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# Transcript of Proceedings

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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: In the Matter of: :  
: :  
CONSUMERS POWER COMPANY: : Docket Nos.: 50-329 OM  
: : 50-330 OM  
(Midland Units 1 and 2): : 50-329 OL  
: : 50-330 OL  
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DEPOSITION OF FRANK RINALDI

Bethesda, Maryland

Tuesday, 6 January 1981

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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: 50-330 OL
  
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DEPOSITION OF FRANK RINALDI

Bethesda, Maryland

Tuesday, 6 January 1981

Deposition of FRANK RINALDI, called for examination  
by agreement of counsel, at Room 422, Phillips Building,  
7920 Norfolk Avenue, Bethesda, Maryland, at 9:00 a.m.,  
before William R. Bloom, a notary public in and for the  
District of Columbia, when were present on behalf of the  
respective parties:

On behalf of the Applicant, Consumers Power Company:

MICHAEL I. MILLER, Esq.,  
Isham, Lincoln and Beale,  
One First National Plaza,  
Chicago, Illinois

JAMES E. BRENNER, Esq.,  
Consumers Power Company,  
212 W. Michigan Avenue,  
Jackson, Michigan

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On behalf of the Regulatory Staff:

BRADLEY W. JONES, Esq.,  
Office of Executive Legal Director,  
United States Nuclear Regulatory Commission,  
Washington, D. C.

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C O N T E N T S

Witness Examination

Frank Rinaldi 4

Rinaldi Deposition Exhibits Identification

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P R O C E E D I N G S

Whereupon,

FRANK RINALDI

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

MR. MILLER: Let the record show that this is a  
deposition of Mr. Frank Rinaldi, R-i-n-a-l-d-i, taken at  
this time and place pursuant to notice and with the agreement  
of Counsel.

DIRECT EXAMINATION

BY MR. MILLER:

Q Mr. Rinaldi, will you state your name for the record,  
please?

A Frank Rinaldi.

Q By whom are you employed?

A By the NRC, Nuclear Regulatory Commission.

Q And where are you assigned as a work station?

A Structural Engineering Branch of the Office of  
Nuclear Reactor Regulation, the Division of Engineering.

Q And your office is in Bethesda?

A Yes, sir.

MR. MILLER: I would like the Reporter to mark as



eb2

1 Rinaldi Deposition Exhibit 1 a one-page document that is  
2 Mr. Rinaldi's resume and professional background.

3 (Whereupon, the document  
4 referred to was marked as  
5 Rinaldi Deposition Exhibit 1  
6 for identification.)

7 BY MR. MILLER:

8 Q Mr. Rinaldi, I show you a document that has been  
9 marked as Rinaldi Deposition Exhibit 1 for identification and  
10 ask you if you prepared that document.

11 (Handing document to the witness.)

12 A Yes.

13 Q Is it true and accurate to the best of your know-  
14 ledge?

15 A Yes.

16 Q Are there any changes that you want to make, or  
17 additions?

18 A No.

19 Q Among your professional qualifications is the  
20 statement that you're a member of the Main Committee of the  
21 ACI-ASME Committee on Concrete Pressure Components for  
22 Nuclear Service.

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When did you become a member of that Committee?

A Let's see. It's been-- I don't know exactly the date but it's been at least two years on the Main Committee.

Q And prior to that time had you been a member of any other Committee?

A I was a member of the same Committee but on a Working Group on the design of containment, containment structure, the Working Group on containment structure.

Q Perhaps you could just explain for the record what the difference is between the Working Groups and the Main Committee.

A The Main Committee controls an approximate three Subgroups and each Subgroups may have two to three or four Working Groups under it. The Working Group on concrete containment reported to the Subgroup on design, for example, and the Subgroup on design reports to the Main Committee.

So the Main Committee oversees all the work by all the Subgroups and all the Working Groups. It's approximately 24 people, members of industry and consultants and government, and it's a national code used internationally.

All right.

Now the hierarchy is Working Group,--

eb4

- 1           A       Subgroup.
- 2           Q       -- Subgroup, and then--
- 3           A       Main Committee.
- 4           Q       -- Main Committee?
- 5           A       Yes.
- 6                    And the Main Committee-- You see, this is a joint
- 7 ACI-ASME, and then this part of ACI reports to the ASME com-
- 8 bined....You see, the Main Committee is for combined ACI-
- 9 ASME.
- 10          Q       Did you have any specific task when you were on the
- 11 Working Group on concrete containments?
- 12          A       No. Our main task is to try to make sure that the
- 13 Committee members are aware of the NRC regulations and guides,
- 14 Regulatory Guides, and that we keep informed of what the
- 15 Working Group and the Code body itself proposes and passes as
- 16 design guides to the industry.
- 17                    So it's a sort of mutual benefit for them to know
- 18 what our ideas are and for us to know what they are planning
- 19 to do in the design industry.
- 20          Q       During the time you were on the Working Group did
- 21 it formulate any industry standards in which you took part?
- 22          A       No. As a policy, we try not to initiate anything.

eb5

1 We're just sort of advisory and information -- information-  
2 wise. We do not take any lead part in initiating anything for  
3 them.

4 Any rules and regulations that we initiate are in  
5 the form of Regulatory Guides, NRC Regulatory Guides or Staff  
6 Positions.

7 Q Well, when you said "we" in your previous answer,  
8 are you referring to NRC personnel?

9 A Yes.

10 Q Okay.

11 During the time that you served on the Working  
12 Group, did the Working Group itself formulate any standards  
13 for concrete containments?

14 A Well, the standards was started in 1973, and then  
15 was amended in '75, a major revision. But all along, each  
16 meeting, you know, new changes are adopted and proposed by  
17 the members of the group, and mostly from A&E and fabricators,  
18 I guess.

19 Q As a member of the Working Committee do you vote?

20 A Yes.

21 Q Even though you are an employee of the NRC?

22 A Yes, I vote.

eb6

- 1 Q All right. Let me just make sure I understand:  
2 The Working Committee dealt only with concrete  
3 containments. Is that correct?
- 4 A Yes.
- 5 Q And the Main Committee deals with not only concrete  
6 containments but all concrete pressure components for nuclear  
7 service. Is that correct?
- 8 A Yes.
- 9 Q And for how long had you been a member of the  
10 Working Committee?
- 11 A Officially I believe since 1975.
- 12 Q And since 1974, have you been a Senior Structural  
13 Engineer in the Structural Engineering Branch, Division of  
14 Engineering, Office of Nuclear Reactor Regulation?
- 15 A Yes.
- 16 Q Okay.
- 17 Are you a member of any other professional societies  
18 besides this ACI-ASME Committee?
- 19 A Yes. I'm a member of the American Society of  
20 Civil Engineers. I was. I don't think I've kept up my dues.  
21 As of this writing I don't know whether I am or not.
- 22 Q Have you published any papers, any professional



eb7

1 papers?

2 A I don't think they were printed but they were  
3 presented at meetings. I think there was one in Milwaukee  
4 some time ago about the NRC endorsement of the Code, Division  
5 2 of the ACI-ASME Code.

6 And we published a report on a Spanish nuclear  
7 power plant, Lemoniz. I was a consultant to the International  
8 Atomic Energy Commission and we published a report early in  
9 1980.

10 These are recent reports I've been associated with.

11 Q All right.

12 When you said you presented a paper regarding the  
13 NRC endorsement of the ACI-ASME Code, was that to an ASME  
14 meeting?

15 A Yes, a convention.

16 Q And what year was that?

17 A I believe '79.

18 Q And would that paper be found in the proceedings  
19 of that convention?

20 A No. There was an agreement that we didn't have  
21 time to write it up so we just made an oral presentation on it,  
22 and it was agreed like that. An exception was made in that

eb8

1 case.

2 Q And what specific responsibility did you have for  
3 the report on the Spanish nuclear power plant?

4 A I was the structural member of a five-man commis-  
5 sion to review the design and the problems with this plant.

6 Q And that report was published when?

7 A Early in 1980. I can't remember the date exactly.  
8 It was published by the International Atomic Energy Agency.

9 Q Mr. Rinaldi, prior to February of 1980 had you ever  
10 been assigned to perform any function for the Nuclear Regula-  
11 tory Commission with respect to the Midland Nuclear Power  
12 Plant?

13 A No.

14 Q And when were you first assigned to the Midland  
15 Project?

16 A It was early in 1980. I don't recall the exact  
17 date. I have it in my notes, and I think your lawyer has  
18 reviewed that. It's on one of the pages.

19 Q And since you were assigned to Midland, approxi-  
20 mately how much of your time has been spent on the Midland  
21 Project?

22 A Approximately 20 percent of the time, 20, 25 percent.

eb9

1 Q I take it then you have other assignments with  
2 respect to review of structural design of other nuclear power  
3 plants?

4 A Yes.

5 Q Is that correct?

6 A Yes.

7 Q Would you identify those for us on the record?

8 A The current ones that I have are Waterford 3,  
9 Comanche Peak, D. C. Cook. I have had other plants that I  
10 have passed on to other people, but currently these are the  
11 plants that I'm responsible for.

12 Q All right.

13 And who made the assignment of the Midland Project  
14 to you?

15 A My branch chief.

16 Q Who is that?

17 A Dr. Franz P. Schauer.

18 Q And what's the name of the person who was your  
19 predecessor as structural reviewer?

20 A Romuald Lipinski.

21 Q Would you just describe for us briefly what your  
22 duties as Senior Structural Engineer are with respect to the

eb10

1 Midland Project?

2 A Well, this transfer occurred subsequent to the TMI  
3 and our staff was considerably reduced, so we also have some  
4 consultants which were hired because we didn't have suffi-  
5 cient personnel to help us in the review. And these people are  
6 from Naval Surface Weapons Lab -- Center I think is the  
7 exact name of the place.

8 So I have monitored their review of the plant  
9 during this time.

10 Q Have you personally done any calculations or  
11 evaluation of the structural adequacy of the Midland Plant?

12 A I have reviewed a great deal of the information  
13 submitted but I have not reviewed a hundred percent of it.  
14 Since we have the consultants doing this review, I have re-  
15 viewed a large percentage of it but not a hundred percent.

16 Q Have you personally done any calculations to verify  
17 the structural adequacy of the plant?

18 A No, I have done no calculations, just reviewed the  
19 criteria.

20 Q When you say you reviewed the criteria, what  
21 criteria are you referring to, sir?

22 A The criteria submitted by the applicant on the

eb11

1 safety of the Category I structures to see if they meet the  
2 safety requirements adopted by the Nuclear Regulatory Commis-  
3 sion.

4 Q Now since you've been assigned to the Midland  
5 Project, have you been concerned solely with the structural  
6 analysis arising out of the soils investigation?

7 A No.

8 Q Then is it correct to say that you have been in-  
9 volved in a review of all aspects of the structural engineer-  
10 ing of the Midland Project?

11 A Yes.

12 Q About how much of the effort has been devoted to  
13 the soils-related issues with respect to structural engineer-  
14 ing and how much has been related to the balance of the  
15 structural effort?

16 A Well, we haven't separated it percentage-wise.  
17 During this 1980 we have reviewed the entire FSAR to identify  
18 and reevaluate -- identify new items of concern or assess  
19 whether the previous open items have been resolved or, in our  
20 opinion, are still pending.

21 At the same time we have factored in our review  
22 the problem with the soil at the Midland site. We have



eb12

1 undertaken this review in a combined fashion so as to carry on  
2 the review at the FSAR stage and at the same time evaluate  
3 the problems with the soil settlement at the site.

4 Q Now when you were assigned to the Midland Project,  
5 what, if anything, did you do to familiarize yourself with  
6 the status of the project at that time?

7 A I had some short meetings with the previous re-  
8 viewer and in February I believe there was a meeting at the  
9 Midland site which discussed the problems with the soil at the  
10 site, and the structures.

11 And there were presentations made by Consumers and  
12 Bechtel and the consultant to Bechtel and Consumers.

13 Q At the time that you were assigned to the Midland  
14 Project, had the Naval Surface Weapons Center already been  
15 engaged as a consultant of the NRC?

16 A It was in the process of being engaged at that time.

17 Q Did you play any part in the selection of the Naval  
18 Surface Weapons Center as their consultant?

19 A The part that I played is the processing of the  
20 papers for the NRC and writing the work <sup>scope</sup> ~~code~~ that they were  
21 going to perform.

22 Q Did you make some sort of determination or did you

ebl3

1 participate in making a determination as to the professional  
2 competence of the personnel from the Naval Surface Weapons  
3 Center?

4 A Yes. I was requested to contact them and see if  
5 they had the ability and as to their qualifications. And the  
6 major reason they were selected was their availability to  
7 support the staff, and the closeness, being in the local area.

8 Q What sort of evaluation, if any, did you make of  
9 their competence?

10 A I looked over their professional qualifications.  
11 There was the possibility of three people working on this,  
12 and one has been a Ph. D. of many years, already the senior  
13 person there. Another person has a Master's degree in  
14 structural engineering. And the most junior one I believe has  
15 got a Bachelor of Science.

16 But this was left all to the discretion later on  
17 of the lead person, Dr. Huang, to select his team. But I did  
18 the review of at least two people in detail, Matra and  
19 Dr. Huang.

20 Q And to whom did you make a recommendation with  
21 respect to the hiring?

22 A To my branch chief.

eb14

- 1 Q And that's Mr. Schauer?
- 2 A Dr. Schauer.
- 3 Q Right.
- 4 And in fact the Naval Surface Weapons Center was
- 5 retained not just for Midland but for Comanche Peak and
- 6 Waterford as well. Is that right?
- 7 A Yes.
- 8 Q Now do you know a man named Joseph Kane?
- 9 A Yes.
- 10 Q When did you first meet Mr. Kane?
- 11 A Maybe two years, approximately.
- 12 Q And when did you first become aware of the fact
- 13 that Mr. Kane was assigned to the Midland Project?
- 14 A I guess at the same time as I was assigned to the
- 15 Project, or shortly thereafter at the meeting at -- that we
- 16 had at the plant site.
- 17 Q All right.
- 18 What responsibility, if any, do you have to report
- 19 to Mr. Kane?
- 20 A I don't report to Mr. Kane.
- 21 Q All right.
- 22 Do you have any obligation to consult with him,

eb15

1 or to keep him informed of what the Structural Branch is  
2 doing with respect to the Midland Project?

3 A Well, as Mr. Kane deems necessary, or myself, to  
4 have interaction, we do so, you know, on a verbal basis. I  
5 don't believe we have ever had any formal transmittal of any  
6 information between the two of us except on a verbal form.

7 Q All right.

8 Let me see if I understand the reporting require-  
9 ment or the reporting chain.

10 There's the Naval Surface Weapons Center. That's  
11 Dr. Huang. Correct?

12 A Yes.

13 Q They report to you?

14 A Yes.

15 Q And then you report to Dr. Schauer?

16 A Correct.

17 Q And then to Mr. Jim Knight. Is that correct?

18 A Yes.

19 Q And has there been-- On how many occasions have  
20 you discussed this, the Midland Project, with Mr. Kane?

21 A I can't recall exactly. I could just make a guess.  
22 I don't know, maybe a dozen times, maybe ten.

eb16

- 1 Q And have you had occasion to discuss the Midland  
2 Project with Mr. Gallagher?
- 3 Do you know Mr. Gallagher?
- 4 A I met Mr. Gallagher at the site visit, and I  
5 haven't met him since, or seen him since.
- 6 Q All right.
- 7 Have you had any occasion to discuss the Midland  
8 Project with any representative of the Inspection and Enforce-  
9 ment Branch?
- 10 A Inspection and Enforcement Branch? Could you  
11 clarify that?
- 12 Q Well, let me be more specific with respect to some  
13 names.
- 14 With Mr. Fiorelli, Gaston Fiorelli?
- 15 A No.
- 16 Q With Mr. Keppler?
- 17 A I don't recall that name.
- 18 Q With Mr. Gilray?
- 19 A That name sounds familiar but I don't think we had  
20 any formal discussions.
- 21 Q With Mr. Shewmaker?
- 22 A I know Mr. Shewmaker but I don't believe -- I don't



ebl7

1 remember discussing these problems with the plant with him.

2 Q In the conversations that you had with Mr. Kane,  
3 were these just casual meetings or were they meetings called  
4 specifically to discuss the Midland Project?

5 A Some were, and some were just professional get-  
6 together or visitation among the staff.

7 Q All right.

8 And have you had any meetings with the Corps of  
9 Engineers assigned to the Midland Project?

10 A I met some of the representatives of the Corps of  
11 Engineers at the site visit in early 1980, and I have had no  
12 other meetings with them.

13 Q Now these conversations with Mr. Kane, has he ever  
14 expressed his opinion to you regarding the structural ade-  
15 quacy of the facilities at the Midland Power Plant?

16 A No.

17 Q Has he ever asked you for your opinion with respect  
18 to the structural adequacy of the Midland Plant?

19 A He has asked me whether the soil problems would  
20 affect the structures. And we have discussed whether we had  
21 enough information to evaluate this concern of his.

22 Q All right.

ebl8

1           And you had this conversation about whether you  
2 had enough information on more than one occasion?

3           A       Yes. We had some formal meeting I believe. We  
4 have discussed this at a time when even the Project Manager  
5 was present, and we also have discussed it informally, yes.

6           Q       And when was the most recent occasion on which you  
7 had a discussion with Mr. Kane?

8           A       We had a meeting, a visit from the applicant, and  
9 we had a recess period where the staff discussed the situation  
10 of the latest development with the review of the Midland  
11 Project.

12          Q       Do you have an approximate date?

13          A       I believe that it was in December, early December,  
14 1980.

15          Q       And at that point in time what was your position  
16 as to whether there was sufficient information from the  
17 applicant so that you could evaluate the structural adequacy  
18 of the Midland Project?

19          A       We have asked questions to the applicant and we  
20 don't have all the information back which would make us  
21 evaluate any problems <sup>which are structurally</sup> ~~with the structural~~ related to the soil  
22 settlement problem.

eb19

1           In addition we have had previous open items which  
2 the applicant has not fully responded or responded in a way  
3 acceptable to the staff.

4           Q       And did you communicate that to Mr. Kane at this  
5 meeting, this recess?

6           A       Well, it was communicated in general. I don't know  
7 whether he was listening or not.

8           Q       At this meeting what, if anything, did Mr. Kane  
9 say about his investigation of the soils problem?

10          A       Mainly that the Corps of Engineers were still in  
11 the process of finalizing their review of what the applicant  
12 had provided them, and he did not have any final conclusion.

13          Q       Did he also say that he needed additional informa-  
14 tion from the applicant?

15          A       I believe so.

16               MR. MILLER: I would like the Reporter to mark  
17 Rinaldi Deposition Exhibit 2, which is a handwritten document,  
18 undated. At the top it says "Kane - Extension 492-8162."

19                               (Whereupon, the document  
20                               referred to was marked  
21                               as Rinaldi Deposition Exhibit  
22                               2 for identification.)

eb20

- 1 BY MR. MILLER:
- 2 Q Mr. Rinaldi, I hand you a document marked Rinaldi
- 3 Deposition Exhibit 2 for identification and I ask you first
- 4 if that is in your handwriting.
- 5 (Handing document to the witness.)
- 6 A No.
- 7 Q Do you recognize the handwriting?
- 8 A Yes.
- 9 Q Whose do you think it is?
- 10 A John Matra.
- 11 Q And Mr. Matra is an employee of the Naval Surface
- 12 Weapons Center?
- 13 A Correct.
- 14 Q All right.
- 15 I represent to you that that document comes to you
- 16 from the files in your office that were made available to us
- 17 yesterday.
- 18 Did Mr. Matra give you a copy of those notes?
- 19 A Mr. Matra gave me this xeroxed copy and it was a
- 20 subject he discussed with Mr. Kane.
- 21 Q Do you recall the dates on which he discussed those
- 22 subjects with Mr. Kane?

eb21

1           A        It was in the fall of 1980. I don't recall the  
2 exact date.

3           Q        Were you present in this discussion?

4           A        No. It was a phone conversation where Mr. Kane  
5 had a need to talk to the reviewer and they talked to each  
6 other. I don't know the details of that conversation except  
7 the subject matter that was given to me for my record, that  
8 this conversation occurred.

9           Q        You don't know whether Mr. Matra called Mr. Kane  
10 or vice versa?

11          A        I don't know. It could have been either way.

12                   MR. MILLER: I would like to have the Reporter mark  
13 as Rinaldi Deposition Exhibit 3 for identification a xeroxed  
14 copy of a handwritten sheet entitled "Midland NPP, Midland,  
15 Michigan." In the upper left-hand corner it has the words  
16 "Darl Hood," and in the upper right-hand corner the words  
17 "Consumers Power."

18   (Whereupon, the document  
19   referred to was marked as  
20   Rinaldi Deposition Exhibit 3  
21   for identification.)

22   BY MR. MILLER:



eb22

1 Q Mr. Rinaldi, I show you a document that has been  
2 marked Rinaldi Deposition Exhibit 3 for identification and  
3 ask you if that's in your handwriting.

4 (Handing document to the witness.)

5 A Yes.

6 Q All right, sir.

7 Will you describe for us what that document is,  
8 please?

9 A When I was assigned the review of the Midland  
10 Project I made some summary notes on the situation with the  
11 reviewer of the plant, and these are just a very brief  
12 summary indicating the date when the transfer occurred, which  
13 shows February 11, 1980,--

14 Q That was the date on which you were formally  
15 assigned to the Midland Project?

16 A Yes.

17 (Continuing) -- and that Mr. Huang and John Matra  
18 were going to be involved in this review since we didn't have  
19 the staff to review all plants. At that time I had many more  
20 plants than the ones I stated before, so I was just going to  
21 supervise the review of these plants with the Naval Weapons  
22 Surface Center.

eb23

1 I also identified to myself what kind of review was  
2 done before, and the people that were involved.

3 Q That's Mr. Lipinski was involved in the prior re-  
4 view?

5 A The last one, the last person that transferred me  
6 to the plant.

7 Q And what other staff, if any, were assigned to the  
8 Midland Project prior to the time you took over?

9 A Well, I believe they are shown on this page.  
10 Hafiz,--

11 Q Will you spell that for the Reporter?

12 A H-a-f-i-z.

13 And I believe in the CP review <sup>it</sup> ~~he~~ may have been.

14 Ken Kapur, K-a-p-u-r.

15 Q All right.

16 Now this appears to be a log of your activities  
17 during a period of time in February of 1980. Is that correct?

18 A In the initial transfer, this was just a log of  
19 the activities, yes, before I fully was involved in the re-  
20 view. This was sort of a, you know, a break-in period between  
21 the 11th and the 27th of February, 1980.

22 Q Did you maintain that sort of a log after February

eb24

1 27th, 1980?

2 A No. After that time we were just mainly involved  
3 in the review of the FSAR and all the other submittals made  
4 by the applicant.

5 Q All right.

6 Now when you took over the review of the Midland  
7 Project it's a fact, is it not, that there was a substantial  
8 quantity of information that had been presented by the appli-  
9 cant to the NRC staff regarding the structural adequacy of  
10 the project following the soils problem? Is that right?

11 A At that time there was I believe a few -- some  
12 preliminary reply to the soil problem and the proposed fix.  
13 And I think there has been some after that. So whatever was  
14 submitted before that, to some extent the preliminary part,  
15 they were reviewed by Mr. Lipinski.

16 Q How do you know that Mr. Lipinski reviewed it?  
17 Did he tell you that he had done so?

18 A Yes, he did, and we discussed his review of the  
19 soil problem, and he had some summary notes.

20 Q Well, let's see if we can get those out.

21 MR. MILLER: I would like the Reporter to mark  
22 as Rinaldi Deposition Exhibit 4 for identification five pages

eb25

1 of handwritten notes, the first sheet of which bears the  
2 date February 26, 1980, and the title, "Midland NPP."

3 (Whereupon, the document  
4 referred to was marked as  
5 Rinaldi Deposition Exhibit  
6 4 for identification.)

7 BY MR. MILLER:

8 Q Mr. Rinaldi, I show you a document that has been  
9 marked Rinaldi Deposition Exhibit 4 for identification.

10 (Handing document to the witness.)

11 I ask you if the first sheet of that exhibit is in  
12 your handwriting.

13 A Yes.

14 Q There are then a number of sheets that follow  
15 which I bear-- I think the first one bears the date 9/78.

16 Do you know in whose handwriting those sheets  
17 occur?

18 A My handwriting.

19 Q Can you tell us, were all these sheets prepared  
20 on February 26th, 1980?

21 A I'm not sure. I believe so.

22 Q All right.

eb26

1           Going back to Rinaldi Deposition Exhibit 3, it  
2 indicates that on February 26th, 1980, you discussed the soils  
3 settlement problem with Mr. Lipinski.

4           Are these notes that you prepared during your  
5 conversation with Mr. Lipinski?

6           A       Either during or afterward, to sort of annotate  
7 major problems or major items that I was aware of with the  
8 plant as of that date.

9           Q       Okay.

10           About halfway down the first sheet there are the  
11 words "Re: Evaluate for seismic," and then it says "Stress  
12 due to settlement to be used as loads. Check with Code 349  
13 plus SRP plus RG 1.142."

14           Now was that Mr. Lipinski's recommendation to you,  
15 or was that your own analysis of what was required after your  
16 conversation with him?

17           A       It was first identified by Mr. Lipinski from his  
18 earlier review of the problem.

19           Q       All right.

20           There is the reference to the Code 349. Is that  
21 the ACI Code 349?

22           A       ACI.



eb27

1 Q And what was the first date on which that Code was  
2 published, do you recall?

3 A I don't recall the exact date. I believe it was  
4 '79.

5 Q Long after the Midland Plant had been designed and  
6 at least partially constructed; correct?

7 A Yes.

8 Q All right.

9 There's a reference to the SRP. Is that the  
10 Standard Review Plan?

11 A Yes.

12 Q Does that also specify certain load combinations  
13 for use in analyzing the structural adequacy of a building?

14 A Yes.

15 Q And what are those criteria? Are they the same as  
16 ACI Code 349?

17 A Not exactly the same.

18 Q Are they more or less stringent in their require-  
19 ments?

20 A Well, I'm sure there would be some areas where  
21 they're more stringent and some areas where they are less  
22 stringent.

eb28

1 Q All right.

2 And there is a reference to RG 1.142. That's Reg.

3 Guide 1.142?

4 A Regulatory Guide 1.142.

5 Q All right.

6 And what's the subject matter of that Regulatory

7 Guide, do you know?

8 A The Regulatory Guide discusses the criteria in the

9 ACI 349 Code and identifies additional criteria which the

10 staff requires for safety of the structures, structures which

11 are not the containment, other Category I structures.

12 Q All right.

13 And do you know when the Standard Review Plan

14 criteria and Reg. Guide 1.142 were published approximately?

15 A I believe it was <sup>1979</sup>~~1975~~. The Standard Review Plan

16 was '74. I don't recall exactly. I guess you take it for

17 granted. And Regulatory Guide 1.142 was subsequent at least --

18 probably a year or eight months after the publication of ACI

19 349.

20 Q Okay.

21 Down in the lower left-hand corner of the first

22 page of Exhibit 4 there is what appears to be a fraction,

eb29

1 1.9 E over 1.4 E, the sign for "less than" and then the  
2 figure 1.1 E. To what does that refer, sir?

3 A I believe it's a ratio of load factors applied to  
4 an earthquake load, and it was some sort of note that I was  
5 writing that the ratio was less than the other one.

6 I don't know at this time exactly.

7 Q All right.

8 Now on the second page of Exhibit 4 there are--  
9 The first half of this is a series of questions. Were these  
10 questions that Mr. Lipinski suggested that you should ask,  
11 or were these questions that you had following your conversa-  
12 tion with Mr. Lipinski?

13 A I believe these are notes and questions that I  
14 made during the meeting at the site. I believe that this was  
15 on February 27th, and only the first page was a summary of  
16 the notes I had of Mr. Lipinski.

17 Q All right.

18 MR. MILLER: I don't want to mislead you,  
19 Mr. Rinaldi. Let me mark as Rinaldi Deposition Exhibit 5  
20 two pages of handwritten notes titled "Midland NPP Trip  
21 Report for Orientation Meeting 2/27 - 28."  
22

eb30

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(Whereupon, the document referred to was marked as Rinaldi Deposition Exhibit 5 for identification.)

B2

BY MR. MILLER:

Q Now, Mr. Rinaldi, I show you a document that has been marked Rinaldi Deposition Exhibit 5 for identification and I ask you if that document is in your handwriting.

(Handing document to the witness.)

A Yes.

Q And are those the notes that you took during the site visit to the Midland Plant on February 27th and 28th, 1980?

A These are additional notes, yes.

Q All right.

But it is still your recollection that everything after the first page of Exhibit 4 are also notes that you took during the site visit? Is that correct?

A My recollection is that these pages were made either at--

Q You're referring to Exhibit 4 now?

A For the following pages on Exhibit 4.

eb31

1 (Continuing) -- were made as notes either after  
2 my meeting with Lipinski or during the site visit.

3 And then Exhibit 5 is some additional notes that I  
4 made either during or following the site visit at the Midland  
5 site.

6 Q It's a fact, is it not, that everything after the  
7 first page of Exhibit 4 refers to such matters as piping  
8 and the actual physical settlement that was occurring at  
9 Midland?

10 A I don't know. I have not reviewed these notes  
11 prior to this meeting, and I would have to re-read them again  
12 to refresh myself.

13 I would imagine they would be because at the site  
14 visit the only thing discussed was soil settlement and problems  
15 as a result of that. But I'm not sure.

16 Q All right.

17 In fact at the site visit there were some discus-  
18 sions of the structural adequacy of the various facilities,  
19 was there not?

20 A Yes.

21 Q All right.

22 So it was in addition to-- There were discussions



eb32

1 that specifically involved your area of responsibility at the  
2 site visit? Is that correct?

3 A Yes. There were proposed fixes that were proposed.

4 Q And in fact you and the individuals from the Naval  
5 Surface Weapons Center had a separate meeting at the site  
6 visit, did you not, with individuals who were involved with  
7 the structural adequacy of the facilities from Bechtel and  
8 Consumers?

9 A No, that's not right.

2.050

10 Q Was there any portion of the meeting that was  
11 devoted to structural adequacy of the facilities at the site  
12 visit on February 27th and 28th?

13 A There were presentations made by Bechtel and  
14 Consumers and the consultant on the proposed fixes, and there  
15 was a tour of the facility, structures selected by Bechtel  
16 I believe and Consumers, and we were shown the diesel generator  
17 building and other structures to impress on us the fact that  
18 in their opinion there were no significant cracks and they  
19 were not detrimental to the structure.

20 Q Now I'm a lawyer. You've got to tell me what is  
21 the significance of a crack in a concrete structure? What  
22 does that indicate with respect to the structural adequacy of

eb33

1 the facility?

2 A Well, you have to investigate what kind of crack  
3 it is. If it's just a surface crack that's one thing. If  
4 it's a through crack that's something else. It is more of a  
5 concern to the structural adequacy of the structure.

6 Q So that not every crack is a matter of concern,  
7 if I understand your previous answer.

8 A Correct.

9 Q And how do you determine whether a crack is a  
10 surface crack or not a surface crack? By visual inspection?

11 A Well, visual inspection or they could conduct some  
12 local sampling of the worst cracks determined from visual  
13 inspection.

14 Q I think you said you could sample. All right.  
15 How would you take a sample of a crack?

C2

16 A Well, first you can measure it and second, you  
17 could remove a local portion of the structure and see whether  
18 there was a through crack or not. If a crack occurred on the  
19 other side of the wall, for example, where the crack was  
20 observed, first of all it's a good indication that it might  
21 be a through crack.

22 Q Does a through crack indicate that the structure

eb34

1 may be overstressed?

2 A Yes.

3 Q All right.

4 A surface crack on the other hand would indicate  
5 what? -- that there was --

6 A Just local shrinkage.

7 Q Shrinkage. Okay.

2.100 8 Now do you recall the individuals from Bechtel and  
9 Consumers Power Company who conducted you on the site tour  
10 and pointed out the cracks to you?

11 A One of the fellows was Julius Rotz. I think the  
12 spelling is R-o-t-z.

13 Q Okay.

14 A And the other fellow was-- I don't recall his name.

15 Q Carl Wontzig?

16 A I believe that's the name.

17 Q Jim Wotzig?

18 A Is this the senior person there that--

19 Q Carl Wiedner? W-i-e-d-n-e-r?

20 A I believe it was Carl.

21 Q And what else were you shown during the course of  
22 this tour beside the cracks in the various structures?

eb35

1           A       Besides the cracks, like I said before, we had a  
2 presentation by members of the Bechtel and the consultant  
3 and staff from the applicant's side.

4           Q       All right.

5                    Do you recall commenting to Mr. Wiedner on this  
6 visit that the cracks were much smaller than you had expected  
7 to see?

8           A       That's possible. But on the other hand, they  
9 might have been a local-- I don't know the reference, what  
10 crack we're talking about when I made the reference. It's  
11 possible but I don't know the reference at the time it was  
12 made.

13          Q       Was this the only occasion on which you visited the  
14 site?

15          A       The Midland site?

16          Q       Yes.

17          A       Yes.

18          Q       Okay.

19                    Now returning to Exhibit 5, during your tour of  
20 the site did you see any through cracks?

21          A       From my observation-- I requested that I walk on  
22 the other side of the wall where they were trying to show me

eb36

1 the cracks that were monitored and reviewed by Julius Rotz.  
2 I did not make any measurement but from visual inspection I  
3 had the impression that cracks were on the opposite side  
4 coinciding with the one from the face of the wall that they  
5 were showing me.

6 Q Do you remember in which structure those cracks  
7 appeared?

8 A The one where we spent most of the time was the  
9 diesel generator building. That's the one I guess they spent  
10 most of the time working on, so that's the one they were  
11 interested in showing.

12 Q Do you recall the location of the wall or the  
13 identification of the wall in which this apparent through  
14 crack existed?

15 A No, I don't believe I made any notes. It was the  
16 wall they were taking us to observe in one of the bays. It  
17 might have been the fourth bay.

18 Q In any event, subsequent to that there were crack  
19 mapping programs undertaken at the site?

20 A I believe they were done before that.

21 Q And they have been followed up since then; is that  
22 right?



eb37

1           A        I don't believe much more than what was done before  
2 that has been done in mapping because the applicant has dis-  
3 missed the crack as being significant based on the evaluation.  
4 Maybe they have been documented different. Maybe what we had  
5 at that time was some preliminary draft of the work done by  
6 Julius Rotz, and he was at the site to discuss his work, this  
7 information.

8           Q        Now are you generally familiar with the 10 CFR  
9 50.54(f) responses that the company has been submitting to  
10 the Nuclear Regulatory Commission in connection with the soils  
11 problems at the Midland site?

12          A        Yes.

13          Q        All right, sir.

14                    I'm going to show you Questions 28 and 29 and the  
15 applicant's response to those questions which are part of the  
16 50.54(f) response. They are marked Revision 5, 2/80, and I  
17 represent to you that they were prepared in February of 1980.

18                    (Handing document to the witness.)

19                    I ask you whether you have seen those responses  
20 prior to today.

21          A        Yes. I have been asked questions on this, based  
22 on the review of the Navy.

eb38

1 Like I said before, some of this information con-  
2 tained in here was provided early by some preliminary or  
3 informal submittals on the crack mapping that was given to  
4 Mr. Lipinski.

5 From my recollection, I don't think any more work  
6 was done after that. Maybe it was documented officially after  
7 that.

8 Q Well, let me add another one to the stack in front  
9 of you, and that is Question 14, and the answer.

10 (Handing document to the witness.)

11 That in fact was the first response by the appli-  
12 cant to the question by the NRC with respect to crack mapping.  
13 Is that correct?

14 A Yes.

15 The way this scenario works is that the staff from  
16 the Structural Engineering Branch prepares certain questions  
17 and then these questions are transmitted to the Project  
18 Manager and the Project Manager issues these questions. So  
19 these questions were prepared previous to my taking over and  
20 they just were answered following in the official form al-  
21 though informal discussion had taken place between Mr. Lipinski  
22 and Julius Rotz.

eb39

1           And at the site visit verbal discussions during  
2 the walk-through were undertaken by Julius Rotz and myself  
3 where he elaborated on what was going to be submitted.

4           Q       Now following your review of these answers to  
5 Questions 14, 28 and 29, did you, in your professional judg-  
6 ment, have any further uncertainties about the cracks that  
7 had been described in response to those questions?

8           A       Well, like I said before, the Navy is doing the  
9 actual review and I am just monitoring them and discussing any  
10 areas where they have problems.

11                   There is the feeling from the Navy, from my dis-  
12 cussions, that some of the cracks may be through cracks and  
13 that they believe that a re-analysis of the structures which  
14 are cracked would be necessary. And factored into this analysis  
15 should be the effect of the cracks as a load to the structure.

16                   And I believe that the applicant has stated this  
17 as early as the review that Mr. Lipinski had done, and there  
18 was a discrepancy on what load factor would be applied in  
19 the evaluation, the factor, the effects of the cracks on the  
20 structures.

21           Q       Well, have there been any-- When did the Navy  
22 reach this position?



eb41

1 A Yes.

2 Q And you are the "Frank" who is addressed in the  
3 handwritten note at the top of the page?

4 A Yes.

5 Q Would you turn to page 6 of those interrogatories,  
6 please?

7 Are those the additional-- Are those the only  
8 additional studies which the Navy requires with respect to  
9 the analysis of the cracks, the ones that are identified in  
10 Interrogatory Number 5 on page 6?

11 A I don't see Interrogatory 5.

12 Q I'm sorry, maybe I've got a different version here.

13 A This is a draft.

14 Q I beg your pardon. It's on page 5 of your copy,  
15 Interrogatory 5.

16 A This Interrogatory 5 addresses the concerns on  
17 the cracks. However, in the other interrogatory questions  
18 the crack problem or the crack -- the results of the crack  
19 evaluation will always be factored into the analysis.

20 Q Well, is that every other interrogatory?

21 A I will have to re-read each one of them. I believe  
22 so, because the other interrogatory addressed the diesel



eb52

1 generator building, the service water structure, and other  
2 Category I structures, and I believe all the structures  
3 founded on this soil material had problems with cracks.

4 So this Interrogatory 5 would assess the crack  
5 problem and then if this would be -- the results of the study  
6 would determine that the cracks should be factored into the  
7 analysis of the structure, then it would affect all the other  
8 structures which are affected by the cracks.

9 Q All right.

10 In other words, depending on the results of the  
11 analysis that is undertaken in response to Interrogatory 5,  
12 you'd determine whether or not you'd have to factor the effect  
13 of a crack into the other portions of the structural analysis?  
14 Is that correct?

15 A Yes, for the crack problem. But, however, it's my  
16 recollection that on some of the structures, some points were  
17 made where the previous analysis was done, assuming certain  
18 soil properties. And now the fact that we have identified  
19 different soil would, in my opinion, require a re-analysis  
20 factoring in the soil properties that we have identified today  
21 unless a general evaluation could be made to state that the  
22 change is not significant.

eb43

1                   And if that could be proven then I believe it  
2 would be satisfactory to the staff.

3           Q       All right.

4                   Interrogatory 5-A refers to analysis which pro-  
5 vides tension field data. Could you define for us what  
6 "tension field data" means?

7           A       Well, this question was written by the Navy and  
8 basically they want to determine whether the steel in the  
9 construction has yielded or not in tension due to the cracks.

10          Q       In other words whether the reinforcing bars have  
11 had their yield strength exceeded? Is that correct?

12          A       Not only the yield strength-- Well, yes.

13          Q       You were about to say that there is some other  
14 definition of an effect on reinforcing steel. What would that  
15 be?

16          A       Well, I was just going to express in a long form,  
17 and then when you interrupted, that was correct what you were  
18 stating and so I agreed.

19          Q       All right.

20          A       I was going to say the bars have been -- not only  
21 exceeded the yield but deteriorated in any extent, you know.

22          Q       From corrosion?

eb44

1 A Corrosion or other things.

2 Q All right.

3 How do you determine whether or not the yield  
4 strength of the reinforcing bar has been exceeded in such  
5 circumstances?

6 A Well, it could be done by tests like I indicated  
7 before, or by analyzing the size of the cracks that originally  
8 was there, the largest dimension of the crack that was ob-  
9 served. You could do some studies to determine whether the  
10 bar had yielded or not. Or by examination.

11 MR. MILLER: We're going to break now, and we'll  
12 return at 12:15.

13 (Whereupon, at 10:20 a.m., the taking of the  
14 deposition was recessed to reconvene at 12:15 p.m.  
15 the same day.)  
16  
17  
18  
19  
20  
21  
22

## 1 AFTERNOON SESSION

2 (12:35 p.m.)

3 Whereupon,

4 FRANK RINALDI

5 resumed the stand and, having been previously duly sworn, was  
6 examined and testified further as follows:

## 7 DIRECT EXAMINATION (Continued)

8 BY MR. MILLER:

9 Q Mr. Rinaldi, before we broke we were discussing  
10 the tension field analysis for the cracks that had been  
11 discovered.12 Have you received a copy of the most recent  
13 responses by Consumers Power Company to the 50.54(f) requests?14 A Well, whatever we received the Navy has and has  
15 reviewed.

16 Q All right.

17 A And from the question on the interrogatory over  
18 there you could tell what questions have been reviewed.19 Q I'd like you to look at Question 40 and the response  
20 to Question 40, particularly Part 4.

21 (Handing document to the witness.)

22 Once you've had a chance to look that over I have

eb2

1 a few questions for you.

2 (Pause.)

3 A Okay, I've read it to some extent.

4 Q Okay.

5 Had you seen it before I showed it to you just  
6 now?

7 A No. The Navy has done the review and I have just  
8 reviewed their questions and discussed with them basically  
9 their review.

10 Q All right.

11 Is the analysis that's described in the response  
12 to Part 4 of Question 40 with respect to what's called in  
13 the response a "conservative method of using the results of  
14 the crack observations," is that a form of tension field  
15 analysis?

16 A Apparently not because-- This is Question <sup>40</sup> + you  
17 say?

18 Q Yes, sir.

19 A Well, apparently that was not reviewed prior to  
20 our comment. It's not part of this interrogatory. This was  
21 submitted--

22 Q November 1980.



eb47

1           A       And this was apparently subsequent to our review.  
2 I have not discussed that with the Navy.

3                   I'd like to make a note that some of the submittals  
4 that are dated a certain date, by the time they reach the  
5 reviewer it might be as much as a month later.

6           Q       All right.

7                   Now do you have an independent professional judg-  
8 ment as to whether or not the analysis that's shown in the  
9 response to Part 4 of Question 40 is an acceptable method of  
10 analysis for determining the effect of cracking on the struc-  
11 tural integrity of the diesel generator building.

12           A       I'm afraid in this two minute's reading of it that  
13 I don't think I would like to pass any judgment on that. I  
14 would like to have some time to review it in the privacy of  
15 my office.

16           Q       So as it stands right now you don't know; is that  
17 correct?

18           A       That's right.

19           Q       Is the analysis that's set forth in this answer --  
20 and you are free to look at it again, obviously -- a form of  
21 tension field analysis as that term is used in the interroga-  
22 tories?

eb48

1           A        Again I just looked at it briefly and I don't think  
 2 I have been able to absorb what is in this in this very short  
 3 time. I would like to have some time to review that and think  
 4 about it and comment either in the form of a question to the  
 5 applicant or in a meeting verbally or otherwise.

6           Q        Well, would you want to discuss it with anybody  
 7 before you reached an opinion on those questions that I just  
 8 asked you?

9           A        Well, first of all, as I told you before, the Navy  
 10 has a contract with us to review this because we have a  
 11 staff problem so they have a contract to do this work. And  
 12 usually I discuss with them any results or questions before  
 13 they go out.

14                        So all the questions that have gone to the appli-  
 15 cant during 1980 since I've taken over I have discussed with  
 16 them. But if there is anything which was submitted after that  
 17 time, we have not discussed it and I'm not even sure if they  
 18 have reviewed this part at this time.

19                        You might want to ask them when you depose them  
 20 tomorrow whether they reviewed this question.

21           Q        They've had no communication with you regarding  
 22 that question?

eb49

1           A       No.

2           Q       Mr. Rinaldi, I just want to understand the division  
3 of responsibility between you and the Navy.

4                    Do you review the work that the Navy does on the  
5 Midland structural analysis?

6           A       Yes.

7           Q       And do you form your own independent professional  
8 judgments about the adequacy of the structures?

9           A       Yes.

10          Q       And do you do that in consultation with the Navy?

11          A       Well, as you well know, in an office, if you're a  
12 manager and you have people working with you, you don't  
13 necessarily review every little piece of work of the employee  
14 that works for you. And this would be a similar relationship  
15 where you are alerted to problems by people doing the work,  
16 and I have a free choice, to read as much of this as I can  
17 and especially any area where I have a great deal of concern.  
18 And I'm sure all of this is a great deal of concern.

19                    So when the Navy performs the review and if they  
20 have any problem with what is in this part, I'm sure I will  
21 review it in a great deal of detail; if they find it acceptable  
22 in their own review, probably I will spend less time

eb50

1 reviewing this.

2 Q Before the interrogatories were sent, did you dis-  
3 cuss their content with anybody at the Navy?

4 A This?

5 Q Yes.

6 A Yes.

7 Q All right.

8 And did you specifically discuss Interrogatory  
9 Number 5, the one that deals with the crack and the tension  
10 field analysis?

11 A Yes.

12 Q At the time you discuss it was there any conversa-  
13 tion with respect to the type of analysis to be performed by  
14 the applicant that would satisfy the interrogatory? Just the  
15 method, not the results but the method?

16 A I understand.

17 I don't think they had anything in mind. I did ask  
18 that question of them at that time. They didn't have anything  
19 in mind. They were waiting for some reasonable proposal from  
20 the applicant.

21 Q And as you sit here today do you know of any method  
22 of analysis which you could put forth as a possible method of

eb51

1 analysis for the applicant?

2 A I haven't had a chance or the time to work on de-  
3 veloping the method of analysis that would apply to this,  
4 just to review what is proposed and based on the proposal,  
5 judge from my experience or an engineering judgment whether  
6 it is acceptable and of reasonable safety.

7 Q On any other project where you served as a struc-  
8 tural reviewer, had you ever requested a tension field analy-  
9 sis of cracks?

10 A In my review? No.

11 Q Do you know whether it has ever been requested by  
12 the Nuclear Regulatory Commission?

13 A I don't know.

14 Q Have you ever seen such an analysis for any type of  
15 structure?

16 A Well, again if I told you I've never seen it over  
17 here it's probably-- I don't know....Because if I had seen  
18 it I would have been able to answer you before what I would  
19 find acceptable.

20 Q So the answer to my question is you have not seen  
21 such an analysis before?

22 A No.



eb53

1 around observing them?

2 (Handing document to the witness.)

3 A At this time I don't remember how this information  
4 came to me, whether from my observation or from listening to  
5 the presentation or discussing with consultants, either on our  
6 side or the A&E and applicant, or a combination of all of  
7 them. They are just some notes that I made of what I wanted  
8 to remember later on.

9 Q A couple of sentences down it reads:

10 "Fix proposed by applicant and A&E con-  
11 sidered not satisfactory."

12 Was that your conclusion at that time, or was that  
13 something that somebody told you?

14 A I don't remember at this time whether it was an  
15 observation I made-- I'm sure everything played a part in  
16 it, discussing with people or my observation.

17 Q All right.

18 A It could be a combination of all of them.

19 Q Under there it reads:

20 "Diesel generator building surcharge,  
21 freeing point load due to electrical line conduit  
22 and rabbit run on opening of concrete electrical

eb54

1 conduit are considered adequate."

2 Did I read that correctly?

3 A Yes.

4 Q Was it your conclusion at that point in time that  
5 the surcharge and the freeing of the point load and having a  
6 rabbit run through what is called here the concrete electrical  
7 conduit were considered adequate?

8 A I believe these are notes based on the presenta-  
9 tions made by the Bechtel people, and it appears to me that  
10 I wrote down the main points of what their findings were.

11 Q All right.

12 A At least that one paragraph makes me think so.

13 Q This is still under "1. Diesel generator build-  
14 ing, Point B. Adding of a common mat that would prevent  
15 additional differential settlement was not used."

16 Is that what you were told?

17 A Yes. Perhaps-- I believe I must have asked a  
18 question, why they didn't consider such a fix, or whether they  
19 had considered it and dismissed such a fix. So I probably  
20 made a note that they dismissed that type of fix.

21 Q "Additional investigation of the concrete electri-  
22 cal ducts was not reported. Safety cannot be assured by just

eb55

1 providing a duct opening for the lines."

B3

2 Now are you referring there, Mr. Rinaldi, to what  
3 is now known as the electrical duct bank?

4 A Penetration, yes. That was a concern of mine at  
5 that time. I believe the applicant has dismissed that fact  
6 by saying that they did not require that duct to be a Category  
7 I structure; it just provides a passage for the electrical  
8 cable and so there is not a Category I passage.

9 I don't believe this one item has been pursued any  
10 further in the questions. If you look further, I don't be-  
11 lieve it has been pursued any longer.

12 It was a concern of mine at that date.

13 Q And has that concern been satisfied?

14 A From my discussion with the Navy, I believe, given  
15 the fact that it does not provide any strength during a  
16 seismic event or anything like that, it just provides a  
17 passage for the cable, I believe that it has been, yes. It  
18 has been dismissed as a concern.

19 Q Good.

20 Then Point D under this says:

21 "Investigation of cracks not completed.

22 The A&E missed few through cracks. Also dismissed

eb56

1 many as shrinkage cracks even though they were  
2 through cracks."

3 Is this note on the basis of your observation physi-  
4 cally of the cracks?

5 A I believe, as I stated before in this deposition,  
6 that it was one of my observations by looking at some of those  
7 walls, and I was under the impression that the crack that was  
8 observed on the one side of the wall was observed approxi-  
9 mately in the same location on the other side of the wall, so  
10 I classified them as a through crack.

11 Q Did you tell any representative of Bechtel or  
12 Consumers Power Company that in your judgement some of these  
13 cracks were through cracks?

14 A I'm sure-- I don't know whether I made any comments  
15 like that or not. It's possible I might have said "It looks  
16 like maybe a through crack." Probably that would be the extent  
17 of the comment.

18 Q All right.

19 Subparagraph E reads:

20 "Does not reevaluate the total structure  
21 using all of the load combinations and add the effect  
22 of settlement and cracks."

eb57

1                   And I think you've previously described your con-  
2                   cerns. And that's a concern that remains today. Is that  
3                   correct?

4                   A        Yes.

5                   Q        All right.

6                   F.        You're going to have to read that into the  
7                   record for me. I can't do it.

8                   A        Basically it states that they investigate the effect  
9                   of propagation of cracks during a vibratory mode. Basically  
10                  if there was an earthquake that would occur, this would affect  
11                  any further propagation of the cracks. That was a concern  
12                  of mine.

13                  Q        The second page of Exhibit 5, number two, refers  
14                  to the aux building, the auxiliary building.

15                  A        Yes.

16                  Q        And it says:

17                                "A. Fix appears adequate if properly  
18                                implemented."

19                  Was that your conclusion based on the presentations  
20                  made that day?

21                  A        Based on the presentation, there was-- What I was  
22                  making a note to myself was as to the general scheme. It



eb58

1 seemed to me like a proper way to go about providing the  
2 support for the structure, but I still have no comments on  
3 whether a reanalysis to prove this should be done. But the  
4 general scheme seemed feasible to me.

5 Q All right.

6 Point B under there says:

7 "Must investigate the effective damage  
8 on the...."

9 What's the next word there?

10 A Tower.

11 Q "...tower section for the misleading effect  
12 during construction."

13 Is that correct?

14 A I believe what looks like "mis" should be mis-  
15 cellaneous.

16 Q Oh, miscellaneous.

17 A It may just have been a stroke of the pen.

18 Q All right.

19 And then C says:

20 "Must investigate for new situation."

21 A Yes. What I'm basically saying, as I stated before,  
22 an analysis still needs to be done which reanalyzes the

eb59

1 structure for the way it will be after the fix and due to the  
2 soil conditions they have now.

3 Q All right.

4 Has the investigation into what you refer to as  
5 the effect of effective damage on the tower section been done,  
6 to your knowledge?

7 A I don't think so. Basically we are requesting the  
8 applicant to allow us to conduct an audit of the design, and  
9 we were hoping during the audit we'd become very familiar with  
10 what analysis and design they have done to date, and that would  
11 help us determine whether the actual design and analysis do  
12 indeed analyze the structure for the new condition, consider-  
13 ing the fix and the new soil properties that they have.

14 Q Was this Point 2.B specifically the subject of a  
15 specific further question to Consumers Power Company?

16 A Basically in those interrogatories, which were  
17 pretty much the result of our review, combining the soil  
18 settlement and a general review of the FSAR, would pretty much  
19 address this, where we asked the applicant through the A&E  
20 to reevaluate and reanalyze the structure, considering the  
21 new modification to the structure and the soil condition.

22 Q What miscellaneous loading effects during

eb60

1 construction are you referring to in that Subparagraph B?

2 A Well, I think I was considering at that time-- Even  
3 like during this fix, for example, you would impose some load  
4 on the other structures because they have to jack things up,  
5 beams, and prop different members, and I was concerned whether  
6 this operation, if any, you know, affected the main part of  
7 the structure, the tower which should not have been affected  
8 by the soil or anything like that.

9 Q I see.

10 A It was just the wing walls that were of concern.

11 Q All right.

12 The next number refers to borated water tanks.

13 "Reanalyze for crack condition if cracks  
14 are not shrinkage cracks."

15 Is that correct?

16 A Yes.

17 Q Number 4 is:

18 "The service water intake structure..."

19 and under that Part A says:

20 "Fix appears bad one. Bring...."

21 Perhaps you can read the rest of it for me.

22 A "Fix appears bad one. Bring to solid

eb61

1 base with adequate design foundation that simulates  
2 old design."

3 That's what it reads.

4 Q All right.

5 Now you say the fix appears to be a bad one.

6 A Yes.

7 Q What did you mean by the word "bad" as used in that  
8 sentence?

9 A Well, given the information at the presentation  
10 from the consultant, the type of fix that the consultant was  
11 recommending to the A&E and in turn to the applicant, it was  
12 not bringing the structure to what it was originally intended  
13 to do.

14 The original design had the foundation to be  
15 supported on firm soil. Now that part of the building was  
16 determined by the applicant later on was indeed supported on  
17 not adequate soil, at least not to the type of soil proper-  
18 ties that the structure was designed to.

19 So it appeared to me that in order for the original  
20 design to be applicable, still not considering the effects of  
21 cracks would be to bring the foundation back on the type of  
22 soil that that part of the structure was intended to be

eb62

1 supported by.

2 Q Do you believe that the remedial action that--  
3 Well, let me ask a preliminary question.

4 What do you understand the remedial action to be  
5 that's proposed for the service water intake structure?

6 A The remedial action for the service water intake  
7 structures, from the presentations and from material provided  
8 to me, consists of <sup>concrete</sup> ~~concrete~~ barrels attached with bolts, tension  
9 bolts, to this part of the structure and then piles would  
10 provide only vertical support during any environmental loads  
11 like seismic.

12 Q And the piles are to be driven down into the glacial  
13 till; is that correct?

14 A Yes.

15 Q Do you believe that the remedial action that's  
16 proposed will not meet NRC criteria for structures?

17 A I don't know a hundred percent that it will not  
18 meet until I see the analysis. And there is always a way they  
19 can show that it still provides adequate support, but I have  
20 not seen the analysis. I haven't seen the models used. I  
21 haven't seen the result of the analysis.

22 But basically, like I stated before, this changes



eb63

1 the original design, so if you're changing the original design  
2 you must redo all the design and analysis over again for this  
3 new support. And I have no way at this point to make a  
4 determination whether it will not be adequate.

5 All I was trying to say in the note to myself was  
6 that this was a change and that it doesn't quite meet the  
7 original intent, so that it was a bad change because it  
8 doesn't go back to the original intent.

9 Q The original intent was to have solid--

10 A A solid support all the way to the foundation of  
11 the structure.

12 Now we have point loads at intervals and it is  
13 only provided with piles for vertical support rather than  
14 lateral support.

15 Q Can you read Subparagraph B, please, into the re-  
16 cord, of Point 4 of Exhibit 5?

17 A Do you want me to read the exact words--

18 Q Yes.

19 A -- or give you the intent of my note?

20 Q First the exact words and then you can explain it.

21 A "When questioning the fix, the fingering  
22 effect of some bad section of so-called good soil

eb64

1 was pointed out. Verify this. Give evaluation.

2 Conclusions."

3 Those are the exact words.

4 Q Okay.

5 Now can you tell us what you meant when you wrote  
6 that note?

7 A What I meant when I wrote the note was when I  
8 asked questions on why the structure was not reanalyzed or  
9 why the applicant did not propose a fix which would provide  
10 the same type of support as before, just so many feet down,  
11 the applicant -- the fellow that was making the presentation  
12 pointed out that they were fearing a fingering effect.

13 And by that the gentleman explained to me that  
14 there is always a possibility that some -- that there might  
15 be a little streak or vein of bed soil which will get water  
16 to come back on that part of the ground and cause problems  
17 for them.

18 So I guess I made a note saying to verify this  
19 and to request a sort of evaluation and make conclusions on  
20 this point.

21 That was the intent of the note.

C3 3.200 22

22 Q Do you remember which individual, Mr. Rinaldi,

eb65

1 from the applicant said that there was the possibility of  
2 having bad finger soil? Was that how it was expressed to you?

3 A The fingering effect. That was the term used, and  
4 I wasn't sure what that meant and so I asked that question,  
5 what "fingering effect" was. And it was explained to me that  
6 -- just what I stated before, that there might be some possi-  
7 bility of water coming through some little vein of, you know,  
8 sandy soil back into that area if they were to undertake a  
9 repair which will involve bringing the foundation to the  
10 good soil.

11 Q Do you remember the name of the person who made  
12 that explanation?

13 A I'm sorry, I think there were-- During that ques-  
14 tioning part, on my part I mean, there were several people  
15 that responded to me, including the consultant, Davison.

16 Q Dr. Davison?

17 A Yes.

18 So I don't know if it was Mr. Dhar or Mr. Davison.  
19 And there was another fellow and I don't remember his name,  
20 whether it was Johnson or--

21 Q Ted Johnson?

22 A No, not Ted Johnson. I know Ted Johnson personally,

eb66

1 so it was not Ted Johnson. It was a tall fellow with a  
2 mustache, a Caucasian, so I don't remember his name. I can  
3 find out, looking at the names of the people there who were  
4 at the meeting.

5 Q Was it McConnell?

6 A It could be. I described his features. I think  
7 if I see him again I'd be able to know.

8 Q Now we earlier discussed the response of the  
9 applicant to Question 40, and I just want to ask you to take  
10 a quick look at Question 41, and ask whether that is going  
11 to deal with some of the questions that remain with respect  
12 to the service water pump structure.

13 (Handing document to the witness.)

14 A Well, definitely this is one of the areas. Like  
15 I stated before, I don't believe this information has been  
16 reviewed, just because of the date.

17 I believe this must have arrived in the Navy's  
18 hand or my hand some time around the holiday season.

19 We will be glad to review it. Again, I hate to  
20 make any conclusions but if they have addressed my concerns  
21 as stated in these notes, you know, there's a very good  
22 chance that it's acceptable.

eb67

1 Q Now we earlier discussed these interrogatories  
2 and we marked as Rinaldi Deposition Exhibit 6 for identifica-  
3 tion a draft set of the interrogatories. The handwritten  
4 note on the front if it reads:

5 "I enclosed two copies but I don't think  
6 we should take time to send them to the Navy. If  
7 they are okay with you let's send them out. Please  
8 call me as soon as you read."

9 A Yes.

10 Q Prior to the time that these interrogatories were  
11 put together though, I take it that the Navy had been con-  
12 sulted so that their concerns had been addressed by the in-  
13 terrogatories as well as your own. Is that right?

14 A That is right.

15 Q Okay.

16 MR. MILLER: I would like to mark as Rinaldi  
17 Exhibit 7 a memorandum from Jim Knight to Mr. Tedesco dated  
18 October 29, 1980.

19 (Whereupon, the document  
20 referred to was marked as  
21 Rinaldi Deposition Exhibit  
22 7 for identification.)



eb68

1 BY MR. MILLER:

2 Q Mr. Rinaldi, I show you a document that has been  
3 marked Rinaldi Deposition Exhibit Number 7 for identification  
4 and I ask you if that is the transmittal -- the attachment  
5 to the first page of that is the transmittal from the Navy  
6 to you of their concerns on the structural questions.

7 (Handing document to the witness.)

8 A Well, the way we have worked in this is the Navy,  
9 with my guidance, have reviewed this FSAR or any information  
10 submitted by the applicant, and they have reviewed this  
11 information utilizing our acceptance criteria and written a  
12 report of the status of the review. It's a draft. It has not  
13 been published and it has not been sent to the Project Manager  
14 at this point.

15 But from that report myself and the Navy, in a  
16 meeting situation which has taken several days, we have  
17 identified the areas which are of concern to us, and these  
18 areas mostly related to the soil problems and the general  
19 analyses are identified in this document.

20 This document-- The cover letter was prepared by  
21 myself for Mr. Knight's signature, and the enclosure to it  
22 was developed by Mr. Huang -- Dr. Huang, I'm sorry, and

eb69

1 Mr. Matra and myself over several days of meeting.

2 Now the other document that you had before, the  
3 interrogatory, that copy that you showed me was a second  
4 draft of the interrogatory. The first draft which was pre-  
5 pared from meetings we had within the NRC staff, that copy  
6 was reviewed in detail by the Navy and they passed on their  
7 comments to me, which in turn I passed on to our legal staff  
8 and they incorporate it into this interrogatory.

9 And what I merely did in the second draft was to  
10 read it for editorial content, making sure that all the  
11 changes and all the things that weren't clear from my point  
12 of view and from the Navy point of view had been included.

13 Q All right.

14 And was Rinaldi Deposition Exhibit 7 one of the  
15 documents that was used to put together the interrogatory?

16 A Yes.

17 Q All right.

18 Now I think that you said that there were meetings  
19 between yourself and Dr. Huang and Mr. Matra at which the two-  
20 page attachment to Exhibit 7 or the three-page attachment  
21 was developed.

22 A Yes.

eb70

1 Q I take it that that meeting took place some time  
2 prior to October 29, 1980.

3 A Yes.

4 Q Do you remember the approximate date?

5 A No. There was more than one meeting. I don't  
6 remember the exact date. If it was of extreme importance I  
7 could try to reconstruct them.

8 But we just have a working relationship. They're  
9 located 13 miles from my office so either by phone or just  
10 jumping in the car and meeting at an NRC site or at the Navy  
11 facility, we do have interaction.

12 Q I see.

13 Was it within 30 days prior to October 29th, say  
14 the last of these meetings?

15 A Oh, I'm sure of that.

16 Q So that in effect the interrogatories were sub-  
17 stantially developed before the most recent submittal by  
18 Consumers Power Company?

19 A If you mean by "the most recent submittal"--

20 Q November 1980.

21 A Yes.

22 Q I just represent to you that the interrogatories

eb71

1 themselves as filed are dated November 26, 1980.

2 A Well, you have to realize that it takes time to  
3 print and issue any information.

4 Q Now do the interrogatories represent all of the  
5 questions that the staff presently has with respect to the  
6 structural adequacy of the facilities at the Midland site?

7 A I believe it addresses the major -- 90 percent of  
8 it. I believe there were a few questions which would apply  
9 to the regular FSAR review which are not identified in this  
10 memo which would be addressed later on in our review, once  
11 we resolve these major things.

12 And there were some questions raised on the missile  
13 spectra which we would look at following the resolution of  
14 these problems which had been identified.

15 And then we had a General Bulletin which applies  
16 to masonry walls, and I believe Midland would have to address  
17 this problem with the masonry walls which are a Category I  
18 structure, as well as all the other applicants of operating  
19 plants or under licensing review.

20 So I believe those are the only two other items  
21 that would really impact, you know, the final review which are  
22 not fully involved here.



eb72

1 I would also point out there is one question where  
2 we asked for general information on the-- Well, the way you  
3 see it on the October 29th it includes, as you can see, the  
4 containment and other structures. But I believe the way it  
5 was issued to you in the interrogatories, it addressed only  
6 other Category I structures and bypassed the containment  
7 structure because it was not involved in this hearing, the  
8 containment being not supported on the same soil as the ser-  
9 vice water and the diesel generator building.

10 So we have requested information from the applicant  
11 which would allow us to perform some analytical analysis our-  
12 self, independent of the applicant, and give us some more  
13 assurance, you know, on the structures.

14 Q Are you referring to what is now Interrogatory 8  
15 of November 26th?

16 A Yes, Interrogatory 8. If you read it careful it  
17 only addresses the structures which are founded on the soil,  
18 and if you look at Question 11 on the October 29th, 1980 memo  
19 by Jim Knight to Mr. Tedesco, you'll find that he's addressing  
20 the containment structure and the service water pump structures  
21 and the diesel generator building, et cetera, because we --  
22 the Navy by saying "we" -- will be conducting an independent



eb73

1 analysis of the structures, and in this review or this analy-  
2 sis they would like to use or review some information that  
3 Bechtel used in the analysis and design of the structures.

4 Q Mr. Rinaldi, just backing up for a second to the  
5 site visit in February of 1980, at that site visit did you  
6 mention to anyone that you were planning at that time to go  
7 to Ann Arbor to review certain calculations that had been  
8 made by Bechtel?

9 A Yes.

10 Q And did you ever do that?

11 A We wrote a memo and we contacted them earlier  
12 through the Project Manager, requesting this audit. We had  
13 mentioned to them at that meeting-- They asked what was the  
14 Navy role in this thing, and we told them that because of TMI  
15 our staff had shrunk to about two working people in the  
16 branch so we needed help doing our review, and that we had a  
17 contract with the Navy and it involved three phases, the  
18 general review of the application, an audit, and some inde-  
19 pendent analysis.

20 And in the spring I believe or, at the latest in  
21 June, I believe of 1980, the Project Manager contacted the  
22 applicant and informed them that we did plan to do this audit.

eb74

1 which would help us review.

2 And we were told that the applicant, specifically  
3 Bechtel, would need a great deal of time to get ready for  
4 this, and they would tentatively be ready in April of 1981,  
5 as far as I know.

6 Q Okay.

7 Returning to the interrogatories, are there any  
8 other outstanding questions with respect to the remedial work  
9 which resulted from the soils problem at the Midland site which  
10 are not addressed in the interrogatory?

11 A I don't believe so. But we have to read the reply  
12 to some of the questions that you pointed out to me earlier  
13 on the November submittal, and there might be additional ques-  
14 tions from that. I don't want to make any judgment at this  
15 time.

16 Q Do you have a schedule as to when you are going to  
17 -- or when the Navy is going to review those responses to the  
18 questions and discuss them with you?

19 A I don't have a schedule for that review but we have  
20 a good working relationship. We could set up a schedule on  
21 a quick turn-around basis, but always considering the other  
22 plants that they have to review under their contract.

eb75

1           The Navy has been-- The Laboratory has been closed  
2 for over two weeks in December. They have a policy of closing  
3 the Lab for two, two and a half weeks in the holiday season,  
4 and they take their vacation time at that time. They have  
5 just returned this week.

6           Q       Okay.

7           Interrogatory 2, the second sentence of it reads  
8 -- and it's referring to the north wing of the service water  
9 pump structure. The second sentence reads as follows:

10                        "While the portion of the structure over  
11 the fill material is being supported by the main  
12 structure founded on natural material through canti-  
13 lever action, it is stated in Management Corrective  
14 Action Report Number 24, Interim Report Number 6,  
15 issued September 7, 1978, that the total design loads  
16 cannot be supported by the main structure."

17           Now what do you understand the words "total design  
18 loads" as used in that sentence to mean?

19                        (Handing document to the witness.)

20           A       Well, by "total design load" I would imagine it's  
21 the load combination that governs the design of those com-  
22 ponents.

eb76

1 Q So in other words as long as there is not a safe  
2 shutdown earthquake, the structure is not going to fail in  
3 its present condition. Is that correct?

4 A It's possible. It depends on the loads. There  
5 could be one situation....I don't know exactly which load  
6 combination controls the design. Bechtel would be in the  
7 best position to answer that question.

8 But yes, if not all the loads would occur at the  
9 same time and not in the worst condition it might not be a  
10 failure mode.

11 Q All right.

12 Going on to Interrogatory 4, there is a reference  
13 to the response to Question 15, 50.54(f), and I have it here.  
14 It refers to a statement that:

15 "Differential settlement primarily in-  
16 duces additional strain which is a self-limiting  
17 effect and does not affect the ultimate strength  
18 of the structural members."

19 Now then, it's a fact, is it not, that once the  
20 differential settlement has occurred, there can be no addi-  
21 tional stress put on the member that has been subjected to the  
22 differential settlement from settlement alone?

eb77

1           A       The settlement-- If you make the assumption that  
2 the settlement has completely stopped and that there is no  
3 further effect of settlement then that's correct. But any--  
4 As it was pointed out even by the applicant and the Bechtel  
5 people, settlement is never a hundred percent complete.  
6 There is always some percent which could occur, you know,  
7 following the major part of the settlement.

8                   It is over a period of years that total settlement  
9 occurs, so I would imagine that there is some effects of  
10 settlement which are going to occur, you know, some two or  
11 three years from now, but they might not be significant. I  
12 don't know.

13                   So when you ask me that question I have a problem  
14 answering because you have to first determine there is no  
15 longer any phase of settlement which is going to occur at  
16 any time from now.

17           Q       Well, do you believe that if settlement were to  
18 occur so that the yield strength of the reinforcing steel  
19 was exceeded, that that would lead to failure of the structure  
20 under the postulated load conditions?

21           A       Well, you see that again is not a question that  
22 could be answered very simply, simply because when you're



eb78

1 talking about the stress level of the structure after the  
2 settlement, you see I don't know whether the steel has  
3 exceeded the yield or exceeded the maximum allowable, or what  
4 level is the structure at.

5 And then you have to postulate all the load com-  
6 binations that we design the structures to, and you have to  
7 conduct the analysis under that condition, and you have to  
8 have results. And I don't have any of those -- any of that  
9 information.

10 I don't know if the steel exceeded the yield,  
11 which I hope it hasn't. I hope it is still under the yield  
12 limit. If it has exceeded the yield, I don't know what stage  
13 of the yielding process is that reinforcing at this time.

14 Q Well, for a steel member that's encased in con-  
15 crete and embedded in the soil, even if it has exceeded the  
16 yield, it still cannot -- it is still within acceptable strain  
17 limits. Is that right?

18 A I understand your question. It could be, yes.  
19 Even though it exceeded the yield it still -- there's-- Well,  
20 you have some strain limit associated with yield, and then  
21 you have, you know, additional strain limit. And after a  
22 careful analysis you can make an engineering judgment saying

eb79

1 even though you exceeded the yield by so much, the strain  
2 limit still could be acceptable, you know.

3 But you only could do this after, you know, a  
4 careful analysis, and some engineering judgment on the analysis  
5 and design.

6 Q And to the extent that the steel is confined by  
7 concrete and soil, the amount of additional strain is self-  
8 limiting. Is that right?

9 A I would not make that determination because  
10 apparently it is just a statement that was made. What we need  
11 to have for our review is what information, what analysis  
12 have they used, meaning the A&E or the applicant, to arrive  
13 at the conclusion that it's self-limiting.

14 We don't have enough information to be able to  
15 arrive at the same conclusion that the applicant and the A&E  
16 have been able to make. They may have, you know, information  
17 which makes them make that conclusion and possibly if we share  
18 that with them, either in their submittal or at the audit,  
19 we'd be able to arrive at the same conclusion that the A&E  
20 and the applicant has arrived at.

21 Q Well, would you agree with me though that if  
22 differential settlement has in fact stopped or additional

eb80

1 differential settlement is predicted, that that settlement  
2 plus the other postulated loads are the limit of the strain  
3 to which the structural steel reinforcing rods will be sub-  
4 jected?

5 A If the settlement has stopped and the steel has  
6 not exceeded a certain level of strain, I agree with you. If  
7 it has exceeded a certain level of strain, then I would not  
8 agree.

9 If I was in a position to see the value done by  
10 analysis, what limit of strain the steel has reached, if the  
11 steel has not exceeded the yield then I would agree with you,  
12 or if it is somewhere close to that I would agree with you,  
13 but unless I know at what strain values is the steel at this  
14 time, I cannot do that.

15 And basically the applicant has been able to make  
16 that conclusion, and I think the only thing that Interrogatory  
17 4 points out is there is some discrepancy in how this infor-  
18 mation was presented. You're saying this is self-limiting  
19 but on the other hand you say that you cannot do certain  
20 things. And I believe there is a question, Part A and B, which  
21 tells you how you reconcile this type of thing.

B4

22 Q Mr. Rinaldi, it's a fact, is it not, that the NRC

eb81

1 accepts certain strains on a structure in excess of the yield  
2 strength of the material if those strains only occur a  
3 limited number of times during the life of the facility?

4 A From what I understand, our policy is to -- the  
5 general policy is not to exceed the yield strength of the  
6 material.

7 Q All right.

8 Are you familiar with the criteria for thermal  
9 effects on containment?

10 A Yes.

11 Q And the fact that those -- in that situation the  
12 yield strength of material can be exceeded on -- what? --  
13 three occasions during the lifetime of the plant?

14 A Well, let's just say the thermal effects are con-  
15 sidered secondary effects. And I agree with you that we don't  
16 think that this type of settlement and crack structure could  
17 be considered a secondary effect.

18 Now if the concrete is cracked due to shrinkage  
19 then we will consider it a secondary effect, but the question  
20 how these cracks are in effect on the structure, whether  
21 they are through cracks or what state the steel is, I myself  
22 and the previous reviewer, we at this time do not consider it.



eb82

1 as a secondary effect, as a thermal effect that you point out.

2 But on the concrete structures and the rebars and  
3 the structures, the general policy on the design of Category  
4 I structures is for the steel, which is the reinforcing, not  
5 to exceed the yield.

6 There may have been a situation where some relaxa-  
7 tion has been made for some reason or other which I don't think  
8 we need to discuss now, that it may have been relaxed. I don't  
9 know. But our concern is that we like to keep the reinforcing  
10 below yield.

11 Q All right, sir.

12 And do you have a professional judgment as to how  
13 much in excess of the yield strength would nonetheless be  
14 acceptable as the licensing basis?

15 A I hate to make that policy now, without consulting  
16 with my management. I don't believe I'd like to make policy  
17 for the NRC.

18 Q That would require -- what? -- Mr. Knight to make  
19 a judgment?

20 A Well, it would be-- It would not just be  
21 Mr. Knight's judgment. It would be the staff, and then through  
22 Mr. Knight. He would have to approve it.



eb83

1 Q Do you believe that the strains which result from  
2 differential settlement are in effect without any limit as  
3 long as the differential settlement continues?

4 A Well, when the limit is failure, yes.

5 Q If there is a satisfactory prediction that addi-  
6 tional differential settlement is going to be a known value  
7 and from that calculations can be made of the additional  
8 strain, would you then agree that that sets the limit for the  
9 additional strain that is going to be induced on the struc-  
10 tural steel?

11 A Yes, if it is at yield, yes. If it is less than  
12 yield or past yield, I would not make any judgment at this  
13 time.

4.060

14 Q All right.

15 Now Subpart B of Interrogatory 4 wants a recon-  
16 ciliation of that statement with the statement that's found  
17 in the Bechtel report about the service water pump structure  
18 not being able -- that the total design loads cannot be  
19 supported by the main structure. And my question to you is:

20 Since that statement refers to total design loads  
21 is there any necessary inconsistency between that statement  
22 and a statement which deals only with the strain loads

eb84

1 resulting from differential settlement?

2 A Well, the structure does not know what the load  
3 comes from. If we have loading combinations to be used in  
4 the design of structures and these load combinations are a  
5 postulated event which will occur in conjunction with each  
6 other, I mean there's no reason why the earthquake has to  
7 occur at the same time as some other pressure loads on the  
8 structure.

9 But yet the NRC and the industry through the Code  
10 work do postulate these events to occur at the same time for  
11 some conservative reason. So in my engineering judgment I  
12 would say this is a similar type of situation where you have  
13 settlement and you have these other loads which have been  
14 imposed by the regulatory agency or the Code which is made up  
15 of industry, all phases of industry, which combines all those  
16 loads you know.

17 So I just have to respect the years of experience  
18 of the Code and the previous regulator and the wisdom of  
19 combining this type of thing and expect the structure to  
20 survive this combination of events which may never occur,  
21 you know, but on the other hand may.

22 So that's the best way I can answer.

eb85

1 MR. MILLER: I want to take a short break.

2 (Brief recess, whereupon the deposition was  
3 again resumed.)

4 BY MR. MILLER:

6 Q Mr. Rinaldi, you stated that temperature, thermal  
6 stresses are regarded by the NRC as secondary. Is that  
7 correct?

8 A Yes.

9 Q What is the differentiation between a primary and  
10 a secondary stress?

11 A I want to correct you a little bit because we're  
12 talking about reinforced concrete structures and the one  
13 that the NRC considers secondary is usually all steel members.  
14 And this is from the ASME code. They have a different require-  
15 ment in the concrete design, so there is some difference.

16 The only one that, like I said before, would be  
17 sort of a secondary nature is a shrinkage crack which we don't  
18 consider at all because we believe it does not affect the  
19 steel inside the concrete. You just have a surface crack  
20 in the concrete which doesn't affect the steel inside which  
21 gives you the strength.

22 I don't want to mix the ASME concept of design on

eb86

1 a steel containment versus a reinforced concrete or pre-  
2 stressed concrete.

3 Q Other than shrinkage, are there any secondary  
4 strains that you know of that are experienced by reinforced  
5 concrete structures?

6 A We don't try-- We had some discussions with the  
7 Code Committee on primary and secondary moments on contain-  
8 ments and we -- the NRC by "we" -- resisted the idea of the  
9 primary and secondary so....

10 Q Your answer is you don't know of any?

11 A I wouldn't consider the settlement problem as a  
12 secondary stress or strain; if it was to be suggested as a  
13 secondary one, that's the way I would answer.

14 Q Why is the thermal effect considered secondary  
15 for steel containments?

16 A The thermal effect is considered secondary--

17 Q For steel containments. I think you testified to  
18 that.

19 A Yes. Because the temperature would not be signi-  
20 ficant under the other loads to affect the components. That's  
21 the way I understand it.

22 Q Differential settlement, regardless of its magnitude,

eb87

1 you believe is a primary as opposed to a secondary strain?

2 A No. I think I pointed out before that it would be  
3 affected a great deal by the extent of the effect of settle-  
4 ment on the structure. And like we said before, we're talking  
5 about a concrete structure, reinforced concrete structure  
6 that has been subjected to cracks.

7 Now as we discussed before, there is an evaluation  
8 of those cracks, and the evaluation of the cracks would  
9 determine the conditions of the reinforcement on the structure  
10 and the condition of the reinforcement on the structure will  
11 give me an insight on classifying whether the so-called  
12 settlement had affected the structure in a primary way or not.

13 If those cracks, as I said before, are just surface  
14 cracks, then I would again agree with you that there is no  
15 effect on the structure and in my judgment it could be  
16 classified as self-relieving or whatever.

17 But if it is through cracks and the structure had  
18 been affected by the settlement and further settlement was to  
19 occur, I would not be able to make a judgment until a detailed  
20 investigation of the rebars and the relation between the  
21 rebars and the concrete has been fully settled.

22 MR. MILLER: I would like the Reporter to mark as



eb88

1 Rinaldi Deposition Exhibit 8 for identification a multi-  
2 page handwritten document titled "Responses to NRC requests  
3 regarding plant fill."

4 (Whereupon, the document  
5 referred to was marked as  
6 Rinaldi Deposition Exhibit  
7 8 for identification.)

8 BY MR. MILLER:

9 Q Before we get to Exhibit 8, I have one more ques-  
10 tion on these interrogatories, and that was Interrogatory 5-D.

11 There's a reference to limiting tension field con-  
12 dition in which a crack will not propagate.

13 Could you please describe what those field condi-  
14 tion are and how that could be demonstrated?

15 A I don't know. I'm not prepared to say.

16 Q Is that something that Mr. Matra or Dr. Huang  
17 would know better than you?

18 A Oh, I don't know if they'd know better than me.  
19 You can try, if it's a concern. But I don't think it is my  
20 position to say how this should be done. But if it is shown  
21 to be an acceptable way-- I think we had the same problem  
22 before. You asked me the same question before.

eb89

1 I don't want to infer how things should be done. I  
2 don't think it is the NRC policy to tell the applicant how  
3 things are done. I don't think we do this for any applicant.

4 Q The reference there is to crack propagation in  
5 Interrogatory 5. You're talking again about through cracks?

6 A Yes, sir.

7 Q So that to the extent that there has been no addi-  
8 tional cracking in, for example, the diesel generator struc-  
9 ture, that's an indication, is it not, that the tension field  
10 analysis -- a tension field analysis would indicate that there  
11 is no problem with the structural integrity of that building?

12 A Well, I'm sure that Bechtel and applicant have  
13 concluded, by reading or discussing the information with our  
14 consultant, has concluded to that.

15 You see, we have the problem with the through crack  
16 situation. It's not very clear whether there are any through  
17 cracks or not. The applicant has dismissed this fact, there  
18 are no through cracks; the only cracks are just minor things.  
19 And I guess the applicant -- excuse me. I guess the consultant  
20 and the staff or the reviewer and the staff that have been  
21 involved in this are not quite that convinced.

4.320

22 So this problem with through cracks still remains

eb90

1 there. And then the fact of whether these cracks have re-  
2 duced the elastic capacity of the structure, that's the  
3 second question that has not really been fully answered.

4 And the third part is given the same structure,  
5 the crack situation, and imposing the load, the postulated  
6 load combination which the Code and the NRC criteria imposes  
7 on the applicant, we would like to know whether these cracks  
8 in this structure in the tension field developed -- that will  
9 be developed by this load combination, whether these cracks --  
10 whether through cracks would propagate any further. That's  
11 the intent of Interrogatory 5-D, to the best of my knowledge.

12 Q Now, Mr. Rinaldi, are you aware of the fact that  
13 because the diesel generator building was, for a portion of  
14 the time, being supported by a duct bank that there was some  
15 cracking of concrete that was postulated to have resulted  
16 from differential settlement caused by the fact that part of  
17 the building was being supported by the duct bank and another  
18 portion was not? Are you aware of that?

19 A When I ~~undertood~~ <sup>undertook</sup> the review of the Midland Plant  
20 at the meeting of February 1980, the applicant and the  
21 architect-engineer pointed out the fact that these duct banks  
22 were applying a load to the structure as a result of the

eb91

1 settlement and that was a result of attaching -- of the attach-  
2 ment of these duct banks and some lean concrete pads which  
3 were underneath some of those duct banks which were producing  
4 some resistance.

5 Q And do you know what happened to the cracks that  
6 were induced by the loads that resulted from the duct banks  
7 supporting part of the structure once the duct bank was cut  
8 free from the diesel generator building?

9 A I assume some of them are starting to close again,  
10 but I still don't know whether they were ever through cracks.

11 This through crack situation was never really  
12 fully investigated. Even the fact that never a section was  
13 taken from the worst area of cracks where a through crack  
14 from general field inspection could have been suspected never  
15 was carried out.

16 And the relieving of these point loads from the  
17 duct bank and the adjustment or the differential settlement  
18 of the diesel generator building by the sand surcharge did  
19 affect the structure some other way, and apparently by the  
20 time I visited the plant had tended to close or reduce the  
21 size of the cracks.

22 Now I would never know whether those cracks were

eb92

1 through cracks or if they were surface cracks to some extent  
2 unless some check was done of the worst location.

3 So one way would have been to analyze this thing  
4 very early to eliminate any doubt as to the through cracks.  
5 At this time it is kind of hard or difficult to make that  
6 assessment. I guess it could still be done. There must be  
7 some way of doing it.

8 Q Well, at this early stage was there anything other  
9 than a visual examination of the cracks that you're referring  
10 to?

11 A At the early stages I was not involved. When I was  
12 involved was in February when the surcharge had already been  
13 implemented and like you said, somebody remembers me making  
14 the statement that the cracks appeared a lot smaller than I  
15 had expected. I guess from what I heard by word of mouth,  
16 maybe there were a lot wider gaps. I don't know about that.  
17 I never saw them.

C4

18 Q But assume with me that you had been involved in  
19 the investigation from the very beginning. Are you talking  
20 about anything other than visual inspection of the cracks  
21 to determine whether or not they were through cracks at that  
22 early stage?

4.320



eb93

1           A        I don't know. If visual inspection had deter-  
2 mined clearly that would have been the first step. If that  
3 wasn't clear and the applicant wanted to satisfy this point,  
4 the normal thing is to take a section, take a core of the  
5 wall.

6           Q        That could still be done, couldn't it?

7           A        Yes.

8           Q        And would the results indicate whether or not the  
9 reinforcing steel retained its integrity?

10          A        It could be, yes.

11          Q        When you say "take a section of the wall" you in-  
12 clude the reinforcing steel that's in the wall. Right?

13          A        Well, if there's a lot of reinforcing. It depends  
14 on the spacing of the reinforcing. You might be able to  
15 avoid that. It depends on where the crack is. It depends  
16 on the spacing of the reinforcing. They might be so close to  
17 each other that a six-inch core might not miss the steel.  
18 But you could--

19          A        In other words you're trying to analyze the con-  
20 crete rather than the steel when you take the section?

21          A        Well, you're analyzing the concrete just on the  
22 crack basis, whether it was a through crack. If you take a

eb94

1 core of it you might be able to determine the crack. The  
2 steel would have to be something else, you know.

3 Q Assume that there were some through cracks. Does  
4 that necessarily mean that the steel has been overstressed?

5 A No.

6 Q Okay.

7 I show you a document that has been marked Rinaldi  
8 Deposition Exhibit 8 for identification and I ask you if that  
9 document is in your handwriting.

10 (Handing document to the witness.)

11 A No.

12 Q Do you know whose handwriting it is?

13 A I believe it is John Matra's.

14 Q Do you know for what purpose he prepared this?

15 A Yes. As a part of the review, he was identifying  
16 all the questions that were brought out at different points.

17 As you see in the front here, questions 1 through  
18 35 is in the later part.

19 Then in the second part, I don't think this applies  
20 just to the settlement problem, the soils problem. This is  
21 from the early stage of the review, what questions had been  
22 asked and whether they had been resolved. And this has come

eb95

1 into my hand very late in the game, just before the holiday  
2 because I asked him if there was -- if he had done this as  
3 part of a review and he said he did. And I said please pro-  
4 vide me with a copy just for my records.

5 Q I see.

6 That's how it came to be found in your file?

7 A Right.

8 Q Did you discuss it with him?

9 A No. We discussed the other part, the part of the  
10 review. This part was never discussed, this one.

11 They wrote a report, with my help, of the general  
12 review and I'm sure they would have used this type of infor-  
13 mation to conduct the review.

14 MR. MILLER: I would like the Reporter to mark  
15 as Rinaldi Deposition Exhibit Number 9 a multi-page document.  
16 The cover sheet says "Technical Reviewers for Midland." The  
17 second sheet is a memo from D. B. Vasallo dated February  
18 15, 1979, Subject: Guidelines for Preparing Safety Evaluation  
19 Reports.

20

21

22

eb96

1 (Whereupon, the document  
2 referred to was marked as  
3 Rinaldi Deposition Exhibit  
4 9 for identification.)

5 BY MR. MILLER:

6 Q Mr. Rinaldi, I show you a document that has been  
7 marked Rinaldi Deposition Exhibit 9 for identification and I  
8 ask you if you have ever seen that document before.

9 (Handing document to the witness.)

10 A Well, this was part of the previous reviewer's  
11 file, which file was passed on to me for holding purpose. I  
12 was never involved in this type of review. So no, this comes  
13 from the previous reviewer's file, which is marked on the  
14 first page on the list of people involved.

15 Q That's Mr. Hafiz?

16 A Yes.

17 Q And you said you never participated in this type  
18 of a review before. Does that mean you never prepared a  
19 portion of the Safety Evaluation Report?

20 A No, I don't mean that at all. I was not involved  
21 in the preparation of any work that was detailed in this memo.

22 Q I see.

eb97

1 Mr. Vassallo and his group prepared that document.  
2 Is that correct?

3 A Mr. Vassallo and his group prepared this document  
4 for guidance to the technical reviewers. At that time the  
5 technical reviewer was A. Hafiz, and at that time these were  
6 the guidelines given for the preparation of the Safety  
7 Evaluation Report.

8 But my record indicated this was never written or  
9 published as a Safety Analysis Report during that time be-  
10 cause this occurred during the TMI pretty much, the TMI problem  
11 area and the Branch that reorganized. There were only two or  
12 three people in the Branch. So I don't believe these direc-  
13 tions were ever implemented by Hafiz or anybody else.

14 The only thing I know is that the following re-  
15 viewer did some more work on this to follow on this.

16 Q You are indicating Exhibit 9.

17 Go ahead.

18 A The following reviewer did some work, but never in  
19 the form of a Safety Evaluation Report, as far as I am aware.

20 Q All right.

21 Now is it your belief that those guidelines for  
22 the preparation of Safety Evaluation Reports have not been



eb98

1 implemented generally by the staff?

2 A I don't know what is in this memo. I'm not aware  
3 right now exactly what guidelines are in this memo. I would  
4 have to re-read it and, you know, study it. It's not appli-  
5 cable any more because Mr. Vassallo is no longer in that  
6 position and guidelines change in different directions by a  
7 different director.

8 Mr. Vassallo is a Branch Chief somewhere right now  
9 in the reorganization.

10 Q Well, Number 4 of the guidelines says:

11 "Remember Regulatory Guides recommend.  
12 They don't require."

13 A Yes.

14 Q Is that still the Staff position in preparing  
15 Safety Evaluation Reports insofar as you know?

16 A As far as I'm aware.

17 MR. MILLER: I would like the Reporter to mark as  
18 Rinaldi Deposition Exhibit Number 10 for identification a  
19 document entitled "Interim Safety Evaluation Report -  
20 Evaluation of Response to 10 CFR 50.54(f) Request Regarding  
21 Plant Fill," dated March 21, 1973, Midland Plant, Units 1  
22 and 2.

eb99

1 (Whereupon, the document  
2 referred to was marked as  
3 Rinaldi Deposition Exhibit  
4 10 for identification.)

5 MR. MILLER: As Rinaldi Deposition Number 11 for  
6 identification, a document entitled "Consumers Power Company,  
7 Midland Plant, Units 1 and 2, Structural Engineering Branch,  
8 Docket Nos. 50-329 and 50-330, Safety Evaluation Report,"  
9 and underneath it it has the word "Draft," and then down in  
10 the lower right-hand corner, "Dr. P. C. Huang, John P. Matra,  
11 Jr. and Frank Rinaldi."

12 (Whereupon, the document  
13 referred to was marked as  
14 Rinaldi Deposition Exhibit  
15 11 for identification.)

16 MR. MILLER: And as Rinaldi Deposition Exhibit 12  
17 for identification, a document entitled "Consumers Power  
18 Company, Midland Plant, Units 1 and 2, Structural Engineering  
19 Branch, Docket Nos. 50-329 and 50-330, Safety Evaluation  
20 Report," and again the three individuals' names are found in  
21 the lower right-hand corner.

22

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(Whereupon, the document referred to was marked as Rinaldi Deposition Exhibit 12 for identification.)

BY MR. MILLER:

Q Mr. Rinaldi, I show you documents which have been marked Rinaldi Deposition Exhibits 10, 11 and 12. I have numbered them in the order that I believe they were prepared, but I would like you, if you could, to tell me when each of those documents was prepared, approximately.

(Handing documents to the witness.)

A This Exhibit 10 I don't believe-- It was prepared mainly by Mr. Lipinski, just at the time or just before the time when this transfer occurred, based on his review of the document presented before that time. And I don't know if it ever got printed anywhere officially or was just an internal type document that was summarizing all the work done on this prior to my takeover of the review of the Midland Plant.

Q Is that a document that you read--

A Yes.

Q -- shortly after you took over?

A Well, I discussed it with him during the transfer,

ebl01

1 yes. Maybe that copy was written in February, early February  
2 or -- what? -- I don't know, the final version of it. But  
3 over that time period it was done.

4 Exhibit 11 I believe is the latest version of this  
5 -- our attempt, mine and the Navy consultant, in evaluating  
6 the FSAR and all the submittals at that time by the applicant.  
7 I regret that there is no date to this, but I can assure you  
8 it will be related to some extent to the questions that you  
9 see in Exhibit 7. So any questions we address in Exhibit 7  
10 or the approximate date would be considered as part of this  
11 report.

12 This report was used in the preparation. And this  
13 is a draft.

14 Now Exhibit 12 is an earlier version of Exhibit 11.  
15 And as you can see it's an attempt to arrive at this report.  
16 It might have been the same copy; I don't know. I haven't  
17 read it.

18 The only problem I have, I see handwritten notes  
19 in the back. On the other hand they might be the same thing,  
20 Exhibit 11 and 12, except in the back you have some written  
21 comments or notes on questions which might have been taken  
22 from this report, from Exhibit 12 or Exhibit 11, in the attempt

eb102 . 1 at preparing Exhibit 7.

2 Q So that these documents, Exhibits 11 and 12, were  
3 prepared some time in--

4 A In the fall.

5 Q -- in the fall of 1980. Is that correct?

6 A Yes, before October 29th.

7 Q All right, sir.

8 Now calling your attention to pages 11-- well,  
9 pages 9 through 12 of Exhibit 11, you will note that there  
10 are five items, five numbered items which are discussed and  
11 it is stated that:

12 "The above Action Items 1 through 5 are  
13 considered open items."

14 In Exhibit 12, pages 10 through 12 list four open  
15 items or four Action Items, and the sentence appears on page  
16 12 of Exhibit 12 that:

17 The above Action Items 1 through 4 are  
18 considered open items."

19 Did the number of open Action Items increase from  
20 the time Exhibit 12 was prepared to the time Exhibit 11 was  
21 prepared?

22 A The only way I could-- I'm not aware which ones



eb103

1 are the later ones since now you have pointed out this dif-  
2 ference. One you know is a follow-up to the other one.

3 The only way for me to answer that is by looking  
4 at the five items and seeing if one dropped off or one was  
5 added to it.

6 Q Would you take just a few minutes and take a look  
7 at that?

8 A I'd be glad to.

9 (Pause.)

B5

10 I still have a little problem. From a quick  
11 scanning of it in 30 seconds or so, I would imagine that  
12 Exhibit 12, the front part of Exhibit 12, may be the latest  
13 copy. Apparently in my files I had several of these ones,  
14 this report in there which might have been slightly different  
15 from other, either editorial or what.

16 So I cannot make a complete assessment and as you  
17 are aware, one of the open items, corrective actions under  
18 consideration mentions a list of items. I guess it addresses  
19 most of -- well, most of the items. I have the impression  
20 the sentence you were pointing out:

21 "The above Action Items 1 through 4 are  
22 considered open items"--

eb104

1 Q That's in Exhibit 12?

2 A Yes, in Exhibit 12. I don't know whether it was  
3 editorial that combined the previous five, or one was dropped  
4 off. I find it very difficult, you know, in a minute or so.

5 But as we pointed out before, you have seen the  
6 questions that we issued in the interrogatory and the other  
7 form of open items over here, the October 29th for the FSAR  
8 review. That would be more of an indication of the type of  
9 information still as an open item because this information  
10 was extracted from these reports.

11 So if you are searching for open items, I think  
12 a better guideline would be that document dated October 29th.

13 Q And the interrogatories that follow?

14 A And the interrogatories, to some extent. The  
15 interrogatories are more limiting in scope than this October  
16 29th but it goes into a little more detail of the questioning.

17 Q All right.

18 Exhibits 11 and 12 purport to deal with other  
19 aspects of the structural design of the plant besides the  
20 remedial soils work, does it not?

21 A Yes. Like I stated before, this is the effort of  
22 the review of the FSAR and at the same time reviewing all of

ebl05

1 the fixes for the settlement problem. And since there has  
2 not been issued this report, you have to excuse the fact that  
3 it's several reports which look very much alike but are  
4 slightly different from each other.

5 The Project Manager does not have a copy of this  
6 report, so I guess you're kind of privileged to have this  
7 first. This is most unusual.

8 Q It is one of the by-products of being a lawyer I  
9 guess.

10 For what purpose were these draft reports created?

11 A The purpose for the draft reports is in fulfillment  
12 of the contract that the Navy has with us. Within a three-  
13 year period they are to issue a draft report, a Safety  
14 Evaluation Report on the three plants we discussed before,  
15 conduct an audit for the three plant design, and do some  
16 independent analysis of these plants, certain structures of  
17 the plant.

18 So this is in fulfillment of the contract. It was  
19 the first plant under their review and they were providing  
20 this information as of the time of their work.

21 Q Now looking at the top of page 11 of Exhibit 12,  
22 there is a Subparagraph C there which deals with the duct

eb106

1 banks, and that paragraph corresponds to your response to an  
2 earlier question of mine, that based on the submittals of the  
3 applicant, the duct bank was no longer a matter of concern  
4 to the staff. Is that correct?

5 A I believe so.

6 Q All right.

7 Does that help again in indicating that Exhibit 12  
8 is later in time than Exhibit 11?

9 I call your attention to Subparagraph C on page 10  
10 of Exhibit 11, where the duct banks are still identified as  
11 a problem.

12 (Handing document to the witness.)

13 A Yes, that....Yes. As I said before, these things  
14 are very close to each other and a quick review of this  
15 Paragraph C on page 10 of Exhibit 11, and page 11 of Exhibit  
16 12 would indicate to the best of my knowledge that Exhibit  
17 12 would be the later version of the report.

18 Q Okay, sir.

19 Now on page 10 of Exhibit 12 there are references  
20 to, in the second paragraph, to certain codes.

21 A Yes.

22 Q All right.

eb107

1           Then there is a reference-- I'm sorry.

2           The bottom paragraph on page 12 reaches some con-

3 clusions, does it not, with respect to the solution of the

4 open items by the applicant as providing a basis for licensing

5 Midland insofar as the structural aspects of the foundation

6 are concerned? Isn't that correct?

7           A       Yes.

8           Q       All right.

9           The bottom paragraph on page 12 starts out by say-

10 ing:

11                   "The use of these criteria as defined

12           by applicable codes, standards and specifications...."

13 and so forth, and then, down at the very bottom of the sen-

14 tence it says:

15                   "....constitutes an acceptable basis for

16           satisfying in part the requirements of General De-

17           sign Criteria 2 and 4."

18           All right. My question is:

19           Are the applicable codes and standards referred to

20 in the last paragraph on page 12 the codes and standards

21 which are referred to in the second paragraph on page 10,

22 that is, ACI-318-63 and 318-71?



eb108

1           A       They may and they may not. Let me discuss this  
2 item.

3                   This report was written in compliance with the  
4 contract we had with the Navy. It's a general type of report,  
5 and we have paragraphs in there which pretty much we issue  
6 when all the items will be resolved.

7                   However, throughout the report we have identified  
8 open items and discrepancies between what's acceptable and  
9 what is being proposed by the applicant.

10                   This report was written in such a form that once  
11 these discrepancies were resolved, they could be deleted  
12 from the report and the report be published. So the summary  
13 conclusions would be applicable to the final resolution of  
14 all the open items.

15                   So it would be incorrect for you to just read that  
16 one paragraph at the end where it states that we meet certain  
17 criteria, 2 and 4 I believe in that one case, and bypass any  
18 one open item written in each section of that report.

19           Q       Okay.

20                   I understand that satisfaction of the open items  
21 is also a part of the conclusions that are found on pages 10  
22 through 12 of Exhibit 12. My question was a much more limited

ebl09

1 one:

2 In the last paragraph there, the last sentence  
3 actually reads:

4 "Conformance with these criteria, codes,  
5 specifications...."

6 and so on.

7 And my only question is are the codes that are  
8 referred to in that last sentence the codes that are identi-  
9 fied in the second paragraph on page 10 of Exhibit 12, that  
10 is, ACI-318-63 and 318-71?

11 A And again I'm not sure of that because I don't know  
12 if in this case we made a determination that 318 was in  
13 itself applicable or that the later version of the ACI-349  
14 would be applicable.

15 I remember from preparing this with the Navy in  
16 the fall of last year that there were certain areas where  
17 we were pointing out that there are later criteria which the  
18 industry is using, ACI-349.

19 I believe-- Well, this report should be used in  
20 the sense that I just stated, which is a draft which hasn't  
21 even been issued to the Project Manager, so it is like material  
22 under work by the staff.

eb110

1           Q       Now, Mr. Rinaldi, calling your attention to pages  
2 8 and 9 of Exhibit 12, if you would just look at them under  
3 the heading "Other Category I Structures."

4                       There is in that section, is there not, a reference  
5 to ACI-349?

6                       (Handing document to the witness.)

7           A       I see on page 9 that there is a reference to ACI-  
8 349 as modified by Reg. Guide 1.142.

9           Q       And so with respect to other Category I structures,  
10 Exhibit 12 states that the applicant is going to have to  
11 conform to ACI-349 as modified by that Reg. Guide, but there  
12 is no comparable statement, is there, with respect to the  
13 applicable code criteria for foundations?

14          A       Well, after discussing this with you right now it  
15 seems to me that way.

16                       Again I want to point out this is just a working  
17 document, but from our discussion it would indicate that, yes.  
18 The two of them are slightly different so there is a strong  
19 possibility that that is the case.

20          Q       And that wasn't inadvertent. That represented your  
21 thinking at the time, your and the Navy people's thinking at  
22 the time that the document was prepared. Correct?

eb111

1 A I'm sorry, I did not understand the question.

2 Q All right.

3 The failure to refer to ACI-349 in the foundation  
4 section of this document wasn't a mistake or inadvertent, was  
5 it? It was your thinking and the thinking of the Navy people  
6 at the time the document was prepared. Isn't that right?

7 A Yes, I would think that probably 318 would apply  
8 fully to the foundation. I have to differentiate that the  
9 foundations, those foundations apply to all the Category I  
10 structures. So the foundation could just be the footings or  
11 whatever, and the structure-- It's a different component.

12 This criteria, it just applies to the foundations  
13 and I guess was found acceptable. Perhaps we determined at  
14 that time that there wasn't that much change in the criteria  
15 for foundations in the 349 and 318, or perhaps that has not  
16 been addressed yet.

17 Q Well, in fact plants have been licensed in which  
18 all the structures and all portions of the structures were  
19 evaluated pursuant to 318 rather than 349. Isn't that correct?

20 A Would you repeat that question?

21 (Whereupon, the Reporter read from the record  
22 as requested.)



eb112

1 BY MR. MILLER:

2 Q It's a fact, is it not, that there are plants  
3 operating today that were licensed on the basis of their  
4 conformance to 318 ACI criterion?

5 A I believe so.

6 Q Okay.

7 And it's recognized that the Midland facility was  
8 designed and at least partially constructed before ACI-349  
9 was published. Is that correct?

10 A I believe so. To the best of my knowledge, yes.

11 Q And so on the basis of that it is at least possi-  
12 ble that portions of the structure will meet the ACI-318  
13 criterion but not meet one or more of the standards that are  
14 in the ACI-349 criterion?

15 A Yes, it's possible.

16 Q All right, sir.

17 Mr. Rinaldi, to your knowledge, are there other  
18 facilities that have not yet received their operating license  
19 that were designed and at least partially constructed in  
20 conformance with the ACI-318 criteria?

21 A I'm not sure of that. Any plant that has been under  
22 review since the ACI-349 was issued and adopted with the



eb113

1 reservation stated in Reg. Guide 1.142 has been asked the  
2 same questions, to address the considerations stated in 349  
3 and discuss their effect on the design of the plant in terms  
4 of safety requirements.

5           So it's just very unfortunate this review period  
6 has been very lengthy for Midland but all the plants under  
7 review which have not been issued an OL license, as far as  
8 I'm aware, have been asked the questions, to evaluate the  
9 criteria of 349 as modified by Reg. Guide 1.142 on the design  
10 of the plant.

11           Q       All right.

12                    Have there been any facilities, to your knowledge,  
13 as to which the staff has accepted the analysis presented  
14 by an applicant describing and justifying the differences  
15 between the ACI-318 criteria and not perhaps meeting the ACI-  
16 349 criteria?

17           A       I couldn't say for sure. I don't know whether--  
18 I know for some of the plants this approach has been followed  
19 but I couldn't pull them out from the top of my head at this  
20 moment, you know, which plants.

21           Q       Just for the record, Mr. Rinaldi, would you discuss  
22 what the reservation that is contained in Reg. Guide 1.142 is?

eb114

1           A       There are several reservations there. Something  
2 to do with ductility factors, one of the main areas is. As  
3 a result of some working group on dynamic loads, there is  
4 some reservation as to the ductility factors used in 349  
5 versus what we propose.

6                   And there are a few other changes. I don't recall  
7 all of them, you know. I usually refer to it.

8                   But from my recollection there are at least four  
9 items that are different, but the main one, as I remember, is  
10 this ductility factor under dynamic loads.

11           Q       I'd like to call your attention to page 12 of  
12 Exhibit 12, and in numbered paragraph 4 the statement is made  
13 that:

14                               "Corrective actions undertaken and/or  
15 proposed by the applicant for the structures in  
16 question do not recommend the most conservative and  
17 permanent remedial action."

18                   Now let's just deal with corrective actions that  
19 have been undertaken.

20                   To your knowledge, outside of the preloading of  
21 the diesel generator building, have there been any corrective  
22 actions undertaken?

eb115

1           A     No. Like I said, that report is a sort of a work-  
2 ing document in the staff, and perhaps the exact wording,  
3 the tense is a little bit misleading.

4           Q     Well, which part of it is misleading?

5           A     Well, it probably should be "The proposed...." If  
6 should differentiate, like you identify the one undertaken  
7 for the diesel generator building and one proposed for the  
8 other structures. It's a bit misleading, that statement there.

9           Q     All right.

10           A     As far as the structural review is concerned, is  
11 there any question as to whether the fix of the diesel  
12 generator building, that is, the preload, was the most con-  
13 servative and permanent remedial action?

14           A     No, I don't think we want to make any judgment on  
15 the preload. It's more of a soil type determination. The  
16 only concerns that we would have is on the effect on the  
17 structure and the analysis of the structure.

18           Q     And we discussed that earlier today, have we not?

19           A     Yes.

20           A     So this is sort of a, you know, a statement which  
21 is not fully developed. I believe by the time this will be  
22 passed on to the Project Manager, some more reading of the

eb116

1 report and some more internal questioning on my part would  
2 hopefully eliminate statements like the first phrase on that  
3 first paragraph.

4 Q Well, do you believe that a structural analysis  
5 of the diesel generator building should have been accomplished  
6 before the preload was put on the building?

7 A It's not for me to say, you know, what the applicant  
8 should do. The applicant has done that and in their infinite  
9 wisdom I hope they have evaluated all the other alternatives.

10 I think we have discussed the evaluation of the  
11 damage to the structure due to differential settlement before,  
12 and I don't think I have anything more to say about the evalua-  
13 tion of the cracks, and the further evaluation required on the  
14 structure based on the change.

.320

15 Q All right, sir.

16 The next paragraph reads:

17 "The proposed repair for the service water  
18 building consisting of the vertical piles and core  
19 barrels is not considered as...."

20 And the word is "dependent"--

21 "...as the placing of a foundation resting on stable  
22 soil."



eb117

1 I've read that right, haven't I?

2 A Let me read it, please.

3 (Document handed to the witness.)

4 (Pause.)

5 Yes. Again, this is internal work and it still  
6 needs to be written but it would indicate to you to some  
7 extent what I indicated before about no consideration given  
8 to bring the supports of the structure to the same type of  
9 soil foundation subgrade that was originally envisioned in  
10 the design of that structure.

11 The previous design gave support all to the  
12 structure on solid material where this is giving a different  
13 type of supports which have not been fully-- Their analysis  
14 and the adequacy has not been fully shown to us except just  
15 a statement that it is adequate. And we have questions on  
16 certain specifics of the fix proposed by the applicant.

17 Q All right.

18 Now my only question right now is what does the  
19 word "dependent" mean, as used in that sentence?

20 A Well, the same thing. I've tried to explain in  
21 terms of the previous design and the following design. The  
22 previous design depended on the support of the structure, to



eb118 1 the whole perimeter of the structure or the whole base of the  
2 structure on the solid soil. It depended on that.

3 Now this new fix gives a different design and does  
4 not provide the same type of support, and we haven't seen any  
5 analysis and we don't know whether the applicant has done any  
6 analysis on that, so we don't feel that-- You propose a new  
7 design which wasn't considered before so we don't know whether  
8 we could depend on this new design as much as the previous  
9 design which considered different loading conditions until  
10 we are shown in detail that it is just as good, or better or  
11 worse.

12 That's the part of dependency that is not clear  
13 perhaps in that short phrase. Maybe it needs some expansion  
14 of ideas.

15 Q Isn't the only question as far as the NRC is con-  
16 cerned whether there is adequate protection of the public  
17 health and safety?

18 A Yes.

19 Q And that's what you are ultimately concerned about,  
20 regardless of the design. Is that right?

21 A Yes. Well, apparently from what-- Just the state-  
22 ment that it's okay after the soil problems we had, we don't

eb119

1 feel it would assure us that the safety is maintained because  
2 at one time, the applicant's designer was providing one type  
3 of support and now is providing a different one, which pro-  
4 vides, in a general sense, a limited type of support compared  
5 to the previous one.

6           The previous one provided support all along the  
7 structure. This one provides just point supports. And the  
8 structure is cracked. The previous one depended on the  
9 whole structure to provide lateral resistance. Now we only  
10 depend on part of the structure to provide the same lateral  
11 resistance.

12           So something doesn't match, you know. If at one  
13 time I depend on the whole structure, the total mass to pro-  
14 vide lateral resistance and now I'm only counting on part of  
15 the structure to provide lateral resistance, somehow the word  
16 "dependent," you know, sort of....Could I depend on this  
17 portion of the structure to provide the same resistance that  
18 I was counting on the whole structure to provide before?

19           So maybe this will help you understand our reason-  
20 ing behind from this informal document.

21           Q       Let me understand one very important thing,  
22 Mr. Rinaldi.

eb120

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It is not the staff position, is it, that the use of core bells and piles is unacceptable?

A No, sir.

Q That is, the applicant may demonstrate that piles and ~~core~~<sup>corebells</sup> bells provide adequate margins so that it resists all the loads and you may ultimately conclude, after reviewing the material, that this design provides adequate assurance for the public health and safety. Isn't that right?

A That's possible.

Q All right, sir..

Now in fact there have other facilities that have been reviewed by the staff which utilize piles as foundation support for certain structures, are there not?

A Yes, there are piles. But you have to analyze the whole model and the whole loading condition and the whole situation in conjunction with each other. But there are other structures which utilize piles.

Q Okay.

This second paragraph goes on to say:

"The erection of abutments under this part of the structure is the only remedial action that provides soil support resembling that of the

B5.5

eb121

1 original design."

2 Now the use of the word "abutments," would you  
3 define that word as it is used in the sentence?

4 A Well, it would be a structure which would transmit  
5 the load to the solid soil below.

6 Q Would it be in effect a solid concrete block under  
7 the foundation?

8 A Under the foundation of part of the perimeter wall.  
9 The best visual aid I can give you right now would be like  
10 when you drive on the highway and you see an overpass, on  
11 the side usually it's considered an abutment to that structure,  
12 so it is really supporting the span at one point or along one  
13 side. So there would be the best visual....

14 Q Now this determination that the erection of abut-  
15 ments would be the only remedial action to provide soil  
16 support resembling that of the original design, was that your  
17 conclusion or was that Mr. Matra's or Dr. Huang's?

18 A It was discussed among us. I don't know who came  
19 up with it first, or what.

20 But I want to emphasize, like you said before,  
21 that any other design that is safe is adequate. But if we  
22 want to use the previous analysis, assuming there was no



eb122

1 damage, no severe damage to the structure, the only one that  
2 would be valid would be putting an abutment and carrying it  
3 down to the original soil that you were counting on before.

4 That's the only intent of that paragraph in this  
5 working document.

6 Q I see. All right.

7 Now the next sentence in this Paragraph 12 reads:

8 "The borated water storage tanks should  
9 be loaded to monitor any effects on their supporting  
10 foundations and soil median."

11 Do you know if that work is underway?

12 A Well, I believe what verbally was told us was the  
13 applicant was proposing to do that type of work, so we feel  
14 it is at least a step to resolve this although there is still  
15 some question on dynamic -- if dynamic loads might cause more  
16 problems than not.

17 But that would be one way to see whether these  
18 cracks will propagate under at least a static condition.

19 Q And the final subparagraph under Number 4 on page  
20 12 is:

21 "The proposed dewatering system should  
22 be categorized in its entirety or in part, as per



ebl23

1 determination of the system evaluation and geo-  
2 science personnel, as Category I systems and should  
3 be designed and constructed to resist the loads of  
4 OBE/SSE and other pertinent soil loadings."

5 My question is: Is that really a structural  
6 engineering corrective action?

7 A It's related. Structural engineering and soil and  
8 everything else is sort of, you know, a no man's land type of  
9 situation. It could affect all of them.

10 The only reason it was pointed out is the fact,  
11 if these people determined that this system is indeed a  
12 Category I structure--

13 Q Which people?

14 A The systems people and the geosciences and the  
15 hydraulics people determine that this well system is a Category  
16 I structure, then it needs to be designed as a Category I  
17 structure. Otherwise we are identifying a problem-- The  
18 consultant is identifying a problem with liquefaction potential  
19 at the site.

20 If the systems people rule out that the well system  
21 need not be a Category I structure, that it's not essential  
22 for the operation of the plant, that means there would be no

eb124

1 need for this well system so that means the liquefaction  
2 potential at the site is not present, the way we see it.

3 Q I see.

4 So all you're saying is if some other Branch makes  
5 a determination that it's a Category I system, it has to be  
6 designed in accordance with Category I criteria?

C5

7 A Right, because right now it's not.

5.525  
5.540

8 Q Mr. Rinaldi, I take it that Exhibit 12, the section  
9 that deals with foundations, pages 10 to 12, represents again  
10 your best judgment to date on the outstanding problems from  
11 a structural standpoint with respect to the soil settlement  
12 issues at the Midland site. Is that right?

13 A The effects-- The structural aspects that are  
14 related to the soil problem.

15 Q If, for example, in your judgment, the judgment  
16 of the consultants, the Naval Surface Weapons Center folks,  
17 the imposition of a surcharge or preload on the partially  
18 constructed diesel generator building is going to lead to  
19 structural problems if it wasn't done properly, you would  
20 have expressed that in the Draft Safety Evaluation Report,  
21 Exhibit 12, wouldn't you?

22 A Well, I have a feeling nothing has been mentioned

eb125 1 about that because something has already been done, you know,  
2 and the only interest that we have right now after something  
3 has been done is in the analysis and the evaluation of the  
4 structure in its present condition.

5 So we made no attempt of changing something that  
6 has been done here. We cannot help that.

7 Q I think you testified earlier, Mr. Rinaldi, that  
8 as far as you knew, Reg. Guide 1.142 was being applied to  
9 all plants that still had an operating license application  
10 pending. Is that correct?

11 A As far as I know, yes.

12 Q Do you know whether or not there was any-- Well,  
13 what was the effective date of Reg. Guide 1.142, do you know?

14 A I don't know the date. I'm sorry.

15 Q Was it before or after 1976?

16 A It's after '76.

17 Q Do you know whether there is any process within  
18 the NRC by which the applicability of Regulatory Guides to  
19 plants whose design and construction was underway when the  
20 Regulatory Guide was adopted is determined?

21 A Well, like you said before, the Regulatory Guide  
22 is just a guide, it's not a law. But the reviewer and the

ebl26

1 staff finds that the information in the ACI-349 differs from  
2 the judgment of the staff as a collective item. Mainly any  
3 items that is in Regulatory Guide 1.142 was not dreamed up  
4 by just one person and accepted by one person. It goes  
5 through a process where all the structural engineers within  
6 the Category I structures review have an opportunity to make  
7 comments, and then the industry as a whole makes comments.

8           And they have a question period, and revision to  
9 the Guide. And then they go to a hearing. And even the ACRS  
10 discusses the Guides that are released by the NRC.

11           So it's a lengthy process where everyone has some-  
12 thing to do. But at different times certain parts of the  
13 Reg. Guide guidelines could be waived if an engineering  
14 assessment is made by the staff at that time to be appropriate  
15 for that particular situation.

16           Q       And that is still the case with respect to the  
17 applicability of ACI-349 and Reg. Guide 1.142 with respect to  
18 the structures at the Midland facility. Is that right?

19           A       Like I said before, usually we ask them if the  
20 structure -- if the plant is already under construction that  
21 the applicant assess the effect of the requirements of ACI-  
22 349 in their design and in their assessment the applicant



eb127

1 may determine that certain components may be five percent  
2 ~~over stress~~ <sup>overstressed</sup>, based on the new criteria.

3 And the staff may make a judgment that five per-  
4 cent is not a significant difference and would find it accept-  
5 able.

6 Q In your experience have you ever required an  
7 applicant to rebuild, if you will, a structure because it did  
8 not conform with ACI-349?

9 A To date, I do not remember doing that, unless some  
10 modifications were -- could have been easily implemented.

11 MR. MILLER: I would like the Reporter to mark as  
12 Rinaldi Deposition Exhibit Number 13 a memorandum from Roger  
13 Mattson to Dennis Dougherty dated December 17, 1979. It's  
14 a multi-page document.

15 (Whereupon, the document  
16 referred to was marked as  
17 Rinaldi Deposition Exhibit  
18 13 for identification.)

19 BY MR. MILLER:

20 Q Mr. Rinaldi, I show you the document marked as  
21 Rinaldi Deposition Exhibit 13 for identification and ask you  
22 if you have ever seen that document.



eb128

1

(Handing document to the witness.)

2

A Yes, I have.

3

Q That is in fact the contract between the NRC and

4

the Naval Surface Weapons Center. Is that correct?

5

A It is the original contract process for the work

6

of the Navy, yes.

7

Q All right, sir.

8

Did you prepare any part of that document?

9

A Yes, I did.

10

Q Which part?

11

A Well, probably most of it, and some of it just

12

utilizing previous a previous contract that we had with other

13

government labs. It's not all original. Some of it is boiler-

14

plate from other contracts.

15

Q All right.

16

Which parts of it are not what you refer to as

17

boilerplate, which you drafted?

18

A Well, I couldn't pull out any single one. There

19

was a previous contract which pretty much was like this one,

20

issued to INEL Laboratory. And I believe that the work scope

21

and subtasks for Midland are identical for the plants this

22

other laboratory is reviewing.



eb130

1           A       Well, the way I understand, this is the form that  
2 this contract finally went out from NRC to the Navy. The  
3 previous one is the working document that was transmitted  
4 from my Division at that time to the Division of Contracts.  
5 And as you can see, the time delay in issuing something from  
6 that date to the February date.

7           Q       It's typical?

8           A       I don't know but....

9           Q       There are some changes, are there not, with respect  
10 to the description of the work for Midland? I refer specifi-  
11 cally to the estimated completion dates.

12          A       Let me see.

13                   (Document handed to the witness.)

14          A       Yes, because this is the only indication of the  
15 fact that the task -- the contract was issued so much later.  
16 Because of the delay this date had to be changed. There was  
17 no way they could start working and complete something by  
18 January 8th if they didn't receive the contract until February,  
19 so it had to be changed. That's what I was pointing out be-  
20 fore.

21          Q       All right.

22          A       That's the official one there, the last one that

eb131 . 1 you have.

2 Q Exhibit 14.

3 Have any of these dates that are found in Exhibit  
4 14 that relate to Midland been met by your contractor?

5 (Handing document to the witness.)

6 A Well, to some extent, no, they have not been met  
7 because from the dates you have it's a little bit late. But  
8 you have to recognize the complexity of this Midland review  
9 with so much material pouring in at different times and  
10 interaction at different times.

11 The only date-- The last action date to be met  
12 is to prepare the SER Supplement. In a way, the issuing of  
13 this outstanding question in my opinion would pretty much  
14 fulfill the intent of the contract if indeed this type of  
15 review was a typical review with no major problems.

16 So that part, the 6/15 date, 1980, was met with  
17 about three months delay, I would guess.

6.060

18 Q So that with the issuance of the final questions,  
19 and that was Rinaldi Deposition Exhibit 12, and they later  
20 became some interrogatories-- Is that correct?

21 A Yes.

22 Q -- that represents, outside of the structural



ebl32

1 audit, completion by the Naval Surface Weapons Center of their  
2 evaluation of the structural adequacy of the Midland Project.  
3 Is that right?

4 A No. You have additional information which you  
5 have submitted after that, and they're under contract to us  
6 until 1982, so even though we have this contract, this is  
7 the general estimated completion date, estimated man-days.

8 At the discretion of myself as manager of this  
9 contract, and my Branch Chief and my Assistant Director and  
10 Director, et cetera, et cetera, we can always revise the work  
11 scope to best serve our review process. And as a matter of  
12 fact we have spent a lot of time on Midland versus the other  
13 two plants because of the complexity of the review and the  
14 bulk of the material to be reviewed.

15 Q Okay.

16 A So they do plan to review the additional material  
17 that you have submitted between now and the audit and the  
18 time an independent analysis will be done. If you look at  
19 the last part of that item, we hope to at least consider  
20 as many of the open items, as much of the information pro-  
21 vided by the applicant through the use of the contractor.

22 After that, it will have to be the staff continuing



eb133

1 any work related to Midland.

2 Q All right.

3 Do you have a schedule for the development of a  
4 final staff position with respect to the soils-related issues  
5 as far as the structural analysis goes?

6 A Well, how could we have a date when an audit cannot  
7 be done, is taking so long to get done while some other  
8 applicants usually are ready for an audit within a month or  
9 so? It's hard to set any date. It will be changed drasti-  
10 cally, from my observation of this review, because of the  
11 bulk of the material presented and the various number of  
12 submittals that come in and the limited times that we have  
13 in the contract.

14 So we keep on changing this continuously, and I  
15 believe we must have found in my files some other information  
16 which was later on what timing we were going to work on  
17 different plants. So this is a continuous changing.

18 Q Well, prior to the time that an SER, a partial  
19 Safety Evaluation Report is issued with respect to the soils-  
20 related issue, does the structural audit have to be complete?

21 A Well, it depends on what information we received  
22 at that time, whether it addresses all the concerns. The

eb134

1 audit up to now has been done in OL reviews. But it's part  
2 of the review process that has evolved in the past two years,  
3 two or three years. So it is up to the discretion of the  
4 management what direction they want to go.

5 It's not a decision that I make by myself. They  
6 might consult me but I receive directions from my Branch  
7 Chief and from my Assistant Director and it's up to them to  
8 make these decisions. I don't make them myself.

9 Q Well, do you have any judgment as you sit here  
10 today that it is necessary to perform the structural audit  
11 before you could reach a conclusion as to the adequacy of the  
12 remedial measures for the soils problem at the Midland site  
13 insofar as the structural analysis is concerned?

14 A It could be the audit or it could be information  
15 provided to us and given time to review. The audit exercise  
16 expedites the type of review by having direct interaction with  
17 the designer over the reports that they have prepared and  
18 used in the design and analysis of this plant.

19 From a conversation with the A&E, with the Project  
20 Manager present, I was informed that all this information  
21 would not be available and that the seismic criteria will  
22 never -- being discussed for this plant is still not part of

eb135

1 the analysis and design.

2           Again, the management will have to make a decision  
3 whether just a commitment by the applicant that they will do  
4 certain things certain ways is just the adequate way of the  
5 review process or that being due to the unusual circumstance  
6 of this plant versus others, we at this time need to have  
7 concise numbers like safety margins and the latest design  
8 loads, like the new seismic spectra that the Geoscience Branch  
9 is trying to discuss with the applicant as applicable to the  
10 Midland site.

11           So there is at this point too many question marks  
12 which haven't been resolved and it's very hard for me to make  
13 a conclusion for when this soil matter will be resolved  
14 because unless you resolve the seismic input spectra, I don't  
15 see how the A&E will be able to analyze these structures  
16 this new spectra and the effect of the cracks and everything  
17 else.

18           And unless the management makes a decision and  
19 tells me that just a statement by the applicant is adequate  
20 at this point for the construction permit licensing, I cannot  
21 make a judgment. Somebody will have to direct me on what the  
22 envelope of the review is, and I respond to that.

ebl36

1 Q And no one has done that to date?

2 A I don't know about it. Nobody has told me about  
3 it.

4 Q All right.

5 Let me just deal for a second with seismic.

6 What is the relationship of the structural review  
7 to the seismic -- the review of the adequacy of the structure  
8 to a seismic event?

9 A Well, we review the plant for the load combinations  
10 that are adopted by the Standard Review Plan. Now as part  
11 of this load combination, two of the loads are the seismic  
12 input. There is the earthquake load due to the safe shutdown  
13 earthquake, and the earthquake load due to the operation  
14 basis earthquake.

15 Now this load is determined from a spectra that  
16 the Geoscience Branch approves. And to date this is still  
17 under discussion.

18 In the original CP review which was done many years  
19 ago there was a spectra which was accepted--- I don't know  
20 whether it was accepted but it was used and documented in  
21 the FSAR and the FSAR identifies the same type of spectra.

22 Now the Geoscience people tell me that that spectra



ebl37

1 is no longer acceptable for the Midland site, and I have no  
2 judgment on that. I just rely on what is given to me by the  
3 Geosciences Branch, which also reports to the same Assistant  
4 Director that my branch chief reports to.

5           So even though it is within a family type opera-  
6 tion at this time, which it wasn't before many years ago,  
7 still their determination affects our final evaluation. And  
8 at the December meeting this was discussed with the applicant  
9 and I was present, and I don't know if a final resolution of  
10 this spectra was done.

11           I believe the applicant was in the process of  
12 determining that the spectra acceptable to the Geosciences  
13 Branch wasn't that much different than the spectra proposed  
14 in the FSAR for the structures in question, although there  
15 were a few structures, one or two; I don't remember exactly;  
16 which may not exactly be enveloped by this spectra used in  
17 the FSAR.

18           Q       Do you have to wait until the Geosciences Branch  
19 has finished its seismic review before you can issue a partial  
20 Safety Evaluation Report that deals with the structural  
21 aspects of the remedial action on the soils?

22           A       All is based on the direction by management. If



ebl38

1 management tells me that all we need to review at this point  
2 is just commitments by the applicant, "I will do this, I  
3 shall do this," and that type of thing, then that could be  
4 written with the statement that this is all contingent on the  
5 spectra -- on the acceptable spectra by the Geoscience Branch  
6 being enveloped for the structures at the Midland site by  
7 the spectra stated in the FSAR.

8           So there are two restrictions as I see right now  
9 sitting here that would determine this.

10           Q       Two restrictions? I'm sorry, what are the two?

11           A       At least from the seismological approach there are  
12 two restrictions. One is the type review directed by the  
13 management. What do we accept? Just the criteria and no  
14 details, no safety limits, actually checking out of the safety  
15 limits, safety margins and stress levels?

16                   And the other one is the fact that the acceptable  
17 spectra of the Geoscience Branch will be enveloped by the  
18 spectra stated in the FSAR for all the structures, the  
19 Category I structures at the Midland site.

20           Q       I think you said in response to a previous ques-  
21 tion that other applicants were ready for a structural audit  
22 in a month or so. Are you aware of-- Can you identify some

ebl39

1 applicant specifically for whom that has been the case?

2 A Well, the one I had the experience with was TVA  
3 on the Sequoyah Plant. It was a seismic question. They used  
4 a site-specific spectra and within a short time they were able  
5 to re-evaluate the structures that we identified concern with  
6 for the new spectra and make a determination.

7 Q Okay.

8 MR. MILLER: I would like the Reporter to mark  
9 as Rinaldi Deposition Exhibit 15 for identification a memo-  
10 randum to Mr. Rinaldi from Darl Hood dated December 19, 1980.

11 (Whereupon, the document  
12 referred to was marked as  
13 Rinaldi Deposition Exhibit  
14 15 for identification.)

15 BY MR. MILLER:

16 Q Mr. Rinaldi, I show you a document that has been  
17 marked Rinaldi Deposition Exhibit 15 and I ask you if you  
18 received that document from Mr. Hood on or about the date it  
19 bears?

20 (Handing document to the witness.)

21 A I believe the date might be a little bit later,  
22 but I received it before the holidays, yes.

ebl40

1 Q All right.

2 Have you formulated a position in response to  
3 Mr. Hood's inquiry found in Exhibit 15?

4 A I'm in the process of discussing this with my  
5 Branch Chief, so I could give my reply this week.

6 There is a problem. There is insufficient time to  
7 discuss all these items if we have more interaction with  
8 different staff.

9 Q You mean at the structural audit?

10 A Right.

11 Q That's because Consumers Power Company wants to  
12 discuss all outstanding open items?

13 A I don't see how you could do that within a week's  
14 time. Most plants-- Some of the audits that they've been  
15 going through, they were limited at the most to the same  
16 scope or a more limited scope and took all that time. And  
17 then if you open it up to more interaction with different  
18 reviewers, I don't think it will be very effective and fruit-  
19 ful, in my opinion.

20 But I haven't-- We haven't made a formal decision  
21 in this. I was in the process of discussing this with my  
22 chief.

ebl41

1           That's my feeling. I think a structural audit is  
2 enough in itself, and the proof is that the A&E wants so much  
3 time even to fill it up. So why does he need less time and  
4 more confusion with different reviewers, and the same amount?  
5 I don't know.

6           MR. MILLER: Let's take a short break now.

7           (Brief recess, whereupon the deposition was  
8 again resumed.)

9           BY MR. MILLER:

10          Q       I would like to return for a minute to Rinaldi  
11 Deposition Exhibit 12, which is a Draft Safety Evaluation.

12                On page 10 of that document under numbered para-  
13 graph 1-A there is a reference in the last sentence to  
14 "pertinent soil-structure interaction methods should be used  
15 in the revised analysis." And the question I have is whether  
16 or not the staff contemplates that the applicant will use  
17 any other soil-structure interaction method than has previously  
18 been submitted to the NRC staff?

19          A       I don't know, but what I understand from the re-  
20 analysis, you should do a soil-structure interaction analysis  
21 also.

22          Q       No indication of any dissatisfaction by the staff



ebl42

1 with the prior method of analysis used by the applicant, is  
2 there?

3 A I don't imply that from that paragraph.

4 Q All right, sir.

5 On the next page, page 11 of Rinaldi Deposition  
6 Exhibit 12, the last sentence on the page reads:

7 "We recommend that the surveillance of  
8 the soil properties be conducted throughout the  
9 entire period of consolidation of the building...."  
10 referring to the diesel generator building--

11 "....to verify the validity of this assumption."

12 What type of surveillance is referred to in that  
13 sentence?

14 A The same type that they used to determine the value  
15 of 500 feet per second. They used some sort of an approach  
16 to determine the shear wave velocity will not be lower than  
17 500 feet per second at whatever the consolidation is. If it  
18 is seven years it may be at some interval, some agreeable  
19 intervals, maybe they should conduct the same evaluation to  
20 determine whether the shear wave velocity would drop or not,  
21 you know, increase or what.

22 Q And that involves making some borings and--





eb144

1 has not been transmitted.

2           Apparently it is a Joe Kane copy. I don't know if  
3 I have a copy of my own or whether it was xeroxed or what.

4           Q       Did you ever discuss this document or participate  
5 in a group where this document was discussed with Mr. Hood?

6           A       No.

7           Q       Calling your attention to page 8 of Exhibit 16,  
8 there's a Subparagraph D at the bottom of the page that refers  
9 to rattle space.

10          A       Yes.

11          Q       Does that refer in any way to the structural ade-  
12 quacy of any of the facilities at the Midland site?

13          A       Well, it could be. I don't think we have addressed  
14 that concern. I know that I've heard the words "rattle space"  
15 but I don't think we have addressed that in a great deal of  
16 detail.

17                   I believe there is a question in the interrogatory  
18 that addresses pipes and stuff, and I think it was somewhat  
19 brought up in that respect. But I don't think there is much  
20 reference in the structural part. So if you're trying to  
21 establish a tie, how it's related to the structures....

22          Q       Well, did the Corps of Engineers have any

eb145  
6.410

1 responsibility for evaluating the structural adequacy of the  
2 facilities at the Midland Plant?

3 A I don't believe so.

4 Q Mr. Rinaldi, have you had occasion to review the  
5 order issued by Mr. Case and Mr. Stello on December 6th, 1979,  
6 in connection with the soils remedial work at the Midland  
7 facility?

8 A Not in great detail. I just-- I think the Project  
9 Manager when I took over the plant sort of gave me a view  
10 of the situation.

11 Q That's Mr. Hood?

12 A Yes.

13 Q What did he say to you?

14 A Well, he just told me that the soil problem was  
15 identified and the situation where the construction permit  
16 could be revoked. There was an appeal by the applicant which  
17 would allow them to continue the construction until the  
18 Hearing Board would make a judgment but that in the meantime  
19 we should continue with the review as far as we can.

20 And also this problem with the soil problems and  
21 the CP work, the CP and OL.

22 Q Did you have any discussion with Mr. Lipinski

eb146

1 regarding the December 6th, 1979 order?

2 A No, we just discussed the technical aspects of  
3 the review.

4 Q And at the time that you took over the review did  
5 you have any basis for concluding yourself that a review of  
6 the information provided by Consumers Power Company to the  
7 staff would not permit you to conclude that the safety issues  
8 associated with the remedial action taken or planned to be  
9 taken at that time by Consumers Power Company to correct the  
10 soil deficiencies would be resolved?

11 That was a long-winded question.

12 A I don't think I was able to comprehend your ques-  
13 tion. I'm sorry.

14 Q What I'm really asking you, Mr. Rinaldi, is whether  
15 you had any basis, on December 6th, 1979, to agree or dis-  
16 agree with that portion of the December 6th, 1979 order that  
17 begins with the sentence that starts "Therefore...."

18 MR. MILLER: Now I would like to have the question  
19 re-read.

20 (Whereupon, the Reporter read from the record  
21 as requested.)

22 THE WITNESS: Well, I have a problem with that

ebl47

1 question. I can answer in two parts.

2 When I took over this plant I did not know any  
3 details of the problem associated with Midland. I had enough  
4 work assigned to me that I didn't look for more interesting  
5 reading or anything like that on Midland. So that's the  
6 first part.

7 The second part: I have no idea whether things  
8 could get resolved or were adequate or what until we conducted  
9 a review, and there was a certain breaking-in period and the  
10 presentation in February is the first time that I got a good  
11 idea what the problems were, and what the proposed fix by  
12 the applicant was.

13 Q Let me ask you this question:

14 As you sit here today do you believe that the  
15 applicant has established acceptance criteria that are to be  
16 applied by it in determining the structural adequacy of the  
17 facilities at the Midland site?

18 A I don't think in full it has done that. Because  
19 of the settlement problem, they have not fully evaluated the  
20 impact of the settlement on the structure, and basically the  
21 crack and change in soil properties.

22 I have heard verbal statements, and some in writing,



ebl48

1 that the applicant <sup>has</sup> is prepared through the A&E to conduct  
2 additional analysis and do additional work but this has not  
3 fully addressed all the safety issues that would be raised  
4 at any level of the review due to the problem at the site.

5 Q Well, my question was limited, Mr. Rinaldi, to  
6 acceptance criteria.

7 Has the applicant established acceptance criteria  
8 with respect to the structural aspects of the remedial work  
9 associated with the soils problem at Midland?

10 A Well, I said that due to the situation that you  
11 have at this time, he has not established for us acceptance  
12 criteria because he is dismissing a lot of the conditions  
13 that are prevalent at the site as being of significance. So  
14 until we agree on what's significant and what is not signifi-  
15 cant, I don't see how he could establish relevant criteria  
16 for the site.

17 Q Aren't the criteria found in the pertinent ACI  
18 and the ASME code?

19 A Like we said before, I don't think the ACI and  
20 other codes address fully the problems that we have on the  
21 soil settlement. I think they apply to a general design-  
22 review situation where nothing has occurred.

eb149

1           In the regular CP permit, we review a plant and no  
2 construction has been undertaken. And this is a different  
3 situation where this is after the fact and we have another  
4 situation. So basically somebody would have to make a --  
5 compare the two CP permits. He would have to make an assess-  
6 ment of the situation you have at hand and, the way I under-  
7 stand, to assure public safety versus the case where you have  
8 another plant on which nothing has been done and they are  
9 hoping that all these criteria apply.

10           Q       When you say "all those criteria" are you referring  
11 to the codes and standards, the ACI code?

12           A       The codes or specific criteria that are made up  
13 for that specific plant.

14           Q       I think you said in response to a previous ques-  
15 tion that the applicant is dismissing many of the conditions  
16 at the site and that is why acceptance criteria haven't been  
17 established.

18                    Are you referring to such matters as crack analy-  
19 sis?

20           A       For one, yes.

21           Q       The other matters that we described are addressed  
22 in interrogatories. Is that correct?

ebl50

1           A       The other matters as stated in the interrogatories,  
2           yes, they have certain....Even at the CP stage the applicant  
3           proposes certain models and certain concepts for the structure,  
4           the structure will be such-and-such, and the soil will be  
5           such-and-such.

6                       And in this case the structure is such-and-such  
7           and the models are such-and-such but we have still some dis-  
8           agreement on the way that the applicant is modeling <sup>and</sup> on the  
9           effectiveness of the modeling and the design that the applicant  
10          is using.

11                      So when you look at this from -- as the Midland  
12          Plant and as the structures are today, is this being represented  
13          in the construction permit? I would have to say No.

14                      So all the criteria have not been provided in the  
15          CP application for the way the plant is today, in my opinion.

16           Q        Maybe I ought to have your definition of acceptance  
17          criteria. It comprises the codes and standards to which  
18          the applicant says he will build the plant. Is that right?

19           A        That's one item.

20           Q        That's one item.

21                      It also comprises what?

22           A        The proposed models for the structures, soil

eb151

1 characteristics. That's another one.

2 Q In other words the applicant goes out and looks at  
3 the soil on the site or says what the soil is going to be and  
4 that is an acceptance criteria? That then becomes an  
5 acceptance criteria?

6 A And then the loads the applicant will use in the  
7 analysis, and he assumes certain properties of materials for  
8 the structures. That's another one.

9 He proposes certain testing that will be done for  
10 the facility.

11 He proposes some quality assurance/quality control  
12 for the placing of the material.

13 And what I'm saying, this is generally what is  
14 done for a new CP application. And what we have today is  
15 somebody else reviewed the CP application some time ago. What  
16 I'm concerned about right now, after my takeover of this  
17 review, I asked myself the question, if this was a new CP  
18 application coming in, based on what I have now, would I sign  
19 off on a CP permit, or would I ask additional questions to  
20 assure that the applicant, when he goes to the design and  
21 complete the construction of the plant, is in the right path  
22 to assure safety and adequate structures.

eb152

1           So I have questions myself and the Navy people,  
2 the contractors, that we would like to have answered before  
3 we feel that, you know, we could sort of issue at this point,  
4 given that the construction permit has never been issued  
5 before, issue a construction permit today.

6           Q       Are your questions addressed to the adequacy of  
7 the remedial work, or to the acceptance criteria for that  
8 work?

9           A       Well, the two of them are related. The acceptance  
10 criteria, like we said, it comprises several things and we  
11 went over like five or six items just before. So the remedial  
12 action for the structure would represent the structure as  
13 proposed by the applicant today, and would be reflected in  
14 the model. It would be reflected in the properties of the  
15 material. It would be reflected in the safety margins that  
16 you expect. It will be reflected in the quality control/  
17 quality assurance of the construction.

6.700 .

18           So for all those reasons it sort of reopens the  
19 item whether the construction permit should be granted. Given  
20 that it would be requested today, -- I have no control over  
21 years ago or what -- as a reviewer I was asked to assess this  
22 if this was a new CP application today, given the information



eb153 1 that I have, do I have adequate information to issue a new  
B7 2 CP permit?

3 And all the questions related to this, or most of  
4 them, the ones in this interrogatory part are related to a  
5 CP permit, and the same questions pretty much, in greater  
6 detail, will apply to the OL permit later on in actually  
7 verifying that all this criteria has actually been met.  
8 That's what we usually do in our review.

C6 9 But the first assurance that this criteria could  
10 be met is part of our CP review, as I understand it.

11 Q I'm sorry to come back to this but when you say  
12 "these criteria," the very last few words of your previous  
13 answer, to which criteria are you referring?

14 A Once again I think we defined "criteria" before  
15 as being -- consisting of modeling of the structures, pro-  
16 perties of materials, methods of analysis, and acceptable  
17 margins in the structures, and testing procedures that will  
18 be used, and quality control and quality assurance programs.

19 Q And conformance with the applicable codes; right?

20 A Yes.

21 Q All right.

22 A This will be as part of what I mean by "criteria,"

eb154

1 the complex that I just described.

2 Q And the ultimate criterion is that there is reason-  
3 able assurance that the health and safety of the public won't  
4 be endangered. Isn't that the ultimate criterion?

5 A Yes.

6 Q You can see I'm having some difficulty with this  
7 whole subject, Mr. Rinaldi.

8 Just to make certain that I understand:

9 Questions which go at least in part to the ade-  
10 quacy of the remedial measures that are planned by the appli-  
11 cant in this situation also establish criteria by which those  
12 remedial measures are to be judged. Is that correct?

13 A I don't understand your question at all. I'm sorry.

14 Q I don't understand either; because the interroga-  
15 tories which we discussed earlier in part deal with the ade-  
16 quacy of the remedial work, do they not?

17 A Yes.

18 Q Let's go to a specific interrogatory, Interroga-  
19 tory 3-A, dealing with the remedial action at the service  
20 water pump structure. Subsection A says:

21 "Is the corbel designed such  
22 it depends upon a friction fit with the service

eb155

1 water pump structure's north wall resulting from  
2 the pretensioning of the long longitudinal bolts?"

3 Is that a question that is designed to determine  
4 the acceptance criteria for the remedial action to the ser-  
5 vice water pump structure or the acceptance criteria for the  
6 remedial action to the service water pump structure?

7 A I think it applies to all the above, all the items  
8 that you're talking about.

9 Q Both acceptance criteria and the adequacy of the  
10 remedial work?

11 A Yes, in my opinion.

12 MR. MILLER: Let me hear the question back.

13 (Whereupon, the Reporter read from the record  
14 as requested.)

15 BY MR. MILLER:

16 Q Let me rephrase the question without rereading  
17 Interrogatory 3-A which I show you. I would ask you whether  
18 that interrogatory goes to the adequacy of remedial action  
19 or the development of acceptance criteria for the remedial  
20 action?

21 (Handing document to the witness.)

22 A Both.

eb156

1           Q       Is there any interrogatory that you can identify  
2 which deals only with the acceptance criteria or only with  
3 the adequacy of the remedial action?

4                   Why don't you take a look?

5                   (Handing documents to the witness.)

6           A       Just from recollection, I think it would take about  
7 a half hour to look at this again. However, from the  
8 recollection of this document, most of them apply to both of  
9 them because, like I said before, the material properties  
10 have been changed, the modeling has been changed. There is  
11 new QA/QC to be implemented and documented. And there is some  
12 testing that should be required. And there is additional  
13 analysis and design to be proposed.

14                   And there are certain limits, design limits and  
15 analysis limits to be identified and stated, based on the  
16 directives of my management, that for all plants under review,  
17 they should meet the current NRC criteria or acceptance  
18 limits, or show that the equivalent or, to some extent,  
19 similar safety could be assured.

20                   So based on these reasons, I believe that most of  
21 these questions address this criteria identification and even  
22 from the remote one that I remember, I believe Interrogatory

ebl57

1 4 where you're just analyzing the cracks, to some extent, yes,  
2 questions whether the fix -- how the fix would be affected  
3 by the cracks but on the other hand, it analyzed the basic  
4 criteria on the modeling of the structures, on the material  
5 properties, on the QA/QC on the structure proposed by the  
6 applicant. At least those three points. There may be more.

7           So in that respect it's my feeling that these  
8 questions address both the remedial action per se and general  
9 design criteria because these structures are being proposed  
10 today as the structures to be used at the Midland site for  
11 the purpose of constructing this plant.

12           Q       Getting back to the example we're talking about,  
13 the analysis of the bolts, the answer to that interrogatory,  
14 if it shows that the bolts will withstand the force produced  
15 in the bending mode, that would both satisfy the staff that  
16 the remedial action involving those bolts is adequate, and  
17 establish an acceptance criteria for the bolts themselves.  
18 Is that right?

19           A       That is right if the management requires only  
20 general criteria and not any assurance of detailed margins.  
21 In the whole sense it would.

22                    Just a statement that "We comply with such-and-such,



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1 we're doing such-and-such" has been acceptable some time ago  
2 but under the new environment after TMI, I don't know what....

3 Q I think you referred to design margins. Margins  
4 over what? Over standards codes?

5 A Well, in the past I don't believe that the applicant  
6 has stated actual margins that they were proposing to meet  
7 or things of that nature. Being the situation the same,  
8 just what you stated before would be the type of statement  
9 that was provided in say a year or so on that specific  
10 criteria.

11 If you just want criteria for the bolts during  
12 the CP review then there might have been a question, are  
13 these bolts able to resist bending loads? That would  
14 have been a valid question at the CP level and the appli-  
15 cant would respond, "Yes, it will be able to resist with those  
16 bolts bending loads because A, B, C, D, or just A, or will not  
17 be able to resist bending mode and we are going to modify it,"  
18 you know, propose something else.

19 Q When you're talking about-- But now you say some-  
20 thing more may be required in terms of safety margins,  
21 quantification of safety margins.

22 A I don't believe so but if I am given other

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1 directions, directions to require this type of thing maybe,  
 2 but as for the CP permit as far as I've been aware, this is  
 3 the type of -- what you stated would be an adequate reply,  
 4 with substantiation to that type of reply.

5 Q And have you been given any direction that some-  
 6 thing more is required in analyzing the remedial actions that  
 7 are associated with the soils problems at Midland, any direc-  
 8 tion from your management?

9 A At this time, no.

10 MR. MILLER: If I can have two seconds, I think  
 11 I may be finished.

12 (Brief recess, after which the deposition was  
 13 again resumed.)

14 MR. MILLER: Okay, that's it for today. Thank you.

15 (Whereupon, at 4:34 p.m., the taking of the  
 16 deposition was concluded.)

17  
 18  
 19  
 20 Subscribed and sworn to before me  
 this.....day of..... 19.....

21 .....  
 Notary Public  
 22 My Commission Expires .....

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CERTIFICATE OF NOTARY PUBLIC AND REPORTER

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I, William R. Bloom, the officer before whom

the foregoing deposition was taken, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness was taken by me with Stenomask and thereafter reduced to typewriting by me or under my direction; that said deposition is a true record of the testimony given by said witness; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken; and, further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

  
\_\_\_\_\_  
Notary Public in and for the  
District of Columbia

My commission expires 14 August 1985