

1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

3 BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

4 -----)
5 IN THE MATTER OF:)

6 CONSUMERS POWER COMPANY)

7 (Midland Plant, Units 1 and 2))
8 -----)

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

9 The Discovery Deposition of HARI NARAIN SINGH,
10 a witness herein, taken pursuant to Notice of Taking
11 Deposition, before Matthew W. Betz, CSR-2010, Registered
12 Professional Reporter, a Notary Public within and for the
13 County of Wayne, State of Michigan, at the McNamara Building,
14 Detroit, Michigan, on Friday, December 19, 1980, commencing
15 about 11:00 o'clock in the forenoon.

14 VOLUME II

15 APPEARANCES:

16 ISHAM, LINCOLN & BEALE
17 (By Mr. Ronald Zamarin and
18 Mr. Alan S. Parnell)
19 One First National Plaza
20 Chicago, Illinois 60603

21 and

22 JAMES E. BRUNNER, ESQUIRE
23 212 West Michigan Avenue
24 Jackson, Michigan 49201
25 Appearing on behalf of Consumers Power Company

WILLIAM D. PATON, ESQUIRE
UNITED STATES NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555
Appearing on behalf of the Nuclear
Regulatory Commission



C O N T E N T S

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WITNESS

PAGE

Hari Narain Singh

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Cross Examination by Mr. Zamarin, continued 266

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2 SINGH

3 Detroit, Michigan

4 Friday, December 19, 1980

5 About 11:00 o'clock, A.M.

6 - - -

7 H A R I N A R A I N S I N G H, having
8 previously been duly sworn testified further as follows:

9 - - -

10 CROSS EXAMINATION (continuing)

11 BY MR. ZAMARIN:

12 Q It is now eleven o'clock. We delayed beginning this morning
13 because there were certain administrative matters with regard
14 to discovery and scheduling that we have been attempting to
15 work out and, of course, you understand, Mr. Singh, that you
16 are still under oath and still sworn to tell the truth today?

17 A I do.

18 Q All right. I have been advised by Mr. Paton that you have a
19 clarification to an answer that you gave yesterday that you
20 would like to make, and if you just want to go ahead and tell
21 us what that is, please?22 A When I work in Pennsylvania, Department of Transportation,
23 then I design bridges and foundations and at the same time
24 I reviewed. Okay, in Arizona I supervise a crew who is doing
25 foundation investigations, so I watch sample taking.

26 Q And that was disturbed sampling?

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- 2 A Yes.
- 3 Q I have here what has been marked Consumers Exhibit Number 4
4 for identification as of today's date, and I'd like to show
5 you and Mr. Paton that Exhibit and I am going to ask you af-
6 you have had an opportunity to review it, to tell me what it
7 is.
- 8 A Yes. I prepared it.
- 9 Q You did it? What is it?
- 10 A It is a computation of the pressure, computation of the pres-
11 sure below the foundation, the footing level along the depth
12 of the fill material because of the surcharge load.
- 13 Q Okay, and why did you prepare that document?
- 14 A Because I wanted to see how the pressure varies below the
15 footing.
- 16 Q What did you see?
- 17 A I did it and saw it varies.
- 18 Q All right, and of what significance is that variation to you?
- 19 A Well, that it will affect the settlement.
- 20 Q How?
- 21 A Because the settlement depends upon the pressure.
- 22 Q I mean "how" in a quantitative sense?
- 23 A If there is less pressure there will be less settlement.
- 24 Q What conclusions did you reach on the basis of the calcula-
25 tions and the analysis of the information in Exhibit Number 4

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CANTON 313 877-7631

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2 A The conclusion was I found the settlement pressure. I didn'
3 calculate the settlement.

4 Q Why not?

5 A It was not required. I don't know how the piezometers are.

6 Q Why did you do the calculations in Exhibit 4 if you then
7 didn't do anything with them?

8 A Because it was to be compared with the one exhibit we were
9 given.

10 Q Okay. Now we are getting somewhere. It was to be compared
11 with this Figure 2?

12 A What is that, let me see that figure.

13 Q Wait a minute, I have my notes on it. Do you have an unmark
14 copy?

15 It is of View Graph Number 5 as attached
16 to Consumers Exhibit Number 12, for identification, as of
17 October 15th, 1980, and that's the deposition of Joseph Kane
18 and I have got here a clean copy, I am getting a clean copy.

19 All right. I have what I am going to gi
20 to you, and it is Figure 2 to the December 14, 1980 submitta
21 by Consumers Power Company, and that submittal was Consumers
22 Exhibit Number 8, for identification, as of October 15 in th
23 Kane deposition, and this Figure 2 was included with that an
24 it was also a part of Exhibit Number 12 of that same depositi
25 which was a Joe Kane document.

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- 2 Is that the graph that you saw that then
- 3 prompted you to do the calculations contained in Exhibit 4?
- 4 A It looks like that.
- 5 Q Okay, and what was it that you were trying to either verify
- 6 or check or look at with regard to that Figure 2?
- 7 A Actually the dirt loads shown here in this graph was much more
- 8 than I have got in one of your tables, not tables, my correc-
- 9 tion, it is in question number four -- I am not sure, but I
- 10 got a table in which it is given at the time of surcharge the
- 11 dead load weight at 2.2 keps.
- 12 Q All right, and what is shown on this graph as far as dead load
- 13 A Here I found much more than that.
- 14 Q What?
- 15 A Dead load.
- 16 Q What did you find?
- 17 A Well, I can measure here, one, two, almost three keps.
- 18 Q And did you ever find out why in a table that was 2.2 keps
- 19 and why here that that load is over three?
- 20 A Well, you have to furnish this. I don't know. Whatever in-
- 21 formation I have got I have to do it according to that.
- 22 Q Did you ever find out what you perceived to be what the cause
- 23 was for which you perceived to be a difference in dead load?
- 24 A I don't see anything.
- 25 Q Does that mean you haven't found it?

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- 2 A I have not found out.
- 3 Q So you still don't know?
- 4 A No, I still don't know.
- 5 Q Did you ever ask anybody?
- 6 A My liaison in NRC, I asked Joe Kane.
- 7 Q And what did Joe Kane tell you?
- 8 A I say that is here -- I am telling him, and I don't remember
9 the table number, but it is written there.
- 10 Q What did Joe Kane tell you?
- 11 A He is not aware of why it is.
- 12 Q Did he say he'd find out?
- 13 A No. How should I find out?
- 14 Q No, did he, did Joe Kane tell you that he'd find out for you
15 and let you know?
- 16 A Perhaps he will make contact with applicant and then --
- 17 Q (Interposing): Perhaps he would, that is a possibility.
18 he tell you that he would do anything to find out?
- 19 A No, he didn't tell me.
- 20 Q Did you want him to get that information for you?
- 21 A Sure, I would like to have that, but I didn't tell him that
22 I want it.
- 23 Q Why not? Did you assume that he knew that you wanted it?
- 24 A Because, no, because we are waiting for some information from
25 Consumers Power. There were a lot of designs and calculations

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2 that we wanted and thought that they might furnish in their
3 next report and then we would know.

4 Q You mean there was something that you perceived to be a con-
5 flict in information --

6 A (Interposing): Uh-huh.

7 Q (Continuing): -- and you thought that the most appropriate
8 way to conduct your review as lead reviewer was to not tell
9 anybody about that or ask for an explanation but rather just
10 wait for it to come in some time down the road until you got
11 it?

12 A I asked NRC. It is responsibility of NRC to tell me.

13 Q So you then did expect Joe Kane to get the information to-
14 gether?

15 A Sure.

16 Q Did he ever do that?

17 A I don't know.

18 Q He hasn't ever given you the information?

19 A No, I don't have anything.

20 Q All right. You have indicated that you noticed that in some
21 table there was a figure of 2.2 keps. Do you recall what it
22 said that 2.2 keps represented?

23 A That say it is the dead load at the time of surcharge.

24 Q Did it say any more about that?

25 A No, I don't remember.

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2 Q All right, and how do your calculations that you have got in
3 Exhibit 4 here relate to this confusion that you had between
4 2.2 keps and this something in excess of three keps that is
5 shown on Figure 2?

6 A It shows more load at the top layer of the soil, I mean just
7 below the footing, that at the time of surcharge this shows
8 more load and that one shows less.

9 Q So what you did is when you got this graph --

10 A (Interposing): Uh-huh.

11 Q (Continuing): This showed what the load would be at differ-
12 ent elevations based upon a dead load of -- oh, I don't know,
13 it looks to me like about 3.2 keps or something like that?

14 A I think 3.4, 3.2.

15 Q And you then did some calculations to see what the stress
16 would be at various elevations based upon 2.2 keps, is that

17 A Right.

18 Q And then I'll bet you went and you made another one of these
19 graphs based upon --

20 A (Interposing): Yes.

21 Q (Continuing): -- your calculations?

22 A Yes.

23 Q Right, and you gave that graph to Joe Kane?

24 A Yes.

25 Q And that graph is what we have as View Graph Number 6. It :

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2 Consumers Exhibit Number 12 as of October 15, 1980, in the
3 Kane deposition, right?

4 A Yes.

5 Q All right, and what that graph is, that is a graphic depic-
6 tion of your calculations as contained in Exhibit 4, right?

7 A Uh-huh.

8 Q Good. After you did these calculations and you did this gr
9 that Joe Kane has got marked Exhibit 12 for his deposition,
10 View Graph Number 6, and I see here where it says 2.2 keps,
11 Table 4.1, so maybe that's where you got the 2.2 keps?

12 A Yes.

13 Q What did that tell you?

14 A That the load was 2.2.

15 Q Well, heck, you knew that apparently by looking at Table 4.
16 You didn't have to go through all that stuff on Exhibit
17 Number 4. You plotted that graph out or at least drew the
18 graph?

19 A Uh-huh.

20 Q What does that graph say to you?

21 A It say that if I add this whole lot then the total lot at t
22 time of surcharge is less at the surface from this graph
23 (indicating). That's what it states.

24 Q Okay. That would pretty much follow if you had a 2.2 keps
25 and you had a 3.2 keps load, you pretty well know that the

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2 stress would be less for the 2.2 keps load, right?

3 A Yes.

4 Q So what in addition to that revelation did your graph of
5 the calculations you used did this Exhibit 4 show you?

6 A Just difference of the stresses it shows. That's all, the
7 difference of the stresses between what is the graph I got in
8 -- what is the number?

9 Q All right, the graph that you got --

10 A (Interposing): From the application.

11 Q From View two. I see what you did. It looks like what you
12 did on here was that you laid your graph over the graph that
13 was in Figure two from the applicant?

14 A Oh, yes. I don't lay, but I compare what is on the top here,
15 this thing (indicating).

16 Q What I mean you put both graphs on one or both of the data?

17 A Yes.

18 Q Okay, so basically what you were trying to do here was get a
19 graphical depiction of what the stresses are at different
20 elevations and what it would like at 2.2 and what it would
21 look like at 3.4, I believe is what you show as calculated at
22 628, right?

23 A Uh-huh, yes.

24 Q All right. Taking just the information using the 3.4 keps,
25 or should it be 3.5 keps? I notice you have here the dead

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load equals 3.5, and then here you have it equals 3.4. Is that because you got the 3.4 off of Figure 2 but you calculated it at 3.5?

A Approximately calculated it. It was 3.5 and here it was 3.4 and I measure it.

Q On Figure 2?

A Just approximately.

Q So what you did is you used the 3.4 on this graph, right?

A I think I used 3.5 -- maybe 3.4, it doesn't make very much difference, but --

Q (Interposing): Okay, what's a tenth of a keps, huh?

A Well, I am not aware of all the load what is there because I don't know how much pre-load is there and how much is there (indicating) because I just approximate it to see, and whatever the drawing shows I take that.

Q Okay. Based just upon the 3.4 keps dead load that is used in Figure 2 of Consumers -- you have got a little graph there, what does that tell you? What kind of information does that give you with regard to your review of the soils issues at Midland?

A That 3.5 keps I have written, that's after completion of the building when all is there, but I don't know at the time of surcharge whether this load there is 3.4 or 5, that I have no way to know.

SINGH

- 2 Q Sure you do, you could ask somebody.
- 3 A Well, I can communicate with NRC.
- 4 Q Did you do that?
- 5 A Yes, that is why I asked that, how it is the 3.55 after I seen
6 this in September.
- 7 Q Sure, and did anybody ever answer that question for you?
- 8 A No.
- 9 Q Who did you ask, Joe Kane again?
- 10 A I have already told you that was the only time I asked. I
11 don't know how it is 3.5.
- 12 Q And did Joe Kane say, "Well, I will see if I can find out and
13 get back to you and let you know"?
- 14 A No, no, he didn't.
- 15 Q But you expected him to get back to you with that information
16 didn't you?
- 17 A No, I didn't expect these things because ultimately when I
18 submitted this thing, that result, then he wanted some more
19 questions on what more problems I have on other things, be-
20 cause there will be some kind of interrogatories.
- 21 Q So you knew if you had any problems concerning any of this
22 there would be interrogatories that you could ask?
- 23 A Yes, any problems if I have some more questions which are n
24 clear to me.
- 25 Q I see, so Joe Kane --

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- 2 A (Interposing): So he --
- 3 Q (Interposing): Excuse me, I thought you were done.
- 4 A So he wanted to compile all the questions but I don't know
5 whether he will ask somebody and give it to me. I assume t
- 6 Q Right, but he never did give it to you, whether he asked som
7 body or not, right. I mean you don't know?
- 8 A No, I don't know what he is doing after that.
- 9 Q He hasn't given you one lick of information that you asked f
10 about this graph, has he, and about these calculations?
- 11 A No, I didn't get.
- 12 Q You understand that question?
- 13 A Do I understand the question? Yes, I understand the question
- 14 Q He hasn't, has he?
- 15 A I asked him only why is it 3.5. I didn't ask give me the
16 information. I ask why is it 3.5.
- 17 Q You asked him that as a lead reviewer and you asked him becaus
18 he was the contract technical coordinator with the Corps from
19 the NRC?
- 20 A Uh-huh.
- 21 Q And you asked him because you assumed that he would go get
22 the information that you needed for your review, right?
- 23 A No.
- 24 Q No?
- 25 A I didn't want --

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2 Q (Interposing): You didn't want the information?

3 A I can do it.

4 Q Because what?

5 A I didn't want that -- I didn't ask him to give it to me.

6 Q Did you want the information? Was it necessary for your review?

7 A I wanted to review that. No, when I was reviewing I was not
8 with him, and this one was from the applicant and the appli-
9 cant was given all the questions.

10 Q All right.

11 A Okay.

12 Q Yes, and you come up with a figure of 3.2 and a figure 3.4
13 I'll bet as the lead reviewer you'd like to know which one
14 the one that was right?

15 A Uh-huh.

16 Q So you ask Joe Kane if he knew, right?

17 A Yes, I asked him.

18 Q Okay, and you assumed when he said that he didn't know that
19 would find out and he'd let you know, didn't you?

20 A He didn't say that he'd let me know.

21 Q I know he didn't say that, but did you expect him to get y
22 that information somehow?

23 A Expect him to get it somehow, no doubt about that.

24 Q Okay, in fact the reason that you mentioned it to him was
25 let him know that you had that problem with the informati.

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2 so that ultimately you would get that information so that you
3 could finalize your review on this matter, right?

4 A Yes.

5 Q As you sit here now you still haven't gotten that information
6 from Joe Kane, right?

7 A Yes.

8 Q Do you remember when it was that you mentioned to Joe Kane
9 that there was this problem with the data?

10 A The same day Dr. Peck gave the demonstration, the same time I
11 say I had never seen such kind of load there.

12 Q That was back in around the 14th of September, 1980?

13 A No.

14 Q No?

15 A It was on 30th of August, about the end of August sometime.

16 Q I see, so it was in August of 1980?

17 A But at that time I didn't get the picture, the submission. I
18 got that after 15 days.

19 Q Okay, so what you have been getting back from Joe Kane when
20 you have been mentioning to him that you had these problems or
21 you need this additional information is simply that he keeps
22 asking you to tell him about more problems that you have but
23 he hasn't given you any other information yet, right?

24 A Right.

25 Q Looking just at Figure 2 --

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- 2 A (Interposing): Uh-huh.
- 3 Q (Continuing): And this is Figure 2 to that September 14th
4 1980 submittal by Consumers --
- 5 A (Interposing): Yes.
- 6 Q What conclusions, if any, can you draw from that graph with
7 regard to the surcharge program, assuming that the informa
8 contained on that graph is accurate?
- 9 A If the information given on this graph is accurate then I
10 assume that the dead load of the building and all the dead
11 load of the building is less than -- I don't know, probably
12 about -- okay, just a second, if all the dead load includin
13 the machine load is -- I can't read this. I can't say here
14 if that is 4.50 or something.
- 15 Q It looks about like 4.4.
- 16 A 4.4.
- 17 Q You are taking the dead load plus the live load, right?
- 18 A Yes, 4.4 approximately then at the time of surcharge there w
19 some excess load then the final load is going to come on the
20 building, if assuming that 4.4 is correct.
- 21 Q Okay. How much less than the 4.4 could you have and still
22 have the load that was on the building during the surcharge
23 exceed the final load?
- 24 A I have no way to know what is the final load on the building.
25

MR. ZAMARIN: Could you read back, please

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2 that answer to that question and the answer preceding?

3 (Whereupon the Reporter read back the
4 last two answers.)

5 Q (By Mr. Zamarin, continuing): Okay, what is it that you as a
6 reviewer want to see with respect to the relationship between
7 the load during surcharge and the final load?

8 A The loading of the surcharge has created compression in the
9 foundation. It has some kind of compressibility constant and
10 you can determine out of that and if the final load is more
11 than the load of the surcharge load that constant, it depends
12 upon the load.

13 Q So what you then want to see is that the load during the sur-
14 charge period was at least as great as the final load on that
15 building was going to be, is that right?

16 A No, I didn't get your question correctly.

17 Q What you want to see is that the load of the building --

18 A (Interposing): Uh-huh.

19 Q (Continuing): At surcharge was at least as much as the final
20 load is going to be on that building, or in other words that
21 the final load isn't going to be more than the load during
22 surcharge, is that right?

23 A If the final load is going to be more on the surcharge,
24 definitely, then the compressibility will be different.

25 Q Okay.

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- 2 A (Continuing): Because this soil is not over consolidated for
3 that part of the load of the building. It would be more.
- 4 Q So what you want to see as reviewer is that the load during
5 surcharge is not less than the final load?
- 6 A That's not the only criteria, not less than the final load.
7 That's one criteria.
- 8 Q All right, give me another one?
- 9 A Another one I would like to see the surcharge load should be
10 at least some in excess of the final load.
- 11 Q How much?
- 12 A Well, assume 1.5 times the final load. Normally I seen in
13 all the surcharge it is generally twice, sometimes 1.5.
14 Actually surcharge in some cases is defined as the load more
15 than the permanent load in some instances, especially the
16 Navy and even in Stanley Johnson paper 90-70 he defines what
17 the surcharge over the permanent load is going to be.
- 18 Q All right. You say or you give the figure 1.5. What about
19 1.2?
- 20 A I say, yes, I never seen. I have seen two. I don't remember
21 ever seeing 1.5, so it could be very critical.
- 22 Q It what?
- 23 A It might be critical for certain reasons if the dead load
24 suddenly increases then you will be in the critical zone, okay,
25 so in some cases you don't know. Take the example of the snow

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load on the building, because sometimes the load might
two or three months on top of the roof, and it might i
the load on the building, so in engineering designs yo
some margins.

Q How much snow are you talking about when you say that
snow on the roof is an environmental load to be an impo
factor?

A We design 50 -- 150 pounds per square foot in building
breakwaters between the lock, we take 150 pounds per sq
foot.

Q How much snow would it take to exert 150 pounds per squ
A It becomes snow and then it becomes ice, it depends on
happens completely, and I am telling you it is not impo
but it might.

Q Okay, well, just snow, how many feet of snow would it t
exert 150 pounds per square inch or square foot?

A It can become ice, and snow is very light.

Q It comes down out of the sky as snow.

A Snow is very light, one inch of snow -- well, generally
foot of snow -- maybe is equal to one inch of water nor
so it would take tremendous amounts, I can guess it mig
100 feet.

Q Okay, and that ice has to come from somewhere, so you w
need all that snow building up and turning, that 100 fe

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- 2 of snow turning into ice?
- 3 A Due to compressibility. It doesn't have to become ice, but --
- 4 Q (Interposing): Okay, sure, as it compresses or as that
- 5 pressure occurs, whatever, it becomes ice and it would take
- 6 100 feet of snow to become ice to give you that kind of
- 7 pressure?
- 8 A The entire season, yes, naturally.
- 9 Q Okay. We were talking about the factor by which the surcharge
- 10 total load during surcharge ought to exceed the final load,
- 11 and I asked you if in your opinion 1.2, for example, of the
- 12 load during surcharge to the load that would be there after
- 13 completion of the building, in your opinion would be suffi-
- 14 cient?
- 15 A No.
- 16 Q No?
- 17 A No, as an engineer there has to be a margin of safety depending
- 18 upon the type of the structures.
- 19 Q Okay.
- 20 A (Continuing): Well, this particular structure, this is
- 21 nuclear power plant, it is very important, the safety of the
- 22 structure to insure safety of the structure in all conditions
- 23 and I would not go less than 1.5. That is my opinion.
- 24 Q Okay. What do you base that on, just kind of a gut feeling?
- 25 A My experience.

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2 Q Your experience in what?

3 A In designing.

4 Q Surcharging?

5 A No, designing structures.

6 Q What about your experience in surcharging? You don't have
7 any, do you?

8 A No, I don't have any.

9 Q And when you say your experience in designing structures hav
10 you designed any structures like the Diesel-Generator Buildi

11 A I design bridges.

12 Q Well, I have seen the Diesel-Generator Building and bridges
13 and they don't look the same to me.

14 A No, but it don't mean the principle is not the same.

15 Q The principle is the same?

16 A The engineering is the same.

17 Q Right, you build it so it doesn't fall down, but aren't there
18 some differences as far as how a structure is going to --

19 A (Interposing): No, sir, the analysis is the same.

20 Q Wait a little before you answer my question. That wasn't eve:
21 a question yet, okay, so wait and give yourself about ten
22 seconds after I finish so you will know I am done.

23
24 Okay, can you give me any basis other
25 than your opinion or can you give me the basis for your
opinion that the margin of safety as you style it with

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2 respect to the surcharge load as opposed to the loading during
3 the lifetime of the structure should be 1.5? In other words,
4 can you tell me a textbook that might say that?

5 A The surcharge load is equal to the total load of the building
6 and, definitely, I am getting a margin of safety of one, fac-
7 tor safety of one, and I know I am going to increase the
8 margin of safety to 1.5 to insure more safety to the structure

9 Q What I am saying is unless we assume that the .5 that you are
10 increasing it in going from 1.5 is magic somehow, upon what
11 do you base your opinion that 1.2 wouldn't be enough but 1.5
12 is what ought to be there? I mean, can you give me the name
13 of a book or the name of a paper or name of a study or the
14 name of anybody or anything upon which you base that opinion?

15 A Most of the factor of safety I have been using in any Corps
16 of Engineers, in all kind of structures is 1.5 and more.

17 Q Okay. In other words, if you were to design something you
18 would design for 1.5 times the expected load, right?

19 A That is not factor of safety. There is a difference between
20 load factor and factor of safety.

21 Q Tell me what the difference is between the load factor and
22 the factor of safety?

23 A Load factor defines, considers the increase, the percentage
24 of load, the factor of safety compares with the stresses.

25 Q Okay. All right, so when you design then are you telling me

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2 that you always design for a 1.5 factor of safety, 1.5
3 times the anticipated stress?

4 A And more.

5 Q Regardless of the type of structure?

6 A One point -- no, I say it can go above 1.5, but never less
7 than 1.5 I never used in my life.

8 Q Okay. With regard to your surcharge program in deciding on
9 the amount of surcharge load, and I know you have never had
10 any experience with that, but do you know if there is a differ-
11 ent practice perhaps in the engineering field with regard
12 to whether you would load to a factor of 1.5 as opposed to
13 1.2 with respect to the stress?

14 A No, I didn't get your question. Would you repeat it?

15 MR. ZAMARIN: Read it back, please

16 (to Reporter).

17 (Whereupon the Reporter read back the
18 previous question.)

19 A Stress of what?

20 Q Well, I would assume that the stress that that load, the sur-
21 charge load and the structure that is being loaded would im-
22 pose upon whatever it is that is holding the building up, the
23 soil or whatever?

24 A The question is not 1.2 and 1.5 -- I didn't understand what
25 you mean by the stress in surcharge.

SINGH

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2 Q You told me that you always design things so that you have
3 factor of safety of -- you design something for one and a
4 half times the stress, at least one and a half times the
5 stress that is anticipated that that structure, whatever it
6 that you are designing will ever be subjected to, right?

7 A Uh-huh.

8 Q Am I correct in that that was your statement?

9 A It means that I -- okay, let me see this thing.

10 Q Yes.

11 A Whenever I design a structure I have come across these things
12 the stress used has a margin of safety of 1.5 and more.

13 Q Okay. Do you know whether in developing pre-load programs
14 the engineering field -- I am not talking about drawing board
15 design from the ground up, I am talking about in surcharge
16 programs such as we had at the Diesel-Generator Building, do
17 you know whether engineering practice is to calculate the load
18 to be applied to that to provide a margin of safety of 1.2
19 rather than 1.5?

20 A No. I have even seen there was a margin of safety of two.

21 Q Okay, you have been reading something where there was a margin
22 of safety of two, right?

23 A Yes. I can give example, that was in the Mayport Airfield.
24 Their surcharge was approximately twice the actual --

25 Q (Interposing): All right, that was for what, a runway?

SINGH

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2 A Runway.

3 Q For a runway, so you read about that. Did you ever read about
4 any other surcharge programs as to what the factor of safety
5 was?

6 A I read other programs but I never saw any factor of safety
7 there.

8 Q So you really don't know then other than that they used the
9 factor of two at the Mayport Airfield what is commonly
10 accepted in the engineering field, do you?

11 A It is commonly accepted, it is a good practice accepted in
12 general programs, but I have never seen less. I read a couple
13 more papers and I don't remember those things, but I didn't
14 see less surcharge in the actual load and even one less than
15 the actual load surcharge was always more than the actual dead
16 load.

17 Q Okay, right, the surcharge is always more, okay, so that would
18 be a safety factor of one?

19 A More is not one. You have to have --

20 Q (Interposing): You say it is never less. If it is not less
21 it has got to be at least one.

22 A But I haven't seen anything which is less than one and even
23 one I have not seen because I say it might be more than that
24 and how much more than that --

25 Q (Interposing): I am trying desperately to understand your last

SINGH

2 couple of answers. You are saying that you have never seen
3 a surcharge where they use a load during surcharge that was
4 less than the final load, right?

5 A Final load, right.

6 Q Okay, and you read about one where the surcharge load, the
7 pre-load was twice what the final load would be, right?

8 A Uh-huh.

9 Q You have to say yes or no?

10 A Yes.

11 Q He can't record the bobbing of your mustache. Do you know
12 strike that, and the only surcharge about which you have in
13 formation with respect to the load and a factor of safety
14 was at Mayport Airfield?

15 A Go ahead.

16 Q And, therefore, you don't know what the accepted standard is
17 in the engineering field with regard the safety factor for
18 surcharges, isn't that right?

19 A Well, I discuss with my supervisors.

20 Q Your supervisor being?

21 A Bill Otto.

22 Q What did he say?

23 A He say it is always more than that.

24 Q Always more than what?

25 A Is more than one always the ratio of these things.

SINGH

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2 Q Okay. What else did he say?

3 A That's all he says.

4 Q Okay. It is always more than one?

5 A Uh-huh.

6 Q So you do know that at least in the engineering field that it
7 is accepted practice that the surcharge load must be at least
8 equal to the final load, right?

9 A That is my opinion if I would surcharge I would surcharge 1.5.

10 Q I know you would.

11 A Yes.

12 Q And you know some people when they drive around the interstate
13 and the speed limit is 55 that they drive 30, but what I am
14 asking you is whether -- what I am asking you is whether it
15 isn't true that all you know about the standard in the engineer-
16 ing practice with regard to surcharge is that you use a load
17 that is at least equal to the final load, isn't that right?

18 A You say at least final load. I as an engineer told you that
19 it shouldn't be less than 1.5. I am not agreeing to that it
20 should be at least one.

21 Q I am not asking what Hari Singh would do and I am not asking
22 how you drive on the freeway.

23 A Sure.

24 Q What I am saying is, I am asking you about your knowledge of
25 the standards in the engineering industry and you have told

SINGH

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2 me that your supervisor, Mr. Otto, told you that it has to be
3 at least a safety factor of one, right, at least?

4 A He says more than one.

5 Q Okay, so that means that it has to be at least one?

6 A No, I don't say he say at least. He said more than one.

7 MR. PATON: That's pretty clear. He
8 didn't say -- he said it has to be more than one. He did not
9 say --

10 A (Interposing): He did not say at least.

11 Q So it has got to be at least 1.0001, right?

12 A I will not agree to that.

13 Q What the heck did he tell you? What did you understand him
14 to be saying?

15 A He said that it should be more than one.

16 Q More than one? Okay, so all you know then about the standard
17 in the industry is Mr. Otto told you that it had to be more
18 than one, isn't that right?

19 A It is more than one, yes.

20 Q And that's really the extent of your knowledge about what the
21 standard is in the engineering industry, right?

22 A What was that, please?

23 MR. ZAMARIN: Would you read it back?

24 (Whereupon the Reporter read back the
25 previous question.)

SINGH

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A Okay, I will answer that. He give me that more than one and gave me paper to read and I read that paper and I found that it was two.

Q So you know that somebody did two, right, and that was at the Mayport Airport?

A Okay, that's why he give it to me, and I go and read, and I asked because actually it should be more than one, and I read this paper and get the details, I read it and found two and then I accepted that.

Q So you saw two in that paper, right?

A Yes.

Q So other than what you read in that one paper about what they did at Mayport Airfield and Mr. Otto telling you that it should be more than one, you have no knowledge of what the standard is in the engineering industry, isn't that right?

A Okay, standard of engineering, the factor of safety is almost in any design I have come across, I found is more 1.5, so based on that I am basing this thing in every case that the safety falls, and I have the margin of safety of 1.5, and I have seen some surcharge done in the past based on that, too.

Q Tell me about the surcharge you have seen done in the past?

A That I read the paper.

Q So when you say you have seen them done in the past you are talking about that Mayport Airfield?

SINGH

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- 2 A Uh-huh.
- 3 Q Okay. My question, however, is other than the paper you read
4 about the Mayport Airfield and Bill Otto's statement that it
5 should be a safety factor of more than one you have no know-
6 ledge of what the standard is with regard to the safety
7 factor in surcharge or pre-load programs in the engineering
8 field?
- 9 A In engineering field for surcharge I don't think there is one
10 standard like that, that they use just one factor of safety.
- 11 Q Becuase you don't know what the standard is, right?
- 12 A In my knowledge there is no standard, but in practice there is
13 that factor of safety.
- 14 Q In what?
- 15 A For everything there is a factor of safety and that should be
16 1.5. I have not seen -- I have practiced 24 years and I have
17 never seen a factor of safety anywhere less than 1.5.
- 18 Q All you have seen about surcharging though is the paper on the
19 Mayport Airfield?
- 20 A Yes, and that was two there.
- 21 Q Okay, but you haven't seen anything else or have any other
22 knowledge of what the engineering standard would be on sur-
23 charge, your knowledge is limited to what you read in that
24 Mayport paper and Bill Otto's comment that it should be more
25 than one, right?

1 SINGH

2 MR. PATON: I object to the question be-
3 cause the question has been asked repeatedly and the Witness
4 has repeatedly stated that based on his engineering practice
5 and his experience of 24 years he has stated that he would
6 apply generally in the engineering field a figure of 1.5.
7 I think his answer is clear.

8 MR. ZAMARIN: That is his practice. Per-
9 haps you have missed the question, too. The question is --

10 MR. PATON (Interposing): No, I didn't
11 miss it.

12 MR. ZAMARIN (Continuing): It is the
13 standard in the industry not what Harry Singh does when he is
14 designing a trapeze or a bridge, it is what the standard is in
15 the industry and I believe, Mr. Singh, that you have testified
16 that your only knowledge of the surcharging and what is done
17 in the surcharging is your experience with reading the paper
18 on the Mayport Airfield and Bill Otto, who is your supervisor,
19 saying that it should be greater than one. Now was that what
20 I understood you to be saying with regard to surcharge, and
21 if I am wrong tell me and we will go down and I will want
22 every other instance that you have upon which you base know-
23 ledge of the standard with regard to a surcharge program.
24 That's all.

25 MR. PATON: All right, is that your

SINGH

2 question?

3 MR. ZAMARIN: Yes.

4 MR. PATON: Okay, I object to the question
5 because I think Mr. Singh has indicated what he believes to be
6 industry practice based on what he has seen in 24 years of
7 engineering and I think his answer is clear and his answer
8 is saying that is more than his thought, it is what he has
9 experienced and, therefore, that what he is saying is generally
10 accepted engineering practice.

11 A Can I add something to this?

12 Q (By Mr. Zamarin, continuing): On what? Do you know what my
13 question is?

14 A Yes.

15 Q Do you remember what my question is?

16 A Yes, factor of safety.

17 Q No.

18 A (Continuing): I talked to Bill Otto and that was just a
19 casual talk, it was not -- he said, "Well, at least you don't
20 want less than that, there should be some factor of safety
21 more than one."

22 Q He didn't say, "You don't want less than," did he?

23 A No, no, he said more than one. He said it should be more than
24 one but I mean this was just a casual talk, it was not a
25 serious talk, so I will not consider that.

SINGH

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2 Q Good, I won't hold him to it.

3 A He gave me a book and told me to see this thing, that there it
4 is.

5 Q Fine.

6 A And I take that as correct.

7 Q Listen carefully to my question, and my question is that other
8 than your casual talk with Bill Otto where he said it should
9 be more than one and gave you a book --

10 A (Interposing): He said the book contains something.

11 Q Yes, okay, sure, and you went and you read this one paper
12 about the Mayport Airfield which was in the book that Bill
13 Otto gave to you following your casual conversation with him?

14 A Uh-huh.

15 Q All right, and other than that conversation with Bill Otto
16 that you told us about and what you read about in that Mayport
17 Airfield paper, isn't it true that you don't have any know-
18 ledge of what the engineering standard is regarding the safety
19 factor for surcharges?

20 A Okay --

21 Q (Interposing): Isn't that true?

22 A I read lot of paper but they have never mentioned what is that,
23 and if I am going to calculate it I can find that.

24 Q I am not asking what you know now. Isn't it true that that
25 is the extent of your knowledge in that area with regard to

SINGH

2 standards for surcharges?

3 A Sure, it mean I saw that, but I have read a lot of other
4 papers.

5 Q But the extent of your knowledge about the factor of safety
6 in surcharge programs is based on the Mayport Airfield paper
7 that you read and your casual conversation with Bill Otto,
8 isn't that true?

9 A Please, may I ask you to read back again?

10 (Whereupon the Reporter read back the
11 previous question.)

12 A Can you read it again?

13 (Whereupon the Reporter read back the
14 previous question.)

15 A Surcharge -- strike that out, paper reporting surcharge load,
16 I have read more than one, but in those papers this factor of
17 safety has not been mentioned so I assume that, I assume that
18 the factor of safety as asked by me should be one is not cor-
19 rect, it should be more than 1.5. Once they don't mention
20 it doesn't mean that that is one.

21 Q I am trying to think of a question that would match that
22 answer, Mr. Singh. That wasn't my question. My question
23 simply is that isn't it true that your own knowledge of what
24 the engineering industry standard is for safety factor in
25 surcharge programs is what you read in that Mayport Airfield

SINGH

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2 paper and what Bill Otto said to you as you have described to
3 us in that casual conversation? Isn't that it?

4 A Let me say I have not read only one paper, I have read other
5 papers, but they don't mention it, and that doesn't mean that
6 I have only that experience. I have other experience.

7 Q I am not asking you for your experience, I am not asking you
8 whether you are illiterate and didn't read them, I am asking
9 you for what information you have with regard to the industry
10 standard with regard to the safety factor in surcharge programs
11 and isn't it true that that knowledge is limited to what you
12 read in the Mayport paper and what Mr. Otto said to you during
13 that casual conversation you have described?

14 A The new standard in my knowledge for the surcharge or the
15 factor of safety what is used in other normal engineering
16 practice should be used.

17 Q Okay.

18 MR. PATON (Interposing): That is, I sub-
19 mit, that is an answer.

20 Q Okay, so what you are saying is that to your knowledge there
21 isn't any standard?

22 A No.

23 Q But that you would use the general standard used in design in
24 the engineering industry, right?

25 A Good, yes.

SINGH

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2 Q Okay. My question is though that when you say that you don't
3 believe or you don't have any knowledge of any standard that
4 is because the only knowledge you have with regard to safety
5 factors that were used or are used in the industry is what
6 you read in that Mayport paper and what Bill Otto might have
7 mentioned in this conversation, right?

8 A Okay, I read, I read lot of other papers regarding this and
9 they don't mention this thing, factor of safety, and that
10 means I assume they use the normal engineering practice taking
11 that as a factor of safety that should be used in surcharge, too

12 MR. ZAMARIN: Would you read the question
13 back, please?

14 (Whereupon the Reporter read back the
15 previous question.)

16 Q Okay, my question is other than -- strike that.

17 Isn't it true that the only knowledge that
18 you have of what might be an industry standard of the engineer-
19 ing field with regard to surcharge programs and the factor of
20 safety to be employed therein is the paper on the Mayport
21 Airfield and your conversation with Bill Otto that you have
22 described to us?

23 A Would you read it again to me?

24 (Whereupon the Reporter read back the
25 previous question.)

1 SINGH

2 MR. PATON: Just a minute. Can I ask for
3 a clarification and that is that you are asking him to elimi-
4 nate from his answer the information he gave you before that
5 he would use a standard from general engineering? You are
6 asking for a standard that applies only to or limited to sur-
7 charging?

8 MR. ZAMARIN: Yes. The statement he made
9 about other sources is in the record.

10 MR. PATON: Fine, I am just trying to
11 clarify it if that helps the Witness any.

12 A In my knowledge there is no standard, there is no standard
13 for factor of safety for surcharge load. What is practice in
14 other engineering, civil engineering field is the same factor
15 of safety which should be applicable on the surcharge load.

16 MR. ZAMARIN: Would you read the question
17 back? That is not responsive.

18 MR. PATON: It's not? Can we go off the
19 record? To me that was the perfect answer.

20 MR. ZAMARIN: Okay, off the record.

21 (Whereupon there was a short discussion
22 held off the record after which the
23 Reporter read back the previous question.)

24 A You waiting for my answer?

25 Q Yes, we are waiting for you.

SINGH

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2 A I look in the manuals of the Corps of Engineers which is
3 one of the leaders in this kind of thing and consult with
4 Bill Otto, and any manual giving the details of surcharge and
5 I didn't find anything regarding factor of safety, so I assume
6 that the leader in this area don't have so there is nothing
7 existing regarding factor of safety of surcharge load and the
8 other factor of safety, the factor of safety in other area
9 of civil engineering should be used.

10 MR. PATON: Let me talk to the Witness
11 for a minute. Let me ask him on the record or off the record --

12 MR. ZAMARIN: No, stay on the record.

13 MR. PATON: All right, I am trying to --
14 I think I understand what you want. It's difficult and I have
15 been trying to, off the record, assist and, you know, I think
16 the Witness has answered your question but apparently it is
17 not exactly the form in which you want it.

18 MR. ZAMARIN: I would think that he could
19 give a yes or no answer.

20 MR. PATON: Let me just ask you, would
21 you be satisfied if he were to say that he had no knowledge
22 from another source as to whether or not in fact there is
23 any industry standard that relates strictly to the factor of
24 safety for surcharging?

25 MR. ZAMARIN: Sure, he can say that but

1 SINGH

2 that's really not the answer to my question.

3 MR. PATON: That's not enough?

4 MR. ZAMARIN: No.

5 MR. PATON: No? I am really not sure what
6 else you want besides that.

7 MR. ZAMARIN: My question is very straight
8 forward. I want him to say it is limited to what he has already
9 said. He can answer that question yes or no. If he answers
10 yes that's it. If he answers no I am going to ask him to list
11 all the things. He has to answer that one first and that's a
12 yes or no.

13 MR. PATON: I am really trying to get over
14 the hump here because we are taking a lot of time on this.

15 MR. ZAMARIN: Yes, it has been 25 minutes
16 now that I am trying to get an answer.

17 MR. PATON: Let me ask you this one ques-
18 tion. If he were to say that he had no other knowledge from
19 any other source other than talking to Bill Otto and reading
20 that paper you would then be able to conclude in your own
21 mind that the answer to the question you were trying to get is,
22 yes, that his knowledge is limited to that, is that correct?

23 MR. ZAMARIN: Sure. We are not playing
24 twenty questions.

25 MR. PATON: I know what your problem is,

SINGH

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2 you are not happy with the form in which you are getting the
3 answer.

4 MR. ZAMARIN: He is not answering my
5 question. Sure what he may be giving me one might be able to
6 through deduction conclude what the answer is but I think I
7 am entitled to a straight forward answer to my question and
8 he can answer it yes or no. If he says no, that the statement
9 in my question is not true then I will go ahead and I will ask
10 him for all of the other factors of safety he knows about un-
11 til I know that he doesn't know any and I will ask my question
12 until he answers yes that what I state in my question is true.

13 MR. PATON: You don't have any trouble
14 with arriving at what is already on the record?

15 MR. ZAMARIN: That's right, I don't, but
16 somebody some day down the road might read the transcript that
17 isn't as smart as I am.

18 MR. PATON: That's true and -- well, all I
19 can do is let you and Mr Singh try to work it out.

20 MR. ZAMARIN: Would you read that question
21 back again?

22 (Whereupon the Reporter read back the
23 previous question.)

24 A I search for other literature including all the manuals of the
25 U. S. Corps of Engineers. I never found anything and in that

1 SINGH

2 case that's the only thing I know and it is limited to that.

3 MR. PATON: Now, is that your answer?

4 He said it was limited to that. Isn't that your answer?

5 MR. ZAMARIN: Would you read the question
6 back, please? It can be answered yes or no and there is enough
7 in there, my question is complete enough so that it makes it
8 easy for a yes or no answer and this is nonsense that we keep
9 getting stuff where the Witness just doesn't want to answer.

10 MR. PATON: I want to make a statement on
11 the record and the statement is that we have been struggling
12 with this for some time. It is my opinion that the Witness
13 has answered the question, apparently not in the precise form
14 that Mr. Zamarin would like. I think we are trying to cooper-
15 ate and I would ask the Witness in order to satisfy Mr. Zamarin,
16 I think this is what he wants, that when you listen to this
17 question do so extremely carefully and if you can answer the
18 question with a yes or no do so. Now you can explain your
19 answer but try to answer it if you can first with a yes or no,
20 if you can. Do you understand what I am saying to you?

21 A Say it again, the last part.

22 MR. PATON: All right, I think what Mr.
23 Zamarin wants you to do is to answer the question, if possible,
24 with a yes or no. Do that first. Listen to the question care-
25 fully and if you can answer it with a yes or no do so and then

SINGH

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2 you can explain that if you want to, if you want to explain
3 why you say yes or no you can do so.

4 A Good.

5 MR. PATON: Try to answer it yes or no if
6 you can, okay?

7 A Yes, I know, you know.

8 (Whereupon the Reporter read back the
9 previous question.)

10 MR. ZAMARIN: Do you understand?

11 A Uh-huh. Yes, but I search for the entire manuals of the
12 United States Corps of Engineers regarding the surcharge and
13 factor of safety and I consulted NRC people and wanted any-
14 where the written factor of safety and I found nowhere written
15 what is the factor of safety for surcharge load.

16 Q Okay, so then other than the manuals that you looked at and
17 the paper on the Mayport Airport that you read and your casu-
18 al conversation with Bill Otto, you have no --

19 A (Interposing): No, and also -- oh, go ahead.

20 Q Did I leave something out? I will start over again. Well,
21 what did I leave out?

22 A I consulted NRC personnel, too.

23 Q All right. Who in the NRC did you consult?

24 A I wanted to know if they know anything about that. I had
25 conversations about that with Joe Kane.

SINGH

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2 Q What did Joe tell you?

3 A It is nowhere written regarding surcharge.

4 Q When did he tell you that?

5 A Long ago I talk to him.

6 Q Where were you when you talked to him?

7 A Two months ago.

8 Q Where was it, on the telephone?

9 A It was on telephone.

10 Q What did you say? Did you say, "Joe, do you know what factor
11 of safety there should be in a surcharge"?

12 A No, it was a discussion when we saw that (indicating).

13 Q Figure 27

14 A Applicant's presentation on the 28th of August at Midland and
15 then we saw something and what should be factor of safety, so
16 we look through different papers and so I didn't find anything
17 defined anywhere so I guess what is normal is used in engineer-
18 ing, civil engineering practice should be.

19 Q So Joe couldn't give you any more information on that either?

20 A No, he didn't show me any paper where at that time I might
21 have found that, and after that I didn't consult him.

22 Q Okay, so whether than -- isn't it true that other than your
23 asking Joe Kane if he knew what the factor of safety should
24 be and him saying no, he didn't know, and your referring to
25 the Corps manuals and not being able to find anything and your

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2 casual conversation with Bill Otto in which he said it ought
3 to be more than one and that paper you read about the Mayport
4 Airport you don't have any knowledge with regard to what might
5 be a standard in the engineering industry with regard to sur-
6 charge loading?

7 A Yes. Yes.

8 Q What was the purpose of the safety of factor -- strike that.

9 What was the purpose of the factor of
10 safety that you read about at the Mayport Airfield?

11 A Any structure design you provide to make sure of safety.
12 That's normal practice for engineers because there are a lot
13 of unknown factors in construction material, variability and
14 to guard against all this contingencies engineers use a factor
15 of safety.

16 Q What was the purpose, do you know, of surcharging to twice
17 the final load at the Mayport Airfield?

18 A Because they are over consolidated for the less load.

19 Q What were they trying to do to the soil?

20 A Compress it.

21 Q Was the purpose there just to accelerate settlement?

22 A Yes, that was one of them.

23 Q What were the others?

24 A I assume that otherwise to get it over consolidated so that
25 the final settlement would be less, the over consolidated

SINGH

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2 load, the settlement would be less.

2

3 Q What was the magnitude of the surcharge at the Mayport Airfield?

3

4 A It was ten feet of soil higher than the final grade.

4

5 Q What was the magnitude of that load?

5

6 A I don't know. They have given two -- they mentioned this, but

6

7 I don't know. No, I am sorry, it was ten feet above the ground

7

8 level and it was -- I don't remember, I don't exactly remember

8

9 now, but it was ten foot higher than the final grade so you

9

10 can calculate. I assume it was the weight of the soil. I

10

11 would assume 110 or 120 multiplied by ten, so I would assume

11

12 120 multiplied by twelve would be 1200 points.

12

13 Q 1.2 keps?

13

14 A Yes, more than that.

14

15 Q What kind of soil did they use?

15

16 A Oh, I don't know what kind of soil they used.

16

17 Q It wasn't ten feet of peat, was it?

17

18 A No, I don't have any idea of the soil.

18

19 Q What area of the airport was surcharged?

19

20 A It was extension of this.

20

21 Q It was what?

21

22 A They were going to extend the airport from, I guess, it was

22

23 for four hundred feet to 8,000 feet. It was swampy area that

23

24 they were surcharging.

24

25 Q They were surcharging a swampy area?

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2 A Yes, because they are going to build the airport there, extend
3 it.

4 Q Okay. You think there is a difference in surcharging a swampy
5 area as opposed to the load that you want to impose as opposed
6 to maybe surcharging the Diesel-Generator Building?

7 A I think the principle is the same.

8 Q That is the same but as far as the amount of load you wouldn't
9 see any difference, would you?

10 A Amount of load, you say? I don't understand your question.

11 Q Can you tell me where I could find that Mayport Airfield paper?

12 A I don't know. I have a copy of that.

13 Q You have a copy of that?

14 A Because Bill Otto give it to me.

15 Q Could I look at it for a minute after lunch?

16 A I think I have one here.

17 Q Oh, maybe I can look at it before lunch. What else have you
18 got there? Off the record.

19 (Whereupon there was a short discussion
20 held off the record.)

21 A (Continuing): You might request, I think Bill Otto has a copy
22 of that. I give it back.

23 Q You gave it back to him?

24 A Yes, I gave it to him.

25 MR. PATON: We will attempt to get that

1 SINGH

2 for you.

3 MR. ZAMARIN: Thank you.

4 Q (By Mr. Zamarin, continuing): Does the factor of safety that
5 we have been talking about or does factor of safety depend
6 on what it is that you as an engineer are trying to accomplish?

7 A I didn't get the intent of your question.

8 Q Okay. What I mean is this. Are certain things that you do,
9 for example, you might have a factor of safety with regard
10 to slope stability or with regard to bearing capacity?

11 A Uh-huh.

12 Q (Continuing): And there are generally accepted factors of
13 safety within the engineering field for those two elements,
14 for example, that are quite different, aren't they?

15 A They might be different, yes.

16 Q They might? They do, don't they? Don't you typically use
17 maybe a factor of safety of three for one of those and one and
18 a half for the other?

19 A That's right.

20 Q Right. Okay, so it does depend on what you are trying to do
21 and what you are setting out to accomplish as to what the
22 factor of safety ought to be, right?

23 A Yes, but I have never seen less than 1.5 for anything.

24 Q Okay. All right, you could be surprised though, couldn't you?

25 A Not if I see something somewhere written, some documentation,

SINGH

- 2 but I will not accept somebody's mouth.
- 3 Q But you also haven't seen very much about the surcharge and
4 the factor of safety used, right?
- 5 A No, I saw all these papers and went to the manuals.
- 6 Q But they didn't say anything?
- 7 A Didn't say anything. I can calculate for the load they have
8 given, you can calculate and I believe in that.
- 9 Q Okay, but if you consider that to be so important why didn't
10 you do that calculation to find out what factors of safety
11 have been used?
- 12 A Where?
- 13 Q Where? In the papers you read?
- 14 A They were not evident, not enough information.
- 15 Q No data?
- 16 A Not enough information given, but in some cases I think I did
17 in some places, in that Mayport paper.
- 18 Q Other than Mayport though you didn't at least do any kind of
19 a calculation to tell you what the factor of safety was,
20 right?
- 21 A Mayport give information.
- 22 Q Okay, but you didn't do any calculations with regard to those
23 other papers as to what the safety factor was even though
24 that was important to you?
- 25 A But the information might develop very quickly for that.

SINGH

- 1
- 2 Q So that when you said you could do the calculations on that
- 3 you meant if the information was available, but it is not
- 4 available in those papers, right?
- 5 A If available I would do it.
- 6 Q But there wasn't that information in those papers, right?
- 7 A No, not adequate. There was some but not adequate in my
- 8 opinion.
- 9 Q Okay. When you refer to a safety factor that you use of 1.5
- 10 is that usually in the design of a structure?
- 11 A Generally. I remember it was in slope, it was when I design
- 12 a retaining wall.
- 13 Q Uh-huh, so --
- 14 A (Interposing): This is in sliding, I remember it is in slid-
- 15 ing of retaining walls. I am referring to the Pennsylvania
- 16 Highway Department mainly.
- 17 Q There it was 1.5 and that was with regard to overturning or
- 18 sliding?
- 19 A I think it was sliding.
- 20 Q Okay. What is it for overturning?
- 21 A It might be two, but it is more than 1.5.
- 22 Q Now what is it for bearing capacity?
- 23 A Bearing capacity depends, maybe two, three, I have seen some
- 24 manuals say three, but I don't remember where it is. I
- 25 immediately refer to the manual and find it out.

SINGH

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2 Q Did you use a safety factor in predicting settlement on any
3 of the retaining walls that you have been involved with?

4 A Retaining walls? I never predict settlement.

5 Q Why not?

6 A It is not in design. Generally we design for bending and
7 shear and all such things, because I never have problems with
8 I calculate it.

9 Q Did you ever predict settlement for the bridges you designed?

10 A One in India I did. I don't know whether the bridge was built
11 or not. I left.

12 Q Did you use a safety factor in predicting settlement?

13 A In settlement I never used it.

14 MR. ZAMARIN: This would be a good time
15 break for lunch.

16 (Whereupon the deposition was recessed
17 until 1:15 o'clock, P.M.)

18 - - -

19 AFTERNOON SESSION

20 CROSS EXAMINATION (continuing):

21 Q (By Mr. Zamarin): With regard to Figure 2 of that September
22 14th Consumers submittal, and that again was marked as
23 Exhibit Number 8 at the Kane deposition on October 15th, in
24 determining the factor of safety that was associated with the
25 loading depicted on that chart, would you measure the stress

SINGH

- 1
- 2 at the mid point in the fill?
- 3 A I would not measure at mid point. Normally most of the settl-
- 4 ment will occur on the top portion so I will measure above
- 5 the middle somewhere. At this stage I can't make a snap de-
- 6 cision. I have to study more.
- 7 Q What do you have to study more?
- 8 A Normally it is taken where the most -- where we see the most
- 9 area where the settlement will occupy.
- 10 Q In your opinion that would be somewhere in the top half of
- 11 the level of the fill?
- 12 A Yes, somewhere there.
- 13 Q And in making that calculation I'd like to go through with
- 14 you on Figure 2 how you would go about doing that, just so I
- 15 understand how you would use this graph. Okay, if for example
- 16 we were going to take the level of 618 --
- 17 A (Interposing): Uh-huh, okay, 618.
- 18 Q See it?
- 19 A Uh-huh.
- 20 Q How would you go about from the information contained on that
- 21 graph in using the data that is represented on that graph
- 22 determining the factor of safety?
- 23 A In this case suppose -- I am assuming this is correct.
- 24 Q Uh-huh.
- 25 A I am not telling it is correct.

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SINGH

- 2 Q That's right. I am saying assuming that the information on
3 the graph is correct, right.
- 4 A (Continuing): It will take this total load here (indicating
5 Q Okay, wait. When you say the total load here, I am going to
6 describe it.
- 7 A Total stress.
- 8 Q Total stress, and by that --
- 9 A (Interposing): I am assuming on calculating on this 618.
10 Q Right, at elevation 618. All right, and you say you would
11 take the total --
- 12 A (Interposing): At 618.
- 13 Q And how would you determine the total stress at 618?
- 14 A You can make a diagram from this top from here to here
15 (indicating). You see this is -- your graph shows the total
16 stress when the surcharge is there and all loads are there,
17 is it not what is showing this graph? It shows at the time of
18 surcharge you have this much stress at the top and this much
19 stress at the bottom, so I am assuming this.
- 20 Q Okay, so at 618, for example, can you tell me what the total
21 stress will be?
- 22 A At this elevation (indicating)?
- 23 Q At 618 under the surcharge load what is it that you would use
24 and then see what the factor of safety was?
- 25 A Assuming this drawing, Figure 2 -- what is the Exhibit number?

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DETROIT 313 861-2923

OAKLAND 513 877-7621

SINGH

- 1
- 2 Q It is Figure 2 in the September 14th submittal.
- 3 A All right, this submittal at 618 I will measure the total
4 stress. I don't know exactly, but approximately 5.1 kep,
5 that's my estimate I am using.
- 6 Q Sure.
- 7 A (Continuing): And I am assuming that this will be the final
8 load on the structure.
- 9 Q When you say "this" you are referring to line number five?
- 10 A Line number five.
- 11 Q And that would represent the final load of the structure?
- 12 A No, it is trace developed by the final load given by the app.
13 cant.
- 14 Q Okay.
- 15 A (Continuing): Which I have not verified that final load is
16 correct or not, but based on that the stress will be, oh,
17 4.3, 4.3.
- 18 Q And then would you divide 5.1 by 4.3 to determine what your
19 A (Interposing): Yes, that would be.
- 20 Q (Continuing): Factor of safety is?
- 21 A Yes.
- 22 Q Excuse me just one minute.
- 23 Okay, before you go away from that, that
24 figure, I want to ask you a couple of questions. It seems to
25 me in determining the stress associated with the final load

SINGH

- 1
- 2 you have included the weight of the soil and should you be
- 3 doing that?
- 4 A No, the weight of the soil it has been included here (indicat
- 5 ing), the weight of the soil that includes total pressure.
- 6 Q Okay, that's right, and in your opinion in determining the
- 7 effective stress of the structure you would include the stress
- 8 associated with the weight of the soil?
- 9 A Yes, both are present.
- 10 Q Both are what?
- 11 A Both are present at that time so I would include that one.
- 12 Q In a situation such as the Mayport Airfield in coming up with
- 13 a factor of safety of two do you know whether they included
- 14 the weight of the soil along with the stress associated with
- 15 the load?
- 16 A At twice the load they have calculated. I assume that have
- 17 calculated the load is twice, the load they have calculated.
- 18 I calculated it on the surface and there will be more at the
- 19 top of the surface.
- 20 Q There would be more what?
- 21 A More on the surface, on the top surface.
- 22 Q Yes, so it is your opinion that when they report a factor of
- 23 safety of two that they have included in their calculations
- 24 as you have in taking it off this graph in Figure 2 the
- 25 stress associated with the weight of the soil?

1 SINGH

2 A I think they have calculated at the surface of the runway.

3 Q Oh, I see, I see, so there wouldn't be any soil weight at the
4 surface, is that what you are saying, so, therefore, it kind
5 of washes itself out?

6 A No, here at the ground level -- well, let's see here, at the
7 ground level then they calculate 20 feet, the surcharge, I
8 believe it is 20 or 22, approximately.

9 Q Yes.

10 A (Continuing): What is going to be the actual load, ten feet,
11 they say the runway level was ten feet and they loaded up to
12 20 feet high so at that surface they calculate it.

13 Q At that surface, and by that you mean --

14 A (Interposing): Where the ground level was originally, so in
15 this case the footing of the building, and so I would calcu-
16 late at that level in the same way I will not consider any
17 load for the soil here (indicating).

18 Q For the soil here? Okay, so if you are calculating it at the
19 level of the footing --

20 A (Interposing): Yes.

#3 21 Q (Continuing): -- you wouldn't include any soil weight that
22 would contribute or result in stress, right?

23 A Under the footing definitely, but there is soil by the side
24 of the footing that will contribute stresses below, you know,
25 the footing. The footing there is below the top level.

1

SINGH

2 Q How thick was the compressible layer that they were dealing
3 with at Mayport Airfield, do you know?

4 A I don't know.

5 Q Was that information provided in the literature?

6 A I read it, probably 14 feet.

7 Q I am sorry, what?

8 A I am not sure.

9 Q Let me mark this as an exhibit and I am marking it as Consume
10 Exhibit Number 5. If you can take a look at that and I will
11 give you a minute to view Exhibit Number 5, which is the
12 Mayport paper that you were referring to earlier, isn't it?

13 A Yes.

14 Q Okay. If you can take a minute to look at that and then I am
15 going to ask you about the thickness of the compressible layer
16 and I just want to tell you what to be looking for in there,
17 and then I am going to ask you if you can estimate or calculate
18 for us the factor of safety halfway through the compressible
19 layer at Mayport.

20 Okay, have you had a chance to look that
21 over?

22 A I want to find out the thickness of the muck.

23 Q I think it is about ten feet or something.

24 MR. PATON: He said 14 feet.

25 A But that is not the thickness of the muck.

SINGH

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2 Q (By Mr. Zamarin, continuing): Okay, well, let's set that
3 aside for a minute and let me ask you something else. I
4 going to give you a piece of paper and you have a little
5 cil there that is just a little stub, and you may take t
6 one --

7 A (Interposing): That's big enough for me.

8 Q Okay. All right, I want you -- I am going to give you s
9 assumed facts. They don't apply to Midland. They don't
10 apply to anything I am aware of, and I want you to show
11 how we would go about determining a pre-load amount usin
12 this 1.5 safety factor.

13 Let's assume a structure that is 50
14 by 50 feet, that's 50 feet square, okay?

15 A Yes.

16 Q And it has a weight of three keps per square foot.

17 A Weight of the structure.

18 Q Yes, 3 keps per square foot. Okay, and you have a compr
19 ble layer 100 feet thick and you want to surcharge this :
20 ture with sand in order to achieve your 1.5 factor of sa.

21 A Surcharge with sand?

22 Q Sand, yes.

23 A How much sand, yes.

24 Q How many feet of sand would we pile up on that 50 by 50
25 structure in order to achieve your 1.5 factor of safety?

SINGH

- 1
- 2 A Okay, I need some more information to calculate this thing.
- 3 First you have to determine the distribution of the pressure
- 4 under the foundation which you cannot do without, without some
- 5 more information.
- 6 Q Well, I can do it, I can make it up, so I will give you a
- 7 distribution of pressure. Use a two to one distribution, two
- 8 vertical to one horizontal.
- 9 A Two horizontal, one vertical?
- 10 Q No, two vertical and one horizontal.
- 11 A It will be somewhere -- of a total of 100 feet thickness, it
- 12 will dissipate somewhere in between.
- 13 Q What will?
- 14 A That stress, the entire thickness will not be affected by that
- 15 load.
- 16 Q By what load?
- 17 A The load you are putting.
- 18 Q You mean the load of the structure?
- 19 A Load of structure, you know, once they put on the load, the
- 20 entire load will not go one way 100 feet, it will go out.
- 21 Q Well, you can put on a heavy enough load so that it can go 100
- 22 feet, can't you?
- 23 A Yes, but you want a factor of safety.
- 24 Q Right.
- 25 A Factor of safety, so --

SINGH

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2 Q (Interposing): Right.

3

4 MR. PATON: Let me ask a question clarify
5 ing. Are you pre-loading this before there is any structure
6 there or after?

6

MR. ZAMARIN: No, no, you have a structur

7

8 fine.

9

10 MR. ZAMARIN: I started out by saying you
11 have a structure there.

11

MR. PATON: The structure is there.

12

12 Q Okay.

13

13 A That was 3 keps per square foot and he wants to surcharge it.

14

14 MR. PATON: Sure, but I wasn't sure
15 whether the structure was there or not.

16

16 Q (By Mr. Zamarin, continuing): What I want to know is how muc
17 of a surcharge we would have to put on that to provide your
18 1.5 factor of safety?

19

19 A It is not that easy for me with the data given as to how much
20 I load, how much of a load I put here. The depth will be
21 going down more and more. Suppose I put four tons it will be
22 maybe eight foot deep, suppose I put 12 tons, maybe 24 feet,
23 so you can't do this in such a way. You need at least one or
24 two days to figure out the distribution. You can't assume
25 like that.

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DETROIT 312 461-2932

CAYLAGE 312 527-7231

SINGH

- 1
- 2 Q Okay, so you'd need one or two days in order to --
- 3 A (Interposing): Sure, you have to study this. This is not
- 4 going in one day and one second and making a snap decision.
- 5 Q Come on, Hari, I am not asking for a snap decision.
- 6 A But you are asking factor. I can calculate factor of safety
- 7 at this level, that is reasonable, at the top of it.
- 8 Q What would it be at the surface?
- 9 A Oh, that is very easy.
- 10 Q Okay.
- 11 A Your load is only 3 keps.
- 12 Q Three keps, right.
- 13 A For the building.
- 14 Q Yes?
- 15 A So I will put down 1.5 and multiply by three, and I will need
- 16 4.5, and I measure for that, for how much sand you need, and
- 17 it depends on the weight of the sand. Suppose the sand weigh
- 18 120 pounds, then you put the 500 divided by 120 it will be.
- 19 Q That is the number of feet of sand you have to put on top of
- 20 the structure?
- 21 A Yes.
- 22 Q So then what you want to do is you want to put one and a half
- 23 keps worth of sand on top of this 3 keps structure so you'd
- 24 have a total stress at that level of four and a half, right?
- 25 A Yes, using the three and then the one and a half, so that is

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CANTON 313 537-7021

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SINGH

no problem, I can do this. It is obvious, but if you go below that -- this I will accept that one maybe because that is very easily done.

Q Okay. Would that then, providing that type of surcharge that you just described, provide in your opinion the factor of safety that we are talking about this morning that would be required with regard to surcharge program?

A You say -- yes, the factor of safety.

Q I am sorry, I didn't hear you.

A Read the question, please.

(Whereupon the Reporter read back the previous question.)

A For Midland, yes.

Q I asked you a little earlier if you had a chance to take a look at the Corps letter of July 7, 1980?

A Yes, uh-huh.

Q And have you had a chance to just glance at that?

A I glance this thing, but -- okay.

Q Can you tell me to the best of your recollection into which of the questions in that letter you had input and what the extent of your input was for each of those?

A There are a lot of overlaps in these questions, four and five people preparing because we used to study and everybody was writing questions and then we combine together and then I fo

SINGH

1

2 a lot of overlapping so it's hard to pull out from any par-
3 ticular question any one sentence by me. I gave idea and
4 some other people gave idea and I have some rough approxima-
5 idea, and I have written that -- give me that, excuse me, c
6 me those papers I have some marks approximately. Somewhere
7 I put some numbers. Yes, in question number 39 I have input
8 in one and two. You can read from here, one and two is
9 written here (indicating), one, two, three, four, five, it
10 marked here question 39.

11 Q Okay.

12 A And there is mark there which shows one and two. There are
13 only two suppositions that I put in there.

14 Q Okay. With regard to all of those questions in that Corps
15 report you only had input into this (indicating)?

16 A No, this particular question I have two and I have other
17 questions, too. Question Number 40, I believe I have input
18 in, let's see, 40 is the main head and then the small one in
19 parenthesis. Forty, small one, two, and four.

20 Q All right.

21 A (Continuing): And some others, there are some others where
22 I have little input earlier and there I can't extract all
23 these things.

24 Forty-one I have input, 41 is the main
25 head, the main question and then subhead 41, one and that or

- 1 SINGH
- 2 is in parenthesis, 41, two.
- 3 Q Okay.
- 4 A (Continuing): And then 42, same thing, 42, one, 42, two. In
- 5 44 I don't have input in 44.
- 6 Q Okay.
- 7 A Forty-five, I believe I don't have input, maybe few lines, but
- 8 I don't remember exactly.
- 9 Forty-six, the question regarding cooling
- 10 pond, I have some input in that.
- 11 Q What input did you have into 46?
- 12 A Cooling pond, I say.
- 13 Q I know, but like what did you say? What did you do that
- 14 ended up getting something of you into 46?
- 15 A Forty-six? Regarding the stability of the dikes and there is
- 16 some category one pipe underneath.
- 17 Q Category one pipe?
- 18 A Yes, that is -- I assume is right because that is discharge
- 19 pipe.
- 20 Q Really what your input was there is you said, "Hey, I'd like
- 21 to know the stability of the dikes because there may be
- 22 category one pipe there," and that was the kind of input you
- 23 had into 46?
- 24 A Yes.
- 25 Q Was that the extent of it?

SINGH,

- 2 A Yes, that was this kind of thing.
- 3 Q Do you have any reason to doubt that the dikes are stable?
- 4 A No, I wanted to -- no, once you give me something to check I
5 have to check. I don't have reason or no reason. I want to
6 verify.
- 7 Q Okay, continue. What about after question 46?
- 8 A Forty-seven, this is question three in that and 48, no, on
9 48 I don't think so. Maybe some input but I cannot extract
10 completely.
- 11 Q I didn't hear what you said with regard to 47. Did you have
12 any?
- 13 A Yes, I told you three.
- 14 Q Oh, three? Okay, okay.
- 15 A In 48 I don't see any. It might be, but I am not positive.
- 16 Q Were there any other questions?
- 17 A Not as close as I can figure out, but there may be a few lines
18 here and there.
- 19 Q Okay. What was your input to sub parts one and two of
20 question 39?
- 21 A I think it is bearing capacity. Let me see. You asked which
22 question?
- 23 Q Thirty-nine, one and two.
- 24 A Thirty-nine, you want me to read this thing for you?
- 25 Q Well, when you said you had input did you prepare the question?

SINGH

- 1
- 2 A I prepared the question.
- 3 Q Oh, okay. Why did you want to know what you asked about in
4 question 39?
- 5 A Okay, it was, I believe that the bearing capacity of settle-
6 ment was made before there were no provisions for the dewater-
7 ing, but now dewatering comes in picture so there be some
8 changes, so just I wanted the details.
- 9 Q Does dewatering have an effect on bearing capacity?
- 10 A It first goes on the settlement.
- 11 Q Okay, the settlement. What about bearing capacity?
- 12 A The bearing capacity is the next question in 39.
- 13 Q All right. Why did you want to know about that?
- 14 A On bearing capacity I have not received any calculations re-
15 garding bearing capacity so I wanted to see.
- 16 Q You wanted to see what?
- 17 A How it is calculated, how much it is there, how much I acce-
18 I don't want anything else except to complete that, whatever
19 information is given to me and the factor of safety.
- 20 Q You don't have any reason to question the bearing capacity,
21 do you?
- 22 A No, but I have not reviewed. How can I tell?
- 23 Q Okay. Did you look in the FSAR for information about beari-
24 capacity?
- 25 A I saw this was given in a table and the table is not enough

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SINGH

2 for me to review.

3 Q Why not?

4 A I want to see how the calculation is done, how much shear
5 strength parameter, so I want the complete computations.

6 Q Did you have any problem with any of the values that were con-
7 tained in that table of the FSAR?

8 A There is no question of problem, problem is I am a reviewer
9 and whatever you say it is, you say it is three and I can't
10 accept it until I review these things.

11 Q Is that type of review required by Reg Guide 170?

12 A It is reviewed, yes, sure, I believe it is required if I am
13 reviewer I would review that.

14 Q So in your opinion this type of review where you have to go
15 beyond the information contained in the table in the FSAR is
16 required by Reg Guide 170?

17 A Yes, sir. It came from Corps of Engineers I think that is the
18 reason.

19 Q You think that is the reason, but you do say in your opinion
20 you think it is required by Reg Guide 170, is that true or
21 not?

22 A I am not familiar with Reg Guide 170.

23 Q Are you familiar with the Standard Review Plan?

24 A Yes, I have seen that plan.

25 Q And is this type of verification of information or the backup

SINGH

1
2 information such as is contained in the PSAR table required by
3 the Standard Review Plan?

4 A It doesn't specifically speak anything.

5 Q So in your opinion it is not required by the Standard Review
6 Plan?

7 A I think, in my opinion, this is required to see all the compu-
8 tations.

9 Q Required by what? By the Standard Review Plan?

10 A I think yes.

11 MR. PATON: I didn't hear the last question

12 MR. ZAMARIN: Read it back.

13 (Whereupon the Reporter read back the
14 previous question and answer.)

15 Q (By Mr. Zamarin, continuing): You said, yes, you think it is
16 required by the Standard Review Plan?

17 A Yes, anything comes to me for review I am a reviewer then I
18 will be going to put my signature on it and anything when I
19 put my signature I am taking responsibility for something and
20 then I would like to see information for what I do.

21 Q I understand that and really what I am asking you is is there
22 a requirement in the Standard Review Plan that says you must
23 do this checking of the backup calculations?

24 A No, it is not written there.

25 Q Okay. This question you are talking about deals with a

SINGH

- 1
- 2 containment, doesn't it?
- 3 A Let's see what is there. Reactor building foundation.
- 4 Q Yes, who told you that was within the scope of your review?
- 5 A I didn't ask. I am a reviewer so I have to satisfy myself.
- 6 Q Well, I mean obviously there was some limitation. You
- 7 wouldn't start looking at anything, didn't somebody else tel
- 8 you what structures you are supposed to be looking at?
- 9 A They say you are technical engineer, the foundations, bearin
- 10 capacity.
- 11 Q For everything out there on the site, is that what your unde
- 12 standing is?
- 13 A No, what is furnished to me, just like Auxiliary Building an
- 14 all these things, so --
- 15 Q (Interposing): I am talking about the containment right now
- 16 on the Auxiliar Building?
- 17 A That Reactor Building, reactor foundations.
- 18 Q Who told you that you should be looking at the Reactor Build
- 19 foundations? That is not founded on plant fill, is it?
- 20 A No, it is not on plant fill.
- 21 Q Why are you looking at it?
- 22 A Huh? Okay.
- 23 Q I was waiting for you to answer. I didn't realize that you
- 24 had?
- 25 A Okay, I will tell this. This question was partly formed by

SINGH

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2 me and partly formed by NRC, so you will have to satisfy NRC
3 too. I have input into that.

4 Q Okay. Really my question is when you first got this assign-
5 ment --

6 A (Interposing): Uh-huh.

7 Q (Continuing): Were you told that you were supposed to be
8 looking at the foundations and matters that related to the
9 plant fill at Midland?

10 A No, for all category one structures, that was my understanding.

11 Q I see, and who was it that gave you that understanding or
12 told you what it was that you were supposed to be doing?

13 A I got my supervisor.

14 Q Mr. Otto?

15 A Yes.

16 Q Okay. Have we pretty much gone through now your reasons for
17 asking sub parts one and two of question 39?

18 A Yes. Now I see, Reactor Building is category one structure.

19 Q Yes. It is category one?

20 A That's right.

21 Q And you took your job to be looking at category one structures,
22 right?

23 A That's right, that's right. It doesn't matter whether it is
24 reactor or what it is if it is category one structure.

25 Q Were you told to look at any non-category one structures?

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- 2 A No. Certain things I felt very close to category one struc-
3 ture, so -- category two, and that question came to my mind.
4 I never asked that question a couple of places.
- 5 Q So you then took it upon yourself to question the categoriza-
6 tion of some of the structures out there?
- 7 A Yes, sure, because there is category one pipe or category one
8 certain things and immediately I felt that I should point out
9 to NRC. I didn't ask them, I pointed it out to NRC.
- 10 Q You pointed it out to Joe Kane?
- 11 A I wrote to NRC, not Joe Kane.
- 12 Q Who in NRC?
- 13 A It must have gone to the director. I don't know where it goes.
- 14 Q Oh, from you it went to Otto?
- 15 A Yes.
- 16 Q And from Otto to Simpson?
- 17 A Simpson.
- 18 Q And from Simpson it went up to NRC, and that is the kind of
19 route that it took and it must have reached Joe Kane ulti-
20 mately but you didn't transmit directly to Joe Kane?
- 21 A No.
- 22 Q Did you prepare the questions for question 40, sub part one,
23 sub part two and sub part four?
- 24 A I think I give it to you, yes.
- 25 Q Did you prepare them? You said you had input. I am really --

SINGH

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2 I am asking you if really you wrote those questions?

3 A Let me see. 41, I have input in that.

4 Q What was your input in question 41?

5 A Last sentence.

6 Q When you say 41 we are talking about sub part one, right?

7 A Yes. Give the question to me.

8 Q It says furnish the computation details for evaluating magni-
9 tude of vibration for Diesel-Generator Building including
10 magnitude of existing forces, whether they are constant or
11 frequency dependent.

12 Why did you ask this question 40, sub part
13 two, for bearing capacity computations?

14 Do you understand my question?

15 A No, what are you talking, you say question 40?

16 Q In 40, sub part two. Oh, I see, you want to see the question?

17 A Sure.

18 Q All right. What I want to know was --

19 A (Interposing): Question 40, sub part two.

20 Q Yes. The bearing capacity. Do you see that?

21 A Yes.

22 Q Was it that you wanted calculations for the bearing capacity
23 or that you wanted new borings?

24 A In this particular case they have given graph and that graph,
25 from what was that prepared, that graph, I don't know.

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- 2 Q So all you wanted in that question was the calculations that
3 were used in preparing that graph?
- 4 A Let me see this to read completely. Okay, this I ask from the
5 new borings which I have requested.
- 6 Q Okay, so you wanted new borings?
- 7 A Yes.
- 8 Q And new bearing capacity calculations, you weren't interested
9 in that question on the computation or the bearing capacities
10 in the table you already had or the graph you already had,
11 is that right?
- 12 A Okay, assume the -- I assumed that after pre-load the
13 characteristic of the soil in the Diesel-Generator Building
14 had changed, it had become denser than before, and naturally
15 there would be some change in the shear strength parameter,
16 and it would be more realistic that you give the new results.
- 17 Q Would you expect the shear strength after the pre-load to in-
18 crease or decrease from that that it was before the pre-load?
- 19 A It will increase.
- 20 Q Increase? Can I have that back (indicating).
- 21 Who originated the request for the addi-
22 tional borings at the Midland site?
- 23 A It was originated before I joined this. I can't tell the
24 name. I don't know these names.
- 25 Q With regard to question number 40, sub part four, that referre

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2 to a contour map showing the settlement configuration of the
3 Diesel-Generator Building that had been furnished by Consumers
4 in February of 1980 that indicated that the base of the build-
5 ing apparently had warped through differential settlements
6 and, therefore, concluded that additional stresses would be
7 induced on the various components as a result of that.

8 Was there any input from the structural
9 consultant into that question or was that your question?

10 A That's foundations, so that is mine. Excuse, me, the question
11 was asked before by some other reviewer I replaced. I changed
12 this language but the question was the same, but I take full
13 responsibility for this.

14 Q Have you communicated at all or transmitted any information
15 to or received any from a structural consultant with regard
16 to stresses induced in the Diesel-Generator Building by the
17 differential settlement?

18 A I pointed out and sent to NRC this thing and they must have
19 done this thing. I don't know.

20 Q You don't know whether they did or not?

21 A No.

22 Q Question 41, for -- strike that.

23 I'd like you to take a look at question 44.
24 Tell me if you have any idea who wrote that question?

25 A Oh, I don't have any idea. It was written before I took over

SINGH

- 2 this job so I don't know. You have to ask the supervisor.
- 3 Q Bill Otto, you mean?
- 4 A Bill Otto, yes.
- 5 Q Okay. Can I have that back (indicating)?
- 6 Are you aware that there is a discussion
- 7 of the stability of the dikes in the PSAR?
- 8 A As a matter of fact I tried to get a copy of the PSAR and
- 9 never found one. I have been trying hard for five months.
- 10 Q You haven't seen a PSAR?
- 11 A I have not seen. I have some -- not PSAR, no.
- 12 Q You haven't seen that?
- 13 A I saw some reference to that given from the PSAR, such and
- 14 such, but I haven't been able to get a copy. Unfortunately
- 15 I never obtain a copy of the PSAR.
- 16 Q Did you ask Joe Kane for one?
- 17 A I ask a lot of times.
- 18 Q Have you seen the FSAR?
- 19 A Yes, I have seen that.
- 20 Q When did you get, first get a copy of the FSAR?
- 21 A The day I join the new section, then I got the FSAR.
- 22 Q About how long ago did you first request a copy of the PSAR,
- 23 do you remember? Was that pretty shortly after you joined the
- 24 project?
- 25 A Yes. I never wrote a letter, I say just I would like to see

SINGH

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a copy of the PSAR, perhaps they didn't send one to the Corps of Engineers.

3

4 Q

Do you know if anyone ever asked the applicant to send the PSAR to the Corps?

5

6 A

Frankly I didn't ask anything.

7 Q

Do you know if anyone asked the applicant to send the PSAR to the Corps?

8

9 A

I don't know.

10 Q

But you did ask Joe Kane for a copy of the PSAR?

11 A

Yes, numerous times I see and I said I want to see this thing, get a copy of that.

12

13 Q

Were you aware at the time that you prepared question 46 with regard to the emergency cooling pond that there was an analysis of stability of the dikes in the PSAR?

14

15

16 A

PSAR I have not seen I told you.

17 Q

I know, but were you aware -- well, strike that. Then, I take it, since you hadn't seen the PSAR that at the time that you prepared question 46 you didn't know that there was a discussion of the cooling pond dike stability in the PSAR, did you?

18

19

20

21

22 A

Let me see that. Okay, this question originally was formulated before I came, but I put some input in that and because we didn't have any soil strength parameter to verify the stability, so it was requested.

23

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- 2 Q At the time you put some input into question 46 you weren't
3 aware that there was an analysis of the dike in the PSAR, were
4 you?
- 5 A No, I don't, if is present in PSAR, if already conceived about
6 the dike in the PSAR as to the height, strength and shear
7 strength at that level, because I don't know, it looks to me
8 that PSAR is too preliminary at that time the shear strength
9 was determined.
- 10 Q Do you recall what my question was?
- 11 A Yes.
- 12 Q It was whether at the time you provided any input into
13 question 47 you were aware that there was a discussion of the
14 dike in the PSAR. You weren't, were you?
- 15 A No, I haven't seen this PSAR, so naturally --
- 16 Q (Interposing): And you hadn't seen it and you also weren't
17 aware that there was a discussion of the dike in there, right?
- 18 A No, I wasn't.
- 19 Q Okay. Had you reviewed the discussion of the dike in the
20 PSAR at the time you provided input into question 46?
- 21 A Yes, I have seen the FSAR.
- 22 Q What was your problem then with the information that was con-
23 tained in the PSAR with regard to the dike?
- 24 A In the FSAR you have given all final results. From final re-
25 sults I couldn't conclude that this structure is safe. I

SINGH

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2 would like to see the computations and actual shear strength
3 and how shear strength was determined.

4 Q You sure you are not from Missouri?

5 A No.

6 Q You indicated that you prepared sub part three to question 47,
7 and that question relates to dewatering, doesn't it?

8 A Let me see that. Yes, yes, last few sentences in that para-
9 graph.

10 Q The last few sentences referring to including the supporting
11 data for what is asked here and the locations and that kind of
12 stuff?

13 A Yes.

14 Q Why were you fooling around with the dewatering?

15 A That is part of geotechnical too, and it has to do with the
16 hydrologic.

17 Q Who prepared the rest of that question?

18 A Some was prepared by -- well, perhaps before I join this thing,
19 by Willis Walker.

20 Q Willis Walker?

21 A Yes.

22 Q He is from the Tulsa District, isn't he?

23 A Yes.

24 Q What elements of dewatering is covered by the geotech as
25 opposed to the hydrologic section?

SINGH

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2 A Well, when I am student in my school I cover applied soil
3 mechanics, permeability, all these things come under that,
4 wells.

5 Q Well, I mean, what can happen when it comes time to review a
6 dewatering plan, are you going to do it or are the people in
7 hydrologic going to do it? How are you going to decide who
8 does it?

9 A Perhaps NRC will decide that hydrologic will do that.

10 Q Let's assume they don't or haven't. How would you decide?

11 A I would not decide because they will direct me to do that and
12 I will confine myself to their direction.

13 Q I want to refer you again to Figure two in the September 14th,
14 1980 submittal by Consumers Power once again. This is in-
15 cluded as View Graph 5 of Consumers Exhibit 12 at the Kane
16 deposition of October 15th, and I want to go through with
17 you again how you would go about determining factor of safety
18 at a point, for example, at elevation 618. The reason why I
19 want to go through it again is I went through this with Mr.
20 Kane in his deposition and he indicated that in making that
21 determination you don't take into account the weight of the
22 soil and that's also my understanding of the way it works,
23 and in doing that if you would go back to my example of
24 the 100 feet of soil --

25 A (Interposing): Uh-huh.

SINGH

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2 Q (Continuing): If you go down, for example, 50 feet into that
3 soil and calculate the weight of the soil you come up with an
4 almost impossible figure for the amount of load.

5 A Yes, sure.

6 Q All right, so in doing the calculations at 618 feet on Figure
7 2 would you agree that it would be appropriate to take, in
8 determining the load during surcharge, to take the load indi-
9 cated between line one and line two for the elevation at 618
10 and add to that --

11 A (Interposing): Yes.

12 Q (Continuing): -- the load indicated between line five and
13 line three, okay, and then divide that by the load indicated
14 between line one and line four, so that what you are doing is
15 you are adding the stress due to the dead load at the time of
16 surcharge plus the stress due to the surcharge and dividing
17 that by the stress due to the dead load plus live load of the
18 structure after the surcharge when it is in service?

19 A You mean to deduct this load? Yes.

20 Q Well, yes -- not to deduct that load necessarily because you
21 are not deducting it, you are just not adding the weight of
22 the soil as an additional stress after the building is
23 completed.

24 A As I told you before this thing needs some time for study
25 and you ask me within a minute to make a snap decision that

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- 2 may be completely not right, and last time you asked me how
- 3 much pressure will be created at this level, and --
- 4 Q (Interposing): Yes, and that's why I am coming back to it
- 5 now because you have had some time to think about it.
- 6 A No, no, I didn't think about it. I was busy in answering your
- 7 questions.
- 8 Q I mean now you have some -- I am asking you now to take some
- 9 time and think about it and see if what I just suggested
- 10 doesn't make sense to the way you calculate the factor of
- 11 safety?
- 12 A That time which you are giving myself is not enough, but I
- 13 will tell you some what happened.
- 14 Q Okay.
- 15 A Actually the most it will be at that level --
- 16 Q (Interposing): When you say at that level you are talking
- 17 now at the footing level?
- 18 A Footing level and then if you consider at that level, that
- 19 zone that you want to find out this factor of safety, I
- 20 assume that he has to deduct this one (indicating).
- 21 Q Okay, that's right. Okay, so if you are doing this at ele-
- 22 vation 618 you would deduct the weight of the soil?
- 23 A Even here (indicating), this one it would be more reasonable
- 24 to deduct that.
- 25 Q That's right. Even at the footing level it would be more

1 SINGH

2 representative?

3 A That's right, but you don't give me time to think. I will
4 take even one day to think about that.

5 Q Okay. I am not trying to rush you. That's why I am coming
6 back to it because I don't want to do anything that is unfair.

7 Okay, so tell me would it be correct then
8 in determining the factor of safety at elevation 618 to take
9 the load indicated by the distance between line one and line
10 two and add to that the load indicated between line five and
11 line three, that's the live load in there, all right, so what
12 we would do here is we would add, for the enumerator we would
13 take the dead load during the surcharge program plus the
14 stress associated with the surcharge itself, right, we would
15 add those two together to get the stresses of the structure
16 plus surcharge?

17 A Enumerator, okay.

18 Q What about -- okay?

19 A Uh-huh.

20 Q Is that okay?

21 A Uh-huh.

22 Q And then what we would do is we, for the denominator, the
23 thing that we are going to divide is that we would then take
24 the stress resulting from the dead load plus the live load?

25 A Uh-huh.

SINGH

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2 Q (Continuing): Of the building, so putting that down then and
3 by referring to the numbers associated with these lines on the
4 graph the numerator would be the load associated distance
5 between line one and line two plus the distance between line
6 five and line three and the denominator would be the distance
7 between line one and line four -- well, line one and line two
8 plus the distance between line two and line four?

9 A I don't know how they wrote this thing, it is all messed up.

10 Q Well, no, someone will look at this chart --

11 A (Interposing): Why not say that this line (indicating) --
12 well, go ahead.

13 MR. PATON: May I interrupt here, please,
14 just for a moment, let me ask the Witness if he thinks he
15 could follow this better after a break, if we had about a
16 five minute break and he looked at the chart, would that
17 assist you in any way?

18 A That might help, yes.

19 MR. PATON: Okay, let's take a five
20 minute break and you can look at the chart and if you want
21 we can even decide on some clear way to do this.

22 A I understand what he asked.

23 MR. PATON: Yes, I understood his question
24 also. I think maybe you might need a couple of minutes to
25 look at it, is that right?

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A Go ahead, I understand this.

MR. PATON: You don't need a break?

A No, I don't need this, no. I can look at this, but it is messed up at the same time.

Q (By Mr. Zamarin, continuing): Let's start again and I will break it down this time into two separate questions first describing what I am doing and then with reference to this on the chart, okay?

In order to determine the factor of safety at elevation 618 is it correct that what we would do is we would take the stress attributable to the dead load of the structure --

A (Interposing): Uh-huh.

Q (Continuing): -- and add to that the stress attributable to the surcharge, to the sand --

A (Interposing): You want me to correct here or later?

Q Correct here if there is a problem.

A Dead load of the structure at the time of surcharge?

Q That's right, at the time of surcharge.

A That you add to that (indicating).

Q All right, we take the dead load of the structure at the time of surcharge and add to that the stress associated with the surcharge loading?

A Okay.

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1 SINGH

2 Q And then we divide that by the stress resulting from the
3 dead load of the structure after the structure is complet

4 A (Interposing): Completed structure.

5 Q (Continuing): -- plus the live load of the structure --

6 A (Interposing): Including machinery and everything.

7 Q That's right, okay, and then when you do that mathematica
8 computation you would come out with a factor of --

9 A (Interposing): No, no, you have to add some more.

10 Q What?

11 A To the dewatering.

12 Q Okay, and then you would subtract what from the denominated

13 A Denominator, you would have to add this one too.

14 Q You would have to add the stress attributable to the effect
15 of the dewatering?

16 A Yes.

17 Q Right?

18 A Uh-huh.

19 Q Now, I know that I am rushing you, but I want to give this
20 to you to think about --

21 A (Interposing): No, I know.

22 Q All right, when you dewater -- okay, really what you are
23 doing is you are still dealing simply with the weight of
24 soil, right?

25 A Yes, the soil what is coming from here to here (indicating

SINGH

2 you see, the pressure double up by the soil, this dewaterin
3 so that pressure you have to add because it came after, aft
4 this soil is already existing there. That is what you are
5 not considering there.

6 MR. ZAMARIN: Why don't we take about a
7 five minute break.

8 (Whereupon there was a short recess aft
9 which the deposition again continued.)

10 Q (By Mr. Zamarin, continuing): On about how many occasions
11 have you prepared or done settlement calculations?

12 A I have done only once, I told you, in India, and that is
13 where I don't know if structure was built or not after that.
14 I read settlement calculations in the schools in my graduate
15 course.

16 Q That's right, that was yesterday. I had forgotten you told
17 us about that. Did I ask you how you went about making that
18 settlement calculation in India, what tests?

19 A You didn't ask.

20 Q Good. Can you tell me now?

21 A No, there were some soil tests there, just bearing tests.
22 There were no other tests.

23 Q So there was a bearing test and on the basis of that you
24 estimated settlement?

25 A Settlement, that's right.

1 SINGH

2 Q And because you don't know if the structure was built, the
3 obviously you don't know how close you were on that predic

4 A No, I don't.

5 MR. PATON: Mr. Singh does have a state
6 ment he'd like to add to the prior discussion about Figure
7 attached to the applicants 9-14-80 submittal.

8 MR. ZAMARIN: Is it a statement or cla
9 fication?

10 MR. PATON: I think it is -- off the
11 record.

12 MR. ZAMARIN: All right.

13 (Whereupon there was a short discussio
14 held off the record.)

15 Q (By Mr. Zamarin, continuing): Just because I am a nice gu
16 I'm going to ask you a question that Mr. Paton and you wou
17 like me to ask and that is what in your opinion would be t
18 very, very, very, very best way to determine the factor of
19 safety with regard to the surcharge of the Diesel Generato
20 Building?

21 A First to get the appropriate shear -- not shear, but stres
22 distribution along the depth below the footing and plot th
23 stress, find out the area of the total stress at the time
24 surcharge and then find on the separate drawing, separate
25 plot total area under full load of the Diesel Generator

1 SINGH

2 Building and then the factor of safety will be total stress
3 area under surcharge divided by the total stress area under
4 the full load of the Diesel Building.

5 Q And I understand that in your opinion that that would be the
6 best way to do it?

7 A Yes, at that stage, within 10, 15 minutes of thinking I think
8 that would be the best.

9 Q However, by that you are not saying that the method that we
10 described before and went through before on that graph is not
11 an acceptable way of doing it, is it?

12 A Okay, before that when I say total stress area, from that
13 total stress area the dead load of the earth should be
14 excluded, but dead load due to dewatering should be included.

15 Q Okay, so even on your very, very, very, very best method,
16 taking this total area of stress, you would deduct the dead
17 load of the soil but not the dead load of the soil --

18 A (Interposing): Increasing soil --

19 Q (Interposing): Strike that, I misspoke.

20 You would deduct the dead load of the
21 soil but you would not deduct the stress associated with the
22 effect of dewatering, right?

23 A Yes.

24 Q Now, again my question was that recognizing what you have
25 just described in your opinion is the best way of determining

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what the factor of safety is, you would still agree the method that we went through before using that graph on Figure 2 is still an accepted method of determining factor of safety, right?

A We went through two. One we went on the top and one at feet.

Q Right, right.

A In the middle I think is accepted, but the dewatering should not be deducted.

Q I have here what has been marked Exhibit Number 11 of the Kane Deposition as of October 15th, 1980, and I want to ask you if you recall providing any input to Joe Kane so that he could prepare a presentation or critique of Consumers' concerns with regard to the Diesel Generator Building. Do you recall doing that?

A Yes.

Q One of the statements in here is that the state of the art limitations, and he puts that as a Consumer Power Comparison position, using thin samples, meaning the samples that you were taking, the borings, the 28 foot samples which you have if you view the Diesel Generator Building surcharge field test or field experiment, and it goes on and says, however, in some respects we have better control to duplicate long term field conditions which did not develop during

SINGH

2 preload."

3 Now, do you agree that there are limit
4 with state of the art because of the use of thin samples a
5 opposed to observing behavior with regard to the full 28 f
6 thick layer?

7 A I didn't understand the question very well.

8 Q Okay, let me show you, and there is also some writing in h
9 that you can disregard, but let me show you -- it is Number
10 and Joe Kane said you had some input into that.

11 A Yes, I had input into that.

12 Q You did have input into this remark Number 7?

13 A Yes.

14 Q Yes?

15 A Yes, I gave a graph showing how the sample disturbance sho
16 be minimized.

17 Q Should be minimized?

18 A Minimized.

19 Q Why don't you describe for me how the sample disturbance
20 should be minimized?

21 A I gave that, the Schmartmann diagram.

22 Q I see, so you are referring to the Schmartmann diagram?

23 A Diagram, right.

24 C But that really doesn't minimize as much as it corrects for
25 it, does it?

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SINGH

2 A It is not correction entirely.

3 Q But it does, it does attempt to correct?

4 A But the minimum after that it is acceptable. The state of
5 the art accept that.

6 Q The Schmartzmann diagram is really nothing more than a typical
7 shape of a curve and then you correct your curve to look
8 something like that, right?

9 A Yes, uh-huh.

10 Q "Uh-huh" doesn't come out necessarily as a yes. Is your
11 answer to that question a "yes," when you said "uh-huh"?
12 I assume you said "yes"?

13 A Yes, you take a typical curve or a sample taken -- I assume
14 what you are saying a typical curve meaning the sample has
15 been taken in the normal procedure taking care of all these
16 things, and the graph has been drawn testing that sample.

17 Q Yes.

18 A (Continuing): Then the Schmartzmann correction is applied to
19 make a curve which is very close to which would have been
20 exact curve.

21 Q So in other words the Schmartzmann tells you what shape the
22 curve ought to look like if there are sample disturbances,
23 right?

24 A Uh-huh, yes.

25 Q Would you agree that because of the nature of the fill bene

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2 the Diesel-Generator Building and the heterogeneity of the
3 fill underneath the Diesel-Generator Building that in taking
4 samples and running tests that you would expect to get a
5 scatter of results because of that heterogeneity?

6 A I believe I saw the boring -- there are places you can take
7 samples and calculate and determine the shear strength or
8 settlement, and using those settlement figures you predict
9 the settlement at various locations. It might be different
10 in different locations but it can be calculated these things
11 and that was what would satisfy us.

12 Q What would happen if you found that it was different at
13 different locations? What value would you use?

14 A All different locations?

15 Q Yes? In other words, let's assume that you took some samples
16 and you had a scatter of results, you had some settlement
17 one place that predicted half an inch of settlement over
18 life of the plant and you had another one that predicted
19 sixteenth of an inch --

20 A (Interposing): Okay.

21 Q (Continuing): -- you had another one that maybe predicted
22 three inches, what would you do with that information? How
23 would you reconcile those results?

24 A The structural engineer analyze these things, how much settlement
25 you are putting in a place like that, it is not my part

SINGH

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2 It is a problem for the construction, somebody has made th
3 problem he should take care of it.

4 Q I see, so what you would do is you would assume that he to
5 the results that you got was a reliable prediction of the
6 settlement behavior of that building, right?

7 A If it has been done carefully, all the prediction there will
8 be reliable.

9 Q How many times have you yourself used that Schmartmann pro-
10 cedure to correct for sample disturbances?

11 A I have not use it any, only in the case of this. I send it

12 Q (Interposing): Only in the case you what?

13 A This Diesel-Generator Building, I draw a graph and send two

14 Q (Interposing): So that would be the maiden voyage for you
15 in Schmartmann, is that right?

16 A I --

17
18 MR. PATON (Interposing): I think he has
19 said he has done it.

20 MR. ZAMAIN: I think he said he has not.

21 A No, that graph, a Schmartmann correction I took on it. I
22 took one sample from one of your FSAR and I draw this
23 Schmartmann graph and send to Mr. Joe Kane.

24 Q Have you done it subsequent to that? After that?

25 A No.

26 Q Did you ever do it before that?

SINGH

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- 2 A No.
- 3 Q That was the first time?
- 4 A Yes, I read in books and discuss with my supervisor,
5 especially Jim Simpson and he said that is reliable and he
6 has a lot of experience and based on that I draw the conclu-
7 sion that it is okay.
- 8 Q How many times have you been involved in the selection of
9 appropriate soil properties for use in design?
- 10 A No, I have not been involved taking soil property. Excuse
11 me, for that I took help from Ron Ericksen who is our geolo-
12 gist.
- 13 Q For what you took help?
- 14 A For taking samples and testing regarding those samples.
- 15 Q You told us how you would correct for sample disturbance. H
16 would you minimize for sample disturbance?
- 17 A That is the minimizing, it is not correct, you can't correct
18 100 percent.
- 19 Q You can't what?
- 20 A Correct 100 percent.
- 21 Q Okay. Is there any way that you minimize the sampling dis-
22 turbance that you can expect when you are taking the sample?
- 23 A I am not expert in that. I take help. I say I take help
24 from Ron Ericksen and he advises me.
- 25 Q What did he tell you about that, if anything?

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SINGH

- 2 A He said that there is way he can tell.
- 3 Q There is a way he can what?
- 4 A Take sample with minimum disturbance.
- 5 Q But he didn't tell you how he would do that?
- 6 A No. I didn't even like because it was too long for me. He
- 7 will give me a complete book on that and it is not possible
- 8 for me to do it. It is a waste of my time.
- 9 Q Have you ever been involved in selecting locations from whi
- 10 borings should be taken?
- 11 A I have selected.
- 12 Q Where?
- 13 A In bridges.
- 14 Q How many?
- 15 A On bridges? I have, altogether, I must have designed 50
- 16 bridges but, you know, design and review including that, but
- 17 actually I don't, I am limiting it to review, I am not in-
- 18 volved with taking locations of the borings but in design I
- 19 am involved directly so.
- 20 Q About how many, I am sorry?
- 21 A That will be approximately 15 to 20.
- 22 Q So with regard to 15 or 20 bridges you have selected the lo-
- 23 cations of the borings?
- 24 A I selected and give it to them.
- 25 Q What tests did you then run?

1

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2 A I didn't test. I selected the borings and give it to them
3 the approval of the appropriate person and he took borings
4 and he give me the results.

5 Q Well, what results did he give you?

6 A Oh, in some cases he say the blow counts and in certain cas
7 blow count was enough, and certain cases the hard stratum i.
8 so low that my piles were all low bearing piles, it means
9 there is no friction there, so all the information I got fro
10 the person in charge. I was not involved in testing and in
11 the taking of borings.

12 Q So you have never been involved directly in any soil testing
13 is that right?

14 A I haven't tested that, no.

15 Q Have you been involved in evaluation of test results?

16 A What do you mean by evaluation of test results?

17 Q Well, looking at the data that has been obtained from test re
18 sults?

19 A Yes.

20 Q And then deciding what parameters should be used in design?

21 A Yes.

22 Q What data was being corrected by the Schmartzmann method in
23 correction or sampling disturbance that you sent to Joe Kane?

24 A This log of load versus void issue.

25 Q Really what I am asking you is what data is it that you were

1 SINGH

2 correcting? In other words, what field test or what kind
3 a situation did you have that you were dealing with?

4 A There was a graph given in your FSAR of some test result
5 the graph where they have calculated the sample as being
6 from a certain depth, where that was done from the permeability
7 there, and they took out that graph and then calculated to
8 correct the diagram. The original diagram was from the FSAR
9 and the correction was minor, but the original, the intention
10 that diagram was to show it correct.

11 Q Was there any way that you confirmed the fact that your correction
12 tion was accurate or that it worked with regard to this data?

13 A No. I am saying if that is accurate, you see, the weight
14 corrected the way this graph is done, if I have accurate data
15 from somewhere I can use it.

16 Q Okay, so what you have done is you have gone through a correction
17 tion procedure but there is no way that you can know, as you
18 sit here now, whether this was an accurate correction, right?

19 A For this particular input I don't say it. I can't say, but
20 I will do, if I will get the correct information on the same
21 procedure you can tell it.

22 Q How do you know though that your correction is accurate?

23 A Well, this has been developed by scientists or engineers so
24 based on that I have been researching that.

25 Q So really all you did was go through a procedure of correction

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SINGH

2 that Schmartzmann --

3 A (Interposing): Yes.

4 Q (Continuing): -- put his name on?

5 A Right, yes, and it is the state of the art and it has been
6 accepted and that's what I did.

7 Q I want to show you Note 3 of Table 37-1, which was an encl
8 sure to the request to Consumers Power Company for addition
9 borings and sent to them on June 30th, 1980, and I'd ask yo
10 to take a minute and read that, and it starts on November
11 it starts out saying, "Continuous split spoon sampling" --
12 and if you would just read that.

13 A I have read it.

14 Q Did you have any input into Note 3 of Table 37-1?

15 A No, I didn't. I saw this thing and maybe made a few sugges
16 tions in a word here and there but that is not mine. I thi
17 it was -- I think you should talk and this should be clarif
18 from Ron Ericksen, he is our boring man, investigation exper

19 Q I'd like you to read Note 3 and tell me what you think that
20 tells Consumers Power Company that they have to do with
21 regard to borings?

22 A This says, "Continuous split spoon sampling should be taken
23 using SPT is required." That means he wants to find out the
24 different stratum between. That is my interpretation.

25 Q Is it also your interpretation that undisturbed sampling is

SINGH

- 1
- 2 required for each of those areas where the continuous split
- 3 spoon sampling is done?
- 4 A Yes. The continuous samples, sampling should be taken near
- 5 that, very near or close to that.
- 6 Q Not continuous samples, you mean the undisturbed samples
- 7 should be taken?
- 8 A Undisturbed should be taken.
- 9 Q Very near where each of these continuous split spoon samples
- 10 were taken, right?
- 11 A Right. I think that is the intent of that to find out what
- 12 is the type of layers of these things.
- 13 Q In your interpretation of that Note 3 do you think also that
- 14 undisturbed samples should be continuous?
- 15 A No, no.
- 16 Q How would you go about determining from what strata they
- 17 should be taken?
- 18 A Let me tell my interpretation.
- 19 Q Okay, that's all I am asking you.
- 20 A Where the SPT is taken, the penetration there they should have
- 21 high dense material and then you don't have to take samples
- 22 there.
- 23 Q You just want samples from the worst possible spots?
- 24 A That's the worst case -- no, not worst case, it means very
- 25 firm, that is very compressible and likely to damage the

SINGH

2 structures and then you have to take there to assist, the
3 results of that to assist and so you know the effect of that
4 compressible soil on the stability of the structure.

5 Q In other words, don't send us any good news, just send us the
6 bad news?

7 A If it is good then it is okay.

8 Q Yes, okay.

9 A (Continuing): Let me continue with the intent of my feeling
10 Suppose you have a very high blow count, the soil is good
11 there so use your judgement and take the sample.

12 Q Right.

13 A (Continuing): This has been gone into, this has been dis-
14 cussed before in Washington, D. C. with the meeting with NRC
15 and Consumers Power, and I was present there.

16 Q Right, and you listed to what went on there and your under-
17 standing of what the intent of Note 3 is not only based upon
18 your understanding of the development of those requests but
19 your reading of it now and the fact that you were at that
20 meeting and you heard this being discussed there?

21 A There it was discussed, the same thing and we told the same
22 thing, use your judgement.

23 Q With regard to the pre-load program at the Diesel-Generator
24 Building, how would you go about estimating piezometer level
25 prior to the pre-load?

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2 A Estimate?

3 Q Uh-huh, would you bother doing that?

4 A I didn't understand what you say.

5 Q All right. If you are going to do a pre-load like was done
6 at the Diesel-Generator Building, would you bother estimating
7 piezometric level prior to the pre-load?

8 A Sure, yes.

9 Q How would you do that?

10 A I would put a piezometer and see what is the water table then
11 put in a piezometer and generally the water table will show
12 up in there.

13 Q And then what would you do?

14 A Then they put the surcharge.

15 Q Okay, but what I mean is before you do the surcharge would
16 you try and predict what the piezometer level was going to
17 during the surcharge?

18 A Predict?

19 Q Yes?

20 A What is intended. I want to see the water table, what is
21 there and that's why I am using piezometer.22 Q That's right. I think maybe you are saying that you
23 wouldn't bother making an estimate of what the piezometer
24 was going to do during the surcharge, you would simply look
25 and see what the piezometer did during the surcharge.

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SINGH

2 A During the surcharge I would see piezometer, sure.

3 Q But you wouldn't estimate what it was going to do beforehand,
4 would you?

5 A I don't know how.

6 MR. PATON: I have tried not to interrupt
7 this, but the Witness has obviously misconstrued your question
8 Your question was not clear that you asked him whether or not
9 he would, prior to surcharge, whether he would do anything to
10 estimate this, and I was confused by your question, too, and
11 I am sure he is.

12 MR. ZAMARIN: He was answering it.
13 And I understood that he was just going to say that he didn't
14 know how to do it.

15 MR. PATON: I think he gave an answer
16 because he misconstrued your question.

17 A I would like to listen to the question again.

18 MR. ZAMARIN: Why don't you listen to it
19 again.

20 (Whereupon the Reporter read back the
21 previous question.)

22 A After the surcharge is placed, I don't think I understand
23 your question.

24 MR. PATON: It could have been more
25 straightforward. Would you read the question back again,

1 SINGH

2 please.

3 (Whereupon the Reporter read back the
4 previous question.)

5 A Beforehand, I assume you were telling me before surcharge
6 and the piezometer I would use only to read the water table
7 that's all, the elevation and if there is previous pressure
8 There is a lot of times, but in the Diesel-Generator Building
9 I don't think there is any previous pressure, but some places
10 there may be gas or something trapped inside, but in this case
11 I will read the piezometer. I will not estimate, I don't know
12 what is meaning of estimate in this particular case, but I
13 will read the piezometer level and then when the surcharge
14 come then I will like to see those piezometer levels. I will
15 not try to predict. That is compressible soil there, so I
16 will let it go gradually, or I will put half surcharge and
17 let the piezometer disappear and then put another one. That
18 is the idea of my looking at the piezometer.

19 MR. ZAMARIN: Could I hear that answer
20 read back, please?

21 (Whereupon the Reporter read back the
22 previous answer.)

23 A (Continuing): I would like to not see it rise to excessive
24 heights because there might be shear failure.

25 Q Okay, how would the piezometer rising high relate to the

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- 1
- 2 possibility of shear failure?
- 3 A I can't predict. You have to test the soil underneath.
- 4 Q In your opinion is there any need to predict the level that
- 5 the piezometers are going to go to during the pre-load and
- 6 make that prediction before the pre-load? Is there any need
- 7 to do that?
- 8 A Yes, I will predict, assume it don't go beyond certain height
- 9 Q Okay, you would predict just to make sure that it doesn't go
- 10 beyond a certain height because that would indicate a shear
- 11 failure, right?
- 12 A Excessive pore pressure will be created, but I have to know
- 13 the shear strength of the soil underneath.
- 14 Q Would that be the only purpose for which you would predict
- 15 piezometric level before the surcharge?
- 16 A Predict, you know now what I mean by predict, that means pre-
- 17 dict what will happen when the surcharge is placed.
- 18 Q Yes. What I mean by predict is if you would make a predictio
- 19 before the surcharge of what is going to happen during the su
- 20 charge and that would be the only reason that you would want
- 21 to predict --
- 22 A (Interposing): No -- okay, go ahead.
- 23 Q (Continuing): -- the only reason you would want to predict
- 24 would be to make sure that if the piezometer level is going t
- 25 high that you then stop or do something because you may be

SINGH

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2 inducing shear failure, right?

3 A Yes.

4 Q Would you predict before pre-load the settlement that would be
5 expected during the pre-load?

6 A Yes, I will predict that.

7 Q Why?

8 A I would calculate this figure first.

9 Q Why?

10 A And compare these things.

11 Q Why?

12 A First I have to know how much settlement is going to place.

13 Q Why?

14 A Why?

15 Q Why?

16 A Because you have to minimize about a structure that, and I
17 want to eliminate because I have put certain load on that and
18 with that certain load the soils which is underneath, how much
19 is going to settle.20 Q What do you care about how much it is going to settle as long
21 -- aren't you interested really in the amount of load?22 A How I know by the surcharge that the settlement has been com-
23 pleted, how I know that?24 Q You wouldn't necessarily know that on the basis of a prediction
25 beforehand, would you?

SINGH

2 A No, I will not know if that settlement is nine inches, or
3 eight inches or 20 inches. I want to eliminate that settl

4 Q Right, I understand that.

5 A That's why I make it.

6 Q Oh, you just make a prediction to see whether you need to
7 charge it or not?

8 A Yes, to need means to eliminate that settlement, how much
9 charge I need.

10 Q I see, so if -- wait a minute, I think I misunderstood what
11 you said. You don't predict settlement to determine the
12 weight of the surcharge load, do you?

13 A No, I will calculate settlement only. I will calculate se
14 ment under the structure. I have to know that.

15 Q Why do you have to know how much settlement you would expect
16 under the pre-load?

17 A Because pre-load should be under to create that much settle
18 ment.

19 Q Okay, but isn't the settlement prediction with regard to pre
20 load of compressible material sometimes unreliable?

21 A Unreliable?

22 Q Yes?

23 A Well, that's what I am trying to say.

24 Q I am saying aren't the predictions sometimes unreliable such
25 that it is better to do, for example, what was done at the

1 SINGH

2 Diesel-Generator Building and that is load the structure and
3 watch it and keep the surcharge on until you get a straight
4 line on a settlement log time curve?

5 A Read that question again.

6 (Whereupon the Reporter read back the
7 previous question.)

8 A If I do the testing very carefully my settlement will be
9 reasonable, within ten, fifteen percent of predicted, and bas-
10 ed on that I will put load on, the surcharge load.

11 Q Would it be possible to get settlement predictions that would
12 be accurate to within ten or fifteen percent in soils such
13 as we have had underneath the Diesel-Generator Building
14 which are heterogenous?

15 A Heterogenous, okay, go ahead.

16 Q No, go ahead.

17 A You conclude all the time it is heterogenous. There are layers
18 of soil, but you have different types layers and you calcu-
19 late settlement in each and you get accurate results, but
20 you have to do this in every layer, because you have sand,
21 clay, silt, all this and in every layer you calculate the
22 settlement.

23 Q You are talking about variation in the vertical distance, and
24 doesn't it vary under the Diesel-Generator Building, in your
25 opinion, in the horizontal distance also?

SINGH

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2 A Yes, it varies.

3 Q So if you were to take sample borings in order to calculate
4 this you wouldn't have any dirt left under the building,
5 would you?

6 A Okay, but some of the settlement will be less and some will
7 be more, and why not take care of that?

8 Q How are you going to find those?

9 A How? You take borings, you will find it if you have will to
10 do that.

11 Q If you have what, sir?

12 A Will.

13 Q Will?

14 A Will, yes, to do that.

15 Q Weren't borings taken under the Diesel-Generator Building
16 already?

17 A There were borings taken.

18 Q Did you ever do any settlement calculations based on those
19 borings?

20 A You have never given anything to me. You will calculate first
21 because I am the reviewer. I would like the applicatn to
22 calculate and I will check.

23 Q Is there a difference between checking and reviewing?

24 A No, it is same thing.

25 Q It is the same thing as far as you are concerned?

SINGH

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2 A Yes.

3 Q If you had been the reviewer at the time before the surcharge
4 program would you have requested predictions of settlement
5 beforehand based on borings?

6 A Based upon soil test, accurate soil test I would like to see
7 them.

8 Q You would?

9 A Yes.

10 Q Okay. To your knowledge nobody ever requested that from
11 Consumers though, did they?

12 A I don't know. To my knowledge I don't know.

13 Q In your opinion if this kind of testing had been done prior
14 the surcharge and a prediction of settlement had been made
15 what percentage of error would you expect there to have been
16 as a maximum in that prediction?

17 A If there is a very careful sample which has carefully been
18 taken and tested, I will predict within ten to fifteen per-
19 cent.

20 Q Maximum, right?

21 A Yes. I might -- I would consult with my supervisor regarding
22 these things and based on that, because I have not done very
23 much, that I have already told you, and they advise me that
24 they can predict within ten, fifteen percent.

25 Q When you refer to your supervisor are you talking about Bill

SINGH

2 Otto or Jim Simpson or both?

3 A Both.

4 Q Simpson, too?

5 A Yes.

6 Q Do you know if anyone has made the calculations of predicted
7 settlement of the Diesel-Generator Building during the sur-
8 charge?

9 A No, I don't.

10 Q Have you reviewed the boring logs that were furnished with
11 question 46 response?

12 A Response for 46?

13 Q There were some boring logs furnished, weren't there?

14 A I have not reviewed the response for question 46. It has come
15 to my office, I believe, but I didn't have a chance to look
16 at it.

17 Q Have you reviewed the response to question 44?

18 A No.

19 Q Have you reviewed the response to question 42?

20 A Any material received in my office in last three weeks from
21 Consumers Power I have not reviewed.

22 Q In your opinion was the pre-loading of the Diesel-Generator
23 Building the best option to deal with the soil fill problem
24 there?

25 A Yes, I say so provided it is the proper way, that they should

SINGH

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2 have the settlement after pre-load and test and satis
3 that it had been achieved, and I agree, and this is n
4 not of the department..

5 Q I understand.

6 A (Continuing): But I will add this because the struct
7 already built, the structure must have been evaluated
8 consequences of the pre-load. I don't know in advance
9 might shatter the structure, lot of cracks, but I want
10 to determine how much is the difference in settlement
11 offer and once I find something happening to the struc
12 will stop surcharge right there.

13 Q Have you had any experience in dewatering?

14 A No. Excuse me, recently, recently in the last couple
15 we have been doing one dewatering in Corps of Engineer
16 our office, not dewatering actually, what we were doin
17 testing permeability, permeability of some areas.

18 Q What areas?

19 A To our project.

20 Q You mean the Midland project?

21 A No, no, the Corps of Engineers. I still am working fo
22 Corps of Engineers.

23 Q I thought you were working full time on Midland?

24 A Yes, but I am aware that they were doing it.

25 Q So you are not involved in that?

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- 2 A No, I am not involved in that.
- 3 Q In determining when the soil under the Diesel-Generator
4 Building is out of primary consolidation, in your opinion will
5 settlement data provide that information?
- 6 A Which settlement data are you talking about? You mean the
7 soil or the building? Are you talking about the settlement
8 data which I will take from borings or settlement data you
9 have given to the response of question number 277
- 10 Q Settlement data that is actually observed, the real live stuff
11 not the laboratory stuff, would that indicate when the soil
12 is out of primary consolidation?
- 13 A I want to know the real settlement, where is that? Somebody
14 has taken that.
- 15 MR. PATON: He is talking about measured
16 settlement.
- 17 A Which settlement, which does he mean? I have to have what
18 settlement.
- 19 Q Okay, measured -- I assume you wouldn't have data unless
20 somebody measured it. I am talking about the real live stuff,
21 okay, the settlement data observed, measured, taken, written
22 down and then done whatever with, plotted and analyzed, would
23 that information with regard to the Diesel-Generator Building
24 tell when the soil there is out of primary consolidation?
- 25 A You take real data from the settlement, provided the building

SINGH

- 1
- 2 is not warping or anything, all the load is doing uniformly
- 3 and employ this thing it will give you, you can see the curve
- 4 long enough and that will give this thing, if the building has
- 5 already been built on a soil which is not consolidated before
- 6 and still it is going in primary consolidation and then
- 7 secondary consolidation and it will give this.
- 8 Q You have seen -- you have seen the settlement versus log time
- 9 curve for the Diesel-Generator Building that has been sub-
- 10 mitted by Consumers Power Company, haven't you?
- 11 A Yes, I have seen.
- 12 Q Assuming that you don't have this excessive warping that you
- 13 indicate would affect the information on that, would that curve
- 14 show a long enough period of time to be able to predict whether
- 15 the soil was out of primary consolidation?
- 16 A No, still I believe that there is something that should have
- 17 continued some more because there is not enough data to draw
- 18 the secondary range at this time.
- 19 Q Why not?
- 20 A Well, I need some more, the scatter is so much that somebody
- 21 has drawn through that because I can draw another line on
- 22 that in a different angle.
- 23 Q You are talking about the straight line portion now?
- 24 A Yes.
- 25 Q So you think that there is too much of a scatter of data?

SINGH

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2 A I want some more because if you have to draw a straight line
3 if you have more data then you can predict more accurately.

4 Q How much more data would you want?

5 A Okay, before answering this thing I would like another ques-
6 tion. The soil under the Diesel-Generator Building was not
7 completely saturated, so that is another reason and I don't
8 consider that represents the consolidation theory of whether
9 it is secondary or primary, and we draw conclusions whether
10 it is secondary or whether it is primary, that is what we have
11 do so there are two reasons I have to assume the soil is just
12 completely saturated, but that is not actually.

13 Q Okay, assuming that the soil was completely saturated except
14 for the top three feet of the soil underneath the footings
15 would it be your opinion that the curve would predict when the
16 soil is out of primary consolidation?

17 A No, still be a lot of capillary action and capillary prevents
18 or reduces the permeability very much due to friction, so still
19 there will be some doubt to me. Capillary should be completely
20 eliminated.

21 Q The capillary moisture --

22 A (Interposing): Capillary moisture, you said that three feet
23 is still there, and there is capillary moisture in that so
24 that will prevent your -- that reduces the permeability of the
25 soil. Capillary moisture that is not saturated fully, it is

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partially saturated.

3

Q And so is it your opinion that the only time you can ever pre-

4

dict settlement and predict when soil is out of primary con-

5

solidation from a settlement versus log time curve is when all

6

of the soil right up to the very bottom side of the load that

7

is applied to it is completely saturated?

8

A This curve has been obtained and is true only for the saturat-

9

ed soil drawn in the laboratory and that is based on this thing

10

and there is also another thing, the loading, every load incre-

11

ment is double the previous load.

12

Q What do you mean the load increment is double the previous

13

load? I don't know what you mean?

14

A I mean testing is done, when you do laboratory testing, and

15

you draw that curve, that is the criteria.

16

Q What is the criteria?

17

A You double the next load. You increase the load from one and

18

then two tons, four tons, eight tons, and go on doubling that

19

and on that basis that curve is drawn. That has some effect

20

on that primary and secondary consolidation.

21

Q Is the shape of the curve, is the general shape of the curve

22

the same for each of these load increments that you are talk-

23

ing about?

24

A No, for whole load increments there will be one curve. This

25

is one curve for the whole thing. There might be one hundred

SINGH

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2 load increments or 20 load increments, it all depends.

3 Q To your knowledge does Joe Kane want the Corps of Engineers
4 to be present if borings are taken at the sample tube opening
5 and specimen selection for testing?

6 A No, not to my knowledge. I am not aware of that because this
7 is handled by Bill Otto and the person who is in charge of
8 borings.

9 Q I show you a document which has been marked as Exhibit Number
10 6 and ask you to take a look at it and then direct your atten-
11 tion to the last page thereof and to the very last comments
12 written on it.

13 (Whereupon the document was handed to the
14 Witness.)

15 Q (By Mr. Zamarin, continuing): Can you tell me what that docu-
16 ment is, Exhibit Number 6?

17 A What that document is?

18 Q Yes, is that something from your files?

19 A No. This?

20 Q On the front it says "Singh," do you see what it says there?

21 A Yes, this top, definitely, this page (indicating) I have a
22 copy of this.

23 Q Have you seen all of that before?

24 A Up to this (indicating), but I don't have copy of it. I don't
25 have copy of that. This is entirely different.

SINGH

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2 Q When you say that this is different -- give that to me so that
3 I can describe it a little better.

4 When you say you don't have a copy of this,
5 what you are talking about is the last four pages?

6 A Okay, but I have not seen this thing.

7 Q All right. On the last page of this there is some handwriting.
8 Do you know whose handwriting that is, like that little sub-
9 paragraph small letter g. Where it says Joe wants?

10 A No, I am sorry, I can't recognize who has written it.

11 Q Do you know whether that is Mr. Otto's handwriting?

12 A No, I can't recognize. I know -- I don't think it is Mr. Otto.
13 I know that it is not mine.

14 Q I know, but does it look like Mr. Ericksen's handwriting?

15 A I can't tell that. I am sorry, it is very hard to recognize
16 this but this definitely is not my handwriting.

17 Q Has Joe Kane ever told you anything generally about Consumers
18 Power Company?

19 A No.

20 Q Never told you what he thinks about them as to whether they
21 are a good utility or a bad utility?

22 A No.

23 Q Never told you whether he thinks Bechtel is a good or bad
24 engineering outfit?

25 A No.

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- 1
- 2 Q Never expressed any kind of opinion --
- 3 A (Interposing): No.
- 4 Q (Continuing): -- to you in that regard with respect to
- 5 Consumers or Bechtel?
- 6 A No, sir.
- 7 Q Did Joe Kane ever talk to you about the fact that your deposi-
- 8 tion was going to be taken and the type of thing you might be
- 9 asked in your deposition?
- 10 A No, I have read his deposition.
- 11 Q Okay. What did you think of his deposition? Did you see any-
- 12 thing in there that comes to mind as you sit here now about
- 13 what you disagree?
- 14 A I read, but I can't remember all these things.
- 15 Q All right. Can you remember anything in there on what you
- 16 thought Joe was wrong or which you disagreed with?
- 17 A Okay, I have read his deposition, not all the portions. Some
- 18 of them I haven't received yet.
- 19 Q That's right, I haven't either.
- 20 A So I have read first day and second day.
- 21 Q How about the third day?
- 22 A Third day partially I read, but so far I didn't see that.
- 23 Q Okay. Of what you have read and that is the first day and
- 24 the second day and part of the third day, did you see any-
- 25 thing in there that you remember that you didn't agree with

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- 1
- 2 or where you thought Joe was wrong?
- 3 A No, I didn't see it. I didn't disagree anywhere.
- 4 Q So there was nothing in there that you can remember where you
- 5 would have answered differently than Joe?
- 6 A No, at that time I don't remember now what it is, but --
- 7 Q (Interposing): And you never talked to Joe about what might
- 8 go on at this deposition here?
- 9 A No, sir, he never tells me. I asked him and he said, no, he
- 10 is not supposed to talk.
- 11 Q Did you talk to Joe Kane on Wednesday?
- 12 A This Wednesday?
- 13 Q Yes. He was here?
- 14 A Yes, I talk to him.
- 15 Q What did you talk to him about?
- 16 A Oh, he came and we talk and he said that he was going at 1:30,
- 17 and that's all I asked.
- 18 Q That's all you communicated as far as Joe Kane is concerned?
- 19 A Regarding what?
- 20 Q Regarding any communications with him at all this week?
- 21 A No.
- 22 Q No?
- 23 A Let me see, this week I didn't talk to him on the telephone,
- 24 no, I saw him first time this week at eight o'clock in my
- 25 office yesterday, I believe. Is that right? No, day before

SINGH

- 1
- 2 yesterday.
- 3 Q On Wednesday. Yesterday we started your deposition?
- 4 A I saw him yesterday. I saw him yesterday for the first time
- 5 this week, I believe.
- 6 Q He was here for a few hours yesterday morning and that was the
- 7 only time you saw him?
- 8 A Yes. I am sorry, I told you on Wednesday, I didn't see him
- 9 on Wednesday.
- 10 Q Did Joe Kane at any time ever give you any advice as to what
- 11 to do in a deposition or what to expect in it?
- 12 A Yes.
- 13 Q What did he tell you?
- 14 A Tell the truth.
- 15 Q Anything else?
- 16 A No.
- 17 Q Just walked up and said, "Hari, tell the truth," and passed on
- 18 into the night?
- 19 A I'm telling the truth, that means both of them advised me, him
- 20 and Joe Kane (indicating Mr. Paton).
- 21 Q Didn't Kane tell you anything else?
- 22 A No.
- 23 Q Didn't it strike you as odd that that would be the only thing
- 24 that he would say to you?
- 25 A Beg your pardon, I didn't get the question.

SINGH

- 1
- 2 Q Did it strike you as being odd that that would be the only
3 thing that he would say to you?
- 4 A No, he said, the only thing he say is if you want to read my
5 deposition, and I read part of his deposition and I didn't
6 have time to go through the complete deposition. I read him
7 and Darl Hood's deposition, partly I read and I like to read
8 Simpson but I didn't get a copy of this.
- 9 Q Okay. Have you ever considered whether some kind of a failure
10 of the dike could occur which would affect a category one
11 structure?
- 12 A Yes, if it is category one structure it might be damaged.
- 13 Q Well, tell me how that could happen?
- 14 A I feel that there is pipe, that means discharge pipe going
15 through category one -- I am sorry, to the dike and if that
16 dike slides the category one pipe is underneath and it might
17 be damaged.
- 18 Q All right, so what you are telling me is that there is a
19 category one pipe that goes underneath the dike?
- 20 A Underneath, somewhere under the slope.
- 21 Q Okay, and if the dike were to slide it could damage the
22 category one pipe?
- 23 A Yes, yes.
- 24 Q In what way? By that I mean what is the method by which that
25 damage could occur? Would it be crushed? Would it be broken,

SINGH

1
2 ripped, moved, clogged or all of the above?

3 A It depends how much land of the dike slide on that.

4 Q Well, just estimate whatever you want, make whatever assumption
5 tion you want and I want you to postulate for me the type of
6 failure that would damage in some way a category one pipe?

7 A Bending.

8 Q Bending?

9 A Bending.

10 Q Okay, tell me how and where the dike would fail and how and
11 where it would bend the category one pipe?

12 A I don't know where it would fail, but if it would fail any-
13 where, say ten feet length, any length where it is loaded
14 with this weight of this slide, suppose that dike slide and
15 the load is on this pipe, I don't know how long, two or
16 three hundred feet long pipe, and it is going under the dike
17 and the whole dike is sliding and all the load went onto that
18 pipe here, it would bend this way (indicating) and create
19 tremendous pressure on that.

20 Q This is a discharge pipe?

21 A A discharge pipe.

22 Q Where is the pipe?

23 A It is under the cooling pond, just near the emergency cooling
24 pond we call it.

25 Q Buried in the dikes?

SINGH

- 1
- 2 A It is under the slope.
- 3 Q So it is buried in the fill that makes up the dike, this pipe?
- 4 A The pipe is there somewhere under this.
- 5 Q But the pipe is just laying on the bottom of the cooling pond,
- 6 isn't it?
- 7 A It is not the bottom of the cooling pond, it is on the edge
- 8 of it inside the dike.
- 9 Q All right, and is that pipe surrounded by fill that the dike
- 10 is made out of?
- 11 A Yes.
- 12 Q Is there any other way in which you can postulate a failure
- 13 of the dike which would affect a category one structure or
- 14 system?
- 15 A Any other way I can tell you except other than sliding?
- 16 Q Yes, other than sliding and damaging that pipe. Is that it?
- 17 A Well, that will affect the category one structure.
- 18 Q And you are not aware of any other way in which the dike could
- 19 affect a category one structure, right?
- 20 A No, I can't think of anything else.
- 21 Q Okay. If that pipe were to be moved so that it was down in
- 22 the natural soil, in the material and not in the fill from the
- 23 dike would your hypothesized failure of the dike still be
- 24 able to damage it?
- 25 A It still can damage.

SINGH

2 Q How?

3 A Because the failure, the sliding failure on the slope, plus
4 sometimes it can go in the bottom.

5 Q So you are saying that --

6 A (Interposing): If it is away from that then definitely.

7 Q In your opinion a sliding failure of the dike could take some
8 of the fill with it, and therefore, bend the pipe?

9 A It happens, it happens. If the fill is very good then it
10 won't happen, but the failure of the slide in the slope it can
11 go to the fill, and I think it will go all the way, very deep.

12 Q Are you saying it can or can't?

13 A It goes, yes, it goes, you have to investigate it and see that
14 fill is strong enough that it won't develop there.

15 MR. ZAMARIN: It is now four o'clock and
16 because of airline schedules we have to cease the deposition.
17 What I'd like to do is adjourn subject to resumption at some
18 time in the future as we can agree on and because there has
19 been some problem in the past with complaints about that I
20 think that we should note that especially today I think we have
21 had an actual amount of time questioning the Witness of not
22 much more than about four hours, and I don't think we have
23 had four hours because of various matters that we had to
24 attend to, but we will adjourn now sine die subject to resump-
25 tion at a time and date to be agreed upon.

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Do you have any objection to that?

MR. PATON: I, you know, I heard your comments and I have no response.

MR. ZAMARIN: Do you have any objection to that?

MR. PATON: Do I have any objection to the continuation of Mr. Singh's deposition?

MR. ZAMARIN: Yes.

MR. PATON: I don't think it necessary that if I did I would have to put it on the record at this time. We obviously have scheduling problems and so I don't have any comment in response to your question about whether or not I have an objection at this time. I am not going to make a statement now that I have no objection or waive any objection that I may have.

MR. ZAMARIN: What I am saying is if you have some objection I will stay here until midnight and finish it.

MR. PATON: Fine, do what you want.

MR. ZAMARIN: If you have an objection tell me now and we will alter our plans.

MR. PATON: I am just not responding to your statement.

MR. ZAMARIN: You won't tell me whether

SINGH

2 you have an objection or not?

3 MR. PATON: That's correct.

4 MR. ZAMARIN: All right, we will adjourn
5 and resume at some future date.

6 (Whereupon the witness was excused and
7 the deposition adjourned.)

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2 STATE OF MICHIGAN)
3) SS.
4 COUNTY OF WAYNE)

5 CERTIFICATE OF NOTARY PUBLIC

6 I, Matthew W. Bats, of the firm of
7 BETZ AND SUMMERS, INC., a Notary Public within and for the
8 County of Wayne, State of Michigan, duly commissioned and
9 qualified, do hereby certify that the witness whose attached
10 deposition was taken before me in the before-entitled cause
11 at the time and place hereinbefore set forth, was by me first
12 duly sworn to testify the truth, the whole truth, and
13 nothing but the truth in the cause aforesaid; that the
14 testimony contained in said deposition was by me reduced to
15 writing in the presence of said witness by means of
16 stenography; afterwards transcribed upon a typewriter under
17 my personal supervision; and that the said deposition is a
18 true and correct transcript of the whole of the testimony
19 then given by said witness.

20 I do further certify that I am not
21 connected by blood or marriage with any of the parties, or
22 their attorneys or agents; that I am not an employee of
23 either of them; and that I am not interested, directly or
24 indirectly, in the matter in controversy, either as counsel,
25 agent, attorney, or otherwise.

IN WITNESS WHEREOF, I have hereunto set

BETZ AND SUMMERS, INC.

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my hand and affixed my notarial seal at the City of Lathrup
Village, Oakland County, State of Michigan, this 6th
day of February, 1981, A.D.

Matthew W. Betz
Matthew W. Betz, CSR-2010
Registered Professional Reporter
Notary Public, Wayne County, Michigan
My Commission expires May 10, 1982.