UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

IN THE MATTER OF:	Docket Nos. 50-329-OM
	50-330-OM
CONSUMERS POWER COMPANY	50-329-OL
	50-330-OL
(Midland Plant, Units 1 and 2)	

The Discovery Deposition of HARI NARAIN SINGH, a witness herein, taken pursuant to Notice of Taking Deposition, before Matthew W. Betz, CSR-2010, Registered Professional Reporter, a Notary Public within and for the County of Wayne, State of Michigan, at the McNamara Building, Detroit, Michigan, on Thursday, December 18, 1980, commencing about 9:45 o'clock in the forenoon.

VOLUME I

APPEARANCES:

ISHAM, LINCOLN & BEALE
(By Mr. Ronald Zamarin and
Mr. Alan S. Farnell)
One First National Plaza
Chicago, Illinois 60603

and

JAMES E. BRUNNER, ESQUIRE
212 West Michigan Avenue
Jackson, Michigan 49201
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

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SINGH

Detroit, Michigan

Thursday, December 18, 1980

About 9:45 o'clock, A.M.

- - -

H A R I N A R A I N S I N G H, was thereupon called as a witness herein, and after having first been duly sworn by the Notary Public to tell the truth, the whole truth, and nothing but the truth, testified as follows:

- - -

MR. ZAMARIN: This is the deposition of Hari -- is it Narain?

MR. SINGH: Yes.

MR. ZAMARIN (Continuing): Singh, taken pursuant to Notice and agreement of counsel and it will be taken in accordance with the rules of procedure of the Federal District Court and the regulations of the Nuclear Regulatory Commission.

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CROSS EXAMINATION

BY MR. ZAMARIN:

Q Mr. Singh, the Notice of Deposition called for production of certain documents.

A Uh-huh.

Q (Continuing): And as modified by agreement of counsel, quite

simply it called for production of any documents which were copies of documents other than those in the public document room or other than unmarked copies of documents which were either transmitted to or from Consumers Power Company or Bechtel in this matter.

Do we have and has there been production to us previously of all such documents that are within your possession or control as I have just described?

A Yes. One thing I would like to ask. I have been preparing some questions for use with witnesses of Consumers Power. Shall I present that before --

Q (Interposing): You have what?

A I have prepared some questions to be asked in the depositions of certain people we are going to depose them in the future, and I have certain questions for them and that is in my custody now.

Q I see. Who is it that asked you to write those questions?

A I write them and consult with NRC people.

Q Okay, who was it that asked you to write them? Did anyone ask you to write those questions?

A Yes, Mr. Joe Kane. I talk to him and we have some kind of agreement that, "Do you have anything you would like to ask," and then we prepare some and we discussed them and finalize.

Q Yes, I'd like to see those.

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MR. PATON: Just a minute, please. My recollection is that a similar situation came up with Mr. Kane, and I think you asked to have questions produced by Mr. Kane that were written by him for a similar purpose as has just been indicated by Mr. Singh, and we indicated at that time that we would not produce those documents and that's what we expect to do with Mr. Singh.

MR. ZAMARIN: I think you better put on the record the reason why, because obviously I don't think you have any right to protect him with respect to Mr. Singh.

MR. PATON: I don't think I am required to put on the record a legal argument as to why we are not going to produce the documents. One of the reasons is that they involve our preparation for the hearing in this case.

MR. ZAMARIN: I am not asking for a legal argument. There was a production request and it either requires you to produce them or state a privilege.

MR. PATON: I have just stated for the record what the reasons were that we felt that we didn't want to produce those documents.

MR. ZAMARIN: Okay, your objection is because --

MR. PATON (Interposing): I am not objecting. I am just not producing the documents.

SINGH

MR. ZAMARIN: My understanding of procedure is you produce them or state an objection.

MR. PATON: We are not producing them, that's correct.

MR. ZAMARIN: But you are not objecting to the production on the basis of --

MR. PATON (Interposing): The word "objecting" is your word. You asked me to produce documents and I have indicated that we are not going to produce them. If you want to call that an objection, fine. I don't object to your calling it an instruction.

MR. ZAMARIN: Really what I am saying is that on a production request you have a choice of doing one of two things, producing or stating an objection, and I just want to know what your objection is so that we can deal with that. You have to do one or the other.

MR. PATON: You have asked us to produce documents and I am indicating to you we are not going to produce these documents, and you have asked me to make a statement on the record and I told you that I don't feel obliged to put all my legal reasons as to why we are not doing it on the record, but one of the reasons we are doing it is, that we are not going to produce the document, is that these are documents that Mr. Singh has been asked to prepare in

preparation of our case.

MR. ZAMARIN: All right. Well, off the record.

MR. PATON: Off the record.

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

MR. ZAMARIN: Being unpersuaded by your lack of stated objection I do want production of those documents and consider the failure to have produced them to be inconsistent with the notice to produce and notwithstanding that I will proceed as best I can with the deposition in the absence of those documents which should have been produced and whenever we get to the end of the other questions I will simply have to adjourn subject to coming back if and when we do get the documents.

Q (By Mr. Zamarin, continuing): For whom did you prepare questions?

A Prepare for NRC.

Q With regard to what Consumers witnesses?

A Almost all.

Q All? Tell me each of their names and then I am going to ask you each of the questions that you prepared for each of these people.

A Questions was prepared, I have prepared for Dr. Peck.

SINGH

Q All right.

A And I prepare a few questions for Mr. Afifi, and for Mr. Dahr. That's all.

Q Okay. Did you prepare any for Hendron?

A No.

Q Davison?

A No, I'm going to work on that but I have not prepared.

Q Okay. Are there any others that you are going to work on?

A No, I can't recall, but maybe.

Q Okay. You can call me up and let me know when that happens.

A Sure.

Q How many pages of questions have you prepared for Peck, Afifi and Dahr?

A I can't tell. I don't know. I haven't counted the exact number, but it has been retained and discussed and sorted down

Q Who have you discussed them with?

A Well, I discussed with the NRC lawyers, attorneys, Mr. Kane, Mr. — the other lawyer, Mr. Bradley Jones. That's all.

Q Okay. Tell me as best you can recall each of the questions that you have prepared for Dr. Peck?

A I can't remember, but in the ballpark I can tell. Along these lines, but the exact questions it is very difficult to remember all these things. Mostly the questions were on shear modulus.

Q What else?

A Settlement.

Q Okay.

A (Continuing): Piezometers and that's all.

Q That's all? Okay, let's be a little more specific about what you want to know from Dr. Peck about shear modulus?

A I am not talking about Dr. Peck, Dr. Afifi, I can't answer for Dr. Peck right now.

Q Have you prepared any questions for Dr. Peck?

A Yes, but I am not going to tell now because --

MR. PATON (Interposing): Wait a minute.

MR. ZAMARIN: Whoops, I think you are.

MR. PATON: Let's go off the record.

A (Continuing): For Dr. Peck I am not on shear modulus, that is for piezometers.

Q That's what?

A For piezometers.

Q Okay. What are the specific things that you want to know or that you have prepared for Dr. Peck about piezometers?

A Well, I wanted to see where the piezometers are located and I wanted to find out what is the kind of soil in which the bottom of the piezometer rests, and I didn't find anywhere from documents that I can pinpoint and say that is in clay or sand because no document has been produced by the Consumers

Power, so I wanted to know, ask Dr. Peck how do you know tha the piezometers are in clay.

Q Anything else?

A No, I -- at this stage that is my only thing.

Q That's all you want to know from Dr. Peck is where the tip (the piezometer is located?

A Ye because if the piezometer is not in the clay you are n getting --

Q What else have you prepared or do you intend to prepare wit regard to questions for Dr. Peck?

A Intend to? I have to study again a little more. I will ta about the settlement.

Q What about settlement?

A The settlement, I assume that settlement is not, is not settlement of the clay actually, okay. Here there is load versus settlement, but the load is not directly going on th ground, it is transmitted to the foundation, the footings, somewhere else, some other element, you know what I mean?

Q Yes.

A So there is a rigidity of the footing which makes the situ tion like that, and whatever you load you put here (indica ing) and that is not going there, it is going somewhere el

MR. PATON: Let me instruct the witnes when you say, "It is not going there. It is going somewhe

else," the problem is putting it on the record. When you say, "It is not going there" when it is typed up it doesn't show, okay, so be careful. When you say "there" indicate where "there" is.

A Okay. So there is some problem there. I see some problem on the settlement versus load. That ground is not direct and on that basis I am going to ask a question from Dr. Peck.

Q What question would you ask him?

A Is this the correct settlement of the soil underneath.

Q What if he says, "Yes"? Then what would you ask him?

A I wouldn't agree with him.

Q You wouldn't ask him anything else?

A Well, he has a right, it is a free country. I say I will not agree with him.

Q Okay. Why wouldn't you agree with him?

A Because in my belief when we do consolidation tests and put the soil on that and the load on that the entire load is transmitted right below the load, but in this case part of the load, through the flexibility of the footing is going in other locations.

Q Do you view the pre-load of the Diesel-Generator Building as one giant consolidation test?

A It is not a consolidation test, no.

Q I know, that's what I am getting at.

SINGH

A No.

Q You view that as a field test, don't you?

A It is a kind of -- no, it is not a test. I consider that you are trying to increase the strength of the soil. A test is something else. A test is to find out parameters, but it is not a test, you are trying to increase the strength of the soil. I agree with that.

Q Okay. Have you ever heard the expression "field test"?

A Yes.

Q What is a field test?

A A field test we do just like you do dewatering test, you do a field test like a permeability test. That is a field test.

Q Can you tell me what a field test is without just giving examples?

A A field test is done in situations when determining the settlement parameters.

Q And in your opinion the surcharge program of the Diesel-Generator Builidng at Midland could not be viewed as a field test, is that right?

A Yes, I would view this thing. You are -- here you are testing the structure not the soil in this case.

Q I see, and are you testing at all the structure-soil interaction?

A You are testing soil-structure interaction, I agree with that.

Q That is about the whole ball of wax with the Diesel-Generator Building, isn't it?

A Sure.

Q Okay. Can you tell me to where the load is being transmitted during the surcharge?

A Well, under the footing of the Diesel-Generator Building the soil is not uniform. In certain areas it is stiffer and in certain areas it is very compressible, acting as a spring in the area where there is this compression the footings bend and due to this bending action the load is not uniform under the bottom.

Q All right, and you indicated before that the load was going some place else other than --

A (Interposing): Yes. The load you apply reacts from the bottom. The total load on the footing remains the same but under the footing they are not uniform.

Q What is the significance of this observation of yours?

A Significance of this will be we have a load displacement diagram and that load is not realistic because that is based, that entire load placement on the footing is going on the soi below that.

Q I see, and I am still not clear. Some of the load is transmitted to the soil?

A No, it is all transmitted to the soil one place and the other

The entire load is going on the soil, but suppose you put the two tons of load here (indicating) --

Q (Interposing): Are you saying that it isn't being uniformly transmitted to the soil?

A Uh-huh, yes, yes, yes.

Q So that would mean that with respect to certain of that soil underneath the Diesel-Generator Building, in your opinion it is being subjected to greater loads than those that are indicated on the load displacement diagram, is that right?

A Let me answer, at certain locations some is more and some is less.

Q But the sum of all of those loads will be equal to the total of the load?

A Sure.

Q Okay. Why is that a problem?

A It is a problem that under the very soft foundation, on the soft area, and there are also a more stiff area, and in the future it is going to be subjected to more load.

Q Yes.

A (Continuing): And then it will settle more.

Q What is this future load you are referring to?

A Well, the structure is designed for eight or nine combinations of loading.

Q Eight or nine combinations of load?

A Yes, a lot of combinations of load. It is for tornado, wind load, live loads, small loads, so you can see those things, they might come later.

Q So in your opinion environmental loading will induce additional settlement in the building?

A No, it might fracture the foundation because --

Q (Interposing): Go on.

A (Continuing): What happen because the load is not uniformly distributed on the foundation, it has induced some bending in the footing for which the footing has not been designed.

Q Have you observed such bending?

A Well, you have to remove the foundation, because I was not supposed to, I got the paper and see the documents and I concluded that settlement is not uniform. There are differences in settlement and --

Q (Interposing): So as you sit here now this is just an opinion that you have?

A It is not opinion from the information you have given to me. Opinion is from just guessing. It was from what the information is you have given and from that I am predicting.

Q Opinion isn't formed from guessing. If you ever tell me you have an opinion I am going to ask you for the facts on which you base it, so I disagree, opinion is not formed from guessing.

SINGH

Tell me all of the facts upon which you base your statement which you call an opinion that the foundation is, I think you said, "bending"?

MR. PATON: Is that what you said?

A Bending, yes.

Q Okay, do you understand my question?

A Yes, I saw the settlements on the corners, east and west -- let me see, it was north, okay, east, west, where it was more in the middle, and that means the foundation had warped.

Q Had warped?

A Just like this (indicating), warped.

Q And warping means bending?

A Yes.

Q How much was that warped?

A Well, I didn't calculate. I saw the warping and someone else has to do the calculation.

Q Somebody has to do it and you review it?

A Yes, the applicants do this thing.

Q I see. It is not your job to do that?

A Oh, no, no, no, no.

Q Did you ask anybody for that calculation?

A No, I have not asked. I have already given my report that there will be bending in that and somebody should check this thing. I have given my comment.

Q To whom did you give that comment?

A Well, NRC.

Q To whom, to Mr. Kane?

A I don't send to Mr. Kane, it goes to NCD, North Central Division and from then it goes to NRC.

Q To Jim Simpson?

A I give it to Bill Otto, and he give it to the chief engineering divisior, and from there where it goes I don't know.

Q Who is the chief engineer?

A The chief engineer is Mr. McAllister — Chief Engineering Division, not Chief Engineer.

Q The Chief of the Engineering Division is Mr. McAllister?

A Uh-huh.

Q What is his first name?

A Phil, I should say Phillip.

Q Phillip? Okay. Is he located in Chicago?

A No, he is located in our office.

Q He is here?

A Right here, yes.

Q All right. Did you keep a copy of this report?

A Yes, I keep it. Ultimately it goes to the NRC file.

Q Did you keep a copy?

A Yes, I keep a copy.

Q I don't recall ever seeing a copy of that report.

SINGH

A You don't see?

Q I don't think so.

A Well, you have to see it to refresh your memory. It is there.

MR. PATON: The Witness indicates that was included in his first papers that he gave you, if you want to ask him about that.

A It may be some other language but the meaning was the same.

MR. PATON: If it helps any, I believe, if I understood what the Witness just told me, is that that information is in the Core Report which I think is dated July 7th, which was attached to the staff's letter of August 4th. I believe that's correct.

MR. ZAMARIN: All right. Iwas thinking in terms of a Hari Singh report when he said "his report."

MR. PATON: Well, I think that is the situation.

MR. ZAMARIN: Okay, yes, we do have more copies of that than we will ever need.

Q (By Mr. Zamarin, continuing): Other than the settlement markers on the corners, east and west, which were more than in the middle, do you have any other fact upon which you base your statement that the foundation was warped?

A No, sir, that is the information I got and on that basis I wrote this in my remarks.

Q So it is just based on that that you have the opinion or form the conclusion that there was warping in the foundation?
A Uh-huh.
Q Do you have any evidence to suggest that warping has produced stress in the structure that is not tolerable by the structure.
A No. I would like to see that somebody should calculate and give it to me and I will review it.
Q Would that be a structural matter as opposed to a geotechnical matter?
A I think it is a foundation -- I consider this as part of geotechnical engineering. It is foundations. The foundation I consider that.
Q What else do you want to know from Dr. Peck besides where the tips of piezometers are, how he knows what the soils are like where the tips were resting and whether the building bent or not?
A This is just -- I can't tell because I haven't made up my mind. I might study some more and think up some more.
Q Okay. I won't hold you to it but tell me what you think you might ask?
A I can't see anything now, but tomorrow something might pop up.
Q And you will call me? When you say that you had prepared questions it was only with regard to where the piezometer tips were located and where there has been warping in the

SINGH

Diesel-Generator Building which has exceeded allowable stress

A That I am not going to ask Dr. Peck about.

Q Who do you want to ask that from?

A I have retained the question and NRC has given it to the applicants and somebody will answer.

Q In the 5050-4F questions I think there was one about warping?

A Yes.

Q In these questions that are contained in this document that nobody will give us a copy of, is there anything in there besides questions about where the tip of the piezometers are?

A At that time, after writing that report I did further study and in further study then I found something I am not giving in that report.

Q What is it that you found?

A No, I did some more study on the information I got from Consumers Power.

Q Yes?

A (Continuing): And then I am beginning to doubt that. I request borings for all the piezometers in September and the say, "We don't have any record," but those records which I sent to you, the 5050-4, I went in June or July, so I am waiting for information from Consumers Power regarding the piezometers and then I will make my decision.

MR. ZAMARIN: Would you read back the la

SINGH

answer, please (to Reporter)?

(Whereupon the Reporter read back the previous answer.)

Q (By Mr. Zamarin, continuing): You told us earlier that you had some written questions for Consumers Power Company with

A Yes.

Q I think that is what you said?

A Yes, uh-huh.

Q Okay, and in those written questions, the ones that would b asked of Dr. Peck, are there any that have anything to do w something besides where the piezometer tip was?

A It is concerning piezometers. No, it is all concerning piezometers.

Q What besides where the tip rests and the type of soil whe the tip rests are you asking about piezometers?

A Because the piezometers give the pore pressure developed i the soil right where it is located.

Q No, I didn't ask why. I asked what else about the piezome you want to have Dr. Peck questioned about?

A I am questioning that Dr. Peck got information from Consum Power about the piezometers that vary the pore pressure dissipation, pore pressure level up, did he inquire whethe these pore pressure which is developed is actually in clay is it in the sand.

SINGH

Q Have you ever seen a table anywhere that listed the types o soil in which the piezometers were located?

A I saw this thing, yes.

Q Where?

A Oh, in one of the questions, I think it was number 14 or som thing out of 27.

Q What did that tell you?

A I wanted to verify from the boring log.

Q You mean you don't believe what is in that table?

A No, no, it is not a question of believing. I am a reviewer. I don't believe anything until I verify it.

Q I see, so if somebody tells you a stove is hot you have to pu your finger on it?

A No, somebody say it is like that, and then I say who did it and how it is done, give that record to me, that it has been done by a qualified geotechnical engineer and then I will see the borings and then I make the decision.

Q Did anyone ever tell you that that is what your function should be as a reviewer in this case?

A Yes, I am reviewer.

MR. PATON: I am not sure it was entirely clear that that is what your function should be. I don't know what you mean by your question. He said he was a reviewer and what do you mean by your question now?

SINGH

MR. ZAMARIN: Would you read the question back?

MR. PATON: Listen to his question and answer it.

A Yes, I did listen to his question.

(Whereupon the Reporter read back the previous question.)

Q (By Mr. Zamarin, continuing): That was with regard to your previous answer when you said it was to verify everything like that.

A Yes, I am the reviewer.

Q Did anyone ever tell you that this is what you are supposed to do and that is that you are supposed to verify things like that?

A No, once I am reviewer I know my responsibility.

Q How do you know that?

A I have reviewed for the last ten years on these things.

Q I see, so it is just based on what you have been doing for the past ten years that you know what to do now?

A Yes.

Q Okay. Were the reviews that you did within the last ten years all NRC reviews?

A No.

Q Were any of them NRC reviews?

A No.

Q This is the first one?

A First NRC.

Q I am sorry?

A This is first for NRC.

Q About how many questions is it that you have prepared for Consumers witnesses?

A Well, I can't remember exactly now.

Q Oh, give me an approximate number. More than 100?

A Oh, no.

Q More than one?

A More than one, definitely.

Q More than ten?

A No, not more than ten, no.

Q More than five?

A Yes.

Q Somewhere between five and ten?

A Uh-huh.

Q Okay, and these are all of the questions that you have prepared for any Consumers witness, just between five and ten questions?

A It is five broken down into others, but it is asking mainly about the piezometers.

Q Oh, you were asking about five areas and one of the five would

be piezometers?

A Piezometers and this can be broken into many questions.

Q Okay. Now, in these questions that you prepared did you ju: write "piezometers" or do you actually have questions?

A Just like I told you previously.

Q Okay, and you have told me all about the questions with re- gard to piezometers that you have. There is nothing else, is that right?

A Yes.

Q Okay. What about any other areas or any other questions th: you have for any Consumer witnesses? Tell me what those ar:

A Well, I will have some more -- I have not decided, you know because I might think tomorrow because I have to continue o: that.

Q Well, no, I am not saying, you know, that you have to promi: that you are not going to have any more, all I want to know is what you have got now?

A Yes.

Q Okay, do you have anything other than what you have already told me about?

A No, only for Dr. Peck, he is going to be deposed in the fut:

Q Yes.

A So I have only for him so far.

Q Okay. What would you like to know from Davison?

SINGH

A Well, I would like to know about the caissons --

MR. PATON (Interposing): Is your question directed to what questions he has already prepared for Dr. Davison?

MR. ZAMARIN: He said he was going to work on it. He said he hadn't done it yet.

MR. PATON: And you are asking him what he is going to do in the future?

MR. ZAMARIN: Yes, what he'd like to know.

MR. PATON: Just a minute. Your question is, "What would you like to know from Dr. Davison"?

MR. ZAMARIN: Almost precisely, yes. It would be a lot easier if you'd let me see that document, Bill, we would save a couple of hours.

MR. PATON: Your question, do I understand your question to be, you said something like, "What do you want to know from Dr. Davison," and are you indicating his present state of mind? In other words, what he now wants to know from Dr. Davison or are you asking him to predict in the future what he will want to know from Dr. Davison?

MR. ZAMARIN: Both.

MR. PATON: Well, I will let him answer the question of what he presently thinks he wants to know from

SINGH

Dr. Davison but I don't think he should answer a question about what you wonder what he is going to think in the future about what he wants to ask Dr. Davison.

MR. ZAMARIN: Well, let's ask him the one first and then I am going to ask the other one, and as I understand your objection it is the most bizarre objection that I have ever heard.

MR. PATON: Mr. Zamarin, your comments regarding the objection being bizarre, I think —

MR. ZAMARIN (Interposing): It is.

MR. PATON (Continuing): I think it could hardly be more straightforward. You were asking him to predict something in the future.

MR. ZAMARIN: Yes.

MR. PATON: And you characterize that as a bizarre objection? I don't think there is anything I can do to prevent you from following your course of conduct. I object to it. I don't think it is appropriate.

MR. ZAMARIN: I know you don't.

MR. PATON: I would ask you to stop that sort of conduct and let's go ahead and you can have the answer to the question that I am going to allow him to answer and then you can ask him again anything that you might want t

MR. ZAMARIN: Yes, I will ask it again.

SINGH

MR. PATON: I will ask the witness to tel
Mr. Zamarin whatever that question was, which I think was something like, "What do you want to know from Dr. Davison," and please respond to your present thinking of what you now think you want to know from Dr. Davison, if you can respond to that question. I am really not so sure that I am clear o the purpose, but if you can respond to that question please so.

MR. ZAMARIN: Do you know what the quest is?

A Yes.

Q All right, tell me. I don't mean to tell me what the questi is, but I mean to give me an answer to the question that I asked you.

A I would like to know where those caissons will be placed.

Q All right.

A And how it will be built.

Q Could you be more specific about what you want to know abou how it would be built?

A Yes, because I don't see very much space there so I, as a matter of fact I read in your report, June or July, and tha is what.

Q Okay, is there anything else that you'd like to know from Dr. Davison?

A Not at this stage. I have nothing.

#2 Q Okay. I am not asking you for things that you definitely want to ask, but is there anything else that you might want to know from him?

MR. PATON: You mean now? Is that what he knows now or what he may think of in the future?

MR. ZAMARIN: Both, and if he hasn't thought of anything yet with regard to the future then, obviously, that is not going to be within his mind right now.

MR. PATON: That's fine. I thought that was the distinction you were drawing. I am not objecting to him telling you what he knows now. I thought you were asking some questions about what he may think in the future.

MR. ZAMARIN: That's impossible.

MR. PATON: Fine. That was my objection to the question. I think you have changed your question.

MR. ZAMARIN: No, I haven't. It is the same question.

MR. PATON: Okay, if you can answer the question go ahead.

A In the future I can't tell. I don't know.

Q (By Mr. Zamarin, continuing): I am not asking you just for things that you definitely you know you want to ask him now. What I am asking you is are there some other things that you

might want to ask him but you just haven't decided yet?

A No. No, I have nothing in my mind.

Q Okay, so all you have been able to come up with so far is that you might want to know from Davison where the caissons are going to go?

A Uh-huh.

Q And how they are going to be placed because you don't see much room in there to put too many of them, is that right?

A Yes, and what I want I have already written in my report.

Q All right, so there is nothing other than what is in the July 7th, Corps report that you have thought of with regard to Davison?

A At this time I don't think of anything. Maybe after two we I might.

Q And then you will call me.

So far you have told me that you prepar between five and ten questions and all I have gotten are th piezometers, and a warping of the Diesel-Generator Building

A (Interposing): And the caissons.

Q And the caissons.

A It is written also, I have already sent it.

Q All right, I am talking about this document --

A (Interposing): Okay, this document -- you are not talking about the report?

SINGH

Q No.
A Okay.
Q I am talking about the document that I want to look at, and that —
A (Interposing): No, go ahead, go ahead.
Q Go ahead, what were you going to say?
A These five questions include all that, they have been asked and these are already asked from Dr. Afifi, so it is not what I am going to ask new already.
Q Oh, okay. Do you have any problems with the pre-load other than wanting to know where the tips of the piezometers were located?
A What do you mean? I don't understand. What problem?
Q Well, do you have any disagreements with the way the pre-load was conducted other than not knowing where the tips are?

MR. PATON: May I inquire, you are now asking him about the entire pre-load program, not anything to do with questions that he intends to ask a witness, but now you are asking about the pre-load program, any problems he may have with the pre-load program?

MR. ZAMARIN: Yes.

A I did review to check the stability of the foundation. I want exactly the shear strength parameters to check the foundation is stable, the settlement is less, and if the

pre-load gives this correctly then I will accept it.

Q If the pre-load does what?

A Gives correct, I will accept it.

Q If the pre-load does what?

A The shear strength parameters or settlement parameters, compressibility, if that pre-load will give it to me so tha I can review the whole thing I will accept it.

Q Does the pre-load usually give compressibility parameters?

A Yes, you can. The pre-load, the function of the pre-load i to strengthen the foundation and go and test it afterwards undisturbed samples and find out the strength and then I wi get it and make my decision on that.

Q So far as you are concerned then after any type of a pre-lo of a surcharge program, such as was done with the Diesel-Generator Building, no matter where it was done and what typ soil it was done on you feel that it was necessary to then go and take undisturbed samples and do consolidation tests and determine compressibility and shear strength?

A You know, it depends what kind of soil. Supposing you go an test a granular soil, you can't take undisturbed samples of you have to do some kind of related density or some kind of test, but anyway at review I would like to know, and I have to know the parameters, the shear strength parameters and th settlement parameters.

SINGH

Q In your opinion then a field test such as was done with the Diesel-Generator Building does not provide reliable --
A (Interposing): You are telling all the time test --
Q (Interposing): Let me finish my question, okay?
A Okay.
Q Otherwise we are going to have a real mess on the transcript.
MR. PATON: If you have trouble with the questions just tell me.
MR. ZAMARIN: But just wait and let me finish my question.
MR. PATON: Wait until he finishes his question.
MR. ZAMARIN: Could you read back at least what I started in my question (to Reporter)?
(Whereupon the Reporter read back the previous question.)
Q (By Mr. Zamarin, continuing): In your opinion then a field test such as was done with the Diesel-Generator Building does not provide reliable predictions of future settlement, for example?
A No, how do you know if you have reached the actual settlemen or not?
Q Are you of the opinion that the soil beneath the Diesel-Generator Building is in secondary consolidation?

A I don't believe in secondary.

Q You don't believe or you don't think it is in secondary consolidation?

A It is not from the information that has been submitted to me.

Q Tell me every fact on which you base your disbelief with regard to the soil being in secondary consolidation?

A Because the soil doesn't satisfy all the assumptions in which the consolidation theory is based. First to have a dry soil beneath the footing.

Q All right. Now how dry was the soil beneath the footing?

A I don't know.

Q You don't have any idea, do you?

A It is dry. It is not fully saturated, that's what I am telling you.

Q How do you know that?

A Because the water table is not there, it is below.

Q Anything below the water table is not saturated, is that right?

A Below the water table it is saturated, but I do not believe 100 percent saturated.

Q So what you are saying is then you refer to the soil beneath the footings as dry soil because it is not 100 percent saturated, is that right?

A It is partially saturated due to the capillary action.

Q All right. What do you base your statement on that it is

only partially saturated and that only due to capillary action?

A Capillary action, definitely will rise above the water table.

Q All right. What I am asking you is though what evidence do you have that the soil beneath the footings was dry or only partially saturated?

A I want evidence, what evidence the applicant have given that it is saturated.

MR. ZAMARIN: Would you read that back, please (to Reporter)?

(Whereupon the Reporter read back the previous answer.)

Q You are saying you want Consumers to give you evidence that it is saturated?

A Yes.

Q Okay, but you don't have any evidence that it is not saturated?

A No, because I am a reviewer. I want to see that thing that it is saturated.

Q You are not from Missouri, are you?

A I am not from Missouri.

MR. PATON: That's his job.

Q I understand that you want that information from Consumers and you feel that you have to be shown as a reviewer, but my

question is do you have any evidence as you sit here now that the soil beneath the footings is not saturated?

A I want that because my review depends on the information given to me.

Q I understand that, but that's not my question. My question is do you have any evidence that the soil beneath the footings is not saturated?

A How I know that? How do I know that until that information is given. I have to base it on that.

Q I think your answer is "no, you don't have any evidence."

A That's what I am telling you, I don't have any evidence.

Q Okay, good. When you thought that the table with regard to the soil types for each piezometer that was included with the 5050-4F responses was not enough or did not provide enough backup information, did you request additional clarification from Consumers?

A Yes.

Q When?

A I don't remember. Somewhere in April we asked give all the boring information regarding the piezometer holes.

Q During the surcharge program, in your opinion where was the water, the ground water table level?

A After the surcharge? During the surcharge? The surcharge was four or five months.

SINGH

Q Yes.

A (Continuing): So at the end of the surcharge, you mean?

Q No, I mean during, but give me -- all right, where do you think it was at the end of the surcharge?

A I don't know, 622, 622 or 621.

Q Okay. And upon what do you base your statement that it was at 621 or 622?

A I saw after the removal of the surcharge piezometers were going down. There are certain fluctuations and then it stabilized in that range, somewhere in 622, 623, it depends at what different locations it might be.

Q Okay, so in your opinion the level at which the piezometers stabilized after the surcharge removal was the level of the ground water table at the time of removal, is that it?

A Yes, I would say it was.

Q What do you think the ground water table was at the mid point in time of the surcharge? Let's say around June?

A It might be less than that.

Q Do you think it was less than 621?

A It is not 621, somewhere 622-623, but all places I saw this thing it was almost 622, 623 and it depends on what type of soil is there.

Q Do you think it ever got up to 625?

A I don't believe it went there, no.

Q Do you think it ever got up to 624?

A I say 623, I believe maximum.

Q Wait, you started out at 621 and now we have you at 623.

A But you say a different period.

Q I see, okay, so you think that at some time during the surcharge it got up to a maximum of 623, is that right?

A At some locations, yes, because it is a big building.

Q All right, the overall ground water table level during the surcharge of the building in your opinion reached what maximum level?

A 623 maximum.

Q And how do you know that it didn't get up to 624 or 625?

A Well, the piezometers start going down, so I say when it is stabilized, then I say that is where the water table is at that time and again it started going up from the pond water into the location through seepage.

Q How long do you think it would take for seepage from the pond to affect the ground water level at the Diesel-Generator Building?

A Well, I can't predict that unless I have all the information and that information should be given by the applicant to me for review. I would like to have that.

Q What do you want to know? What information?

A All the permeability, soil permeability in different location

distance.

Q Distance?

A Distance, aquafer distance.

Q What is aquafer?

A Aquafer means a stratum, a water building stratum in which the water flows in clay. It doesn't flow at all.

Q What else do you want to know besides aquafer, layer thickness, permeability in the soil and distance?

A Distance.

Q Anything else?

A I can't think of anything now.

Q Okay.

A Head of water.

Q In your opinion at the conclusion of the surcharge was the soil that was saturated in secondary consolidation?

A No, I didn't get the question correctly.

Q Okay, in your opinion --

A (Interposing): Uh-huh.

Q (Continuing): At the end of the surcharge program --

A (Interposing): Uh-huh.

Q (Continuing): Let's say in August of 1979, was the soil beneath the Diesel-Generator Building that was saturated in secondary consolidation?

A The soil was saturated below a certain level, but there are

planty of soil that were not saturated.

Q Do you remember what my question was?

A Yes, you say it is saturated and in secondary consolidation.

Q Okay, I am asking you if in your opinion at the end of the surcharge program, say August, 1979, was the soil that was saturated beneath the Diesel-Generator Builiding in secondary consolidation?

A Was it? I don't have any evidence for that because you haven't given to me.

Q You don't have any evidence as to whether --

A (Interposing): No.

Q (Continuing): As to whether the soil that was saturated was in secondary consolidation?

A No, I don't have any evidence.

Q None?

A None.

Q Have you looked at the settlement versus log time?

A Oh, that's for the total, not -- that's for the total thickness.

Q Based on that settlement versus log time --

A (Interposing): Yes, that is for the total thickness.

Q Let me finish my question, that one you anticipated wrong.

Based on the settlement versus log time curve, do you believe that the soil beneath the Diesel-Generat

Building is in secondary consolidation today?

A No.

Q Why not? What is it about that curve, what is it about that curve that causes you to not believe that the soil beneath that building was in secondary consolidation?

A The curve represents the saturated --

Q (Interposing): I'm sorry, I didn't understand a word of what you said.

A The curve was for a dry soil partly and partly saturated.

Q When you say that it was for a dry soil --

A (Interposing): Partially.

Q Partially, you don't know that, but you haven't been shown proof that it wasn't dry, right?

A No, but I see the water table and the footing is up above the water table.

Q In your opinion the only way you can get an accurate settlement versus log time curve is to have the ground water table at the level of the footing?

A Any way you can prove that it is saturated, any way you can saturate anything, I don't care.

Q Okay, so again what I am saying is when you say that the curve was for a partially dry soil, you don't have any evidence that it was dry, it is just that you don't have any evidence that it was saturated either, is that right?

A I don't take it as correct, unless I see the attached soil is saturated I don't accept it.

Q Okay, and in your opinion unless the entire soil is saturated the curve is inaccurate or unreliable, is that right?

A Sure.

Q Okay. Do you know anybody outside of the NRC or Corps of Engineers that would agree with you on that?

A Everybody will agree that if it is not saturated then the consolidation theory is not applicable to that.

Q Okay, and on the extent of the soil beneath the Diesel-Generator Building that may not be saturated, in your opinion, is of such a nature that any qualified geotechnical engineer would say that the settlement log time curve would be inaccurate with respect to that, is that correct?

A Would you repeat your question, I don't hear it.

MR. ZAMARIN: Could you read it back, please (to Reporter)?

(Whereupon the Reporter read back the previous question.)

MR. PATON: I don't think the Witness can speak for any qualified engineer. I think he can express his own opinion. I mean you want to speak for the entire community of all qualified engineers?

MR. ZAMARIN: He just did in his previous

answer and I am just now clarifying that is all.

A I am telling you that I don't agree with that.

Q (By Mr. Zamarin, continuing): I am asking you if you think there is any qualified geotechnical engineer who would disagree with you?

A With me?

Q Yes, on that point?

A It depends. I don't speak for others, I speak for myself.

Q I am not asking you to speak for anybody. Do you think anybody would disagree with you?

A No, sir, I'm a geotechnical engineer and I ask people, I talk to them about what the state of the art is and according to that everybody would agree.

MR. PATON: I am not sure I understood.

A According to the state of the art, it means that everybody will agree with me, that it is not accurate curve.

Q Okay. In your opinion since the area of the soil which may be unsaturated, being perhaps as much as five feet, we are talking about a soil layer of 28 to 30 feet, would the soil layer that we know is saturated tend to control the behavior of the soil with respect to the settlement log time curve?

A Yes, it will be an impact, a significant impact.

Q I asked if in your opinion it would control it?

A What do you mean by "control"? I would say it would have an

impact. It would --

Q (Interposing): How much of an impact would it have?

A I can't say because I haven't run test on that.

Q Do you know of anyone within the Corps of Engineers who believed that the surcharge program had brought the soil under the Diesel-Generator Building to a state of secondary consolidation?

A I will speak for myself, that it has not reached, and I can speak for -- I have discussions with Mr. Otto. He wouldn't agree. These are the two geotechnical engineers that are here. I don't talk to any other District.

MR. PATON: Let me instruct the witness that within the Corps of Engineers if you have heard of anyone in the Corps of Engineers make a statement with respect to that subject or seen any papers written by anybody employed by the Corps of Engineers with respect to that subject, to relate that information, if you have heard it or seen it. The question was addressed to anybody in the Corps of Engineers so if you have heard that or seen any information relevant to the question, and, frankly, I am not sure I could repeat the question for you right now --

A (Interposing): No, I would like to listen to that question again.

MR. ZAMARIN: Would you read it back,

please?

(Whereupon the Reporter read back the previous question.)

Q (By Mr. Zamarin, continuing): You want me to help you?

A I didn't answer correctly. What do you mean by anybody in the Corps of Engineers?

Q Do you know of anybody in the Corps of Engineers who has reached the conclusion —

A (Interposing): Reached the conclusion it is already — okay, I'm sorry, go ahead, reached the conclusion —

Q (Continuing): Reached the conclusion that the soil beneath the Diesel-Generator Building was in secondary consolidation?

A No.

Q Have you ever heard of a guy named Willis Walker?

A I have heard of him.

Q What?

A I have heard his name.

Q Okay. Have you ever seen any calculations that he has done with regard to the Diesel-Generator Building' surcharge?

A No, I haven't seen any calculations. I have gone through the papers but I don't remember what calculations he has done. I might have gone through that.

Q I see, but you don't remember?

A No.

Q What he concluded or whether you agreed with him or not?

A No, but I have gone through that, but I don't remember what calculations he did.

Q Do you recall if in reviewing Willis Walker's work you disagreed with any of his work?

A I say I don't remember what was that.

Q You don't remember whether you agreed or disagreed with anything he did?

A He has done some calculations but for his purpose, for his purpose to get a ballpark way of getting the idea of the project, but I didn't see anything like that in secondary consolidation or primary consolidation, I didn't see anything.

Q What did Willis Walker do with regard to the Midland soils review?

A He worked a couple of weeks on that project.

Q What did he do during those two weeks?

A He reviewed partly.

Q Yes.

A (Continuing): And he didn't complete in certain areas. He was working partly on dewatering.

Q Anything else? What was he doing? Did he do any calculations on the amount of load, the amount of time that load should remain on the Diesel-Generator Building?

A No, I am not aware of that, no. No, not of my knowledge.

Q Is Willis Walker an engineer?

A Sure, he is an engineer.

Q What kind of engineer?

A Civil engineer.

Q Was he competent to do the work that he was doing with regard to Midland?

A He is competent, yes, sir.

Q Our discussion of the ground water table level beneath the Diesel-Generator Building followed from the question that I asked you about whether there were any elements associated with the surcharge program which caused you to doubt or disagree with the conclusion that the soil beneath the building was in secondary consolidation, and one was, that you mentioned, was of the ground water table level. Was there anything else?

A Yes.

Q What?

A I don't believe the accuracy of the load time versus settlement curve what is here because that definitely does not represent the settlement of the soil. You are measuring partly the deflection of the footings.

Q Okay, anything else?

A And the soil which is not saturated.

Q Anything else?

A Yes, the load is not kept long enough.

Q Oh, how do you know that?

A Well, if you put long enough, six, seven months or eight months I don't know what will be the time --

Q (Interposing): How do you know it wasn't long enough?

A Because you have not given any calculations for me to see.

Q Willis Walker did.

A I don't remember. I say I am not aware of them.

Q So that if Willis Walker did calculations that determined it was on long enough would you be then of the opinion that it was on long enough?

A I will see because I am different reviewer. I might be different in my review. I will get all the data which he has used first. I will test the accuracy of those datas. If those datas are okay then I will say, okay. If they are not I am not going to accept it.

Q Do you think Willis Walker might have used erroneous data?

A No, but based on summary inspections, okay, like this soil, and as the reviewer I have to be satisfied, so for that purpose I have to find out and if it is not accurate, just like I have seen a lot of places people say oh, eight or nine inches, but that is not correct.

Q Do you have a whisper of evidence that the surcharge wasn't on long enough?

SINGH

A I don't have evidence to say or to accept that the surcharge was kept long enough.

Q That wasn't my question. My question was can you give me a whisper of evidence that it was not on long enough?

A But I don't go and get data from outside, I get from you and you have not given me some.

Q I understand that. That's not my question. Okay, my question is simply this, give me every little thread of evidence that you have that surcharge load was not maintained long enough?

A Okay, to predict anything in my work on surcharge I will have to have some data or I will not say anything. Engineers don't conclude without data.

Q I am not asking you to conclude anything, I am asking you to give me what evidence, if any, you have that the load wasn't on long enough?

A How do I know?

Q That's my point. You don't, do you?

A I don't have any data.

Q You know how much the building settled during the pre-load program?

A Yes. I don't know exactly what is settlement, but total I have, total settlement ever since '78 up to November when you started.

Q Tell me what that is?

A In one corner it was eight and a half — no, approximately

eight and a half inches. Yes, in southeast corner, but this is approximate. I am not telling this exact.

Q All right. Give me some figure for some other corners?

A I don't remember from west corner. West have two corners, I don't know exactly what is that but it was less than this.

Q How much less?

A I don't know exactly.

Q Do you know generally?

A No, I don't, no.

MR. PATON: Well, he says he doesn't know exactly.

MR. ZAMARIN: He has qualified his answer. I have to ask it.

Do you know generally?

A Not exactly.

Q Do you know how much of the building settlement during the surcharge was foundation deflection?

A No.

Q Do you have any idea?

A No.

Q Couldn't even guess?

A No.

Q Are you certain that at least some of it was foundation deflection?

SINGH

A It was some part of it.
Q Are you certain?
A Yes, that's why I have given this in the report, I have written this thing.
Q How can you be certain?
A Because the foundation was warped.
Q That is what I am saying, how can you be certain that it was warped?
A From your diagrams you have sent, settlement diagrams given to me.
Q Do you know what a Borros anchor is?
A Yes, I have read about that.
Q Okay. Is there any Borros anchor data provided with regard to the surcharge?
A They have given some.
Q Did you look at it?
A Yes, I look at it.
Q What did it tell you?
A Borros anchors tell you the settlement away from the footing.
Q Settlement of what?
A Settlement of the -- not foundation, of the soil, 20 feet. Borros anchors are at different levels.
Q The Borros anchors tell you something about whether the soil has settled, right?

A If it is accurately predicted.

Q Do you have any reason to belisve that the Borros anchor information that you were given with regard to the surcharge was not accurate?

A Well, there is some question by Dr. Peck, he has asked about some temperature correction and all these things to be made. Let me see, in July or August I read somewhere that he had asked for Consumers Power temperature correction in the Borros settlement and all these things.

Q Asked for what correction?

A Temperature.

Q Oh, temperature?

A Temperature, yes.

Q Okay.

A So if these corrections are made on all these things --

Q (Interposing): Okay, with all of that in mind did you have any reason to doubt the accuracy of the Borros anchor information?

A If all the things are done correctly then I will not have any objection.

Q Do you have any information that all of the things weren't done correctly with regard to the Borros anchors?

A I don't have, but I have read certain documents questioned by your own consultants that they doubt it, they question the

readings, surveyed recordings and all these things.

Q Questioned them from the viewpoint of whether there had been a correction made by temperature?

A Temperature, that the surveys last done were correct with regard to this type of question. I don't know, I want to find out.

Q What did you want to find out?

A The actual report, all the readings of Borros anchors and all these things and see.

Q You have never seen that?

A No, I never seen these things.

Q Who did you ask for it?

A No, I was hunting, you know, and then I saw couple of Borros anchors but they have already more than 20.

Q You say you recently saw these things. What did you recently see that you are referring to?

A It means this Borros anchor information which I wanted to use, and there was a remark from, what do you call it, by John Dunicliff, John Dunicliff which is one of the applicant's consultants and he questioned the accuracy of certain of this.

Q What Borros anchor information other than this letter from Dunicliff that you looked at and have you studied?

A That's all I have because he questioned accuracy and then I say, well then maybe something wrong with that.

Q So you didn't bother to look at it because you figure there would be something wrong?

A Because there is nothing for me, nothing available to me. How I can test the accuracy and give the results but you don't give the details.

Q Did you ask anybody for the details?

A No, this is what I disclose a few weeks ago. This was a new discovery, I have never gone through it before.

Q So up until a few weeks ago you didn't have any need or desire to see the details?

A No, Borros anchors you have not given me the settlement or the log versus settlement curve of the marker that is on the building.

Q Is there anything, any other information that you have which would cause you to believe that the Borros anchor information had not been done correctly?

A No, I don't have any.

Q Is there anything else that would cause you to doubt the reliability of the predictions based on the surcharge program? You have given ground water table, warping of the footings?

A Yes, I would like to separate the affect of the deflection of the footing from those curves which you have drawn and then, and the correct procedure so that procedure satisfies me how to separate the two deflections.

Q Is there anything else?

A No.

Q Have you ever seen any data with regard to the water content of the soil that in your opinion was above the water table level under the Diesel-Generator Building?

A At what time that sample was taken?

Q At any time? Have you ever seen such data?

A Yes, I have seen such data.

#3 Q What did that data tell you?

A Well, it says the water contained 20 percent, 15 percent maybe, various, I don't remember what they are.

Q Do you remember whether it indicated whether the soil was partially saturated or fully saturated or the extant of the saturation of that soil?

A No.

Q You don't remember?

A No, I don't remember this.

Q Would that be important to you at all in determining or reaching a conclusion about the surcharge program results?

A Sure, I would like the soil condition at the time of surcharge, not ten years ago, five years ago, at that time when the surcharge was done.

Q Do you recall what my question was?

A Yes. You wanted to know what water the soil contains.

SINGH

MR. ZAMARIN: Would you read back the question (to Reporter)?

(Whereupon the Reporter read back the previous question.)

Q Would you answer that question?

A If you would like to hear it. I was referring to the moisture content data that I believe was in response to question four. The water contained on the samples, I wouldn't consider those things again.

Q You wouldn't consider them what?

A In the water, in the surcharge program.

Q Okay, why not?

A Because they are not the water contained at the time of surcharge.

Q What do you mean by the term "dry soil"?

A Dry soil means it is not -- partly, maybe completely dry or maybe some moisture in there, it is not fully saturated, partially saturated, yes, sir.

Q Okay, so when you use the term "dry soil" you are referring to any soil that is not fully saturated?

A No, I don't consider that. I just use dry, it means maybe some soil completely dry but some of them have maybe few percentage of water due to capillary action.

Q How high would the percentage of moisture in the soil be and

have Hari Singh still call it dry?

A I would say it is air dry.

Q It is air dry?

A Air dry, yes.

Q Come on, I don't know what that means?

A Air dry is when you dry -- air dry has some water but it is hard to tell what the percentage is.

Q I am just trying to understand what you mean when you say "dry," so what you are saying is it is when you referred to dry soil under the diesel generator building --

A (Interposing): It means air dry.

Q It means air dry?

A Yes.

Q What is the moisture content of air dry soil?

A It depends on humidity outside.

Q Is there any information that you have that indicates that at the time of the surcharge program the soil beneath the Diesel-Generator Building was air dry?

A No, I don't have any evidence.

Q Is there any data that you have ever seen that suggests that the soil beneath the Diesel-Generator Building at the time of the surcharge was other than air dry?

A No.

Q The last time we got any documents from you was on October

15th, 1980?

A Uh-huh.

Q Has any document that hasn't gone either to Consumers or the public document room come into your possession or control in the last six weeks?

A We got some more material and I was turning to that and I have written some letters.

Q You have written some letters?

A Yes. Maybe one letter I should produce that. I remember one letter.

Q Maybe you should. What I am going to suggest is that --

A (Interposing): It might be in the branch file.

Q The branch file?

A Yes, branch file.

Q What branch?

A Tech Branch, where I work.

Q Okay, there is a branch file here in Detroit?

A Yes.

Q In this building?

A Yes.

Q For the Midland Project?

A No, no -- yes, NRC, we call it NRC.

MR. ZAMARIN: I'd like to see that.

MR. PATON: Well, if you want to see that

then, you know, there have been a number of your witnesses, including a Mr. Ferris who didn't bring a file because it wasn't within his grasp, and there are all kinds of files around that are out there in the next room or something. Your witnesses have established a precedent for that.

MR. ZAMARIN: We have given you the entire geotechnical file in Ann Arbor. We gave you 151,000 documents, so don't now tell me that you are not going to give us a group file here.

MR. PATON: You better talk to Mr. Farnell about what Mr. Ferris did. He has got a group file and he didn't bring a single piece of paper because all his papers were in the group file.

MR. ZAMARIN: I want to see that file and I want to see it today.

Q (By Mr. Zamarin, continuing): The documents that were produced on October 15th, 1980, where did they come from?

A What?

Q The ones that were produced in the middle of October. We got some documents, where did they come from?

A Which documents are you talking about?

MR. PATON: What he is getting at is did they come from your department or from —

A (Interposing): Yes, that's the branch file, that's all the

branch file and that has all been Xeroxed and given to you.

Q Okay, so that was the branch file?

A Yes.

Q And had there been any additions to the branch file since October 15?

A Sure, there must be, but I don't know because it is kept by somebody else and there is correspondence between NRC and the Chief of the Technical Branch and Product Manager, so that correspondence, I don't know.

MR. ZAMARIN: I'd like to see whatever is there.

MR. PATON: Okay, consistant with what we did before we will take a look at the branch file and see if there is any additional information there, even though, frankly I think it is 100 percent inconsistent with what Mr. Ferris did. I think Mr. Ferris has a group or section file and he didn't bring, to my knowledge he didn't bring a piece of paper because he said that was some other offices or something. I am not sure what the reason was.

MR. ZAMARIN: I think that's right, and my understanding, however, is that with regard to the Corps and with regard to the Geotech Section in Ann Arbor that if there was a group file that that would be produced and that is what was done for you in Ann Arbor. In fact we went way

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beyond that and people came in and went through every document we had.

MR. PATON: What was this with Mr. Ferris? What was the explanation for that?

MR. ZAMARIN: I don't know.

MR. FARNELL: That was a file that was not under his possession and control, very simply, if you want to request it.

MR. PATON: Well, this file is a group file. Is it not the same?

MR. ZAMARIN: He can't go into it?

MR. PATON: Sure, he can. It is the same as Mr. Ferris could have gone up to his file. The analogy absolutely does not break down. We are going to produce the file, but, you know, it is just difficult for me to understand why we can't be consistent in the position that you have taken today and why Mr. Ferris came to that deposition and didn't bring any papers although obviously he admitted there were many papers in thesame office that related to the Midland Plant.

MR. ZAMARIN: I have no trouble understanding that.

MR. PATON: Well, let me ask you if there is some explanation I would appreciate your putting it on

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the record. All he said was that he didn't own the file or something.

MR. ZAMARIN: So it wasn't within his possession or control.

MR. PATON: Is there some difference between what we are doing today and what Mr. Ferris was doi Hari doesn't own the Corps file either.

MR. ZAMARIN: Well, we are sitting in th building where the file is.

MR. PATON: It is here because we are at the building, and Mr. Ferris was in that building but, you know, we are going to give you the file but I don't underst why Mr. Ferris didn't bring any papers.

MR. ZAMARIN: More importantly I think when we first learned that Sherif Afifi had no individual file that we then agreed to go beyond what the Sherif Afifi produ ction called for in the deposition and produce instead for you their group file with the understanding that that would be the same type of production that would be done wit regard to the Corps of Engineers. That we would do that.

MR. PATON: You say we had some understanding that we would do th same thing for the Corps of Engineers? That I don't frankly recall.

MR. ZAMARIN: I do.

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MR. PATON: I would stipulate to that bu I don't understand any such agreement. I don't recall it. Is it your statement that we had such an agreement?

MR. ZAMARIN: Yes.

MR. PATON: Do you know of anybody else that is aware of it?

MR. ZAMARIN: You should be, you and I had a telephone conversation and made that decision.

MR. PATON: Oh, you and I decided that o the phone?

MR. ZAMARIN: Yes, when I told you that Sherif didn't have any personal file.

MR. PATON: In any event we are going to produce the files that you requested.

MR. ZAMARIN: Why don't we take a few minutes. Is there some place to get coffee around here?

(Whereupon there was a short recess after which the deposition again continued.)

MR. ZAMARIN: Why don't you go ahead and make your statement and then I will clarify that.

MR. PATON: There was a request made for questions written by Mr. Singh which he prepared for use in depositions and he stated that he had written such questions. To my knowledge he has written such

questions and he gave the only copy of those questions to Mr Jones, one of the attorneys for the NRC, and I am told that Mr. Jones gave those, the only copy of those questions to me along with some other information which I gave to Mr. Kane, and Mr. Kane's best recollection is that those, the only cop of those questions is now in his office in Bethesda, so we are physically unable to provide those questions at this tim but I do not raise objection to your inquiring of Mr. Singh as to the nature of those questions.

Q (By Mr. Zamarin, continuing): Before we go on to something else, while we are talking about these questions, is there anything in those questions that you gave to Mr. Brad Jones and that Brad Jones gave to Mr. Paton and Mr. Paton gave to Mr. Kane and Mr. Kane put in his office in Bethesda, that yc didn't tell us about already this morning?

A I think based on my recollection there are four or five questions. Piezometers are mainly it, but I don't know what are the exact other questions, but it was piezometers mostly

Q All right, but there may be something regarding overlapping, but you don't remember exactly?

A No.

Q And we are talking about this one page with regard to these questions that went through this chain that Mr. Paton descr: for us?

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A Yes.

Q Okay. In response to a question before we broke you had indicated that you had requested piezometer logs or at leas more particular information about the data that was in that table in the 5050-4-F question, and at that time we were talking about the Diesel generator building.

To your knowledge was the information t was requested with regard to the data in that table with regard or pertaining to borings taken for installation of piezometers in the dike area as opposed to the Diesel generator building?

A In 55-F, no, I didn't -- excuse me, which report you are talking about?

Q Okay, this morning we talked about a table in 5050-4-F that had information about the soil types for each piezometer location at the Diesel generator building?

A Uh-huh.

Q And you said that you wanted more specific information, for example, boring information?

A Yes, boring.

Q With regard to those piezometers, and I asked you did you ever ask anybody for that and you said, "Yes."

Okay, now, I know and I am told that t has been a request for such information but that that requ

was with regard to piezometers that were installed for the dikes?

A Uh-huh.

Q Not for the Diesel generator building, is that what you were thinking of when you said it had been requested or are you aware of some other request?

A No, I am not aware. When I came to look for this, before it was requested, I believe in my plans, but I didn't request, but other persons working on that project did.

Q Okay, and is it your understanding that that request for boring log information with regard to piezometers pertained only to piezometers in the dike area and not the piezometers in the Diesel generator building?

A I can't say this thing. The request is for all the piezometers I believe.

Q Okay. Do you know whether there is any boring log for the piezometers that were involved in the Diesel generator building?

A That I want to find out. I didn't find any.

Q And no one has ever told you that there isn't any?

A I saw some in the September submission from applicant that these piezometer logs are not maintained. I don't remember whose piezometers they were, but these piezometers I don't find. I never found any.

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Q I have marked as Exhibit Number 1, a document that was provided to me this morning, which appears to be a resume. Is this a correct and current resume of yours?

A Yes. There is something that is typed wrong.

Q Wait, wait, what are you going to change?

A The date is wrongly typed here. I worked in '70 there in Pennsylvania.

Q Okay. Make that correction. I was wondering how you cou have been in two places at once.

A No, no, that is a mistake. It is March '78 I left. I th it is ready.

Q With the correction that you have just made and as it exi now this is, to the best of your knowledge, a correct and current resume?

A Yes.

Q Your experience from 1956 through 1965 in Indiana, did an of that include experience in the geotechnical area?

A I was civil engineer there so I take some borings, not borings, but tests for the foundations of the buildings a this kind of thing.

Q What kind of buildings were you involved with?

A Double story buildings, technical, residential buildings, hospital buildings, this kind of thing.

Q Mostly two or three stories?

A Yes, three story maximum, nothing beyond that.

Q Did you have any experience up until 1965 with the settlemer log time curve?

A No.

Q In your experience as a graduate student and RA at the University of Colorado, did any of that involve geotech?

A No.

Q In your work as a civil engineer for the Pennsylvania DOT --

A (Interposing): Uh-huh.

Q (Continuing): -- did any of that involve geotechnical matte

A Civil engineers designed foundations, piles, caissons, that is considered geotechnical.

Q That was limited pretty much to bridges for the Department o Transportation?

A Yes, yes.

Q And for the Arizona State Highway Department I notice that you worked there for about four months?

A Six months, I believe.

Q April to September?

A Well, five or six months.

Q For a guy who likes to be precise I am surprised. Was that again mainly with regard to bridges?

A It was foundation exploration mostly on drillings and all th things. I was supervisor of the crew and it was for foundat:

engineering.

Q Foundations for what?

A Bridges.

Q Why did you leave the Pennsylvania Department of Transpor

A Well, I worked there eight years and the Department was saturated completely, no chance of promotion, they didn't to relieve me from there, but I wrote to the District tha there and there is no hope of promotion. I completed the work and they were laying off people as a matter of fact, I was not in that. I say, "When you can't promote me I g somewhere else."

Q Was your employment with the Arizona State Highway Depart simply a temporary employment?

A No, no, I was sent there as Civil Engineer I and within t months I got promotion to Civil Engineer II, but I was lo for, at that time I just got United States Citizen, just year ago, so I was looking for a bigger department where scope is unlimited for higher promotion and all these thi so I thought I would go to the Federal Government. Even the DOT I only had maximum of Number II, maybe III, but h I have unlimited scope, XIV, maybe XV, so that was the or intent I change the job.

MR. ZAMARIN: Okay, could you read ba that last question, please, or that last answer (to repor

(Whereupon the reporter read back the previous answer.)

Q What did you do when you first came to the Corps in October, 1978?

A I was reviewing drawings, project sheet piles.

Q Sheet piles?

A Yes, and then also a project called breakwaters, design of breakwaters, construction projects and then designing eart anchors and similar projects partaining into the soils structure interactions.

Q What branch were you in when you first came to the Corps?

A Technical Branch.

Q The Technical Branch?

A Yes.

Q How long were you in the Technical Branch?

A I am still there.

Q Weren't you transferred from some branch or from some other section?

A No, it is the same branch. The Geotechnical Branch is part of the Technical Branch. I change the section.

Q Okay, what section were you in when you first came?

A Design Section.

Q And now you're in what?

A Geotechnical Section.

Q Is there something like a F & M Section?

A It was but they change the name now to geotechnical.

Q What did F & M stand for?

A Foundation and Material.

Q When did you go from the Design Section to Foundation ar Material?

A I believe in May of 1980.

Q Was it when you were assigned to work on this NRC project

A Yes, they keep moving people from here to there so they a me there.

Q What is the difference between the function of the Design Section and the Geotech Section?

A Geotech Section and Design Section practically both do des both do design identical, plus Geotech does borings and log for soil. That's the additional duty.

Q I see. Do you know why you were selected to be the guy who would work on this NRC assignment?

A There are a lot of people so they asked me. I said, "Okay, that's all right with me."

Q But do you know why they asked you?

A Because they were looking for a GS 12 with some experience.

Q A GS 12?

A Yes, with some experience, so I had experience, professional experience. I was registered and that is because, generally

because it is important work so they asked me and I said "Well, all right."

Q Was your transfer to the Geotech Branch from the Design B related to your coming over to do the NRC work?

A No, I didn't get the intent of that question.

Q All right, in other words, why did you get transferred fr the Design to the Geotech section?

A It is not transfer, it is temporary assignment. Maybe la one year, two year.

Q Why were you temporarily assigned from the Design Section the Geotech, was it so you could work on the NRC project?

A Yes, exactly.

Q Why was it necessary to change sections in order to work c the NRC project?

A Because Mr. Otto is the geotechnical engineer chief, he is civil engineer but we call it geotechnical, so I have to w under him.

Q You had to get into his section to work under him since he was the guy that was —

A (Interposing): Who direct me.

Q I see. When did you start work on the Midland Project?

A May 1st — second week of May, 1980.

Q And you hadn't done anything prior to May of 1980 with reg to the Midland Project?

A No.

Q Does anyone review your work?

A Sure.

Q Who?

A Bill Otto.

Q Who besides Bill Otto?

A Not here in Detroit, nobody. It goes to NCD, North Central Division, Chicago.

Q Who reviews it there?

A It goes to Geotechnical section and chief is James Simpson.

Q Jim Simpson?

A I don't know if he reviews but under him somebody reviews. I don't know, but he is the Chief.

Q When you first started what were your responsibilities with regard to the Midland project work?

A First one or two months I was going through all the documents, papers and answer some questions. I spent almost two months with that to understand the complete project.

Q What did you review?

A In the meantime I was going through what the legal questions were and writing my comments, what I don't understand, what I understand, what I need so that is what I was doing side by side.

Q On those comments that you made with regard to what you

understood and what you didn't understand, did you put a that in writing?

A No, it was just scribbling paper.

Q What did you do with that scratch paper on which you mad those notes?

A The final draft that was typed, it was sent to you, your office. Final draft -- what do you call it, it was in Ju or July, I don't know, but somewhere it was sent to the applicant.

Q Are you talking about the July 7th --

A (Interposing): Yes it was the final outcome of my effort the effort which had been done before by some people.

Q Did you take somebody's place when you were assigned to t or did you just join?

A No, I joined this same team.

Q Did your responsibilities with regard to the Midland proje change all the time?

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

Q All right. You haven't been reviewing answers to question since May of 1980. You started doing something else at some time, didn't you? Your responsibilities changed?

A From 1980?

Q From May of 1980 to today?

A Yes, when I join it changed, yes.

Q When did it change and what did it change to?

A I am not working on other projects, I am only working on NRC Midland project.

Q Okay, and what are you doing now?

A Well, you have sent some more documents so I have to go through that. I have not gone through it completely so I have to read these things.

Q How much of Amendment 85 have you gone through?

A Amendment 85?

Q Yes, isn't that -- didn't you get something here within the last three weeks?

A Yes, but I have not gone through that.

Q Have you looked at any of it?

A Just cursory, I saw on the top, but it needs in depth, so I can't remember anything.

Q What have you been doing for the last three weeks?

A Well, I am reviewing these papers and I have some questions on these things.

Q You are reviewing what papers?

A This writing questions for the depositions, attending the meetings, I was in Chicago last week for one week complete.

Q What were you doing in Chicago?

A In the depositions.

Q Oh, at the deposition of Walter Ferris?

A Uh-huh.

Q Oh, I see, so most of your time since you received that latest submittal from Consumers has been sent with regard t preparation for the hearing?

A Yes, mostly.

Q When do you plan to review that information that was provid by Consumers?

A Next week, because I want to get it done, because my next assignment --

Q (Interposing): You take it home with you Christmas Day and work on it.

A No, I don't take home because, no, I can't ensure safety of those papers and those papers are strictly to be in the offi

Q Are you the lead reviewer?

A Yes, for Midland.

Q What does that mean?

A It means as a reviewer I am a leader. Otto checks my review Mr. Otto checks and reviews my review.

Q Who do you lead as a leader?

A Oh, there is Ron Erickson. Sometimes I get help from John Grundstrum.

Q Okay. Really what I am getting at is as a leader does that mean that you make the final technical decisions of the people you lead?

A Oh, no, people I lead. You have a voting log, make a chart of these things.

Q But you can tell someone to do stuff?

A Oh, yes, uh-huh.

Q Did you tell Willis Walker to do anything?

A Not at that time. I was in Geotechnical Section.

Q Do you consider yourself to have a solid geotechnical background?

A I consider myself.

Q What?

A Yes.

Q Yes? Who makes final technical decisions with regard to Midland?

A Here Bill Otto makes final decisions.

Q How about ultimate final decisions, do you know who makes tho

A Jim Simpson.

Q Jim Simpson?

A Yes.

Q Do you have any idea of anyone who is above Jim Simpson who makes final technical decisions?

A No, that I don't know.

Q When you were first assigned to work on the Midland Project were you the group leader or whatever you call it, the lead reviewer?

A Just lead reviewer.

Q Right out of the box?

A Yes. There are not any subordinates as a matter of fact.

Q I understand. They just do what you tell them to do?

A I just request of them.

Q Who else was working at the Midland Project in the Corps at the time that you came on board in May of 1980?

A Ron Erickson and John Grundstrum.

Q When did they start working on it?

A I don't know. I just saw them in their room, I don't know, for the last —

Q (Interposing): Had they done very much work when you came on board?

A Yes, they have done work. They have prepared the draft to some extent partly.

Q Whose idea was it to request additional borings? Was that yours?

A No, it was requested before I join, but I agree with them.

Q Whose idea was it?

A I can't say this thing. It must have been from the Chief.

Q It must have been what?

A From the Chief of the Geotechnical section.

Q Otto?

A Yes.

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Q You won't mind if we tell him you told us we ought to take his deposition, do you?

A No, he is our leader.

One thing I would like to correct. This idea of borings must have been originated with somebody else, some other reviewer, but Otto, Mr. Otto is the final authorit He says yes or no, so h must have approved, but whether it originated from him I can't tell that.

Q Were you given any guidance with regard to what constituted adequate acceptance criteria when you got this NRC assignment

A Yes, I can.

Q What were you told?

A Is to satisfy all the requirements of the code which is prevalent now in the state of the art.

Q What code?

A From the Concrete Institute, ACA Code.

Q What else?

A And NRC requirements.

Q What NRC requirements?

A They have guides for testing. I don't remember the exact number, but they have it.

Q Are you familiar with them?

A Yes, I have gone through that as it portends to my area. I have not gone through all of them.

Q What do you think of those NRC reg guides?

A I say it is pretty good. They are the requrements that you have to comply with. The rule is there.

Q Is it your understanding that with respect to a nuclear projec there can never be a deviation from those NRC regulatory guides?

A No, no, no, sir, unless the rule has changed, but in the middle of the game you can't change the rules.

Q In the middle of the game you can't change the rules?

A No.

Q So in this case there hasn't been any deviation, is that what you are saying?

A No, I have the guidance from the NRC. I can't deviate there from that.

Q Who told you?

A That is ethics.

Q That is ethics?

A Sure, because when the guidance is given to you we have to stick to that.

Q So what you aresaying is that you would not consider and exercise your engineering judgement with regard to anything that deviated from the NRC reg guides in this case, is that right?

A If it is not acceptable to me I will not take that job as a

reviewer.

Q That's not what I am saying.

A That's what I am telling you.

Q What you said is that there can be no deviation from the RNC reg guides?

A For me I will not deviate from them, but if they changed the rule and then give it to me, then definitely.

Q Okay. What I am talking about is if something is presented to you by Consumers which in your technical judgement is adequate is it your position that if it differs from the NRC reg guides that you would find it to be inadequate?

A I have to look at it because there are relative things. It depends on what kind of a structure we are building. If we are building a dog house or a nuclear power plant. If it is a nuclear power plant they know better, the Corps of Engineers knows if it is a nuclear power plant because they have the experience and they are doing work every day on that so I will accept their criteria and what factors they allow. If they allow a factor of maybe two or maybe three, so I will stick to that three, not to two, and so that many times is what is there.

Q What regulatory guides have you used in your review?

A Oh, for the testing, soil testing.

Q What does it say about that?

A This is laboratory testing.

Q It says what?

A Laboratory testing, laboratory testing.

Q Okay, what does it say about laboratory testing?

A The soil parameters should be tested to design parameters.

Q Does it specify when tests have to be taken?

A Sure, if you design a building then you investigate the fou
tion, test the soil parameter for any project you do and th
design it and construct it.

Q And then do what?

A And test it again. You test during construction these thin
Suppose you are putting concrete, you test it thatyou have
put it the right concrete, you test the soil that you put o
the embankment every 500 cubic yards or the fill, it depend
upon the type.

Q Do you know what the purpose of the Diesel-Generator Buildi
is?

A Yes.

Q What?

A To house the diesel generators in it.

Q And what is the function of the building? You say to house
What is it supposed to do?

A Protect the diesel generators.

Q And in your opinion is the Diesel-Generator Building as it

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exists today capable of protecting those diesel generators?

A It has been designed. I didn't get your question correctly.

Q I think you did.

A No.

MR. ZAMARIN: Why don't you read it back, please (to Reporter)?

(Whereupon the Reporter read back the previous question.)

A I have to review it thoroughly. How can I tell you.

Q Has anybody, to your knowledge, in the Corps or in the NRC reviewed it?

A In my knowledge, no, not in my knowledge.

Q Do you intend to conduct such a review?

A If I get the information which I wanted.

Q What information is that?

A Borings have been asked, soil parameters have been asked.

Q Borings?

A Borings and to take the soil, undisturbed samples and test it and furnish the parameter calculations.

Q And have you looked at any settlement data with regard to the Diesel-Generator Building since the surcharge was put on?

A Put on means from --

Q (Interposing): Put on, in other words have you looked at settlement data from, let's say, January of 1979 through

September of 1980?

A September, yes, I have looked at that.

Q And does that provide any information to you with regar the way that building is going to behave in the future?

A That provides some information, yes.

Q Tell me what you learned from that?

A I learned that building is settling.

Q All right, and did you learn that it settled less than a tenth of an inch since August of 1979 when the surcharge removed?

A Yes, I have seen, uh-huh.

Q Does that tell you anything about what you might expect ir future behavior of that structure?

A Yes.

Q What does it tell you?

A Generally when you remove the surcharge and then what happe after that the settlement continues, it takes a straight li and then again goes down, so that is where you are in the position of that straight line portion, your settlement is going straight for the time.

Q And then it goes down again?

A Yes, yes.

Q When does it go down again?

A I got the publication by Stanley Johnson, Corps of Engineers,

1970 and look at this publication and he say that --

Q (Interposing): Well, you tell me when it is going to go down.

A The time factor you have to find that, I have not done the experiment, somebody has to determine how much time or after what time it will again go down.

Q What will cause it to go down again?

A I don't know the cause because I haven't done any experiment on that, sir. I use -- I drive an auto but I am not an auto mechanic, the same thing, I use it as a tool.

Q You don't have any idea what is going to make it go down again?

A It depends on the experiment, something has to. I am not a researcher in that area so you have to determine what time they say that it goes straight and then it goes down.

Q And who says this?

A It is the same paper by Stanley Johnson.

Q Stanley Johnson?

A Yes, sir.

Q He did a paper that says you will have a period of straight line settlement versus log time and then all of a sudden it is going to go down?

A No, no, you remove the surcharge and go back and then suppose you put load again, the load is going to come on that, the Diesel-Generator, and then the settlement goes like that

(indicating) and then again it goes down.

Q Oh, I see, you are talking about then if your increased load that you are going to experience a steeper slope on the settlement curve, right?

A Theoretically. I don't know what is the time there because it goes -- the settlement won't show up at all, just like your graph is now. I have seen the graph. It is a straight line. There is no down, but that is temporary.

Q And will it --

A (Interposing): Again, I don't know how much it will go. I can't say until I have complete data on that.

Q Without data of a significant additional load will it still go down?

A What do you mean by significant?

Q You don't know what I mean by significant load?

A Yes. A load without the imposition of a load that would be in excess of the surcharge loading?

A The surcharge load which you removed already?

Q Yes.

A If there that is that much load again it will go down again.

Q You base this on Stanely Johnson?

A He has this paper he has published on this, but even that, I don't believe you are in that. His statement was in secondary and this wasn't secondary.

Q Are you responsible for the caissons?

A I will be responsible for the caissons.

Q Pilings?

A Pilings, yes.

Q Pipe stress analysis?

A The soil-structure interaction. I will be responsible for the pipe and maybe different kinds of stresses, internal stress, but the structure-soil interaction I will be responsible for that.

Q Do you expect the settlement of the Diesel-Generator Building to ever exceed that which would have been experienced had the surcharge been left on?

A I didn't get the question directly.

MR. ZAMARIN: Would you read it back, please (to Reporter)?

(Whereupon the Reporter read back the previous question.)

MR. PATON: You mean if the surcharge was left on for 40 years, is that what you mean?

MR. ZAMARIN: Yes.

MR. PATON: Forever?

A That I can only predict how much actual load you are going to put on Diesel-Generator Building more than surcharge load or less than surcharge load.

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Q No, I am just talking about if the surcharge load had remained and that was the load for the building?

A It will be the same. That is the load of the building, what the surcharge load, that will be the same.

MR. PATON: You have to tell him what load is going to be put on otherwise --

MR. ZAMARIN (Interposing): Assuming the same or less load.

MR. PATON: Than the surcharge?

MR. ZAMARIN: Yes.

MR. PATON: Okay, all right.

Q (By Mr. Zamarin, continuing): If the surcharge had remained in place --

A (Interposing): Uh-huh.

Q (Continuing): In the Diesel-Generator Building and that were the total load of the building with the exception of environmental loads, in your opinion would the Diesel-Generator Building settle at a rate of settlement in excess of that which is indicated on the settlement log time curve?

A Okay, I don't believe in that settlement log time, I told you many times.

Q I am not asking whether you believe in it.

A Based on that I don't predict anything.

Q I am not asking you to predict anything, I am asking you

whether in your opinion if the load had been maintained would the rate of settlement for the Diesel-Generator Building have exceeded that which is shown on the settlement log time curve?

A I already told that, that what you have told, what you have send, that settlement is to exceed what is shown on your --

Q (Interposing): The rate, the settlement will exceed it?

A I am talking about a total rate. I can't tell what will be the rate.

Q In your opinion the total settlement would exceed that which is shown on the log time curve?

A Which you have predicted from the log time curve that way, and after 40 years that will exceed.

Q And you base that statement on the fact that there is certain information that you don't have as opposed to certain information that you do have, is that right?

A Yes, I believe that we have reached that stage of the secondary consolidation.

Q What evidence do you have that it is not in secondary consolidation?

A First evidence is the -- your total settlement is measured partly from the deflection of the footing. It is not totally on the soil. The deflection has been also included in that, plus your piezometers showing excess pore pressure at the time of the surcharge.

Q In your opinion at the time of the surcharge the piezometer data showed that excess pore pressure was still be dissipated

A Yes.

Q Okay, anything else?

A No, that's all the information I have from the data I got fro Consumers Power.

Q How did you reach the conclusion that excess pore pressure was still being dissipated at the time of surcharge removal?

A Well, some of the piezometers, at least almost all of them, some more, some less, indicates that when you remove the surcharge it didn't stay there, it went a few feet down, and that is excess pore pressure.

Q The deflection downward --

A (Interposing): There was no deflection.

Q Wait, wait, let me finish my question, okay?

A Yes.

Q The deflection downward in the level of the piezometer readings at the time of surcharge removal in your opinion is an indication of excess pore pressure that was not dissipated?

A Not that. Actually it is when finally the piezometer level stabilized that was the actual pressure, anything above that was excess pore pressure.

Q All right, tell me again what evidence you have that at the time of surcharge removal there was still excess pore water

pressure being dissipated?

A When you remove the surcharge after maybe a week or two, the level of the piezometers went down and the pond was still on the level, was at the same level as when the surcharge was removed, so why that piezometer will go down by a few feet? What was that pressure, where the pressure came from? Why did it vanish when the surcharge was removed?

Q Do you have any idea?

A No, I don't. I have only idea that it is excess pore pressure, you see.

Q It was excess pore pressure that was suddenly dissipated?

A Sure, once you remove the load there is nothing to cause excess pore pressure.

Q What would cause it to dissipate and go down like that?

A Because the load is gone and naturally the water will go down.

Q Yes, and how does that indicate to you though that there was excess pore pressure that was still being dissipated at the time the surcharge was removed?

A When the surcharge was removed then there was some -- when you put the load on the materials, saturated material, naturally and try to squeeze it out and this water not go out from that, then the excess pressure there builds up and tries to get out from that spongy thing, some porous thing, and it will take time to get out from there, take sometimes month, two months,

three months, it depends on the permeability of the material and if you remove -- if the water had not gone out and you remove the load then that pore pressure will disappear because there is no load and they don't want to get out.

Q How would you have expected the piezometers to behave if in fact excess pore pressure had been dissipated?

A Well, the piezometers temporarily will be disturbed because it move around, but, again it will go to the same elevation at the time of removal of surcharge.

Q So you'd expect a drop in piezometer level, a rebound and then it would restabilize to the ground water level?

A To stabilize it takes some time. I don't know what procedure you use, how many truck were there unloading the sand from, but I can't say how this fluctuates. It depends on the situation there.

Q Okay, but at the same time are you saying that you can say that the piezometers behavior that was observed out there is inconsistent with the dissipation of the excess pore water pressure?

A I didn't say inconsistent. It went down. I indicated that it was excess pore pressure right there, what else?

Q You just told me -- rebound would make it go down.

A That is temporary, the rebound. It is not permanent, it is temporary. I don't know how much time it will take but

permanently it will stabilize at the actual water table.

Q Is there a way in which you can determine while the surcharge is in place if all excess pore water pressure has been dissipated?

A Well, once you remove the surcharge and piezometer stays there.

Q Is there a way by which you can find out while the surcharge is on --

A (Interposing): Uh-huh.

Q (Continuing): If all the excess pore water pressure has been dissipated?

A First you have to find out, do the analysis from the permability, how much time it will be, it will take to dissipate.

Q Okay.

A (Continuing): And calculate. Say it takes six months for this load --

Q (Interposing): Did Willis Walker ever do that calculation?

A I am not familiar with that. I am not aware of that.

Q Would it surprise you if he did and he found out that in 42 days it would occur?

A No, I will not comment on that.

Q I have here what is Figure 1 to what has been previously marked as Consumers Exhibit Number 8 for identification as of 10-15-80 at the Kane deposition. This is a September 14, 1980 report by Consumers and in Figure 1 there is a plot of

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the data for piezometer PZ-307

A Uh-huh.

Q I'd like you to take a look at that and tell me where on that plot you find excess pore water pressure indicated? You can even mark it with this pencil if you like.

A How can I say excess when this is nothing available -- let me see when the surcharge was removed. Is there anything here. I think you have changed some drawing somewhere else.

Q No, I don't think so. Why don't you look at it while I find a men's room.

(Whereupon there was a short recess after which the deposition again continued.0

A (Continuing): In this drawing I don't know, but from what information I have there are a lot of them.

Q Are you suggesting that this drawing has been changed?

A I have not received this drawing, that I am telling you.

Q You mean nobody gave you a copy of that submission of September 14, 1980?

A No, in review drawings, what I have got are the review drawings concerning question number 27. I have not this section.

Q You have never seen --

A (Interposing): I might have seen, but --

Q (Interposing): Let me finish my question. You have never seen that plot of piezometer PZ-307

A That is piezometer 30. I do this from question 27, I didn't review this. I review from your response to the question. I don't review from these things.

Q Can you get for me what you reviewed?

A Well, that is your response to question number 27, and no-wherein any of these things is it indicating like that.

Q Where is your material on question 27 that you reviewed? Downstairs?

A In my office, yes, sure.

MR. PATON: We can get that.

MR. ZAMARIN: Are you going to bring that up after lunch?

MR. PATON: After lunch, Hari?

A Yes.

Q (By Mr. Zamarin, continuing): Before we leave Figure 1, I want to make sure I understand your answer. Is it that in looking at the plot of piezometer elevations versus timefor piezometer PZ-30 shown in Graph C of Figure 1, that you cannot identify anything on that plot that shows this excess pore water pressure that you told us about?

A From this graph it is not very distinct, but I have graph that is clear and distinct of this piezometer 30, I don't remember, but from there it is not very distinct.

Q Is it distinct at all?

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MR. PATON: Let me see this (indicating).

Q (By Mr. Zamarin, continuing): What I am saying is can you mark anything on that graph that shows me what you are referring to when you say that the piezometer data showed an increas in pore water pressure?

A There is tamporary disturbance when you remove the surcharge and then it goes up.

Q Would you call that rebound?

A Well, when you remove this thing it is rebound and water rush from all directions so there will be a disturbance.

Q And you expect that?

A I expect that, definitely, but finally it come down to where it belong to, and from that here (indicating) we don't show that.

Q It doesn't show what?

A Going back down. There is a disturbance which is there but, again, it stays on the same level for a few inches. I don't care, but it remains almost same. The graph is so small that it is very hard to pinpoint in this case here the disturbance at this point (indicating).

Q Okay, you are showing a disturbance at around August of 1979?

A Yes.

Q At removal of surcharge?

A Yes.

Q Okay, and show me what else on this graph troubles you? Are you saying that that rebound —

A (Interposing): This is not very -- I want a little more from here (indicating). It is going little up and then going down. I don't know how the pond level is, it depends on the pond level.

Q Here is the pond level right above it in Figure B.

A Yes, so it is going up, but from here it is not very distinct.

Q Wait a minute. Let's see, you have got it going up a little bit after the rebound and you would expect that to gradually go up, wouldn't you?

A No, but here the drawing is so small that I don't know how much it went down. I can -- if it is -- if it is less than this (indicating). This is lower, but I don't have any way that I can calculate, you see, the amount. I am talking about what will be this amount (indicating).

Q Anybody got a straight edge? There. Okay, why don't you use that straight edge and do what you want to do?

A No, no, this is not engineering tool.

Q That's all right, it is a legal tool. You can use it. Trust me. Go ahead.

A Oh, my line may not go straight, you know.

Q You have to draw parallel to this line. Use this (indicating).

A I don't know, this is not good.

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Q Pretend you are on a desert island and don't have anything.

A If this line is parallel to this (indicating)?

Q Yes?

A Then this drop, from this line, from the day we start to removing it here, the day you start to remove and if you draw a line parallel to it that will be your datum line, so —

Q (Interposing): Let me do something for you here. I don't think you tried real hard to do that. What are you using over here (indicating)?

A Right here.

Q Okay, you are using the point immediately prior to rebound.

A But that line is parallel to the bottom line.

Q Okay. That's pretty close, isn't it?

A Sure, I don't know how many feet this is, that I would consider that.

Q So you have a little area there, and I am going to mark that with a delta, right?

A Yes.

Q And that area --

A (Interposing): Not area, the depth.

Q Well, we will call it the area which the graph represents, and the change of elevation of the piezometer level, that you consider to be or represent what?

A That's where the excess pore pressure existing in the surcharge

was removed. It should be dissipated, this one and then surcharge.

Q So what you would have expected is after this rebound the piezometer level to never go below the point at which the piezometer read immediately prior to the rebound, is that right?

A Yes, it will stay there. Maybe, you know, it is a soil -- it is not a very defined material, a few inches, I don't care.

Q Okay, can you estimate what this delta is based on the scale that you have on the left of this figure?

A From here, no, I can't because this graph is so small.

Q Okay. How much of a delta in your opinion could there have been and not have demonstrated to you that there was excess pore water pressure that hadn't been dissipated?

A The first thing is the piezometer swing from the excess pressure in the clay or not, I don't have any evidence, you haven't given evidence to prove that, showing the pore pressure in the clay, the compressible material.

Q Have you ever requested that kind of information?

A When you give it to me I will review it.

Q Have you ever requested that information?

A Well, we asked for boring logs and all these things, information on piezometers to find out where those piezometer tips are.

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Q So if you knew where the piezometer tips were then you would know whether the piezometers were showing all of the pore pressure?

A If it is in clay.

Q Have you got my question in mind?

A No.

Q If you knew where the tips were would you then know whether the piezometers were showing all of the pore pressure?

A If I see the tips, if I see the tips then I see that it would develop pore pressure or not.

Q Okay. How much of a delta, and I am referring now back to this diagram, the Figure 1, how much of a delta and by delta I refer to the difference in piezometer level between the point at which the piezometer level was immediately prior to the removal of the surcharge and rebound and the lowest level to which the piezometer reading went subsequent to the removal of surcharge but prior to the lowering of the pond, how much of that delta could there have been without causing you to conclude that there was excess pore pressure that wasn't dissipated?

MR. PATON: I think the Witness has already stated that he couldn't answer that question unless he knows whether the piezometer was in the clay or the sand, but if I am wrong about that the Witness can correct me.

A I don't know the location of the piezometers.

Q Assume that piezometer PZ-30 was in clay.

A Uh-huh.

Q How much of a delta would there be before you would conclude --

A (Interposing): No, no, you can't conclude without that. I I can't take out from my pocket and take this thing, I have to know this condition.

Q You have to know what?

A The condition, what condition it was.

Q I am telling you that the tip of that piezometer is in clay.

A How much clay, ten feet clay? Suppose there is clay and immediately there is sand, six inches, it will dissipate because that six inches of clay will not hold very much.

Q Are you telling me then that without knowing where the tip is located with regard to the type of material in which it is located and the type of material adjacent thereto so you will have some idea of the drainage —

A (Interposing): Yes.

Q (Continuing): That you don't know whether a delta of two inches or two feet, for example, might not indicate that there is still excess pore pressure that wasn't dissipated?

A Well, any drop after the removal of the surcharge, any drop in the piezometer level, not immediately because immediately after disturbance there will be some drop, I consider that

was excess pore water pressure. Not immediately after removal, but it would take some time to stabilize the situation.

Q Could it take as long as, oh, three months to stabilize perhaps?

A It entirely depends on which kind of soil on how it will stabilize. In case of porous material it will stabilize very fast.

Q Very fast?

A Yes.

Q In the case of cohesive soil it could take as long as 90 days to stabilize?

A I will not guess. I won't guess because different soils have different permeability.

Q Surely as a geotechnical engineer you have some idea what the soil is like under the Diesel-Generator Building, don't you?

A I have some idea.

Q Okay, and based upon the idea that you have with regard to the soil under the Diesel-Generator Building would it have taken as long as 90 days for that pore water pressure to dissipate after removal of the surcharge?

A You have not given me the exact, you have not given me the permeability of the soil under the Diesel Building.

Q That's right.

A I don't have that one.

Q Right, but you have got some idea what the soil is like?

A No, I don't. I will not guess. No way.

Q I see, and you don't -- you can't form any kind of an opinion without having every little piece of data in black and white?

A I am a reviewer. If I do I will be cheating.

Q I am asking you for purposes of this deposition, I am not asking you for the purposes of review.

A No.

Q Is it within your ability as a geotechnical reviewer or a geotechnical engineer or civil engineer based on all of your experience, knowledge and expertise, is it within your ability to give an opinion as to whether or not, based upon your knowledge of the soil beneath the Diesel-Generator Building that it could take as long as 90 days after removal of the surcharge for the ground water table level to stabilize?

A No, sir, I wouldn't.

Q You don't have that ability?

A I have ability but because you didn't give me the data --

Q I am asking you if you have the ability to answer that question on the data I have just described to you?

A No.

Q No, you don't have the ability?

A Not with the data which you have given to me, but I have ability with the data which I want. I can do it.

Q I understand that, so you can't give any estimation with the data that I gave you?

A No.

Q Okay, good. How much excess pore pressure would you have expected if there had been no drainage in the soil beneath the Diesel-Generator Building during the surcharge?

A How much excess pressure?

Q Yes?

A It depends on the type of the clay.

Q I said assume no drainage, and based on your knowledge of what the soil properties are underneath the Diesel-Generator Building, what would you estimate?

A Well, a surcharge of 2.1, almost 2.2 keps, and divide it by 6, 2.2, if there is no drainage, but it will take some time to develop because water don't drain very quickly through the clays, and it would take a lot of time to develop and water squeeze out, and then you see the rise in the tip of the piezometer.

Q How long would it take to develop that kind of pressure if there were no drainage, based upon what you understand of the soil layers underneath the Diesel-Generator Building to be?

A I don't have any idea of the permeability of the soil. By seeing the blow count, you can't find out permeability, you can find out by the soil drain, but that is not correct.

Q So you have no information available to you that based upon your ability would allow you to estimate?

A No, I don't know how you can do that.

Q How do you determine permeability of the soil?

A Well, you can do test of the fill.

Q Test of the fill?

A Yes, and see the situation.

Q And how do you go about doing that?

A Well, you draw, put a pump there, you have to pump a well.

Q A well, w-e-l-l?

A Yes, well, and then you put some piezometers at certain angles, it depends and then you measure the draw down.

Q As you pump the water out of the well?

A Yes, draw down and based on that there are some, I am not familiar, but I can't exactly tell how to do this because you have to reference the Thiesmeter.

Q A Thiesmetar, T-h-e-i-s-m-e-t-e-r?

A Yes, one method of doing it and then you calculate this.

Q Would you disagree with the statement as relates to the Diesel-Generator Building that when the surcharge reached its maximum level the rate of settlement decreased rapidly and as anticipated excess pore water pressure developed when the load was applied and dissipated rapidly indicating rapid consolidation of the fill?

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A How can I find out because this is your statement, not mine.
Q I am asking you if you agree or disagree with that statement?
A It dissipated because your piezometer might be located in the sand so there it would dissipate quickly. What you say may be true but that may not be true, and if your piezometer is in the clay it will not dissipate that fast.
Q Well, knowing there the nature, the variable nature of the fill under there wouldn't you expect there to be rather short drainage paths though out there?
A I will agree with that, yes.
Q And wouldn't that lead you to expect rather rapid dissipation of excess pore water pressure?
A What do you consider rapid in that area, what is rapid?
Q Would you expect it to take a year based on what you understand the drainage paths to be?
A If you compare a hundred years and one year, so then one year is rapid in comparison. If you compare one day and one year one day is rapid in comparison to one hundred, so I mean these are related things.
Q Tell me what you would expect based on your knowledge of the fill underneath the Diesel-Generator Building and the short drainage paths as to whether you think the excess pore water pressure dissipation would occur in a matter of 90 days?
A No, I wouldn't go on days like that unless I have complete --

I wouldn't say 90 days or any days, I wouldn't say.

Q So you don't have any information available to you --

A (Interposing): Yes.

Q (Continuing): Upon which in light of your ability as a geotechnical engineer you could make that kind of an estimation, is that correct?

A Right.

Q Have you ever read a letter from a R. B. Peck and S. Afifi, dated July 23rd, 1979, which is located at Tab 75 in Volume 4 of Consumers Power Company Responses to NRC Requests Regarding Plant Fill?

A I might have read but I don't remember the contents.

Q The letter addressed the question of the rate of settlement decreasing rapidly when the surcharge reached its maximum level?

A Uh-huh.

Q And as anticipated excess pore water pressure developing when the load was applied and dissipating rapidly indicating rapid consolidation of the fill?

A Yes.

MR. PATON: Was the question has he read that letter? Is that the question?

MR. ZAMARIN: I am in the middle of it.

MR. PATON: I thought you were finished.

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MR. ZAMARIN: No, would you read it back, please (to Reporter)?

(Whereupon the Reporter read back the previous question.)

Q (Continuing): And based upon that information as to what was contained in the letter from Dr. Peck do you recall having read that?

A Yes, I remember that.

Q And did you disagree with it when you read it?

A I would like to see Dr. Peck concluded thing based on the results of the piezometers and this piezometers, I don't believe have, a lot have not been placed at proper place where it should be placed. I saw this thing, the continuous drainage and then there will be immediately sand.

Q Yes.

A (Continuing): I approximately compare with the boring logs you have given to me. It is not exactly, I know that, but that's the only way I had, your boring logs there, and it is that the piezometers are located near by and based on that I concluded that most of your piezometers are located near the sand which quickly dissipats, so Peck has concluded based on your results. He don't know where the results come from, so he is right.

Q Well, is it possible in your mind that because of the varied

nature of the fill that there is a lot of sand drainage and that, therefore, you would expect rapid, and when I say rapid I mean in the order of perhaps 90 or 100 days dissipation of all of the excess pore water pressure?

A There are pla.es it is rapidly, but there are layers of clay there somewhere.

Q How big?

A Fifteen feet.

Q You think that there are layers of clay 15 feet thick there?

A Yes, sir, I have seen it.

Q How wide, more than three inches?

A No, that was thicker, that is the southwest corner.

Q Do you know how the fill was placed under the Diesel-Generator Building?

A I don't know how it was placed, but I care what is there at the present time.

Q Do you know how the fill was placed underneath the Diesel-Generator Building?

A No.

Q Do you know if it was in 20 foot lifts?

A No.

Q Do you know if it was in less than 20 foot lifts?

A No, I don't know.

Q Would you expect to find a 15 foot layer of clay if it was

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placed in 20 foot lifts?

A Sure.

Q Knowing the nature of the fill that is underneath the Diesel-Generator Building?

A Yes, it was there.

Q I see, and you think that that is likely?

A No, I saw the borings one place, I am talking from the borings.

Q You saw a boring that indicated a 20 foot thick layer of clay?

A No, I told you 15 feet.

Q So you say there is a boring that demonstrated a 15 foot thick layer of clay?

A Yes, it is continuous, so I consider all from top to bottom.

Q I see. In what boring log did you find this? Where did you find this evidence of a 15 foot thick layerof clay?

A Yes, uh-huh.

Q In what boring logs?

A I don't remember the number, but I have it. I will bring it after lunch and you can see.

#5 Q All right, would you do that, please?

A Yes. At one location I told you.

Q You have looked at the settlement data that was collected during the pre-load?

A Settlement, yes, but it is not purely settlement.

Q In your opinion does that indicate that settlement slowed down

during the pre-load at some point?

A Yes, sure.

Q Pardon me?

A Yes.

Q Yes? How do you explain that deceleration in settlement if the soil was not in secondary consolidation?

A Well, still it could be primary and as you load this thing the rate of settlement is going to decrease even in primary area. Primary consolidation in the beginning. Suppose primary is spread on certain land, for example, say over six months, so first three months it will be very fast settlement, but as you go toward the secondary the rate will decrease.

Q Would you expect the rate then to always decrease as you move towards secondary consolidation?

A Yes.

Q And never increase?

A No, if you put another load on then --

Q (Interposing): I am talking about under a constant load?

A No, general load it will decrease unless something unusual happens I don't know.

Q Like what?

A Somebody dug a hole or something disturb somewhere, it might be, but normal situation it will be decreasing the rate of this consolidation.

Q How many building surcharge programs have you been involved in?

A I am not involved in any.

Q How many surcharge programs in general have you been involved in?

A None.

Q How much information with regard to surcharge programs other than at Midland are you aware of?

A Well, I have read the Corps of Engineers' publications and Navy publications.

Q Which ones were those?

A One is in Florida, the name is Mayport Airport, it was on St. Johns Rivermouth. This was surcharging there and they put with the surcharge ten feet high permanent load which it involved and they surcharge it and build the airport.

Q What were they surcharging? What type of soil?

A The surcharge was with some dredge material from the bay.

Q Some dredge material?

A Yes.

Q What did you learn from reading that?

A I learned that the surcharge reduce, compressed the soil and give it strength and they found that they take the borings before surcharge and after surcharge.

Q What else did you learn?

A On that basis was a good correlation.

Q What else did you learn?

A That is what I learn, that is successful way of doing a structure one building.

Q Was that homogeneous material that was being surcharged?

A Well, it is not homogeneous, that somebody can use as homogeneous, it is not homogeneous soil in general. It is a relative thing.

Q Would the soil in surcharge with an airport be considered to be homogeneous material?

A I just told you soil is not homogeneous material in general.

Q I see, so then as far as geotechnical engineering goes no one would ever consider any soil to be homogeneous material?

A No, they assume and based on that they develop the formulas.

Q So let's use homogeneous as it is used by geotechnical engineers and was the material that was surcharged at that airport homogeneous material?

A Yes, I consider it that, yes.

Q Is there a difference between surcharging homogeneous material and varied or non-homogeneous material?

A In what respect?

Q In the analogy that can be drawn between the experience at that airport and the Diesel-Generator Building at Midland?

A In both cases they use this, it will increase the strength of

the soil in both cases.

Q All right, but as far as the reliability and applicability of laboratory testing there would be a difference, wouldn't there

A No, the soil strength is increased. The laboratory test it will give the same results.

Q Would you expect to find some kind of a scatter of results if you had non-homogeneous soil?

A Of course, you have difference, you have some different results.

Q Tell me what else you learned from reading about that air field surcharge?

A I learn a good method to increase the weak soil to be used at a foundation in the structure and all these things, that's the only thing I learned from it.

Q What is some of the other literature that you read about surcharge?

A The Stanley Johnson paper.

Q What did Stanley Johnson tell you about that?

A The Corps of Engineers, they used it at Morganza, that was in Louisiana, somewhere near Baton Rouge. It is a flood control project, and they are building a structure and they surcharge it.

Q What kind of structure?

A It was just like a water structure, it carries -- I don't know

exactly the type of the structure, but they build on that just a kind of bridge pier and the soil was bad so they surcharge it and they get two feet of settlemant.

Q What kind of material was that soil?

A I am not aware of that.

Q Do you know whether it was peat?

A No, it wasn't peat, I am sure of that.

Q What did you learn about surcharging from that reading?

A Well, I learned that you can improve the quality of the soil by surcharging.

Q Anything else?

A No.

Q Okay, so what you have just described to me is the extant of your experience and knowledge about surcharging?

A Uh-huh, that is.

Q Do you consider yourself to be an expert upon the subject of surcharging?

A I am a worker. I am not an expert, I am working and I have knowledge to recognize the problem and to do the design.

Q Based upon the experience that you have described to me that you have in surcharging you wouldn't consider yourself an expert in the area, would you?

A Not an expert, but I am a worker.

MR. ZAMARIN: Why don't we break for lunch.

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(Whereupon the deposition was held in recess until 1:30 o'clock, P.M.)

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AFTERNOON SESSION

Q (By Mr. Zamarin, continuing): Is it your understanding, Mr. Singh --

MR. PATON: Are you going to proceed? He has got all these other little goodies you asked him about.

Q First, is it your understanding that you are going to be a witness at the hearing with regard to the soils at Midland?

A I understand maybe.

Q Pardon me?

A Not sure, but they might ask, yes.

Q Okay, but right now you are of the impression that you are going to be a witness for the NRC?

A Yes.

Q And do you have some idea as you sit here now what your testimony would consist of in general?

A Well, they will ask me regarding my review. What I did. What I feel. What I am unable to review, this kind of thing they will ask, I believe, and I will answer what I think.

Q Okay. What is your understanding of what the unresolved safety issues are at the Midland site?

A I can tell regarding the soil. There are a lot of others I

don't know.

Q Tell me about the soil?

A The soil ultimately leads to the safety of the structure i which the nuclear power plant or the generator will be hou so if the soil is not satisfying the state of the art ther naturally there will be some failure.

Q What do you mean if the soil is not satisfying --

A (Interposing): If the soil is not satisfying the requirem of the state of the art as we have now, we are following, I will consider that it is not complete or satisfactory.

Q You said that the soil is not satisfying the requirements the state of the art?

A Yes.

Q What do you mean by the soil is not satisfying the require ments of the state of the art? What requirements?

A I am telling you you have to load -- the load has to be tr mitted on the soil and you have some bearing, you know, yc have some factors of safety involved in that, so if I know the certain parameters so I can determine the strength of soil, and then we relate with the load and find out the sc is able to carry that load without failure of the structur

Q When you refer to a requirement of the state of the art. What is the requirement?

A The requirement is that until NRC has a factor of safety,

safety of the bearing capacity, and I do not accept 1.9, I have to stick to 2.

Q What are any other unresolved safety issues of which you ar aware at the Midland Plant?

A Mostly the unresolved issue that give the soil parameter, j like settlement criteria, bearing capacity, shear strength criteria so that we can determine how the structure built o this soil is going to interact, just like piping underneath underground, that is invisible, and similarly the building, these kind of things.

Q Have you begun any preparation of testimony?

A No.

Q What?

A No.

Q Have you thought about what you are going to put in your testimony?

A No.

Q You might not even be there?

A I have to write NRC may[illegible] some time in the future, maybe on that. I am worki[illegible]t I feel that I am not satisfied, and I will write all these things.

Q Has work begun anywhere within the Corps on the draft of a SER?

A No, no.

Q Why not?

A Because I am the man who does all these things so I am b
on this, so once my testimony is done then I will start.
Maybe next week I will start.

Q Will you call me and let me know?

A Well, I have to ask my supervisor.

MR. PATON: Next time he does that a
him to give you a dime.

Q (By Mr. Zamarin, continuing): Who is P. McCallister, is
Chief of your division?

A Engineering Division, yes.

Q Do you know whether he has ever told anybody thatwork tc
pare a draft and final SER is already under way?

A No, I am not aware of that.

Q If he did tell somebody that would he be in error?

A I don't know, since somebody might be preparing some, b
am not.

Q You are not aware of anybody who is?

A No, I am not.

Q Have you received any instructions as to when your draf
has to be completed?

A Yes.

Q When?

A End of February

Q 1981?

A Yes.

Q Are you going to have it completed by then?

A I will try. I will try hard.

Q What instructions have you been given with regard to preparing and actually doing the SER?

A I have been asked to prepare the SER based on the informati I have got in my review, results of my review. On that bas I will prepare and provide to my supervisor and then that's the only requirement I have based on my results what I got.

Q Have you ever seen an SER?

A I have seen SER from different places. I have got three he with me but I don't recall where they are from. They are out of Michigan somewhere.

Q What occasioned you having those in your possession?

A What occasioned?

Q Yes, did you do any work on those or did you just get those so you would know what an SER was?

A No, no, I got from -- One I got from Neal Gerling (?), he i the Project Manager of this thing, so he got from somewhere, I don't know.

Q Did he get them just so you'd have some idea of what an SER was?

A Yes, what it look like and what you are supposed to write ar

what would fall in that and that gives me the idea.

Q I have here what you have just provided and it is a graph o piezometer elevations versus time for piezometer number 30, datad 4-80, revision six. It is indicated that is supplemental figure 27-32, and I believe that this was one of the attachments to the response to question 27, is that correct?

A Yes.

Q And I'd like you to take a look at that and tell me on this curve what it is that demonstrates to you a lack of dissipation of excess pore water pressure?

A Actually the drawing, all the data is unplotted here, there is a data point on top here is missing.

Q The data point is there, isn't it?

A I am beginning to doubt on this accuracy of the drawing. I am beginning to doubt that they have not plotted all the data that is received from the piezometer.

MR. PATON: Is that your mark (to Mr. Zamarin)?

A Somebody put it, I didn't put it.

MR. PATON: That is a circle around it.

A What is that?

MR. PATON: If that red circle has some meaning would you tell us what it means?

MR. ZAMARIN: The red circle is around

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a data point.

A Why not that data was plotted on the original drawing?

Q Well, how is it plotted on the original drawing, sir?

A I am talking about this (indicating).

Q Now look on this thing we are looking at. When you look a it from this data point does that tell you anything?

A What is that? That should be shown here.

Q What does it tell you when it has got a broken line like t

A I don't know.

Q You don't know?

A No.

Q Is there any indication on here of what that means?

A No.

Q No it doesn't mean anything to you when there is a data poi that is corrected by a broken line as opposed to a solid lir as an engineer that doesn't mean anything to you?

A If that data has been taken by the piezometer reading that should have been shown on this piezometer drawing.

MR. ZAMARIN: I asked you a question. Would you read my question back, and listen to it very carefully and I'd like for you to answer it.

(Whereupon the Reporter read back the previous question.)

A (Continuing): Unless there is -- if there is no legend, I

don't understand what is that dotted line. Is there somet that defines that dotted line here? This must be written somewhere in the legend.

Q Okay, have you ever looked at this September 14th informat submitted by Consumers Power Company as part of your job a: lead reviewer?

A Yes, I look at it before.

Q Did you? Did you notice this Figure one there, did you not that there was that dotted line?

A I look into that, yes, I look into that.

Q Did you notice there was that dotted line correcting that data point?

A Yes.

Q What did that mean to you?

A I just assumed that this piezometer rise temporarily to that height level of the piezometer.

Q Did the fact that that line was a broken line as opposed to solid line mean anything to you in your review?

A It mean something but is not known a lot of meaning for that.

Q What did you do to find out what it meant?

A Just I found -- I don't remember what data I saw because you have gone -- let me see again.

(Whereupon a document was handed to the Witness.)

A I can't read this.

Q I didn't hear you.

A I can't read these things. They are so --

Q (Interposing): It is the same one you just looked at b

A I have a big magnifying glass in my office, and I can't this thing, this fine print here (indicating).

Q Did you use a magnifying glass to read it the first tim

A Yes, I must have. I have a magnifying glass in my draw that I use for this purpose especially.

Q Okay, but that says, the note on 10-13-79 measures the ment at piezometer DG-3 was 2.502 inches. That is what note says. My question was what did you do to find out that broken line meant correcting that data point when read it as lead reviewer?

A I don't find on the drawing, and then --

Q (Interposing): Then you what?

A Then I pass this thing, I can't do anything on that if have anything.

Q You didn't ask anybody why that was a broken line?

A I asked Mr. Otto if I have problem and for this thing I didn't see anything special so I thought I had already the same information.

Q Did you say you asked Mr. Otto why it was a broken line

A No, not to this (indicating).

Q You didn't ask anyone why there was a broken line?

A I compared with this and this I considered correct (continuing).

Q Looking at that attachment to question 27, would you tell me where on that plot you find any evidence that there was a lack of dissipation of excess pore water pressure?

A Lack of dissipation?

Q Uh-huh.

A I don't understand what you mean by lack of dissipation. Dissipation --

Q (Interposing): You told us this morning that the excess pore water pressure had not dissipated in your opinion based upon that piezometer graph.

A I said lack of dissipation doesn't mean that, lack of dissipation means what you remove and then there is some problem in dissipation then you say lack of dissipation. It is all built up there, the pore water pressure is already built up.

Q Yes.

A (Continuing): And dissipation is done gradually but there is still something left.

Q Show me on that graph where you see excess pore water pressu

A Here, once you remove this thing from the surcharge and the pre-load I would say, and then the piezometer drops down and

finally is stabilized at this stage (indicating), I wo
say the ground water table is right here at whatever d
is, the middle of September.

Q All right, you say at the beginning of September --

A (Interposing): Uh-huh.

Q (Continuing): According to the time plot on the top h
the beginning of September, 1979, this plot tells you t
there is excess pore water pressure, and tell me what a
that plot tells you that?

A It tells there is a drop in piezometer level and this i
the pressure before and now this is water pressure so t
immediately is a drop of few feet.

Q A drop of how much?

A A few feet, maybe one or two feet, 1.25. This is part
this point here is 1.25 feet.

Q Okay, so what you have is, you say, you have a drop of
feet from the level at which the piezometer read immedi
prior to removal of the surcharge, right?

A Yes.

Q And that drop of 1.25 feet the beginning of September,
indicates to you the existence of excess pore water pre

A No, when it went down, so why it went down the remainin
1.25 excess pressure, why is it that it has gone down.

Q Okay, maybe I am misunderstanding you. Are you saying t

that out there today --

A (Interposing): No date.

Q Hold it. Let me finish.

A I'm sorry, I thought you were done so I am answering.

Q Are you saying that out there today -- you are not saying then that out there today you believe there still exists excess pore pressure that hasn't been dissipated based on these piezometer graphs?

A Not today.

Q Not today?

A Not today.

Q Okay, it existed at the time of the surcharge removal?

A Yes.

Q And then it was somehow dissipated after the surcharge was removed?

A Definitely, naturally it would dissipate, the surcharge was gone.

Q And you don't have the squeezing, as much squeezing of the soil?

A Right, yes.

Q All right. Well, to your knowledge did the pore water pressure come back up to a level higher than that which was 1.2 feet below what was the stabilized pressure under the surcharge load?

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A Yes, it can in certain condition.

Q Did it?

A Did it? No, pore water pressure didn't, but the water le rose because of the pond, continuous seepage from the pon still coming there.

Q How do you know that?

A Because the pond is high level, 627 or 620, whatever leve there.

Q What was the level of the pond on the last plot shown on graph you are looking at?

A On this I can't find out.

Q What do you think it was? You just testified about it nc tell me what you think it was?

A About 627.

Q 627?

A Yes. 627, maybe a half a foot up and down.

Q Okay, so your testimony is based upon your understanding as of the time of the last data point on here which was t end of November, 1979, that pond level was at 627?

A This is at 625, I don't know beyond that, but at this le I know (indicating).

Q I am talking about here on the last data point (indicatir

A The pond level must be higher than this (indicating), thi elevation.

Q Sure, I understand it must be higher than that, but I a
ing you --
A (Interposing): But what is that I don't remember.
Q Would it make any difference in your evaluation of this
the pond level were at 623?
A Definitely it make some.
Q In what way would that make a difference?
A Somebody put some load there or something because I don
know.
#6 Q Actually what I am getting at is you indicated that thi
turn on the last data point to the level of the pore wa
pressure during the surcharge load was a result, in you
of continued seepage from the pond, that you would expe
the pond at 627?
A Yes.
Q What I am saying is if the pond was at 623 --
A (Interposing): Uh-huh.
Q (Continuing): Would that still, in your mind, be a res
seepage from the pond?
A No, no.
Q Would it be a return to stabilization of the ground wat
level?
A Ground level wouldn't go there because it is fed by the
Q All right. What I asked you before is whether this ret

to the last data point up to the level at which the pore w pressure had been during the surcharge program indicated after the rebound, a return to the stabilized level of the ground water regime around the Diesel-Generator Building?

A Yes.

Q You said that it was not an indication of the return to th pore water pressure because this came back up as a result seepage from the pond being at 627?

A Yes.

Q What I am saying is if in fact the pond was at 623, for example, would this indicate then to you that what you had when you removed the surcharge, you had a rebound which na ally would show a drop in the piezometer readings and then as that rebound ended you had a return to the stabilized l of pore pressure which did not contain excess pore water pressure. I am assuming 623 on the pond?

A 623? I will not conclude on that if it is 623. That leve will remain below 623 if there is no surcharge load or any kind of excess loading there.

Q But does that change your testimony about whether this ret up to the pore water pressure level that existed during th surcharge was due to seepage from the pond as opposed to a return to the stabilized pore water pressure level after t rebound ended?

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A I don't know what you want to ask me. You say pore water stabilized. I am confused.

Q All right, I will go back and I will take you through it ag You testified that there was a drop in the pore water press level when the surcharge was removed?

A Uh-huh.

Q And that drop of about 1.25 feet --

A (Interposing): Uh-huh.

Q (Continuing): In your opinion was indicative of there havi been excess pore water pressure of 1.25 feet during the sur charge while it was in place.

A Can I tell something here?

Q Yes.

A This is still 1.25. I am not talking about this right here (indicating).

Q That's right, the last reading prior to --

A (Interposing): At that point it is 1.25, yes.

Q Prior to surcharge removal?

A Uh-huh.

Q And that, therefore, what we had immediately prior to sur- charge removal was still 1.25 feet of excess pore water pressure that had not been dissipated, right?

A I would like to have everybody sit instead of standing behir me, excuse me, but it would be better instead of everybody

standing over my head if everybody sit down and then I can go ahead.

Q I don't think they can see the graph that we are pointing at

A But it is a little uncomfortable.

Q Okay, but while we are working with this there is not way to avoid it though.

Could you read back my last question, please (to Reporter)?

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

Q (By Mr. Zamarin, continuing): Then I believe you testified that when the surcharge was removed there was a drop in pore water pressure?

A Uh-huh.

Q And that by it remaining at that lower level, which was more or less 1.25 feet lower that indicated to you that the level prior to surcharge removal was excess pore water pressure and that that lower level was the stabilized pore water pressure level?

A Yes, at that particular instance.

Q Okay, and that the return of the piezometer pore water pressure level up to the point B, the point at which it had been immediately prior to surcharge removal was due to seepage from the pond, right?

A Yes.

Q And you base that upon your understanding that the pond was 627?

A Something more than what it is here.

Q Okay, 627. I think it was 627 and two inches during the sur charge?

A Whatever it may be.

Q What I am asking you is assume that the pond was at 623?

A Yes.

Q And in the months at the end of this graph --

A (Interposing): Uh-huh.

Q (Continuing): All right?

A Uh-huh.

Q Assuming the pond is at 623 during those last couple of mont I want you to tell me if that graph still indicates to you that there was excess pore water pressure which was not diss pated and I want you to then show me where on the graph that is indicated.

Do you understand what I am asking?

A I still don't understand what you are asking.

Q Let me try it again. Assume the pond is at 623 --

MR. PATON (Interposing): Give it to him a piece at a time.

MR. ZAMARIN: I can't, he needs all of

the pieces of data.

MR. PATON: But you have also suppos
tions in there.

MR. ZAMARIN: He is only assuming on
thing.

Q (By Mr. Zamarin, continuing): Assume the pond during th
last two months here is at 623, all right, and not 627, l
at 623.

A Uh-huh.

Q Would you still be of the opinion in looking at this plot
there was approximately 1.25 feet of undissipated excess
water pressure during the surcharge?

A At this location, this area (indicating)?

Q Yes, if this is excess pore water pressure you are assumi
that the pond is at 623 (indicating).

MR. PATON: Let me get some clarifica
He pointed to this area (indicating) which was immediatel
before the surcharge removal?

MR. ZAMARIN: That's right.

MR. PATON: Are you saying the pond le
was at 623 in this area (indicating), I mean, you are aski
him to assume that?

MR. ZAMARIN: No.

MR. PATON: No? You are asking him to

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assume that the pond was 623 over here at the end of --

MR. ZAMARIN (Interposing): Sure.

MR. PATON (Continuing): At the end of November?

MR. ZAMARIN: November and October.

MR. PATON: Are you giving him any assumption on what the pond level was here (indicating), or have you asked him to draw his own conclusions?

MR. ZAMARIN: Here we know it was 627.

A It was 627 here (indicating).

MR. ZAMARIN: That's right, there is no question about that.

A But here (indicating) it was 623.

Q That is what we are assuming that here (indicating) it is 623.

A At what level you want? By piezometer it is indicating here 627, and you are telling 625, that here it has reached 625, I believe.

Q No, no. You see what happened is when you drew that line --

A (Interposing): I didn't draw, somebody must have.

Q 625 is up here (indicating).

A Oh, that is 625.

MR. PATON: Let me see that one minute. Okay. All right.

A Okay, now what is the question?

MR. PATON: I don't know Hari, ask h
do it a piece at a time.

A I can't follow you.

MR. PATON: There are too many assum
and suppositions. I would like if you could to take a p
at a time.

MR. ZAMARIN: Okay.

A I didn't understand your question. I still don't unders
if you can explain to me.

Q All right, you looked at this plot before (indicating) a
you said that in your opinion it indicated excess pore w
pressure at the moment or immediately prior to surcharge
removal of 1.25 feet and you were able to determine that
looking at --

A (Interposing): The graph.

Q (Continuing): The graph, and then the fact that it came
up, but that when it came back up if that was due to see
from the pond at 6277

A Uh-huh.

Q What I am asking you to do is do the same interpretation
this graph for me but assume that at the end here that i
there is seepage at all it is from a pond at 623, not 62
That's all. Does it make any difference to you that it

623 at the end rather than 627, if you make that assumpt

A I don't know what assumption he wants to make. I really don't understand.

Q Holy Smokes, assume that the one was at 623 instead of 6 and that everything else is the same.

MR. PATON: Have you got anything tha says that at that point it was in fact at 623 at the end November?

MR. ZAMARIN: I am asking him to make that assumption. I don't have that with me, no.

MR. PATON: I mean -- okay, you are s the pond was at 627, immediately prior to surcharge it wa and you are asking him to assume it was 623 at the end of November?

MR. ZAMARIN: Yes.

Q (By Mr. Zamarin, continuing): All right. Now, does that change his testimony at all about his interpretation or do that change his interpretation of the graph?

MR. PATON: Let me ask one more questi Did the level change at a very even pace from 627 to 623 during that three and a half months or --

MR. ZAMARIN (Interposing): If that's important you can ask him that.

MR. PATON: I don't know, you are askin

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him to assume certain facts, and I don't know whether he has what he needs to know to do that.

A When I ask to break this down, and I want to ask you you say no, no and that is the whole problem.

MR. ZAMARIN: That's why you have to let me finish the whole question.

MR. PATON: But when he doesn't understa your question as you are going along you are not letting him interrupt you to ask you in the middle of the question.

Q (By Mr. Zamarin, continuing): What don't you understand about my question?

A What interpretation want to say here is 623 (indicating), you want my interpretation for this part or only here (indicating)?

Q You told me before from looking at that entire graph that you were of the opinion that there was excess pore pressure?

A Uh-huh.

Q The moment before the surcharge was removed.

A Okay, now can I interrupt here?

Q Yes.

A Suppose I have to look only this position (indicating). I don't have to look at that position to find out (indicating), only right from here is it stabilized and I conclude that this is the excess pore pressure. I don't need that

(indicating).

Q Oh, all right, so what you are telling me is that on th Figure 27-32 that you only have to look as far as about first week of September, 1979, and you can tell that th piezometer level immediately prior to surcharge removal cated excess pore pressure?

A Okay, let me see again. I will see when this thing is stabilized and once it starts going up I will cut right once it is stabilized because there may be one year here is not needed -- not one year, at least one month when i stabilize and it has no tendency -- you see, it complete stabilized in this place (indicating) so right there I d need all this thing to go up.

Q So in your opinion then that pore water pressure was sta lized from the period in the middle of August to the per

A (Interposing): End of September.

Q The end of September that was stabilized?

A That means I see because of the water pressure in the por what is existing there and from that I can conclude that excess pore water pressure, and if it raise the pond leve it might go to 700, that doesn't make any difference for

Q How do you know that the pore water pressure was stabiliz between the middle of August and the end of September?

A Because once it has become steady, kind of steady and the

could see that.

Q You say it becomes steady and from looking at this graph you say that it became steady and if it becomes steady over a six week period in your mind it is stabilized?

A I would consider it stabilized for a six week period is very good.

Q In your opinion then would any pore water pressure level that would remain steady for a period of at least six weeks be considered to be a stabilized pore water pressure level?

A No, but if the entire level remains the same, it is not going up.

Q What I see --

MR. PATON (Interposing): Wait a minute. Did you finish your answer?

MR. ZAMARIN: I think he did. He said it was not going up.

MR. PATON: Did you finish your answer?

A Yes.

MR. PATON: Okay.

Q (By Mr. Zamarin, continuing): What I see here is that at the end of this graph, in the last three and a half months I see pore water pressure level going up?

A Uh-huh.

Q I see it going up to the last point, to here (indicating)

being at the same point that it was immediately prior t
charge removal?

A Uh-huh.

Q Now, what is it that causes you to believe that it stab
some time prior to this last data point?

A Because -- not in this case, I am generalizing. Here yo
a pond, but in general case there is no pond.

Q I am talking about here, and in fact what you had said e
was that the reason that you thought it had stabilized l
was because you thought that it came up on this last dat
point as a result of seepage from the pond at 627?

A It is stabilized but is still going up.

Q Okay. What I am saying is rather than assuming the pond
627, let's assume a pond at 623?

A Uh-huh.

Q During this last --

A (Interposing): Only in the last month?

Q Only in the last month.

A Uh-huh.

Q Okay. Now, would it still be your opinion, assuming the
at 623, that this rise to this last data point is a resu
seepage from that pond at 623 as opposed to simply a retu
to the stabilized pore water pressure level?

A Now, the 623, how does it immediately drop right here fr

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(indicating)?

Q I will tell you in a minute. All right, assume that the lev of the pond on October 5, all right, at this point right her (indicating) was 627?

A Uh-huh.

Q And that it was dropped to 623 over a period of 15 days, so that's right here (indicating).

A Okay.

Q On October 20th it was 623, all right?

A Okay. Now, in this case, and you say "drop," but this water level went up.

Q Yes.

A (Continuing): I don't know how this water level went up because there is some disturbance going on somewhere.

Q Well, maybe -- would that lead you to believe that what you see on this plot, would that lead you to believe that what you see on this plot is a point immediately prior to surcharge removal which represents excess pore water pressure and then a drop in the pore water pressure as a result of rebound and then when that things comes back up on this last data point to the same --

MR. PATON (Interposing): Look, I don't like to interrupt you and I am going along with you on this questioning of the graph, but he has told you that he is not

understanding your questions.

MR. ZAMARIN: If he doesn't understand th graph then we are all in trouble.

MR. PATON: You asked him three questions in a row without giving him a chance to answer. Give him a chance to answer because that is the problem. If you ask him one question at a time I am sure he will be perfectly willing to answer your questions.

MR. ZAMARIN: I was in the middle of a question when you interrupted. I hadn't finished it yet.

MR. PATON: But you are in the middle of a third question.

Q (By Mr. Zamarin, continuing): Let me start again and see if you can understand.

MR. PATON: Why don't you give it to him one at a time?

MR. ZAMARIN: He keeps claiming he doesn't understand and I find that difficult to believe. I would like to get through this by asking the whole thing.

MR. PATON: If you would ask him one at a time he will understand and answer you.

MR. ZAMARIN: My wife could understand this.

Q (By Mr. Zamarin, continuing): What I am asking is whether or

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not the situation that we have hypothesized here --

A (Interposing): I haven't hypothesized anything.

Q What the hell do you think we have been doing in going thr for the last half an hour?

MR. PATON: Wait a minute, Mr. Zamarin I really don't think that is necessary.

A No.

MR. PATON: And I would ask you not to to the Witness in that manner.

Q It is nonsense. In looking at this graph we have 627 on October 5th and 623 on October 20th, so for that period of 15 days we have this graph here representing piezometer dat We have a surcharge being removed at this point here in August (indicating), all right, and we have this level of piezometer data immediately prior to surcharge removal. We then have a decrease in pore water pressure indicated by the piezometer readings and then we have -- it comes back up to the last data point on this graph to a point which is just about the same as the point immediately prior to surcharge removal.

A Okay.

Q That's the data.

A Okay.

Q And you had indicated in response to my last complete questic

A (Interposing): Uh-huh.

Q (Continuing): That you didn't know how it could come back up here unless there was some kind of disturbance. All right, and that's where we are. Now, my question is --

MR. PATON (Interposing): With the assumption that you gave him?

MR. ZAMARIN: Yes.

MR. PATON: Okay, fine.

Q Now, the question is as a geotechnical engineer looking at this wouldn't that indicate to you that immediately prior to surcharge removal there was no excess pore water pressure but that following surcharge removal there was a drop --

A (Interposing): You want my answer?

Q (Continuing): There was a drop in pore water pressure level that then by the end of November had come back and stabilized?

A That's all?

Q Yes?

A I wouldn't comment anything on that until I do it complete and have complete information before I recommend anything at all.

Q Why didn't you have that problem when you said before that there was 1.23 feet of excess pore water pressure immediately prior to surcharge removal? How come you could do it then and not now?

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A It is because the same seepage is coming, the water leve remains the same and is the same soil it is coming throu

Q All right, but I am telling you the water level is diffe and therefore what you are saying is that you can't make interpretation with that information from what is shown that graph?

A Yes, there is a lot of difference when the water level g down.

Q So what you are saying is when the water level goes down you cannot make that kind of a statement?

A No, no, in comparison to that which I talk on, if you gi the soil details and all these things and lower water le then I can make my prediction.

Q I am not sure whether I understand your answering my que Really all I am saying is then that if in fact the water had gone down in October, okay, if in fact that is what ed then you couldn't -- you couldn't say that there was pore pressure?

A No, I can't say anything on such questions, I can predic existing situation, and with a hypothetical it is very d cult, it is very complicated.

Q So when you answered my question with regard to this 1.2 over here (indicating) were you certain that the pond le hadn't changed during all the time shown on this graph?

A Pond level here (indicating), I assume -- I saw in the drawing it was 627 and then this disappears here (indicating), and I think it was the same.

Q Okay, so you think it is the same all the way through this whole period from the time of surcharge removal through the end of the data on this graph?

A Pond level has a slight variation, maybe six inches or something like that. That I saw on the drawings.

Q I show you what has been marked as Consumers Exhibit Number 2 for identification as of today's date. It is a November 28th 1980 letter to Mr. Lear from Mr. McAllister, and the subject is "Interagency Agreement, Number NRC-03-79-167, Bi-Monthly Letter."

Is that a copy of something that came out of your files and that you gave us today?

A It didn't come from my files, from the branch file.

Q From the branch file?

A It is not my file.

Q Have you ever seen this letter before?

A Let me read this.

Q Pardon me?

A Let me read this.

Q Okay.

A Yes, I have seen this. Yes, I have seen this.

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Q It says in here that the Midland Project SER is to be complete by the end of February, 1981. It says that with a document to be completed in February, 1981, the draft will be considered to be complete on a significant portion of the final SER.

Do you believe that in fact the Corps is going to live up to that commitment to have by the end of February, 1981, that draft complete?

A Yes, I do.

Q It also states in here that the content of testimony for the ALLB hearing is primarily the same as the content of the SER. Do you agree with that?

A Can you repeat it again?

Q Yes. It says in here -- well, I will quote it directly.

"The district will be preparing part of the testimony for the ALLB hearing. The content of the testimony is primarily the same as the content of the SER."

Would you agree with that?

A The testimony?

Q I think you stated something a little earlier that was pretty much the same. In other words, that the SER is going to be pretty much the same as the testimony you are going to be preparing.

A You are asking me if I am now satisfied, if I don't get new working it will be the same as what I am telling, or my

testimony, that I will write the same thing, but it might change, but from the Corps I don't think so, I am talking the entire agency.

Q You do agree?

A Yes.

Q That the SER and the testimony will be the same?

A Part of the testimony will be the same.

Q A part of what will be the same?

A You are taking two days' deposition testimony, so there i lot of things.

Q No, no, you misunderstood. I am not talking about the de tion testimony, I am talking about the testimony that is to be prepared for the hearing?

A Yes.

Q That will be the same as the SER, right?

A Yes.

Q Okay. Returning again to Supplemental Figure 27-32, whic the piezometer elevations versus time plot for piezometer 30, if as you have stated this last data point on this pl represents the stabilized ground water and pore pressure or at least the lower bounds of that, why then wasn't the stabilized level, plus the excess pore water pressure tha say was existing during the surcharge higher than that le

A That's a good question.

Q Okay, yes, it is.

A Very good question. This is not stabilized. This level is not stabilized. I don't know beyond that.

Q You think it is still going up?

A It might be.

Q Okay, fine.

A (Continuing): Then here (indicating) --

Q (Interposing): Why isn't it during the surcharge, if it is not all stabilized but it has got some excess pressure in there why isn't it greater than that?

A I am telling you this because it is early age. That pond had been raising hardly two or three months ago and it takes some time for water level to raise here, it might take four months, six months, one year, I don't know the permeability of that. Here the time ?pse is almost eight months for raising the pond (indicating). Here it has been three months or four months (indicating), so entire seepage from the pond at this point is still in the process of coming.

Q You don't know that?

A No, but that is why I am thinking, because it is not coming in one day or two days, it is continuous until equilibrium is reached so that's the reason there it is low (indicating).

Q The pond equilibrium was reached in three months?

A Well, that also -- no, not if the soil is very poor, just like

in sand it can reach if it is one mile away, but it depen
on the distance and type of the soil inside.

Q If equilibrium had been reached during the time that the s
charge was on would you then agree that based upon that pl
that you have in front of you that there was no excess por
pressure immediately prior to surcharge removal?

A Equilibrium, no, there was equilibrium with this. The wat
wouldn't go down.

Q I am talking about equilibrium from the pond. In other wo
if there had been this level indicated during the existence
of the surcharge load, if during that time equilibrium had
been reached between the ground water table by the Diesel-
Generator Building and the pond seepage, okay, so that you
would not have any further increase at that pond level than
the ground water table by the Diesel-Generator Building?

A It will be increase because when you have surcharge on the
of that it is just like a sponge pressing. This water is n
penetrating that. Once it is removed then it will rise exac
like it is supposed to.

MR. ZAMARIN: Could you read back his answer, please (to Reporter)?

(Whereupon the Reporter read back the previous answer.)

MR. ZAMARIN: I will start again. Are y

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ready?

A Yes.

Q Okay, if you assumed that the point in time in which equilibrium between the pond and the seepage from the pond and the ground water table after the Diesel-Generator Building had been achieved was as indicated by that arrow on here (indicating) that I have marked E for the purpose of equilibrium, and that being at the end of April, would you then agree that this plot indicates no excess pore pressure at the point in time immediately prior to surcharge removal but rather indicates a equilibrium situation at the time of the pre-load, a drop in pore pressure during rebound and then a return to equilibrium

A When equilibrium is reached there that doesn't mean that it w water table, that means water table plus excess pore pressure When you remove that will drop.

Q Then how do you explain it coming back up?

A You see, not here (indicating), this is not equilibrium. That is where equilibrium is reached (indicating).

Q What I am saying --

A (Continuing): In here equilibrium is the same (indicating).

MR. PATON: You are indicating no further changes in equilibrium remains through the end of this chart, is that what you are saying?

A The pond stays at 627.

Q When I am talking about equilibrium, what I am talking about is the maximum charge from the pond --

A (Interposing): Uh-huh.

Q (Continuing): -- at the beginning of May.

MR. PATON: And it stays that way?

MR. ZAMARIN: Well, sure.

MR. PATON: Okay, don't say "sure" because you asked him to assume something else over here (indicating).

MR. ZAMARIN: No, no, that was a previous question.

Q (By Mr. Zamarin, continuing): The pond level stays the same, okay?

A Uh-huh.

Q And the pond level is at 627 and you have maximum seepage from the pond by the beginning of May?

A Uh-huh.

Q All right, then I take it that you still are of the opinion that there is immediately prior to surcharge removal excess pore water pressure and if that's the case then how in the world do you explain this rise at the end of the graph here?

A In this case the pond, this has not reached equilibrium in this particular case and that is what I am questioning. When equilibrium is reached here it drops and it stays. You understand?

Q I don't know what he just said.

A That's the truth.

Q What I am saying is assume on May 1st that equilibrium --

MR. PATON (Interposing): Can we go off the record for a second?

MR. ZAMARIN: Yes.

(Whereupon there was a discussion held off the record; after which the deposition again continued.)

MR. ZAMARIN: I am going to mark this as an exhibit and maybe we can photocopy it.

MR. PATON: Yes, okay. Let me see it just a minute.

MR. ZAMARIN: I want to mark it as an exhibit.

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

MR. ZAMARIN: We can go back on the record.

MR. PATON: That's Exhibit 3, isn't it?

MR. ZAMARIN: Yes.

Q (By Mr. Zamarin, continuing): I have marked as Consumers Exhibit 3, for identification as of today's date, a marked up copy of Supplemental Figure 27-32, which was included with the response of Consumers Power Company to Question Number 27,

and this is the same graph about which I asked you some questions and to which you gave answers.

What I want you to assume now is that at the point in time marked E on Exhibit Number 3, that being May 1st, 1979, the ground water table at the Diesel-Generator Building had already reached a state of equilibrium, with the cooling pond. The maximum seepage had occurred, and would you then look at this entire Exhibit Number 3 and tell me if based upon that curve, with that assumption, that is to point E in time you are of the opinion that immediately prior to surcharge removal there was any excess pore water pressure?

A The reaching of the equilibrium of the water table with the seepage pond has nothing to do with the excessive pore water pressure. Excessive pore water pressure depends upon the load of the surcharge. T[illegible] the excessive load, if the excessive pore pressure has not been dissipated completely it will be a drop in piezometer.

Q You indicated a little earlier that, you explained away what I have indicated here as data point E, that being the data point of the piezometer level at the end of November, 1979, as a result from seepage from the pond, and you explained that then along with this other information on here demonstrated to you that there was excess pore water pressure at point A in time and that is the point immediately prior to

surcharge removal because there had not been achieved a state of equilibrium between the ground water table and the cooling pond, but rather that seepage was continuing to occur and that, therefore, the plotted data between points A and points B on Exhibit 3 in times indicated a state of equilibrium of ground water table which was then increasing at point B as a result of recharge from the pond, right?

A Right.

Q Now, would you agree with me that if there was a state of equilibrium with the bond at point E in time that then these lower points between points A and B on the piezometer readings could not indicate a state of equilibrium of the ground water table?

A The state of equilibrium has nothing to do here with the drop of the piezometer here (indicating).

Q I didn't ask you that.

A That is the answer to the question. You are fixing things.

Q If in fact at point E in time there was a state of equilibrium between the pond and the ground water table, would it have been possible for this period following surcharge removal to have indicated a state of equilibrium that would be lower than that --

MR. PATON (Interposing): Please indicate what period of time?

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MR. ZAMARIN: Let me finish the question.

MR. PATON: Okay, I am sorry, I thought you were finished.

MR. ZAMARIN: Could you read back the question (to Reporter)?

(Whereupon the Reporter read back the previous question.)

Q (By Mr. Zamarin, continuing): Which existed during the time of the surcharge load and during the time of equilibrium with the ground water table and the pond?

A At the level at point E I don't know what is the elevation of the pond. This elevation doesn't indicate the level of the pond. That elevation is pond plus excessive pore pressure.

Q We know that the level of the pond is 627 and that's the assumption all the way through in looking at this graph. It is right here, 627 (indicating).

A What is the level of the Diesel Buildingat that time I don't know.

Q And you have to know the ground water level underneath the Diesel-Generator Building?

A Then I can say what will be here at this time (indicating) once I know what was under the Diesel-Generator Building.

Q Let's look at this plot, all right, and let's say you don't know what the ground water table is --

A (Interposing): No, I don't know what it is.

Q Let's say that you don't know what the ground water table is and I am going to ask you some questions on your expertise as a geotechnical engineer and tell me if we have at point E in time, May 1st, equilibrium between the cooling pond and the ground water table under the Diesel-Generator Building that it then would be possible for the data point after surcharge removal, that is from about the second week of August through the beginning of November --

A (Interposing): Uh-huh.

Q (Continuing): Which show a level less than that after equilibrium is reached and while surcharge was in place to have represented the state of equilibrium in the ground water table?

A Okay. If the pore water pressure has not dissipated here it will be some less. You see it (indicating)? This elevation is shown and is total ground water plus excessive pore pressure.

Q Okay.

A If the total pore pressure has not beendissipated.

Q Then how do you explain the miraculous coming up to point B?

A Because it is rising.

Q What is rising?

A The pond, this water level there is rising.

Q How?

A Because the pond is feeding that.

Q No, way back here at point E in time we have equilibrium.

A Okay.

Q All right, and you say now that something sucked out the ground water table over here (indicating), here after surcharge removal?

A Uh-huh.

Q Yes? What has sucked it out?

A What?

Q All right, we have a point E in time --

A (Interposing): Uh-huh.

Q Equilibrium with the pond.

A Uh-huh.

Q So there is maximum seepage from the pond at point E which is May 1st, 1979, to the end of this graph, right? We are agreed on that. That's an assumption.

A Uh-huh.

MR. PATON: That's an assumption?

A That is here (indicating), and we are assuming and this is not truth, you are assuming that and what I am telling you is that that is not there.

Q We are assuming that.

A If you are assuming that it will be different then you have to assume certain other things there, too.

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MR. PATON: Wait, I'd like to put something on the record. It is clear to me that the Witness is saying that you are asking him to assume something that he construes to be impossible, bearing in mind the facts that are on that chart, and what you are doing is the record is becoming very confused because we are mixing an assumption with fact and the Witness has indicated that he just cannot make that assumption that the chart indicates to him could not be true.

Q (By Mr. Zamarin, continuing): Do you agree with your counsel's statement that I am asking you to assume something that is impossible to you as a geotechnical engineer?

MR. PATON: Bearing in mind the facts on that chart.

Q Yes.

A This might go here like that (indicating)?

Q It might. Doesn't it?

A No, I don't say that because you are assuming something and that is not the assumption on that graph.

Q I am telling you to change only one thing and that is, taking everything else on this graph exactly as it appeared --

A (Interposing): That is not consistent.

Q Exactly as it appeared when it was included with the answer to Question 27 and add one thing and that is the assumption that on May 1st, 1979, the ground water table under the

Diesel-Generator Building was in a state of equilibrium with the cooling pond, that's the only assumption that I am asking you to add and we know that the cooling pond was at 627, and looking at all the rest of the data points, including the last one, how would you interpret that graph?

A Now, that assumption will not be consistent with this piezometer level. That's my answer.

MR. ZAMARIN: Read that back, please (to Reporter).

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

A (Continuing): It might go up, it might go down, I presume it will support the water level which is here (indicating). Where is pore pressure?

Q Dissipated already, maybe?

A No, once --

Q (Interposing): How do you know?

A What?

Q How do you know that it is not?

A Once it is dissipated then it will be level, once it is dissipated completely, there may be a little disturbance there and it will stay there.

Q Are you saying once the pore pressure is completely dissipated, the excess pore pressure is completely dissipated that when

you remove a surcharge load such as that that we had at the Diesel-Generator Building --

A (Interposing): Uh-huh.

Q (Continuing): That there would not be a drop resulting in that rebound such as we have indicated on Exhibit 3?

A There will be drop due to disturbance, maybe, just like they have a lot of other drops, temporary drops right here and finally it will remain on the same level. We have some of these (indicating).

Q What is the maximum period of time in your opinion that that drop could remain?

A No, I can't, I can't answer this thing.

Q Well, can you say that this is too long that is indicated on Exhibit Number 3?

A No, I can't say this thing. It depends on the type of soil in which it is imbedded.

Q Okay, so I take it what you are saying then is that this drop in piezometer reading between what I have marked as Point A and Point B on Exhibit 3 could perhaps be the drop resulting from rebound upon removal of the surcharge, right?

A Some of the drop is clearly shown, it is not shown on this drawing (indicating), but I have a lot of other drawings.

Q I am talking about on this drawing?

A Uh-huh.

Q So that could be a drop?

A No, this couldn't be.

Q Why not?

A Maybe ten days, fifteen days, twenty days, thirty days.

Q Nowwe are getting closer. What is the maximum, what could the maximum be? Could the maximum be 120 days?

A No. I can get with a consistent drawing and show this thing with a drawing.

Q I think you told me that you couldn't tell what the maximum period of time would be before recovery of equilibrium after the drop in piezometer readings as a result of rebound upon surcharge removal?

A Uh-huh.

Q You couldn't tell me what the maximum would be, right?

A Okay, I can tell from your graph which I have seen, 20 days, 15 days from all the drawings I have seen here.

Q All right. Looking just at this drawing could you state with a reasonable degree of engineering certainty that the period of time that it took for these piezometers to return up to data point B, which is the last point on this graph, is in excess of what would be possible for this to still be simply recovery after dissipation due to rebound?

A No, in this particular case you have this long distance, but 80 percent of your drawings showed immediately after, within

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a month, but I don't depend on one drawing.

Q Well, you are now.

Would you read my question back, please (to Reporter)?

(Whereupon the Reporter read back the previous question.)

A No, that is not due to rebound.

Q Will you very carefully listen to my question? Now, that wasn't it.

Could you read it back once again (to Reporter)?

MR. PATON: He did listen very carefully to your question. He says he can't do it, that he doesn't do it on the basis of one shot.

MR. ZAMARIN: He said, no, that this isn't rebound, and that wasn't my question.

Read it back.

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

A No.

Q I take it from your answer to that question then that based just upon the information contained here on Exhibit 3 that it is impossible that this drop in piezometer reading after point A is simply a drop due to rebound and that at point B

it is returning to equilibrium with the ground water regime? That's not possible then, is it on that basis?

A On one drawing, sir, I am not going to give any comment.

Q I think you are, sir, and I am going to sit here all night until you do.

MR. PATON: Wait, I want to put something on the record. Mr. Zamarin is repeatedly asking the Witness to draw conclusions from a plot when the Witness has repeatedly said in his professional judgement he does not draw conclusions from a plot, he draws conclusions from many plots, and if the Witness says that in his professional judgement he does not or cannot draw a conclusion from just this one plot, I think you have exhausted all of the knowledge that can be gained from him if that is the way he feels in his professional judgement, and he simply can't be forced to make some judgement that he says in his professional judgement he can't make. He will answer questions all night, but you can't force him to answer in a certain way.

MR. ZAMARIN: Number one, I am not asking him for a judgement because I don't need that. He was very quick to state some opinions based upon this one plot before and he even calculated the 1.25 feet figure, and I don't know what has happened to strike him dumb suddenly so that now he can't do it when I make an assumption.

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MR. PATON: I'd like the record to show an objection to that statement. I don't think or see any need for that kind of a remark.

MR. ZAMARIN: Well, it is a fact. That's the first point that I have to make. The second is that I hav asked him if he cannot state based upon the information on thi graph that it is impossible for this to indicate simply a dissipation due to rebound and then a return to equilibrium, and that if in fact the correlative of that is true that it is possible that what is demonstrated on here is in fact a drop due to rebound and then simply a recovery over a period of time as indicated on the chart to equilibrium. That's all we are talking about, the time period.

My question is, and I will repeat it because it is too far back to have it reread, is then based upon your statement -- strike that.

You have stated that you cannot say that it is impossible to have taken as long as indicated on this graph, that is between point A and B for the drop in piezomet level due to rebound to then recover to a stabilized reading, then wouldn't you agree that it is possible that what is sho on Exhibit 3 between data point A and data point B is a drop in piezometer readings due to rebound and then recovery back at point B to the stabilized ground water table regime?

A No.

Q All right. Why is that not possible?

A It is not possible because I don't know the state of conditi of the seepage coming from behind and what the water table a the time, as you said here that equilibrium is reached.

Q Then how in the world could you have stated an opinion with regard to this chart before I put that one assumption in and that is the state of equilibrium on there. You have to have the same --

A (Interposing): You don't have water table, and you say the equilibrium is there and this is not consistent with that, and if --

Q (Interposing): Doesn't, sir, doesn't, assuming at point E that we have a state of equilibrium between the ground water table and the pond, only really affect whether in fact we can say that B is a result of increased seepage from the pond isn't that the only difference that that would really make in interpretation of this graph?

A Yes, but if it is increased what is here, if there is no --

Q (Interposing): All I am asking you is by adding the assumption that on May 1st there was a state of equilibrium between the ground water table and the cooling pond, isn't the only difference that that would make in interpreting this graph B, that it would make it highly unlikely, if not impossible

that the rise to point B was a result of increased seepag
from the point we are talking about, isn't that the only
ence that that would make?

A If there is equilibrium that is reached. I have to know
ground water level there, and then it would rise.

Q Well, if in fact you have maximum seepage and equilibrium
point E, then the ground water table has to be at least h
than point B, isn't that correct?

A Is not necessarily.

Q Or at least as high, but it couldn't be below point B, co
it? Could it? Because if it was below point B you would
be able to explain the rise to point B?

A Surely, because it depends upon the water table.

Q Right, okay, so all we have added to this is that we are
adding this assumption that on May 1st we had a state of
equilibrium between the ground water table and the pond, :
that we know that the ground water table was at least equ
to or higher than point B.

A No pore pressure then at that location.

Q That's right, no excess pore pressure.

A You are saying but I am not agreeing to that.

Q I am not asking you to agree to that. You see, your probl
is you are jumping ahead and trying to anticipate where I
going.

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All right, let's take it a step at a time

MR. PATON: Beautiful.

Q Well, I will get you through. I will get you through so that you have to answer the way I want you to. All right, so woul you agree then that if we have equilibrium at point E in time May 1st, between the ground water table and maximum pond seepage --

A (Interposing): That's an assumption. It is not my assumptio

Q That's right.

A I don't --

Q (Interposing): I pulled that one out of the air as far as you are concerned?

MR. PATON: Could you ask him whether he can assume that?

MR. ZAMARIN: I'm not sure.

A Realistically how it is going to happen I can't say.

Q Well, let's assume that it happened.

A I am not assuming, you are assuming. I will not base my opinion on assumption.

MR. PATON: I hate to interject, but I do interject because I want to put something on the record.

MR. ZAMARIN: Why don't you tell your witness to answer. This is ridiculous.

MR. PATON: This is the only thing I want

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to put on the record --

MR. ZAMARIN (Interposing): He doesn't want to make an assumption, and he has to answer questions with these assumptions.

MR. PATON: The only thing I want to say on the record is that you asked him to make an assumption as to the state of equilibrium on May 1st and the Witness has said several times that that is your assumption and not his assumption, and it is not clear to me whether the Witness is able to make that assumption and I would like to ask the Witness are you able to make that assumption?

A I wouldn't like to make that assumption because there is a lot of things involved in that.

MR. ZAMARIN: As an engineer I could ask him to assume the sun isn't going to come up tomorrow.

MR. PATON: Well, I understand but I am asking him if he is able to make that assumption. I am not certain he can do it.

Q (By Mr. Zamarin, continuing): Is it beyond your ability to make that assumption?

A I can assume but that will not be consistent with the truth and that would be all wrong.

Q I am saying to assume this, that it is an assumption.

A I have to have fact, fact.

Q Okay. I am a lawyer, I make assumptions.

A But I don't.

Q Here we are, we are at a deposition, and I am asking you to assume that on May 1st there was this equilibrium between the ground water table and the --

A (Interposing): You are asking me then, and I am not assuming this, I am not going to predict on that unless I do experiment and I get the data and then I will tell you.

Q You are going to assume it --

A (Interposing): No.

Q Is it beyond your ability to make an assumption?

A It would not be beyond my ability. I can assume anything I like but it would be incorrect. What I am going to tell it would be incorrect. I can assume anything.

Q I don't care whether it is incorrect, I am testing your ability or inability --

A (Interposing): I know I am not going to predict something which I don't know exactly what is going on inside.

Q Assume --

A (Interposing): No.

MR. PATON: Let me ask the Witness --

MR. ZAMARIN (Interposing): I think maybe you ought to talk to your Witness or let's get on the phone. Boy, this is nonsense.

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MR. PATON: I am going to put on the record --

MR. ZAMARIN (Interposing): He refuses to make an assumption because he doesn't want to. I mean, baloney. Talk to him, if that doesn't help, you better call somebody.

MR. ZAMARIN: I am putting this on the record. You can stay or depart.

(Whereupon there was a short recess after which the deposition again continued.)

MR. ZAMARIN: All right, you were going to put something on the record?

MR. PATON: Yes. We have had some difficulty with respect to assuming some facts. I have talked to Mr. Singh and I have advised him that it is practice at a deposition, it is acceptable practice, in fact I didn't advise him exactly at this point, I advised him of the rest of it but I am now advising him that it is acceptable practice in the deposition to ask a witness to assume certain facts. Mr. Singh has explained to me something and I agree with him, from his explanation I agree that he is being placed in the position that is impossible for him to deal with and the reason is this, and I want him to listen very carefully to what I say and if I don't state it exactly correct I want

him to please correct what I say.

MR. ZAMARIN: You want me to make t
statement?

MR. PATON: No. I want to state it
if he takes any exception to it I want him to say so.
believe that he has indicated to me that the rise in pi
elevation reflected by Consumers Exhibit Number 3, betw
middle of October and the end of November is, to him, i
sistent with the fact that he is being asked to assume
is that on May 1, 1979, a state of equilibrium with res
the seepage from the pond has been reached, and then yo
proceeding to interrogate him with respect to a plot, h
asked him to assume a fact that the plot itself to him
cannot be true and that places him in an impossible pos

Now, Mr. Singh, if I have not state
your thinking please say so.

A Well, it is not consistent, I agree with that.

Q (By Mr. Zamarin, continuing): Is it impossible?

A I can assume something but it will not be correct, the
I can assume something.

Q A little earlier you indicated that it would not, that
assumption on this plot was not an impossible situation
that right?

A That again is what?

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Q This assumption of equilibrium at E?

A I can assume, but with this elevation that is given, the elevation you have given, the piezometer elevation.

Q Yes. What about the elevation is it that is inconsistent?

A You are asking me to assume equilibrium somewhere here at th elevation (indicating)?

Q At May 1st.

A May 1st.

Q Whatever the elevation is.

A There may be some pore pressure there at that time.

Q There may be? So if you have at the same time the water tab plus pore pressure wouldn't that then lead you to say, if yc assume equilibrium at point E, that in fact accepting that assumption that that would mean that there was no excess por pressure at point E in time, is that right? That's not impossible? You don't agree with that, you don't believe that but that is not impossible, is it?

A That is not impossible?

Q Right?

A Yes, uh-huh.

Q Okay, so it wouldn't be inconsistent?

A No, it wouldn't be inconsistent, but it is not --

Q (Interposing): It is inconsistent with what you believe hap pened but it is not inconsistent with the other data there?

A I don't believe there is pore pressure there.

MR. PATON: Is that now another assu That is the second assumption that there is no pore pres at E, because I believe he was telling you that there is pressure at E and now you are asking him to assume that.

MR. ZAMARIN: Hold it, he can't tell based on the information on this graph alone that there excess pore pressure at point E in time.

MR. PATON: Okay, but he knows --

MR. ZAMARIN (Interposing): He can't me that based on this (indicating).

MR. PATON: He knows independent of t based on the studies he has made that it is his opinion t there is excess pore pressure at this point and now you a asking him to assume that is not true.

MR. ZAMARIN: That's right, just like could ask him to assume that the sun isn't going to come u tomorrow, and he as an engineer can be asked to assume som thing like that and I can do that.

MR. PATON: All we are trying to do is find out what kind of assumptions you are asking him to ma and that is now two.

MR. ZAMARIN: No, the only assumption I am asking him to make is that at point E in time equilibri

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between ground water table and pond, and then to restrict his answer to the information contained on this exhibit, that's all.

MR. PATON: That's all? Can we clarify whether he can make his own assumption on your assumption that says whether or not there is any excess pore pressure at point E?

MR. ZAMARIN: Once assuming point E it necessarily follows, I would think, that then there is no pore pressure at that point unless he can explain to me how that could be so.

MR. PATON: Well, that is contrary to his opinion. His opinion is that --

MR. ZAMARIN (Interposing): Yes, I know, but this is based on the logic that if you make this assumption shouldn't these other assumptions follow from that assumption and those other stated facts.

MR. PATON: Well, ask the Witness.

A You assume that elevation. There is two assumptions.

MR. ZAMARIN: All right, we will see. I will go through it and ask you again to use my assumption and the information on Exhibit 3, and if you have that understanding, if that is what you understand this to mean than fine, I will be happy to have that.

A Sure.

Q (By Mr. Zamarin, continuing): If we assume that on May 1979, the ground water table at the Diesel-Generator Bu was in a state of equilibrium with regard to the coolin that is we had a situation of maximum seepage, then bas solely on the data contained on Exhibit Number 3, and w assumption with regard to equilibrium, how would you in the data contained on Exhibit 3 with regard to whether based on that data there was excess pore pressure that been dissipated immediately prior to data point A?

A By assuming that pore pressure -- excuse me, by assumin state of equilibrium at the pond and ground water table alone I can predict this, but if I have to assume anoth thing, that elevation where it is at point E, that is t ground water is different or somebody says to me pore p is dissipated, that is two things which are known there then I can interpret here (indicating).

Q I see, so that based upon all of your knowledge and all your expertise as a geotechnical engineer or civil engi then it is beyond your ability --

A (Interposing): Uh-huh.

Q (Continuing): Based upon the assumption that at point there is equilibrium between the ground water table and cooling pond, and without knowing what the ground water

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and the cooling pond, and without knowing what the ground
table is, and without being provided as an assumption that
there is no excess pore pressure at point E in time, that
beyond your ability to predict whether there was excess po
pressure existing at the point in time immediately prior t
data point A, is that correct?

A No, I said -- I didn't say that. I need first an assumptic
that water level has reached equilibrium with the pond leve
In other words, I should know the ground water level and a
excess pore pressure, either of the two.

Q Let's say you don't know either the ground water table leve
or whether in fact there is any excess pore water pressure
point E in time. Nobody has told you that. Nobody has giv
you that as an assumption. Taking my assumption with regar
to equilibrium between ground water table and the pond, ta
that assumption and that assumption alone is it beyond your
ability to interpret anything on this Exhibit Number 3 with
regard to whether there might have been excess pore pressur
at a point in time immediately prior to data point A?

A Nobody has told me whether it is pore pressure, okay, exces
dissipated ground water level, but once I see this thing I
see water table has, piezometer level has dropped.

Q Right.

A (Continuing): So I assume, not assume, but I just see that

the piezometer will drop.

Q All right.

A The only thing is that I can see the excess pore pressure in this piezometer elevation which is given right from here to here (indicating) and counting water table plus excessive pore pressure, two things, so once the surcharge is removed the water table is not immediately dropping unless somebody has -- I am sorry, water table in the pond is not immediatel dropping, it remains almost at this time, the same. I am assuming that from the previous drawings given to me, so water table remaining the same and the only thing is droppin is the excess pore pressure. I can see only that is happeni

Q So in your opinion then when you remove a surcharge from a building where all excess pore pressure has been dissipated and you remove that surcharge and there is a rebound you wouldn't expect to see any drop in the piezometer level, is that right?

A Yes, it will be drop.

Q Okay. I believe you said before that what is shown here for the period immediately following surcharge removal, this drop (indicating), that it's possible that that is a drop or account of the rebound, and then --

A (Interposing): No.

Q And at the end of the graph it is coming back up to a level

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equilibrium with the ground water regime. You said that wa
possible before?

A No, that is possible to reach the equilibrium, particularly if there is a disturbance and then it will be gradually a change if the pond level is still high, and if I see a sudd rise then I draw conclusions from that, if that is a steady rise, then that is from the pond, it is coming, but still i is fluctuating and I say it is local disturbance due to cer tain dynamics, the water is flowing fast.

Q But the period here between data point A and B, I believe y testified before that it is possible that that represents a period of rebound and a lowering of the piezometer levels due to that rebound and then a recovery up to point B of equilibrium with the ground water regime.

A I didn't tell that. This is something missing. You haven' given the complete data on this, the other complete data fr this point to this point (indicating).

Q I am talking about --

A (Interposing): That is not drawn correctly.

Q I am talking about what we have here on Exhibit Number 3.

A Uh-huh.

Q And I believe you stated that it was possible that what is represented between what I have marked points A and B as a result of reduction in piezometer levels due to rebound and

then a recovery up to equilibrium with a ground water re
are you saying that is now impossible?

A For this drawing (indicating)?

Q For this drawing.

A You think it is correct drawing?

Q I am just asking you as far as Exhibit Number 3, that for drawing, for what is shown here, the curve that is depict here, it is not impossible for that to represant a loweri of piezometer readings due to rebound and then a recovery back up to equilibrium with the ground water regime, is i

A You verify the information. Supposing you give the wrong data and ask me to predict on that?

Q I am not asking you to verify the data, I am just asking to take this as simply a type of a curve, all right, as a typical representation perhaps of something that might ha happened somewhere and I am asking you if in fact this ty a curve that is shown between what has been marked as dat point A and data point B could possibly be depicting a dr piezometer levels due to rebound and then a recovery back equilibrium with a ground water regime?

MR. PATON: I object to the question because it is so totally open ended it is impossible, with absolutely no assumptions given. For example, are you ask him to say is it possible in a condition where secondary

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consolidation has been reached? In other words, I assume there are hundreds of facts that he could assume. Are you asking him to assume is that possible? Do you want to give him any set of facts? Are you asking him is it possible under any conceived set of facts, is that the question?

MR. ZAMARIN: Okay, the question contains all the information.

MR. PATON: I'm sorry?

MR. ZAMARIN: The question contains all of the information that is intended.

MR. PATON: Okay. I object to the question, the form of the question in that it is so entirely open ended that I don't see how the Witness could possibly answer, but if the Witness can answer the question, go ahead and answer.

A No, with this given data, information, I will not speculate anything. It is just speculation, it is just guessing and you want me to guess something which I don't know. I don't have information so I won't guess.

Q You call yourself a geotechnical engineer, right?

A Yes.

MR. PATON: Wait a minute.

MR. ZAMARIN: Would you cut it out and let me finish?

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MR. PATON: I want to place an objectio on the record.

MR. ZAMARIN: If you would wait until I have finished my question you would see where I am going, a I am sick and tired of you --

MR. PATON (Interposing): When you ask "You call yourself a geotechnical engineer," I don't think that insulting the Witness in this manner is appropriate. I don't see any need for it.

MR. ZAMARIN: Now, Bill, if you would si and if you would put a little bit of distance between your e and your mouth you would have seen what I was doing with re-gard to that question and that's why in the normal exchange and in the normal practice you wait until the question is finished and then you make an objection. You wait until the answer is finished and then you jump in to ask for clarifica tion, you don't do it in the middle, make comments in the middle of the question and in the middle of an answer, no matter how inappropriate or objectionable you happen to think that statement is, because sometimes you might very well be surprised when you hear the whole thing and learn that it isn't offensive or that it isn't objectionable, and I think that you would have found out that that was the case with regard to that question.

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MR. PATON: Mr. Zamarin, my statement i
that you are the one that has repeatedly introduced into th
hearings statements such as you have just made to this Witn
"You call yourself a geotechnical engineer," and I simply d
see any need for that. I don't think it benefits anyone an
I would request that you not continue with that type of rem

MR. ZAMARIN: That wasn't the statement
It happened to be part of a statement I was making before I
was rudely and unprofessionally interrupted. All I am sayi
is that if you would wait until the statements or the ques-
tions are complete that we won't have this kind of a situat
Just wait until the question or statement is complete and s
what it is before you jump into it. I think that is the ap
priate practice and a more expeditious way to proceed.

We are going to have to go back to the
question and answer prior to that exchange. I don't know w
it was.

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

Q (By Mr. Zamarin, continuing): You call yourself a geotechn
engineer and that is intended to communicate to people some
thing about the job that you do and the expertise that you
have, right?

A Uh-huh.

Q You have to answer orally?

A Yes.

Q Okay. And in your experience and expertise as a geotechnic engineer that you intend to communicate not only to the pub generally but to the NRC and to the licensing board in this situation --

A (Interposing): Uh-huh, uh-huh.

Q (Continuing): Is it your testimony that you are without ability to respond to my question about data on this table without having first this data verified as being an accurate depiction of some circumstance and fact, is that your testimony? If it is, fine, then we can move on.

Q No, this data which you have given is not accurate.

Q That's not my question.

A No, sure.

Q Do you know what my question is?

A You want me -- let me hear it again.

MR. ZAMARIN: Would you read it back, please?

(Whereupon the Reporter read back the previous question.)

A I didn't understand that last part.

MR. PATON: I think you can ask to have it read again and if you don't understand the question you can

ask Mr. Zamarin what he means by it.

Q (By Mr. Zamarin, continuing): Are you testifying that it beyond your ability to interpret that graph without knowing that those are actual data points with regard to a certain situation?

A With this graph, yes, with this data given to me I cannot interpret what you want me to tell.

Q I see. It is beyond your ability then to answer the question that I asked you about Exhibit Number 3?

A Right.

Q With that assumption on data point E?

A Right.

Q Okay, super. Do you consider the opinion that you made with regard to Exhibit Number 3 a little bit earlier that there was 1.25 feet of excess pore water pressure that hadn't been dissipated to have been untrue?

A Based on my, on other drawings like that I have drawn my conclusions based on all.

Q Okay. Tell me what the distance is between the data point immediately prior to surcharge and the lowest point to which the piezometer level fell on each of those that you refer to

A I don't remember.

Q You don't know?

A No.

Q Tell me something about each of those?

A In some cases it was three feet, two feet, one feet.

Q Was the maximum three feet?

A Around about three or three and a half.

Q Three and a half feet would be the maximum?

A I am not exactly sure how it was.

Q Well, tell me with as much assurance as you need to have in order to form the conclusion that you testified to a little earlier, in reliance not only on Exhibit 3 but on those also, and be as precise as you need to be for this conclusion that it is three and a half feet plus or minus what, two inches?

A Yes, yes.

Q What was the minimum?

A I don't remember minimum. Maximum I can say three and a half plus or minus.

Q And what about the minimum?

A No, minimum I don't remember exactly.

Q Do you remember whether it was less than three feet?

A Yes, sure.

Q Less than a foot?

A No, I can't say that, you know, exactly. Definitely less than three.

Q Less than two feet?

A Yes, less than two feet.

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Q So somewhere between 23 inches and a fraction of an inch?
A No fraction. What do you mean, the minimum?
Q Yes?
A Twenty-three and what?
Q Twenty-three inches and a fraction of an inch. I don't want to say zero.
A Between you are saying?
Q Yes?
A I told you that I don't remember less than one foot, if it is less than one foot. You asked me that if itwas less than one foot.
Q You said you didn't know whether it was less than one foot bu that you knew that it was less than two feet?
A Yes, I know it was less than two feet.
Q Some place between less than 23 inches and something that approaches zero?
A Twelve inches.
Q Oh, I see. You know that it was greater than 12?
A No, I say between or below two, I don't remember.
Q So it could be?
A It could be, yes, sure.
Q So at some place between 12 inches and something that approac es zero?
A Yes, but I don't remember.

Q That is as precise as you can get, 23 to zero, in that ran
A Yes, but in this range I don't know (indicating).
Q That is precise enough for you to draw the conclusion that you stated with regard to there being 1.23 feet of excess p pressure that wasn't dissipated prior to surcharge removal, that correct?
A 1.25.
Q Right, that's what you said?
A In which case?
Q In Midland at the Diesel-Generator Building?
A 1.23, did I tell any time?
Q That's what I thought you said, 1.23 feet of undissipated p water pressure.
A In response to a question right now?

MR. PATON: I can't tell you.

Q That was earlier when I asked you to look at this (indicati
A Oh, on this particular graph here, this I read from there (indicating). I measured -- I didn't have a scale, nothing just with my eye I estimate. That is an estimation.
Q You estimated it to be 1.25 feet and you said that you were able to make that kind of a conclusion based upon this grap (indicating)?
A This graph here.
Q Plus all of the others.

A From the graph that I see and the only possible thing I can think is that this is pore water pressure.

Q And the reason I am referring to those is that you say that you can make that kind of a conclusion based upon Exhibit 3 but you can't answer my question which I think was a little short of that, the reason for that is because you also know about all of these other graphs, these other piezometer reactions?

A Yes.

Q And I'd like to find out how precise your recollection of those have to be to give you confidence in that conclusion that you stated about 1.25 feet, so I am asking you if having the minimum drop on all of those as being in a range of two inches is precise enough for you to state youropinion based upon Exhibit 3 and your knowledge of what you say was in those others, that it is 1.23 feet of pore water pressure that wasn't dissipated?

A I didn't get your question correctly. You say 23 inches, 1.25 inches, 1.23 inches.

Q You told me that the reason that you had the ability as a geotechnical engineer to draw conclusions based upon Exhibit Number 3 with regard to there having been 1.25 feet of undissipated excess pore water pressure prior to surcharge removal was because you also knew about information that was

contained on other graphs?

A For this particular one, I read this graph (indicating) a told you, but I have idea for the other graphs you gave m read.

Q That's right, I gave you this one. I gave you Exhibit 3 you stated conclusions based upon Exhibit 3.

A I read this thing from there and said there was a drop (indicating).

Q Right, and you stated a conclusion based on just the info tion contained on this?

A You show me the graph and I estimated it.

Q And was that conclusion based just on the information con tained in Exhibit 3?

A This here 1.25 we have measured some others, from other d ings, too, and you say that is piezometer pressure and th after pressure, so I found both of them on there, both fo which you have given me and I measure the thing and found

Q You have both or all of the information given here. Coul have reached the conclusion that 1.25 was excess pore pre that hadn't been dissipated based on Exhibit 3 alone?

A Based on that, yes. I did have some information on that certain particular things but certain particular things n

Q Define excess pore pressure?

A Excess pore pressure, suppose in a saturated soil you put

load on that and then the water try to squeeze out and try to get out of this due to the pressure and it can't get out because the pores are so small, and if it is sand it could quickly get out, but in case of clay it takes some time, so that excess pore pressure, that excess force try to push the water out of that and that is above the hydrostatic pressure.

Q All right. Can you define excess pore pressure without reference to a saturated soil?

A Well, in case of unsaturated soil it will be reached -- even partially saturated soil, you can take excess pore pressure, it can be created --

Q (Interposing): You can create it, is that what you said?

A Yes, because -- I am sorry, go on.

Q Okay, my question was you defined excess pore pressure by referring to saturated soils and I want you to define excess pore pressure without referring to saturated soils. Give me a definition of it that doesn't use the term saturated soils ifyou can.

A Take a sponge, put in water and then watch you put your hand on that and the pressure is created in this water at that point and squeezing out so that pressure on the sponge at that time is excess pore water pressure. The water inside the sponge is experiencing some kind of pressure.

Q And is that the pressure that would be analogous to excess

pore pressure?

A It is excess pore pressure.

(Whereupon there was a short recess which the deposition again continue

Q (By Mr. Zamarin, continuing): Okay, what kind of piezom were used in connection with the Diesel-Generator Buildi surcharge?

A Well, you have a stand pipe piezometer, it is known as a pressure piezometer.

Q Stand pipe, is that what is commonly referred to as an o system piezometer as opposed to a closed system?

A It is open system, yes.

Q All right, and is that what would be commonly styled a ra reacting piezometer?

A Yes, I heard this thing written in your report that is dc rapidly. There is no time lag between the pressure and t reading, very few minutes or seconds maybe.

Q I am sorry, you dropped your voice. What was the end of

A There is no time lag in the pressure reporting.

Q Okay, and is it important for you to know as you review t piezometer data and these graphs the type of piezometers that you know whether it is the slow reacting which has a or the fast reacting which doesn't?

A It is the fast reacting so I assume what they have writte

correct.

Q Well, my question is is it important for you to know in interpreting the data what type of piezometers they are using?

A It is important that there isn't any time lag, yes.

Q It is important what?

A There shouldn't be any time lag in the report of this and how much pressure it is indicating.

Q Okay. Really what I am getting at though is if you were to look at this data and, for example, you say it is a quick reacting --

A (Interposing): Uh-huh, piezometer, yes.

Q (Continuing): If you look at this data and you think that it is a slow reacting one, would that affect your conclusions perhaps?

A I am not assume. I not say that is slow reacting when I am given it correctly.

Q Really what my question is is would you -- strike that.

Would an engineer who is looking at piezometer data or piezometer graphs with respect to a surcharge be likely to come to wrong conclusions if he made a mistake in what kind of piezometer had been used?

A Yes, if there is a time lag piezometer the excess pressure you are reading is not at the time it is taking place. Suppose it takes one year to reach the water level on the top of

piezometer, definitely it is not correct.

Q Okay, and also if it were a slow reacting piezometer you might not see all of the dissipation of pore pressure because it might have been dissipated more quickly than the piezometer could record it, right?

A It depends. Suppose you are in a clay then dissipation depend on the coarseness and the permeability of the clay. If you ar in sand it will go fast.

Q When you were assigned to this Midland Plant did anybody give you any guidance as to what was meant by the term "reasonable assurance"?

A Reasonable assurance?

Q Uh-huh, have you ever heard of that expression before?

A I have heard of it.

Q Did anybody ever tell you what it meant?

A No, didn't tell, but as a professional engineer I understand and am able to tell reasonable assurance means that it satisfies at least minimum requirements.

Q Okay.

A (Continuing): Of the code.

Q Of the what?

A Code, code of practice.

Q Oh, the code, all right.

A You know, the different codes of practices.

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Q Have you read the December 6th, 1979 order?

A I have read, sure, I have read once or twice that December 6, 1979.

Q What is your understanding of what the expression "reasonable assurance" means as it is used in that order?

A If you give it to me I can read again. I don't remember the exact wording and all this thing, and in what context they have used that. I have to refresh my memory.

Q So as you sit here now you don't have any recollection of what the term "reasonable assurance" means to you in relation to that December 6 order?

A Where it was used I don't know. It must have been. I mean, I am not telling you it was not. It must be.

Q What standard are you using in your review of the soils issues for Midland?

A Standards? I will use the state of the art which has been followed by the Corps of Engineers, for the Navy, Navy BuDock's, and now it is Navy BuDock's, but before it was NAV FAC, DM-7, something like that. It used to be Navy BuDock's.

Q Do you apply any notion of reasonable assurance to your review?

A Reasonable assurance? I tell myself if in my definition that it is reasonable once it has satisfied the minimum requirements. Suppose you have factors that go up to 1.5 and somebody give

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me something, but at least you satisfy the I.S. That's reasonable.

Q Have you been working full time on Midland since May, 1980?

A Yes.

Q Are there ever any instances where you have to make a judgement as to reasonable assurance where there is no code that applies to that particular situation?

A No, I have never run into that. I have always worked with a code.

Q You never have had to deal with a situation for which there was no code?

A No.

Q Have you had any experience with undisturbed sampling?

A Undisturbed sampling? I have done on testing. I have done some testing.

Q Okay, have you actually done the extracting of samples from the earth when you say you have done some testing?

A Yes, I have done that. Actually, let's see, I didn't do that. I watched it being done because there were people that were doing it and I was supervisor of the crew, so I used to go and supervise it and see this thing done. The testing I have done is where you have four people doing it together, one doing the reading as to the testing and one was taking the samples, yes, so I have done that.

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Q Okay. With regard to watching a crew actually extracting samples, was that out in Arizona?

A That was in Arizona.

Q And what is the extent of the experience that you have had with regard to the running of the tests that you just mentioned?

A Running the tests? Well, the test -- the testing means taking some samples. It was at Wayne State in the City.

Q Wayne State?

A Yes, so the disturbance is there so it will effect the actual strength, but there is some way to correct this thing.

Q How?

A Well, I did this, I read this. There is this the article by Shmartmann --

Q (Interposing): Who?

A Shmartmann, I don't know how to spell, but it is Shartmann, and once you --

Q (Interposing): Oh, that's a guy's name?

A The name of the guy, and --

Q (Interposing): Oh, I see.

A (Continuing): He has developed this correction, and I don't know how you spell the name.

Q Okay, you are right, it is Shmartmann, S-h-m-a-r-t-m-a-n-n?

A Yes, Shmartmann, he has some kind of correction so we apply

this thing and it has been accepted by the geotechnical engineer so I consider that definitely there were some disturbance.

Q Have you made settlement predictions on the basis of consolidation tests?

A Yes, I have done this, too. Very minor, it was not a big structure, a small structure.

Q Bigger than a doghouse?

A Yes, it was bigger than a doghouse.

Q What was it?

A It was done in -- I was in bridge design. It was with a foundation.

Q Was it a bridge?

A Yes, a small bridge.

Q How long ago was that?

A It was long ago. It was in India.

Q Okay, is the bridge still standing?

A I think it is there. I have not seen it.

Q How long a bridge was it?

A Oh, it was 30 feet span.

Q What was the bridge used for? I mean, was it an automobile bridge or a foot bridge?

A Automobile bridge.

Q Were the settlement predictions that you made with respect to

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that bridge project accurate?

A I didn't go to see this thing.

Q You don't know, it might be a tunnel now, right?

Does the Shmartmann procedure for correcting --

A (Interposing): No -- I am sorry, go ahead.

Q Does the Shmartmann procedure for correction of sampling disturbance apply on compacted soil?

A Compacted soil, I don't have idea. I use for pre-consolidated that is where I use this thing, but in fill material I might use it. I don't have experience in that, I don't use.

Q You don't know whether in fact it would apply for a compacted soil?

A No, for this kind of thing if I have problem I ask my supervisor.

Q What do you think he would say to you or don't you know?

A Oh, I don't know, but he has 30 years experience, 35, so he must have done it before.

Q That's Bill Otto?

A Yes, so this kind of thing I come across and immediately I consult.

#9 Q Have you ever consulted with him to see if in fact with regard to the type of fill that has at least had some compaction effort applied to it under the Diesel-Generator Building, it

would be possible to perform that Shmartmann correction?

A Yes, that happened, I don't know, many times and he said that is okay.

Q He said it would be okay to apply that Shmartmann correction to the soil that had been at least partially compacted?

A Oh, he didn't mention the name of Shmartmann, but whatever is reasonable, we follow the state of the art, follow that one and that would be all right.

Q Do you accept Mr. Otto's guidance without questio.?

A I discuss with him. I question him. He shows me the guidance, the Corps of Engineers manuals and all of these things.

Q For example, if he tells you to use that Shmartmann correction with regard to sampling disturbance for borings that would be taken at the Diesel-Generator Building, you would say that that is okay, is that right?

A No, I myself, I have read about him and so it is not him. I take from him the Corps of Engineers manuals, it has similar correction.

Q Well, I am asking about applying that Shmartmann correction to compacted soil as opposed to notably consolidated soil?

A Yes, I will use it.

Q And would you use it simply because Bill Otto told you it would be okay?

A No, I have never done this thing myself on compacted soil.

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Bill Otto showed me and said I could use it.

Q All right.

A That is why I asked him. I have reasonable assurance bec he has 35 years experience and I have to take guidance fr him.

Q But there is no code that you can refer to?

A No, there is no code mentioned on this thing.

Q Other than for the bridge, that about 30 foot bridge that worked on in India, have you ever had occasion to make an other settlement predictions based on laboratory test res

A I have done, not actual practice, but I have done in scho and some problems, but I never test for it actually.

Q Have you ever had any experience with taking borings in d that had the reservoir behind them filled?

A No.

Q Do you have any knowledge with regard to whether taking s borings carries a risk of inducing failure in a dike?

A This kind of matter I take advice from Mr. Jim Simpson.

Q Okay, so youre expert on doing damage to dikes is Jim Sim

A Jim Simpson, yes, I consult with him three or four times telephone and in person.

Q What did he say about that?

A He said that the Corps of Engineers drill holes almost ev day somewhere.

Q Did he tell you about all of the floods that have resulted?

A No, no, he said that he had experience and he knows it is okay.

Q Have you had any experience in evaluation of underpinning design?

A No.

Q Have you had any experience in evaluation of driven piles design?

A Yes, driven piles, yes, that was my job.

Q Okay, why don't you tell me about your experience with driving piles?

A It wasn't in construction, I designed it and it was constructed.

Q Tell me the extent of the experience you have in designing driven piles?

A Well, I design 30, 40 bridges with those.

Q Thirty or 40 bridges?

A Yes.

Q And those bridges were supported on driven piles?

A Yes. Not in all cases.

Q Is that right, and were these bridges built here in the United States?

A Yes, Pennsylvania.

Q Are they all standing?

A Interstate 90 -- no, Interstate 80 is there, too, Interstate 80.

There is one bridge which has pile design and there are some on other U.S. routes, but they are not interstate, but Interstate 90 there was only one bridge I was involved with.

Q Tell me how you go about designing a pile?

A You have there, they give bearing capacity, they go and test the soil and find out the skip friction and the end bearing, so based on that, and I don't remember the formula, but there is some formula in books that you use and find out on all thes things.

Q You find out the depth to which you have to drive the piles?

A How you drive the piles and on which you have a given loads such as hundred tons, 50 tons, based on that according to the length of the pile.

Q What do you test the soil for?

A Oh, shear strength.

Q What else?

A Shear strength, the way you measure parameters used to test the distance.

Q And you actually test it in the same hole in which the pile is going to be driven or do you go out there and take a boring and drive the pile right down that hole?

A No, at the site the borings are taken and you test it and record the results and use it.

Q You just take the borings in the general area of where the

pile is going to be driven?

A Sure. It depends on the extent of the bridge where you do it.

Q Is there any kind of a load test that you can or that you generally do when you are installing piles?

A Yes, they do load test, too.

Q And describe what that load test would be like?

A They put -- they drive the piles -- I don't know it exactly. I have manuals and they load test it and measure the deflectic and then base that -- generally in Pennsylvania they do three times the actual load it is going to carry.

Q For the bridges?

A For the bridges, they have 2.5 to three times, you know, they apply that force but I was not in testing.

Q And in your opinion would driving a pile to refusal and then testing it to failure give adequate information with regard t the design parameters?

A Drive it to refusal?

Q In other words drive it down until it won't go any more --

A (Interposing): You mean drive the pile to refusal and then --

Q (Interposing): And then test the pile to failure?

A No.

Q I am not talking about the piles you are going to use, I am talking about doing this perhaps in a situation that is near where the piles are going to ultimately be driven. Would that

provide you --

A (Interposing): We never test piles like that, driving to refusal.

Q Would that in your opinion, however, provide adequate parameters for design?

A There are a lot of things, it depends on what kind of soil you are driving, such as within fill material --

Q (Interposing): Let's assume that we have -- I am sorry, what did you say?

A Fill material.

Q Fill, f-i-l-l, fill?

A Yes.

Q All right, there would be a problem then, wouldn't there?

A Yes, because of the settlement of the fill. In the future we havekind of pressure d velop on the site of the piles.

Q Negative skin friction?

A Skin friction, then it try to pull the pile down and in excess of that at which the pile had been tested.

Q Is it possible to conservatively predict the skin friction and then test the piling taking that into account?

A Sure you can do it.

Q And in your opinion would then that along with driving the pile to refusal and testing or loading to failure provide adequate parameters for the design of the piles?

A Driving the pile to refusal?

Q Loading it to failure?

A No, that wouldn't give the skin friction.

Q No, no, I am not saying that. I am saying that you would drive it to refusal, load it to failure, make a conservative prediction with regard to negative skin friction --

A (Interposing): And you are going to ask me how you would make the prediction of negative skin friction.

Q (Continuing): Is it possible to predict negative skin friction by doing a pullout test?

A On that there are a lot of discrepancies, in that there are a lot of discrepancies.

Q Okay, tell me all of the discrepancies about which you know in a pullout test for predicting skin friction?

A First when you pull out the pile you stretch the pile, the pile is stretched and then there is a Poisson's ratio so that when you pull the pile in this direction (indicating) the pile will contract laterally.

Q That's right.

A (Continuing): And then it will lose the contact with the soil.

Q I see. In other words -- all right, and, therefore --

A (Interposing): That's one reason.

Q What is another?

SINGH

A The other reason is that when the pile is in position the weight of the soil creates lateral pressure to the pile, the weight of the soils around the piles and that weight of soil creates or increases the skin friction, the friction on the pile and if that decreases due to certain reasons then that weight is reduced because of the above action.

Q Does Poisson's ratio depend upon the direction of loading?

A Yes.

Q Tell me about it.

A If you pull this way (indicating), longitudinally, then it will contract laterally, but from what I understand you are trying to ask me, if you pull it this way (indicating), you know, it depends upon the -- I don't know what you are asking, explain to me. I was trying to explain something but I don't know if I am answering your questions.

Q Okay, I will tell you in a minute. Are piles supporting those bridges in Pennsylvania subject to negative skin friction?

A Very few. Some are in four or five feet of fill and the rest of them are in the natural soil so I don't think there would be skin friction.

Q So you made allowance then for skin friction?

A No, I didn't.

Q Is that a mistake?

A No, it wasn't a mistake.

Q Are you aware of any bridges that are supported on piles which are subject to negative skin friction?

A I knew one in Arizona and the whole thing went down, the whole bridge went down because of the skin friction. I knew. I am not involved in that one.

Q That wasn't one you designed?

A When I joined the Department, my chief engineer, because I had been involved in similar things, he gave me the information.

Q When you say you had been involved in similar things, are you suggesting you were involved in bridges falling down?

A No, similar repair. I come across because he gave me example that it happened.

Q Okay. How does one account for negative skin friction in designing a pile?

A If he has a chance his pile will not be subjected to that negative skin friction, and I don't think he will consider it.

Q Let's say you have got a situation where you are going to drive a pile and fill. How do you account for negative skin friction, is there any way to do it?

A I would test the sample.

Q You do what?

A Sample, sure, test it for the settlement and find out how much it will settle in the next 40 years, 50 years and based on that I will make this testing.

SINGH

Q Basedon that you can predict or calculate negative skin friction?

A Yes.

Q To what extent does this Poisson's Ratio affect the results of a pull test?

A I can't say that. I have to test it and then find out. I can't tell you right now how much it will affect this.

Q Is there some kind of --

A (Interposing): There is a certain percentage that it will be reduced.

Q Do you know whether that percentage reduction exceeds 50 percent?

A I don't think it would go in that range, no.

Q Do you think it would be closer to about five percent?

A I think it would be more than that. I mean, I am guessing. I am not going to guess any more.

Q Give me your best --

A (Interposing): No, not 50 percent, I know that.

Q It is not 50 so then I suppose if you did a pull test and then factored the results of that by one and a half you would take care of the stuff that Poisson was worried about?

A There are other factors there because there is an uplift because you are reducing the lateral load on the pile because of the pull and that would be another factor in reducing it. I

told you when the soil is around it it creates, it grips the pile --

Q (Interposing): Yes.

A (Continuing): And once you pull the pile out the weight is lifted because of the friction of the pile so all of the flow is not acting laterally in the pile so that will affect it, too.

Q Wait a minute. That doesn't seem to make sense to me. When you have the pile, I can understand that there is a lateral load from the soil --

A (Interposing): Okay, on the side.

Q (Continuing): But when you start lifting that pile and friction is causing some uplift on the soil that doesn't change the load?

A In location, at any location lateral load is dependent on the vertical load.

Q The vertical load of the pile or of the soil?

A The soil around it.

Q Of the soil or of --

A (Interposing): It is depending.

Q When you are pulling a pile out wouldn't you in effect be increasing the effective vertical load of the soil?

A No, no, you are decreasing it.

Q Decreasing it?

SINGH

A (Nods affirmatively.)

Q All right, it just seems to me because of this negative skin d out friction what you are doing, it seems to me that you would be increasing the relative vertical load of the soil with respect re- to the pile?

A I suppose at 30 feet you can decrease it, but let me say that I am not making this thing, somebody has already established some- this thing. I am not doing this, you know, I know you have a right to question this, but somebody has done this. ht?

Q In your opinion is it possible without predicting settlement to 'ou make a reliable allowance in pile design for negative skin friction?

A Repeat the question for me, please.

MR. ZAMARIN: Sure, read it back. and

(Whereupon the Reporter read back the previous question.)

A No, in my opinion it is not.

Q In your opinion there is nothing else in the universe that can you be done other than predicting settlement to reliably predict Legative skin friction, right?

A At the same time you have to satisfy the requirements of the state of the art, what is practiced now days.

Q What is the state of the arts?

A Find out the frictional force.