved in every little detail or every calculation
24 that they do.

25 Q Would you consider an inaccuracy in settlement

1 measurement to be something that he would discuss with you
2 or is that a detail?

3 A I would think he might discuss that with me.

4 Q Do you know of any organization other than Soil
5 and Rock Instrumentation that has made an evaluation of
6 the quality of your settlement data?

7 A I'm not aware of another organization.

8 Could the court reporter read me back the
9 last question?

10 Q Yes.

11 (At which time the aforementioned
12 question was read back.)

13 MR. PATON: Al, we request that you provide us the
14 plots that are referred to in the first paragraph of this
15 letter.

16 MR. FARNELL: I'll talk to Bechtel and we'll endeavor
17 to get those settlement plots to you if they are still
18 in existence.

19 MR. PATON: I would appreciate it.

20 BY MR. PATON:

21 Q Are you aware that excavations have been made
22 directly adjacent to the diesel generator building wall
23 footings?

24 A Of my own personal observation?

25 Q No, I mean are you aware from any source of knowledge.

1 A Somebody told me that Joe Kane reported there
2 was an excavation next to the building and I believe we
3 had a discussion on that at the last meeting we had.

4 Q Do you know what the purpose of digging those
5 excavations was?

6 A I don't know what the purpose was.

7 Q This is the diesel generator building we are
8 talking about.

9 A Yes.

10 Q Do you know the length and depth of those excavations?

11 A No, I don't. I believe they were quite narrow
12 excavations. I don't know how deep they were.

13 Q Were they inside the building?

14 A I don't know, I don't recall. All I recall was
15 that they were close to the wall, whether they were inside
16 or outside, I don't know.

17 Q Do you know how many there were or where they
18 were?

19 A No, I don't.

20 Q Do you know when they were made?

21 A No, I don't.

22 Q Do you know if they had been backfilled?

23 A No, I don't.

24 Q Do you think that because of this excavation
25 or these excavations, that that less than the final load is now

1 being applied to the diesel generator building wall footings?

2 MR. FARNELL: I don't think he can answer. I think
3 he said he is not familiar with these excavations, therefore,
4 I don't think he can answer this question because of lack
5 of foundation.

6 Would the court reporter read the question
7 back.

8 (At which time the aforementioned
9 question was read back.)

10 MR. FARNELL: Also, I don't think there is any testimony
11 that the excavations are currently there. This is in addition
12 to my other objection.

13 Q Do you know if those excavations are there?

14 A No, I don't. I have been told that Mr. Kane made
15 some reference to the excavation.

16 Q If there were excavations directly adjacent to
17 the diesel generator wall footings, could you conclude
18 whether that would remain at the final load being applied
19 to the diesel generator building wall footings was less
20 than the final load?

21 MR. FARNELL: Since we don't know the details of these
22 or he doesn't know the details of these excavations, I
23 don't think he can answer that question.

24 BY MR. PATON:

25 Q Would you have to know the details of the excavation

1 to make that conclusion?

2 A I could make a very general answer.

3 Q We will accept it as a very general answer if
4 you want to give us that.

5 MR. FARNELL: As long as it is not speculation.

6 MR. PATON: General answer.

7 WITNESS: If you remove some soil from above the footing,
8 I'll have change in pressure on the footing to some degree,
9 but it will not be a very significant change.

10 What was your question again?

11 BY MR. PATON:

12 Q My question was directly adjacent to the diesel
13 generator building wall footings.

14 A Adjacent to the wall?

15 Q Directly adjacent to the diesel generator wall
16 footings. Does that change your answer?

17 A It would depend on what you mean by adjacent.
18 I think removing a little soil may change the pressure
19 a little bit, but I don't believe it is a significant change.
20 I would need to know a lot more about it before I could
21 give you a specific answer.

22 Q That's fine. I won't pursue that.

23 MR. PATON: Al, would you provide a plan or information
24 that shows the limits or the extent of those excavations?

25 MR. FARNELL: Could you give me a little bit more

1 definition as to what type -- what you want?

2 MR. PATON: Let me do this, let me ask Mr. Kane -- he
3 is not being deposed, but let me ask him to just address
4 that matter.

5 MR. FARNELL: Let's go off the record.

6 (At which time a brief discussion
7 was held off the record.)

8 MR. FARNELL: I'll endeavor to look into the excavations
9 that Mr. Paton has referenced and to see if I can locate
10 within Bechtel any information concerning when these excavations
11 occurred, the extent of the excavation and whether they
12 have been backfilled.

13 MR. PATON: Thank you, sir.

14 BY MR. PATON:

15 Q Mr. Ferris, do you agree that the diesel generator
16 building is constructed heterogeneous soils with highly
17 variable conditions of layering?

18 MR. FARNELL: That's a compound question. I'll object
19 to it.

20 BY MR. PATON:

21 Q That seems so obvious, it is unbelievable, but
22 we will break the question in half if you want me to.

23 Do you agree that the diesel generator building
24 is conducted on heterogeneous soils?

25 A Beneath the diesel generator building is a

1 heterogeneous fill in my opinion.

2 Q And the reason you changed that answer is that the
3 till below the fill may not also be heterogeneous, is that
4 why you made that distinction?

5 A Until the load, the fill is a highly preconsolidated
6 soil and it may vary from point to point. It is a very
7 competent foundation stratum as you very well know.

8 Q Do you agree that the fill below the diesel generator
9 building has highly variable conditions layering?

10 A I'm not sure that I would necessarily agree with
11 layering, but lensing or layering, there is -- it is quite
12 heterogeneous based on the boring data.

13 Q Other than Midland, do you have experience with
14 other structures built on heterogeneous soils?

15 A Yes.

16 Q In these other projects, did you explore the
17 condition of the soil with borings?

18 A In some of them.

19 Q Did you take soil samples?

20 A What sort of soil samples?

21 Q SPT's or undisturbed soil samples?

22 A This is borings to evaluate the foundation design
23 criteria?

24 Q Yes, sir.

25 MR. FARNELL: Is this before the buildings were built also?

1 MR. PATON: Yes, sir.

2 WITNESS: I would say generally speaking, drilling and
3 standard penetration testing or soil sampling is carried
4 out as an initial process as you move on to a new site
5 to determine soil conditions.

6 BY MR. PATON:

7 Q Prior to initiating the Surcharge Program for
8 the diesel generator building at Midland, why didn't you
9 take similar borings and soil samples that you have just
10 described that you took in other instances before you began
11 construction?

12 MR. FARNELL: First of all, he didn't say he did it
13 in all instances.

14 MR. PATON: All right, in the instances in which you
15 did it.

16 WITNESS: Could you read that question again because
17 I'm not sure that I understood it.

18 (At which time the question was read
19 back for the witness.)

20 BY MR. PATON:

21 Q I'm going to strike the question.

22 In the other projects that you mentioned,
23 other than Midland, did you develop soil profiles and assign
24 representative soil properties to these layers?

25 A Not in every case.

1 Q Did you do those in some cases?

2 A Do you mean some cases, probably most generally
3 we did it.

4 Q In light of your answer that you most generally
5 did it that way, why are you not complying with the borings
6 requested by the staff in this case?

7 A For the same reasons that I didn't do it at some
8 of the sites where we did it on.

9 Q Tell me generally what those reasons are.

10 A It's probably simplest to discuss one site, this
11 is a mining plant in Nevada, in alluvial fan which is very
12 heterogeneous deposit and you cannot get samples there
13 that you can relate in the way that Terzaghi and Peck have
14 done in their book, you can't get standard penetration
15 tests that are meaningful and you can't take undisturbed
16 soil samples that are meaningful and so there we did a
17 preload fills to evaluate the soil properties that we needed
18 to determine settlement of structure foundation.

19 Q You said preload fills, do you mean surcharge?

20 A Surcharge fills.

21 MR. FARNELL: Would the court reporter read back the
22 last few question and answers.

23 (At which time the previous two questions
24 and answers were read back.)

25 WITNESS: I'm referring to the questions where I was

1 asked why we are not doing borings at the diesel generator
2 building as requested by the staff, and the response that
3 I have previously -- in light of the fact that we had done
4 drilling and sampling elsewhere.

5 And the response that I gave was not relative
6 to that particular question. I misunderstood the question.

7 The reason that we are not doing drill and
8 sampling at the diesel generator building is because we
9 believe we have provided the staff with ample information
10 satisfactory information from the settlement and piezometer
11 data to evaluate the adequacies of the preload fill.

12 BY MR. PATON:

13 Q You discussed a moment ago a project in Utah;
14 is that correct?

15 A A moment ago I discussed a project in Nevada.

16 Q Was there a settlement problem at that project?

17 A No, there was not.

18 Q Is your reliance information from piezometers
19 affected by the fact that the fill is heterogeneous?

20 MR. FARNELL: Would the court reporter read back the
21 last question.

22 (At which time the aforementioned
23 question was read back.)

24 MR. PATON: Strike that question and I'll try it again.

25 BY MR. PATON:

1 Q Is the accuracy of information provided by piezometer
2 readings affected by the fact that the fill is heterogeneous?

3 A The accuracy of the piezometer is not affected
4 by that.

5 Q Is the settlement information affected in any
6 way by the fact that the fill is heterogeneous?

7 A What do you mean by the settlement information?
8 Do you mean the settlement at a specific point or the overall
9 picture?

10 Q No, the information you get from a settlement
11 marker is the accuracy of that information affected by
12 the fact that the fill is heterogeneous.

13 A I don't believe the accuracy of the settlement
14 marker is affected by the heterogeneity of the fill.

15 Q In the project where you took undisturbed samples
16 can you tell me how you determined where to take undisturbed
17 samples?

18 A Which project are you talking about now?

19 Q Well, I think you indicated there were projects
20 in which you just spoke awhile ago where you did take undisturbed
21 samples.

22 A We took them in the strata that we wanted to
23 know the soil properties as best we could.

24 (At which time a brief break
25 was taken.)

1 WITNESS: I think that there has been a confusion
2 in the last few questions. I believe my understanding
3 was what I normally do in the way of exploring sites and
4 this is where there is nothing on the site before we go
5 on there and we are getting foundation and material investigations

6 I believe what you are asking me about is
7 borings made at the Midland site after a structure has
8 been constructed. And that is not something that we normally
9 do.

10 BY MR. PATON:

11 Q Based on your experience, do you believe running
12 laboratory consolidation testing to be a reasonable approach
13 for estimating the amount of settlement and the rate of
14 consolidation?

15 MR. FARNELL: Would the court reporter read back the
16 last question.

17 (AT WHICH TIME THE AFOREMENTIONED
18 QUESTION WAS READ BACK.)

19 MR. FARNELL: That's a compound question.

20 BY MR. PATON:

21 Q I'll break it down if you insist. Based on your
22 experience, do you believe running laboratory consolidation
23 to be a reasonable approach for estimating the amount of
24 settlement?

25 A Yes.

1 Q. Based on your experience do you believe running
2 laboratory consolidation to be a reasonable consolidation
3 for running consolidation?

4 A I would have to say that it is not a very reasonable
5 one, not necessarily a very reliable one.

6 Before we get off that, I would like to
7 point out that my response to that was a general response
8 and could be influenced by a lot of other factors.

9 Q Was there ever any consideration given to making
10 settlement prediction test diesel generator building prior
11 to imposing the surcharge program?

12 A I'm not aware of any.

13 Q Do you recall any discussion of that in your
14 reading of Dr. Afifi's deposition?

15 A I do not specifically recall it in Sherif Afifi's
16 deposition. I do recall that there were discussions at
17 the time prior to the time of preloading. There were some rough
18 estimates of what the settlement might be.

19 Q Who made those?

20 A But there were no calculations.

21 Q Okay. Who made those rough estimates?

22 A Dr. Peck in a discussion that we had, I believe,
23 in Champaign, Urbana, he made reference to a pessimistic
24 upper limit of 6 to 18 inches as the settlement resulting
25 from the preloading film.

1 Q Do you have any idea on what he based that rough
2 estimate?

3 A No, I believe it was just that, a very rough
4 pessimistic rough estimate. I do not believe he did any
5 calculations. I do not believe he had any data to do any
6 calculations at that time.

7 Q He must have known something about the site.

8 A No, I believe he was looking at a rough pessimistic
9 upper limit of what the settlement might be. One of the
10 factors that he was concerned about is that our instrumentation
11 should be able to take care of whatever movements occurred.

12 Q I'm sorry, sir, I don't understand that -- our
13 instrumentation should be able to take care of whatever
14 occurred.

15 A Well, he wanted to make sure that when Bechtel
16 arranged for instrumentation that they would be able to
17 take care, operate, under the most pessimistic estimates
18 of settlement that might occur.

19 Q In your recent statement about installation of
20 instruments, did you mean that you wanted to make sure
21 you had instruments that would measure any possible range
22 of settlement so that the settlement wouldn't exceed what
23 your measurements would measure?

24 A Yes, we didn't want to have an instrument that
25 certainly the point would -- it would go off the scale or

1 something like that.

2 Q Sure. And are you connecting Dr. Peck's 6 to 18
3 inches pessimistic estimate with his -- in other words,
4 that was in connection with him saying he wants to make
5 sure we have instruments that would cover at least this
6 much settlement. Is there a connection between those two?

7 A I believe it was made in the context of giving
8 Bechtel some idea of what the upper limit of settlement
9 might be, but it was not based on calculations because
10 I do not believe that he had the data to do calculations,
11 nor do I believe he did any calculations.

12 Q Okay.

13 A It was a spontaneous comment in a meeting.

14 Q Do you know whether Dr. Afifi gave any consideration
15 to a prediction of settlement prior to the surcharge program
16 being imposed?

17 A I'm not aware of any.

18 Q Let me read you from page 57 of Dr. Afifi's deposition,
19 and he has not read this and corrected it, so let me just
20 read this to you and see if it refreshes your recollection
21 about anything.

22 I was asking him about whether he considered
23 making a settlement prediction part of the surcharge program
24 and I'll read this, but you can certainly look at it if
25 you want to.

1 "My original thought may be, perhaps, if
2 there be no confusion, that it would be one way to go.
3 To predict the settlement on the basis of lab tests. The
4 very initial thought because the material appeared to be
5 heterogeneous enough and the surcharge program became an
6 opportunity to provide answers, be provided in lab tests.
7 That was not the favored way to go." (reading)

8 A I have trouble understanding that.

9 Q Obviously, there is typing or some type of errors
10 in there, but my question to you is does that refresh your
11 recollection at all about any consideration given to laboratory
12 testing or anything?

13 A It doesn't change anything I have said.

14 Q You have no recollection?

15 A I don't recall discussing this with Dr. Afifi.

16 Q How many projects have you been involved in where
17 there has been surcharging?

18 A I have been on several. Do you want me to tell
19 you?

20 A Well, first of all, tell me approximately how
21 many projects have you been involved.

22 A Right this moment I can think of five, but I'm
23 not saying that I haven't been on more than that.

24 Q Okay. That's fine, sir.

25 Did any of those involve surcharging after the

1 structure had been partially or completely built?

2 A Yes, two of them.

3 Q Okay. Would you tell us about those two?

4 A Okay. One is a very conventional problem, quite
5 commonly used in engineering in that it was oil tanks for
6 a fossil fuel power plant in Louisiana, the tanks were
7 built and then water load was applied in station to take
8 out the settlement in the foundation. So in that way,
9 the settlement of the tank was taken out prior to it carrying
10 its oil load and also the bearing capacity was enhanced
11 by the consolidation that took place.

12 Q Could I ask you a little bit about that one?

13 A Yes, sir.

14 Q Would that be the normal practice for foundation
15 for oil tanks?

16 A I can't say that it is normal, it is one of the
17 things that is done with oil tanks because frequently oil
18 tanks run poor -- are frequently put on poor foundation.

19 Q You did it because it was some problem with the
20 soil?

21 A The soil was soft.

22 Q Would it be good engineering practice to just
23 go ahead and fill those tanks with oil?

24 A No, we could not have done that, we would have
25 had a problem with the foundation.

1 Q Okay. What would be the most significant problem
2 you would have?

3 A Bearing capacity failure in that particular instance,
4 there was a potential for bearing capacity failure.

5 Q Now, in that instance, did you make a settlement
6 prediction before applying the water load?

7 A I believe in that particular instance there was
8 settlement as to it, but the primary control in that particular
9 instance was in the piezometers, because we did not want
10 to overload the foundation. We put in a partial water
11 load and then watched the piezometer dissipate and at a
12 specific point then added some more water until we reached
13 the maximum load in the tank.

14 Q Was the amount of settlement in that case critical?

15 A No, it was not critical.

16 Q Now, I may have just asked you this, and you
17 may have just addressed it, but why did you make a settlement
18 prediction before imposing the water --

19 A Well, I didn't make it but somebody made it.

20 Q Why was it done?

21 A It was not necessary to be done, it was just
22 something somebody did.

23 Q It was done but in your judgment it was not necessary
24 to be done. So, then that case does not distinguish itself
25 as far as you are concerned for the Midland case, in your

1 opinion in neither case was it necessary?

2 A Well, you asked me where I used surcharging and I'm
3 responding to that request.

4 Q That is correct, but what I'm saying is you don't
5 think it was necessary to make a settlement prediction
6 in that case just like you don't consider it necessary
7 to make a settlement prediction in the Midland case.

8 A I did not say that. In Midland, we did measure
9 settlement and we did use --

10 Q I'm talking about settlement predictions.

11 A I didn't try to draw a parallel between the two.

12 Q But it is true that in neither case did you see
13 the need for making a settlement prediction?

14 A That is correct.

15 Q And in the case of oil tanks you didn't need
16 to make a settlement prediction because you imposed the
17 load in stages and you watched your piezometers and you
18 were able to control the situation that way.

19 A That's correct.

20 Q Would you tell us about the other instance in
21 which --

22 A Instance or instances?

23 Q Well, I think you said there were two instances
24 in which there was surcharging after the structure was
25 partially or fully completed; is that correct, and one of

1 time was the --

2 A I do not recall saying that, but I do know another
3 in which I can discuss with you. That is in Utah. I mentioned
4 it briefly this morning. It is a mining project in an
5 Anarconda Copper Company at a place called Carrfork.

6 In that particular instance, the plant site
7 was in very narrow valley that was filled with material
8 that had been washed down into the valley during flood
9 stages from the hargrain.

10 We intended to do a conventional expiration
11 at that site and found because of the type of material
12 there that we could not get meaningful data to evaluate
13 settlement for structure foundations.

14 We had in any case at that site intended
15 to obtain sheer way velocity measurement because there
16 were some crushers in the site, vibratory loads in the
17 plant. We took the sheer way velocity measurements
18 and then reduced the sheer modulous values by a factor
19 to come up with a modulous on which we could evaluate
20 settlement of foundation.

21 What we did not know at the time we did
22 that, the location we selected for sheer way velocity happened
23 to be the best part of the site and one structure we were
24 aware that there would be quite significant settlement
25 in the structures. And we had recommended at one of the major

1 structures on the site that they place the fill, the required
2 fill area fill. And then put in the foundation of the
3 structure.

4 For some reason that recommendation was
5 not followed and the structure foundations replaced and
6 then the fill was added and, of course, the structure started
7 to settle quite a lot more than what we had predicted.

8 We had not in any case predicted the correct
9 value of settlement on the basis of the data because the
10 soils, the location of that structure were not as good
11 as the location where we had measured the sheer way velocity.
12 I was called to the site and recommended that we fill the
13 building with sand and to some extent beyond this.

14 And I also contacted Dr. Hendron and asked
15 him if he would come to look at the site. He came to look
16 at the site and he increased the amount of preload that
17 I put on the structure.

18 He, in addition -- we looked at each of
19 the structures on the site and because we did not really
20 know the quality of the material below them, we preloaded
21 all of the significant structures like the tailing thickeners
22 and other buildings on the site. And he in conjunction
23 with us recommended a staged loading in the storage area.

24 In that particular case, we used only settlement
25 measurements to evaluate when the preloading had been on long

1 enough because --

2 Q You mean as opposed to piezometers?

3 A We could not put piezometers on there, they would not
4 have been meaningful, the water table was quite considerably
5 below the foundation level, and drilling holes in that
6 ground was just extremely difficult. The piezometers would
7 not have been meaningful in the material either. It was
8 quite relatively pervied.

9 So the entire valuation of the length of
10 time that preload was kept on was based on the settlement
11 measurement. It's my recollection that after about --
12 the text books tell you that sand settles immediately,
13 of course, it doesn't -- granular material settles easily,
14 they don't. They take some time to settle. And we find
15 that usually the major part of the settlement had occurred
16 within one month and we kept the load down for sometime
17 after that until we were satisfied that we were in a secondary
18 consolidation condition.

19 The preload was removed and strangely enough
20 the building looks better than it did at the start. The
21 cracks had closed, and as far as I know the plant is operating
22 quite satisfactory.

23 The maximum settlement at the concentrated
24 building was 16 inches.

25 Q At what building?

1 A At the concentrator building. The main building
2 that I am talking about, the concentrator.

3 Q Does that complete your answer?

4 A That is in summary.

5 Q The 16 inches of settlement at the concentrator
6 building, does that include the settlement that took place
7 prior to the surcharge?

8 A It includes all of the settlement that took place
9 including the settlement under the preload fill.

10 Q Roughly how long ago were you involved at this
11 project?

12 A I would say it is about three years ago, it is
13 quite recent.

14 Q All right.

15 A Yes, about three years.

16 Q And can you tell us, do you remember of the 16
17 inches how much took place before the preload and how much
18 after?

19 A Oh, maybe a third of it took place before, I
20 don't remember. That is the maximum settlement, not all
21 points in the building settled that much.

22 Q Okay. Was there a differential settlement in this
23 instance or was it all settling -- I guess you just mentioned
24 there was a differential settling.

25 A There was differential settling. It was a different

1 foundation than the diesel generator building.

2 Q You indicated that the building looked better.

3 A You could not see cracks that you could see prior
4 to that time.

5 Q Would you expect that from a surcharge program?

6 A I don't know whether you would or would not,
7 it just happened to happen.

8 Q But if there are certain stresses on a structure
9 causing cracks --

10 A Let me answer that question again. I would say
11 if the surcharge program resulted in reduced differential
12 settlements then you would expect that the cracks would
13 close up.

14 Q Right, but if you have differential settlement
15 before you start surcharge, and let's say the north end
16 of the building is settling more rapidly than the south
17 end of the building, if you put a surcharge over that whole
18 building at a uniform rate, isn't -- why would that tend
19 to reduce the differential settlement, isn't that going
20 to either keep the differential settlement the same or
21 aggravate it?

22 A Well, the overall combination of the preload fill
23 and the area fill may result in a more uniform settlement
24 pattern in the building.

25 Q Okay. I'm sorry now, by preload fill, I think I know

1 what you mean --

2 A What I told you was that they had put in the building
3 and then they put in the area fill which was required.

4 When I went to the site I asked them to add preload fill
5 in the building and adjacent to it and Dr. Hendron increased
6 the amount of that preload for me, as to my recollection.

7 Are you worried about the word preload?

8 Q No. Here is my concern, was the preload placed
9 uniformly over the building?

10 A We try to put it uniformly to minimize differential
11 settlement.

12 Q Okay, now that's the key, what did you do to
13 minimize differential settlement?

14 A We tried to put in the fill in relatively uniform
15 layers, you don't put all of it in at one end and nothing
16 at the other.

17 Q Well, let me ask you this, do you have one end
18 of the building settling more than the other if your
19 preloading program puts more weight on the part of the
20 building that is settling less, wouldn't that tend to reduce
21 differential settlement?

22 A Would you say that again, please?

23 Q Yes, if you put more preload weight on the portion
24 of the building that so far has settled less, wouldn't
25 that tend to reduce your differential settlement?

1 A I believe that would, but I don't recall that
2 we were that sophisticated in that particular instance.

3 Q That's my question then, if you didn't make any
4 efforts, did you make any effort in your preload to reduce
5 differential settlement?

6 A We do to the extent of putting in the fill in
7 a uniform manner.

8 Q You indicated that the actual total settlement
9 was approximately 16 inches --

10 A To my recollection -- it is my recollection that
11 the maximum settlement in that specific building was about
12 16 inches.

13 Q And do you recall what your prediction settlement
14 was?

15 A I would say it was probably around three inches,
16 something like that.

17 Q Is there a report that you are aware of that
18 describes the surcharging program that was conducted at
19 Carrfork?

20 A Do you mean a summary report that we prepared
21 later?

22 Q Yes.

23 A I don't recall that we did that. There are memoranda
24 concerning the thing. I believe those would all be the
25 property of Anaconda Copper Company.

1 Q You don't think that Bechtel would have any of
2 those reports?

3 A I do not know that. At one time we would have,
4 but I don't know what happened to the files at the end
5 of the job.

6 Q Do you know if anybody in Bechtel would have
7 them, who that person would be?

8 A I can't think of it right now.

9 Q Would they be in the San Francisco Office?

10 A They would be in the San Francisco Office in
11 the Mining and Metal Division.

12 Q Do you know whether that summary report would
13 show loading and settlement history?

14 A I do not believe I said there was a summary report.

15 Q Are you aware of any report?

16 A I do not recall that we did a final report on
17 that, on the preloading. What I did say was there might
18 be memos concerning it.

19 Q And would those memos be in your division files
20 in San Francisco?

21 A I believe they would be in mining and metals
22 division files.

23 MR. PATON: Al, we are requesting that if such reports --
24 let's go off the record.

25 (At which time a discussion

was held off the record.)

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1 MR. PATON: Mr. Farnell, I'm requesting that you make
2 an effort or you ask Bechtel to provide information concerning
3 the experience just described by Mr. Ferris at Carrfork,
4 including if possible loading and settlement history, cracking
5 history, of the surcharge program that he has just described.

6 MR. FARNELL: Cracking history?

7 MR. PATON: Didn't he mention cracks?

8 WITNESS: I did mention cracks. I don't know what
9 information is available.

10 MR. PATON: Those are the subjects, if any of that
11 is available.

12 MR. FARNELL: We will make an attempt to locate such
13 documents. Note for the record it is Christmas time and
14 your stockings seem to be getting stuffed with many document
15 requests but we will play Santa Clause and do our best
16 for you.

17 MR. PATON: I appreciate that, Christmas or any time.

18 BY MR. PATON:

19 Q Can you tell me the thickness of the compressible
20 layer at Carrfork?

21 A I can't answer that question. I can tell you
22 that there was about 100 to 120 feet of soil above rock,
23 but I don't know the relative compressibility.

24 Q Do you recall the height of the surcharge load?

25 A I don't precisely recall that. I really don't

1 recall the height.

2 Q Did you follow any general rule, such as the surcharge
3 being 50 percent more than the final load?

4 A We -- my recollection is that we had it 50 percent
5 over the dead plus normal alive load. That is what my
6 recollection is and that is merely a recollection.

7 Q Do you have any recollection in that regard with
8 respect to Midland as to what degree the surcharge exceeded
9 the final expected load?

10 A Well, I believe at the last public meeting there
11 was some information handed out showing what the preload
12 stress was related to the building stress and I don't remember
13 the exact numbers, but that piece of information was given
14 to NRC.

15 Q Okay, fine.

16 Q Mr. Ferris, let me review, at Carrfork I think
17 you indicated you did not take piezometer readings.

18 A No, there would have been no point in taking
19 them.

20 Q That is correct, you did not?

21 A Yes.

22 Q Did you address piezometer readings with respect
23 to the first example you gave?

24 A Yes, I did. That was the primary basis that
25 we used for controlling the load.

1 Q Mr. Ferris, I want to ask you some questions
2 about a piezometer elevation plot designated as piezometer
3 number 40 which I'll show you. It is attached to a document
4 entitled consumers exhibit number 12 of Mr. Kane's deposition.

5 A I didn't see these.

6 Q There are some pencil marks on that sheet, which
7 are my own writing, and I ask you to ignore those, please.

8 A Okay. I can't read everything on this or at
9 least I'm not sure that I understand it.

10 Q I think if you have any difficulty, I think we
11 have a better copy of that. That one for example doesn't
12 show the elevation.

13 A This is fine, I think I can understand it.

14 Q Let me ask you some questions and then if you
15 want to review it some more.

16 A If I have a problem I'll let you know.

17 Q During the months of May, June and July, 1979,
18 will you tell me whether that chart shows that the piezometer
19 elevation shows a drop or an increase?

20 MR. FARNELL: I think the document will speak for
21 itself.

22 WITNESS: It appears that -- I presume I don't see
23 the scale on this drawing here, but I presume that upwards
24 means increasing pore pressure.

25 Q We have a better picture of this which shows

1 this line to be 60 and that to be 65. I can show it to
2 you if you want it.

3 A No, this is just fine.

4 Q Okay.

5 A It looks to me like there is a slight increase
6 on the piezometer pressure.

7 Q Did you expect that?

8 A Well, I cannot tell that based solely on this
9 document.

10 MR. FARNELL: What time are you talking about?

11 MR. PATON: He is looking at May, June and July and
12 he said it increased and I asked, "Did you expect it to
13 increase over that three month period."

14 WITNESS: But I think I would need to know something
15 other than what you have just given me to be able to respond.

16 BY MR. PATON:

17 Q Well, let me ask you this, you know that the
18 surcharge reached its full height on April 6th, 1979; is
19 that correct?

20 A Yes, right. It was early and I didn't remember
21 it was April 6th.

22 Q And it was starting to be taken off on August
23 15, 1979. It was fully off on August 30, 1979?

24 A Yes.

25 Q So that during the months of May, June and July, 1979,

1 the full load was imposed?

2 A Yes.

3 Q And what other information would you need to tell me
4 whether that slight increase in piezometer elevation in
5 that three month period is what you expected to have.

6 A The two things that come first to mind are I
7 would like to see a plot of lake level during this period
8 of time. And I would like to see information on the variation
9 of the area ground water table in the vicinity of this,
10 outside of the limits.

11 Q All right, are you indicating that that ground
12 water level could have influenced the piezometer reading?

13 A Of course, it will increase the piezometer reading.
14 I don't know if that is the cause of the rise because it
15 could be that the lake was rising in that period. It could
16 be that the area ground water is rising.

17 Q But didn't you indicate to me before that your
18 knowledge of the piezometer elevation was part of what
19 led you to conclude that you are now in secondary consolidation?

20 A Yes, that is correct.

21 Q Well, then if you are sure you are in secondary
22 consolidation, then you must know what is going on with
23 the ground water.

24 A What I'm saying is you need to change this to
25 take out these other affects, effect of the lake and the ground

1 water and then look at that to see if there has been any.

2 Q Did you do that?

3 A I personally did not.

4 Q Did Bechtel do it?

5 A I believe something like that has been done.

6 Q All right. Who did that?

7 A It would have been done under Sherif Afifi's
8 supervision.

9 Q Do you have knowledge, does he know that ground
10 water table level during that period of time?

11 A I would assume he does. We had a lot of piezometers
12 in the area.

13 Q Mr. Ferris, I want to show you Figure 1 attached
14 to Consumers Exhibit No. 8 of the Kane deposition. And
15 I suggest to you that there is a plot here showing pond
16 elevation versus time. This second plot right here, and
17 I think there is something that would show you the elevation
18 of the pond during May, June and July.

19 I presume this must be August, this is about
20 August here. There are some other platts that show it,
21 let me point that out to you. I'm suggesting to you that
22 this last chart shows April and here is August right there
23 (pointing) and the days I think are the same. Right there
24 on that bottom chart.

25 A And this piezometer is where the two pieces I wanted

1 to know were piezometers not affected by the surcharge,
2 but in the vicinity of this structure so that I have some
3 idea where the ground water table is and I also wanted
4 to have a plot of the lake water because that lake elevation,
5 because that could have something to do with it.

6 Q What you are telling me in short is that you
7 cannot simply --

8 A I cannot look at the plot and tell you right
9 off.

10 Q All right, let me ask you this, if the piezometer
11 number 40 was not influenced in any way by the ground water
12 table, what would you have expected that curve to do in
13 May, June and July?

14 MR. FARNELL: I think he also said it might be influenced
15 by the lake.

16 MR. PATON: Well, I assume the lake is affecting the
17 ground water, right, assuming it isn't affected by the
18 lake or the ground water table, what would you expect that
19 curve to do in May, June and July?

20 WITNESS: If it is not affected by the lake or the
21 ground water, I would have expected it to be fairly level.

22 BY MR. PATON:

23 Q Well, as the surcharge squeezed out the excess
24 pore pressures, wouldn't that line have declined?

25 A Yes, if it was still during that -- I did not

1 understand that question.

2 Q You are saying that it may have already squeezed out
3 all of the excess pore pressures, that is a possibility.
4 We are talking about a supposition, not about a real thing.
5 You are saying that you can't really make accurate --

6 A I cannot look at that one curve without other
7 data and tell you exactly what has happened.

8 Q And you did not do this?

9 A I did not make that evaluation.

10 Q But to your knowledge, you think Dr. Afifi did?

11 A I believe it would have been done in the soils
12 group in Ann Arbor.

13 Q Did you ever hear Dr. Afifi say whether the piezometer
14 behavior was -- what he had expected?

15 A The only comments on piezometers that I can recall
16 is that people felt that the pore pressure dissipated quite
17 quickly and, of course, we had no idea whether that was
18 going to be the case beforehand or not. Do you know whether
19 Dr. Afifi is also satisfied that you are now in secondary
20 consolidation?

21 A I believe he is.

22 Q Is there anyone in Bechtel who has expressed
23 to your knowledge any doubt about whether you are in secondary
24 consolidation?

25 A I don't recall hearing anybody express that doubt.

1 Q Have any of your consultants expressed any question
2 about whether you are in secondary consolidation?

3 A I have not heard them say that.

4 Q Okay. Who under Dr. Afifi do you know would
5 do the actual work involved in taking out of that curve
6 there the impact of the lake and the ground water table
7 so that you would --

8 A I do not know that, on a day-to-day basis, that
9 is entirely within Dr. Afifi's area of work and he could
10 assign any of his people to do something like this.

11 Q Have you ever heard Dr. Peck discuss the piezometer
12 behavior at the Midland site?

13 A Yes, I have.

14 Q What did you ever hear him say about it?

15 A I believe he is of the opinion that we have reached
16 secondary consolidation.

17 Q Based on what I mean?

18 A Based on the data that he has been given.

19 Q Those are his conclusions?

20 A Yes.

21 Q Have you ever heard anything about his reasons
22 or basis for his reasons?

23 A I'm sure I must have, but I can't recall specific
24 statements.

25 Q Did you ever hear him say that the piezometer

1 behaved exactly as expected?

2 A I think he was a little surprised that the piezometer
3 pressure didn't go a little higher than it did, but I don't
4 know of anything else that was surprising and I guess he
5 did not know how quickly the water pressure would dissipate
6 either before we actually put the load on.

7 Q Let me ask you about there is a line on piezometer
8 number 40 plot that says "begin surcharge removal."

9 A Yes.

10 Q And immediately after that line there is a fairly
11 sharp drop in piezometer elevation.

12 A Yes.

13 Q What causes that to drop at that point?

14 A Well, one possibility would be just removal of
15 the surcharge.

16 Q That relieves the pore water pressure; is that
17 correct?

18 A Yes, in this particular instance it appears to
19 have gone down and come back up again.

20 Q Okay, now coming back up again, is that called
21 rebound?

22 A Well, it could be rebound.

23 Q What do you call it?

24 A I don't know that that's what it is called.

25 Q I don't understand what causes that. I can understand

1 why you take the surcharge off, there is a relief pore water
2 pressure is relieved.

3 A And drops.

4 Q And drops the elevation drops. But do you understand
5 why it goes back up again or rebounds?

6 A Well, I think it is going back to the controlling
7 water level there. It may have gone below that when the
8 load was taken out.

9 Q What force would cause it to drop way below that
10 natural stage and bounce back up again?

11 A Well, if you had a negative pore pressure that
12 would cause it.

13 Q Tell me what you mean by "negative pore pressures."

14 A Well, pore pressures that are less than the base
15 that you are measuring the pore pressures from.

16 Q To me the answer is you have a negative pore
17 pressure --

18 A Let me give you an example, and if you take a
19 dense sand and squeeze it, you will see that what was --
20 maybe if it is saturated, what was wet on the outside becomes
21 dry because when you sheer the sand it increases in volume
22 and the pore water is sucked back into the pores. You
23 get negative pore pressure.

24 Q All right. Now, the curve shown on this piezometer
25 number 40 plot after the removal of the surcharge shows lower

1 piezometer elevations, do you agree with that? Lower than
2 it showed in May, June and --

3 MR. FARNELL: What point --

4 WITNESS: The thing I would like to know is where
5 was the lake level during this period was there any pumping
6 going on in this period. What other factors could have
7 affected the ground beyond. I cannot just by looking at
8 one curve tell you the answer to your question.

9 BY MR. PATON:

10 Q. Absence to the knowledge of the ground or the
11 water table level, you cannot draw any conclusions from
12 the fact that the curve after surcharge removal is distinctly
13 at a lower elevation than prior to the removal of the circulation.
14 You can't draw any conclusions?

15 A Well, I would assume that part of that is because
16 of the reduction of the water base water level for some
17 reason, but I don't know what.

18 Q By base water, do you mean the ground water table?

19 A Yes, say the ground water level lowered beyond
20 what happened. That's what I said with that one piece
21 of information I could not --

22 Q In other projects, on which you have experienced
23 with preloading, did the piezometer elevation decline after
24 reaching full surcharge height?

25 MR. FARNELL: I don't understand. Would the court reporter

1 read back that question.

2 (At which time the aforementioned
3 question was read back.)

4 MR. FARNELL: My objection is that are you assuming that
5 the surcharge remained on or did you take off the surcharge,
6 that's it. The question is indefinite.

7 BY MR. PATON:

8 Q After reaching the full surcharge height and
9 the resuming is that it stayed on?

10 A I think I can answer your question. In the case
11 of the oil tanks that I mentioned, when we applied an increment
12 of water in the tank, the piezometers rose and then we
13 maintained that water level in the tank and the piezometric
14 level, level in the piezometer, declined and at some point
15 we added another increment and the piezometer went up again.

16 Q And that is merely normal expected behavior;
17 is that right?

18 A Yes.

19 Q And it declined because you were squeezing out
20 the excess pore pressure?

21 A Right.

22 Q I assume that by looking at this chart, this
23 plot of piezometer 40 you cannot tell absent some other
24 information where you reached secondary consolidation?

25 A No, I would like to see other information before

1 I would make that decision. What I'm really trying to say,
2 just giving me that chart doesn't tell me all the information
3 I need to have. And I have not made an evaluation of it.

4 Q Have you seen the other information, do you recall
5 having seen the other information that you said you might
6 need? Such as the pond level.

7 A I probably have seen it. I do not recall it
8 in relation to that curve. In fact, I don't recall that
9 specific curve, although, I must have seen it because I
10 presume it was at the public hearing.

11 Q Approximately how long -- and is it your testimony
12 that you, yourself, did not make a computation to remove
13 from this type of information any impact of the pond or
14 the ground water level?

15 A I did not.

16 Q You didn't do that yourself?

17 A I didn't.

18 Q Did you ever review that work that was done by
19 anybody else?

20 A I'm sure I must have reviewed some of that in
21 the responses that have been made to NRC.

22 Q Roughly how long ago would that have been?

23 A Quite some time ago.

24 Q Do you know what kind of piezometers were used
25 at the midland site at the diesel generator building?

1 A The piezometers that I saw at the Midland Plant
2 site were casagrande type piezometers.

3 Q Is that an open-tube type of piezometer?

4 A As it was used at Midland it is.

5 Q Were all of the piezometers used in connection
6 with the diesel generator building to your knowledge of
7 that type?

8 A I believe they were.

9 Q Were there piezometers in use in other places
10 on the site that were other than open-tube type?

11 A I don't recall.

12 Q Do the piezometers at the diesel generator building,
13 which I think you said were open-tube type, have a problem
14 with time lag?

15 A Well, there is a time lag affect for any type
16 of piezometer. Casagrande type of piezometer was developed
17 to reduce the time lag from what I would call a stand pipe
18 piezometer, a stand pipe observeration. And so there would
19 be a small time lag.

20 Q You mean the open-type has less of a time lag
21 than another?

22 A The time lag relates to the time that it is required
23 for the water to flow into the piezometer to reach equilibrium
24 level. If you can do that with a very small volume of
25 water, then the time lag will be small and there are piezometers

1 like that. And then with a casagrande type, there is a small,
2 I think it is a 38th inch diameter intube so that the volume
3 of water if piezometer changes by a foot of volume of water
4 that flows in has to be whatever the volume of water is
5 in a 38th inch tube of a foot.

6 Q Do you know who placed the plant fill at Midland
7 as between Bechtel and Canonie?

8 MR. FARNELL: What part?

9 WITNESS: I was never at the Midland site at that
10 time so I cannot tell you from my own knowledge. But it
11 is my understanding that the lower part of the fill was
12 placed by Canonie up to somewhere about elevation. of 615
13 and above that the fill was placed by Bechtel, but I don't
14 know how reliable that information is.

15 BY MR. PATON:

16 Q How about at the dike?

17 A Canonie was a contractor in the dike.

18 Q To your knowledge Canonie did the entire dike?

19 A It is my understanding he did the entire dike.

20 Q To your knowledge, did Dr. Afifi suggest some
21 compromise with respect to the borings that are being requested
22 by the staff?

23 A Suggest to me?

24 Q Suggest to Bechtel or to --

25 A I don't know if he did to Bechtel, but he and I

1 discussed possible.

2 Q Tell us those conversations, tell us what he said and
3 what you said.

4 A Well, I would have to start off the thing by
5 saying that I don't believe that the borings that were
6 requested with the core are technically required. I believe
7 that for each of the fixes that we have provided you information
8 there is a check which is a sound check and well recognized
9 in the industry.

10 Q I'm sorry, sir --

11 A A sound check. Therefore, our discussions were
12 not related to the technical necessity of doing borings.

13 Q Okay.

14 A But rather discussing what might be done to get
15 out of a stalemate situation. That's really the only basis
16 that we discussed.

17 Q Did you read Dr. Afifi's deposition that addressed
18 that subject?

19 A I'm sure I must have. I don't recall exactly.

20 Q Let me suggest to you that I asked him whether
21 his suggestion was based on -- I'm going to suggest something
22 to you and ask you if it refreshes your recollection. I'm
23 going to suggest to you that I asked him whether his recommendations
24 were based on the merits of the case, the real need for
25 borings, or was it just an attempt on his part to settle,

1 get rid of a problem with the staff.

2 A Well, I don't know about his recommendation that
3 you are talking about, I'm talking about discussions I
4 had with Dr. Afifi.

5 Q And I'm asking you about your recollection of
6 his deposition --

7 A I don't remember.

8 Q I suggest to you that he gave the matter some
9 consideration and said it was very difficult to know which
10 of those two provided the basis for his suggestion.

11 MR. FARNELL: I totally disagree with that. And also
12 Mr. Afifi has not completed his deposition yet, so I can't
13 agree with that at all.

14 BY MR. PATON:

15 Q Can I ask you to read pages 245 through page
16 250.

17 I think starting on line 20 he tells what
18 he proposed.

19 My question is, did you ever have any conversation
20 with Dr. Afifi that led you to believe that there was any
21 question in his mind as to the basis for his settlement
22 in this dispute?

23 A I don't understand the question.

24 Q All right, let me strike that.

25 What was your understanding of what his

1 suggestion was or his offer was to provide the staff with
2 some information?

3 MR. FARNELL: There is a couple -- can you refer to
4 a specific page in here or --

5 MR. PATON: You can base your answer on the deposition
6 or conversations that you had with him. Do you understand
7 that he made some kind of an offer or a suggestion?

8 WITNESS: I read that here. What I told you was that I
9 had conversations with Afifi, but I don't know anything
10 about conversations that he had.

11 BY MR. PATON:

12 Q What is your recollection of your conversations with
13 Dr. Afifi as to any suggestion he had to bide the staff
14 with some of the information they were requesting?

15 A The recollection that we had, we met with the
16 NRC, I believe at the end of July at that meeting it was
17 my recollection that it seemed it was a problem in the
18 staff's understanding bearing capacity. And I believe
19 our discussion was based around trying to satisfy that
20 requirement to see if there was some way we could satisfy
21 that because we felt perfectly satisfied, in fact, with
22 bearing capacity and with settlement from a technical point
23 of view with the information we presented.

24 But in an effort to get out of the
25 stalemate, we discussed what might be done, but those were

1 discussions between Dr. Afifi and me and were not. And I
2 don't know how those discussions were transmitted further
3 on in the organization, I don't know if they were transmitted
4 further in the organization.

5 Q Am I correct that the thrust of your statement
6 is that at least in your opinion any suggestion to provide
7 the staff with that information was based on your desire
8 to settle the dispute and not based on your real thought
9 that this information was really needed by the staff?

10 A That's correct.

11 Q Now, my question is this, did Dr. Afifi ever
12 say anything to you that indicated he agreed with you in
13 that regard, that he was doing it solely to satisfy the
14 staff as opposed to thinking that there was any real need
15 for this information?

16 A I believe that's the spirit in which we had the
17 discussion.

18 Q To your knowledge, he agreed with your thinking
19 on that matter?

20 A That would be my recollection of the conversation.

21 Q And you have just read his deposition from pages
22 245 to 250.

23 A Right.

24 Q Does your understanding of pages 245 to 250 indicate
25 to you any conflict --

1 A I don't really see anything.

2 MR. FARNELL: You are talking about two different
3 things. His conversation with Mr. Afifi and these are
4 conversations with other people.

5 WITNESS: In reading that I don't see any conflict
6 with the discussions.

7 What was your question that led up to all
8 this response, do you recall what your question to me was?

9 BY MR. PATON:

10 Q Now, I'm going back to our discussion of a minute
11 ago about piezometer number 40.

12 A Yes.

13 Q And I think you indicated that you couldn't just
14 look at that plot and make conclusions.

15 A Yes, I don't believe so.

16 Q You might not have said this, but I construed
17 it to mean you would have to take out of that plot the
18 affects of the ground water.

19 A I would have to look at all those factors that
20 might affect the piezometric level.

21 Q Can you tell me how you would go about that,
22 how would you take information concerning the ground water
23 table, how would you --

24 A Physically?

25 Q How would you take that information and interpret the

1 piezometer number 40 plot?

2 A I believe I would have to go through all the piezometri
3 data they have to get that information that's necessary
4 to modify that curve.

5 Q Did the graph that I showed you -- do you recall,
6 I'll be glad to show it to you again.

7 A I recall the one you showed me.

8 Q Did it show that the level of the pond did not
9 change during that period?

10 A The particular graph that you showed me for PC-
11 40 did not have the pond elevation on it.

12 Q I thought it did.

13 A You showed me one for PC-30, that had pond elevation.

14 Q This graph for PC -- my point is the ponds is
15 the pond. Would you expect --

16 A I wouldn't disagree with that.

17 Q And would you disagree that during May, June
18 and July, the level of the pond --

19 A The problem I have with this graph was knowing
20 where May, June and July is on it. I can see April and
21 I can see August. The pond elevation during that period
22 rose slightly and then fell according to this. The scale
23 on this drawing is quite different than the scale on the
24 one you just showed me there.

25 Q Is the change in elevation of the pond

1 sufficient to have affected the piezometer elevation?

2 A It could have, I don't know without looking at data
3 to be able to tell you, but the change in the pond elevation
4 would have caused some change in the ground water level
5 and the plant fill and the affect of that on the piezometer
6 is what I would be interested in finding.

7 Q Even if the pond water level remained absolutely
8 constant, it could be that it was causing the ground water
9 table to -- the ground water table was changing as a result
10 of the influence of the pond; is that possible?

11 A Well, that would be one factor that I would want
12 to look at. I do not know because I don't have the data
13 here, I do not know whether in fact that was happening,
14 out that would be one thing I would like to look at.

15 Q Mr. Ferris, directing your attention to piezometer
16 number 40 plot, and specifically the piezometer elevation
17 after the surcharge has been removed, and bearing in mind
18 the fact that the elevation of the pond on figure 1 shows
19 the elevation of the pond remained constant --

20 MR. FARNELL:: I'm going to object, he didn't agree
21 with that statement.

22 MR. PATON: All right, I'll start with that.

23 MR. FARNELL: You are talking about two different
24 scales and they are hard to read so I think this whole line of
25 questioning is going nowhere, slowly.

1 BY MR. PATON:

2 Q Directing your attention on Figure 1 of Kane Deposition
3 Exhibit No. 8, the pond elevation, would you agree that
4 it remained almost constant through the end of the year
5 1979?

6 MR. FARNELL: He said already he had problems with
7 it --

8 MR. PATON: From the middle of '79 to the end of the
9 year.

10 MR. FARNELL: He said already he had problems with the
11 scale on that thing.

12 BY MR. PATON:

13 Q He may have problems. If he can't answer the
14 question because of problems, that's fine.

15 MR. FARNELL: What do you mean by "almost" counsel?

16 MR. PATON: If he can't answer the question, he should
17 say so.

18 MR. FARNELL: It's vague, I'm objecting. I'm telling
19 you, you don't have to speculate, either.

20 WITNESS: I can see that this line is relatively level.
21 There are little humps in there.

22 BY MR. PATON:

23 Q All right, bearing in mind that, what would be
24 the possible explanations for the fact that the piezometer
25 elevation after the surcharge removal appears on piezometer

1 number 40 plot to be lower than the piezometer elevation
2 prior to the beginning of the surcharge.

3 A I think I would have to go back to what I said
4 before. The pond level is one of the pieces of information
5 but the ground water level in the vicinity of the diesel
6 generator building is another and there could be things
7 that were going on that I am not aware of that need to
8 be factored into that before you can analyze it.

9 Q Can you tell me anything that would cause a sharp
10 change in the ground water table?

11 A Yes, a sharp rise in the pond might locally cause
12 a --

13 Q Or a sharp decline?

14 A Or a sharp decline.

15 Q Do you know of any others.

16 A Well, I'm sure I could think of some, I just
17 don't know offhand.

18 Q What we are suggesting is there was no change
19 in the pond and what other possible causes could there
20 be?

21 A Well, if I was going to analyze that, one of
22 the things I would look at first, is the whole pattern
23 of the ground water in the plant fill, and that is controlled
24 by the pond, but the pond level the level at some point
25 within the fill doesn't have to be the same.

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(At which point the deposition ended
on December 10, 1980, at 6:00 p.m.
to be resumed on December 11, 1980,
at 8:00 o'clock a.m.)

AUTHENTICATION

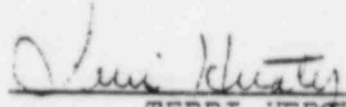
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DATE OF PROCEEDING: December 10, 1980

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TERRI HERATY

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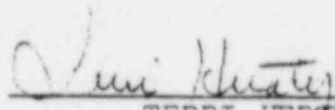
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