

NUCLEAR REGULATORY COMMISSION

ORIGINAL



ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

CONSUMERS POWER COMPANY)	
)	DOCKET NO. 50-329 OL & OM
Midland Plant, Units 1 and 2)	50-330 OL & OM

DATE: July 10, 1981 PAGES: 1502 - 1735

AT: Midland, Michigan

TRO1
5
1/0

ALDERSON  REPORTING

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

Telephone: (202) 534-2345

8107170118 810710
PDR ADOCK 05000329
T PDR

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3 -----X

4 In the matter of: :

5 CONSUMERS POWER COMPANY :

6 Midland Plant, Units 1 and 2 :

7 -----X

DOCKET NOS: 50-329 OL & OM
50-330 OL & OM

8 Midland County Courthouse
9 301 West Main Street
Midland, Michigan

10 Friday, July 10, 1981

11 Evidentiary hearing in the above-entitled
12 matter was convened, pursuant to notice, at 9:00 a.m.

13 BEFORE:

14
15 CHARLES BECHHOEFER, Esq., Chairman,
Atomic Safety and Licensing Board

16 FRED COWAN, Member

17 RALPH DECKER, Member
18
19
20
21
22
23
24
25

1 APPEARANCES:

2 On behalf of the Applicant, Consumers Power Company:

3 MICHAEL MILLER, Esq.,
4 RON ZAMARIN, Esq.,
5 JOANNE BLOOM, Esq.,
6 ALLEN FARNELL, Esq.,
7 Isham, Lincoln & Beale,
8 Chicago, Illinois9 JIM BRUNNER, Esq.,
10 Legal Department, Consumers Power Company
11 212 W. Michigan,
12 Jackson, Michigan 49201

13 On behalf of Mapleton Intervenors:

14 WENDELL H. MARSHALL

15 Appearing pro se:

16 BARBARA STAMIRIS

17 On behalf of the Regulatory Staff:

18 WILLIAM PATON, Esq.,
19 ELLEN BROWN, Esq.,
20 JAMES THESSIN, Esq.,
21 Office of Executive Legal Director,
22 United States Nuclear Regulatory Commission,
23 Washington, D.C.

24 MILLERS HALLS

25 EXTERASE

COTTON CONTENT

C O N T E N T S

BOARD

<u>WITNESS:</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>	<u>EXAMINATION</u>
-----------------	---------------	--------------	-----------------	----------------	--------------------

Benjamin Marguglio (Resumed)

By Mr. Cowan 1520

By Mr. Decker 1526

By Chairman Bechhoefer 1556

Jeffrey K. Kimball 1558

By Mr. Marshall 1574

By Mr. Castellanos 1577

By Ms. Stamiris 1603

By Mr. Miller 1604

By Mr. Marshall 1615

By Chairman Bechhoefer 1610

AFTERNOON SESSION - Page 1617

Benjamin W. Marguglio (Resumed)

By Chairman Bechhoefer 1617

By Mr. Miller 1643

By Ms. Stamiris 1657

By Mr. Marshall 1677

By Mr. Miller 1688

James W. Cook 1691

By Ms. Stamiris 1695

E X H I B I T S

<u>NUMBER</u>	<u>IDENTIFIED</u>	<u>IN EVIDENCE</u>
---------------	-------------------	--------------------

Consumers No. 1 1516 1518

Consumers Nos. 2 & 3 1644 1647

P R O C E E D I N G S

(9:00 a.m.)

1
2
3 CHAIRMAN BECHHOEFER: On the record. Good
4 morning, ladies and gentlemen.

5 Before we resume Mr. Marguglio's cross examina-
6 tion and Board examination, are there any preliminary matters?

7 MR. MILLER: No, sir, none.

8 MS. BROWN: Yes. Chairman Bechhoefer, it was
9 my understanding that we would start this morning with Jeffrey
10 Kimball. I thought everyone had agreed that if we were in
11 the middle of the witness, we would just suspend that witness
12 for the time being.

13 We have Jeffrey Kimball here, and we are ready
14 to proceed with him. I don't expect him to take that much
15 time, and I would think that we could then put Mr. Marguglio
16 back on the stand later in the morning.

17 MR. MILLER: I would really prefer to conclude.
18 As I understood, there was less than an hour of Board ques-
19 tions to finish with Mr. Marguglio, and we could finish that
20 up and then proceed.

21 CHAIRMAN BECHHOEFER: I think that would be
22 preferable, particularly since Ms. Stamiris isn't here at the
23 moment.

24 MS. BROWN: Will we then end with--

25 CHAIRMAN BECHHOEFER: Mr. Marguglio. Pardon?

E1L2

1 MS. BROWN: After the Board asks their ques-
2 tions, are all parties going to have an opportunity to have
3 another round of questions? I can just see from past practices
4 that we are going to be here several hours with Mr. Marguglio.

5 MR. MILLER: So far, I can tell the Board
6 and the parties I have very few questions for Mr. Marguglio
7 on redirect examination.

8 CH/ RMAN BECHHOEFER: I think it would be better.
9 I think it would be preferable, particularly since Ms. Stamiris
10 isn't here. She may have some questions of Mr. Marguglio.

11 MR. MILLER: Mr. Marguglio.

12 MR. PATON: We have some other preliminary
13 matters.

14 MR. MILLER: Okay. Sorry.

15 CHAIRMAN BECHHOEFER: If it looks like Mr.
16 Marguglio is going to take too long, we may interrupt him
17 then.

18 MS. BROWN: Thank you, Chairman Bechhoefer.

19 MR. PATON: I want to say a word about the
20 schedule. Mr. Gallagher has, of necessity, been here since the
21 beginning of the hearing. It appears that he is going-- We
22 would like to get him on the stand. We would like to get him
23 on the stand as soon after Mr. Cook as possible. In fact,
24 we would like to get him on right after Mr. Cook, then to
25 continue immediately after-- If he is not finished, then

ELL3

1 continue with him immediately after Mr. Keppler.

2 Excuse me just a second.

3 The reason is that he is probably more
4 knowledgeable than any Staff witness on this subject, and I
5 think it would be helpful to the Board.

6 What I am saying to the Board is you asked for
7 a couple of witnesses from the Applicant, and I would ask you
8 to consider putting Mr. Gallagher on before those witnesses so
9 we can proceed with his testimony. I think his testimony
10 may be of help in putting things in perspective, and we would
11 like to get him on, so as soon as Mr. Cook is done, we would
12 like to put him on, and then interrupt him when Mr. Keppler
13 gets here, and then put him on right away after Mr. Keppler.

14 CHAIRMAN BECHHOEFER: Just to refresh my
15 recollection, Mr. Keppler will be here Monday?

16 MR. PATON: Monday. My guess is that Mr. Keppler
17 will probably take more than a day, and could take as much as
18 two days, but I have been trying to make that arrangement for
19 Mr. Keppler from the beginning. It was important to him not
20 to be here on Wednesday, if possible, but we would like to get
21 Mr. Gallagher on as soon as you would permit.

22 CHAIRMAN BECHHOEFER: You would propose to put
23 Mr. Gallagher on probably tomorrow morning?

24 MR. PATON: As soon as possible; in other words,
25 right after Mr. Cook, and then if he is still on when Mr.

ELL4

1 Keppler gets here, we could put him on after Mr. Keppler.

2 I am asking that you allow Mr. Gallagher to proceed before
3 the Applicant witnesses that you requested.

4 CHAIRMAN BECHHOEFER: Let me ask, if we adopted
5 this schedule, when would Mr. Howell--

6 MR. MILLER: I thought that everyone was clear
7 on that. Mr. Howell is not available in this two-week
8 session. However, I think Mr. Paton is referring to the two
9 witnesses you requested from Bechtel. I had planned on
10 presenting them on Tuesday. Let me check and see what their
11 schedules are, and discuss this with the Board and the parties
12 before the end of the day today.

13 MR. PATON: Well, of course, if my guess is
14 correct about Mr. Keppler, I would assume that he would still
15 be on the stand on Tuesday.

16 MR. MILLER: Yes.

17 MR. PATON: We would appreciate consideration
18 of this matter.

19 CHAIRMAN BECHHOEFER: Well, would they be
20 available Wednesday?

21 MR. MILLER: That's what I don't know, and I
22 will find out at a break and get back to you.

23 CHAIRMAN BECHHOEFER: Wednesday is the day that
24 I know Mr. Keppler can't be here.

25 MR. MILLER: I understand.

E1L5

1 MR. PATON: Mr. Chairman, I missed that. Did
2 you just suggest that those people appear on Wednesday? I
3 think Mr. Gallagher might not be finished by then.

4 MR. MILLER: May I just find out what their
5 availability is and how flexible their schedules are, and then
6 we will take it from there.

7 MR. PATON: Could we get their names, Mr.
8 Chairman, the name of the people they propose to offer?

T 9 MR. MILLER: Yes. Mr. John Rutgers is the
T 10 project manager for Bechtel, and Marion Deitrich is
11 the ranking Bechtel employee in the MPQAD.

T 12 MR. DECKER: Deitrich?

13 MR. MILLER: Yes.

T 14 CHAIRMAN BECHHOEFER: Rutgers is the--

15 MR. MILLER: Overall Bechtel project manager.

16 MR. PATON: I have one other comment about
17 scheduling, Mr. Chairman.

18 CHAIRMAN BECHHOEFER: Okay.

19 MR. PATON: In the August session, the Applicant
20 indicated that they would prefer to have Mr. Howell go first.
21 We have no difficulty with that. We would request that we
22 address immediately after Mr. Howell the subject of dikes.

23 MR. MILLER: Okay. I hope we can accommodate
24 that. The witness who would be presenting that testimony is
25 Dr. Hendron and, once again, we will have to check on his

ELL6

1 schedule.

2 MR. PATON: Thank you, Mr. Chairman.

3 CHAIRMAN BECHHOEFER: Then in addition, when
4 would you propose to bring-- Who is the witness with the
5 broken foot?

6 MR. PATON: Mr. Gilray.

7 CHAIRMAN BECHHOEFER: Gilray, yes.

8 MR. PATON: Hopefully he will be-- I hope that
9 he will be able to be here for the August session, perhaps
10 toward the end of the first week. I hadn't really gotten
11 specific about that, but from what he told me, he should be
12 ready to be here for the August session.

13 CHAIRMAN BECHHOEFER: Okay.

14 MR. PATON: Mr. Chairman, yesterday--this is a
15 different preliminary matter--I think you requested that the
16 Staff produce a copy of a memo that I was asking Mr. Marguglio
17 about. We have a copy. Were you going to put it in the
18 record? If you are going to put it in the record, maybe we
19 better get additional copies.

20 CHAIRMAN BECHHOEFER: I would like to have it
21 in the record. It could be as an exhibit.

22 MR. MILLER: Excuse me. Mr. Chairman, I have
23 spent some little time in conversation with both Mr. Paton and
24 Mr. Gallagher regarding this document. It is not a memorandum.
25 It is a draft, which was not used, of a speech that Mr.

E1L7

1 Turnbull, an employee of Consumers Power in the MPQAD used
2 in discussing trend analysis.

3 I don't believe that it is admissible. I
4 don't believe that it is relevant.

5 There are memoranda and summaries of meetings
6 that have been prepared by Consumers Power Company individuals
7 regarding trend analysis in the same time period as that docu-
8 ment was prepared.

9 We would have no objection to making those
10 available to the Board, but I do object to using what is a
11 draft of someone's oral remarks and calling it a Consumers
12 Power Company memorandum when that really is not what it is.

13 MR. PATON: Mr. Chairman, could I have about
14 two minutes to respond to that? I would like to discuss that,
15 just very briefly. Just two minutes is all I need.

16 CHAIRMAN BECHHOEFER: Yes.

17 MR. PATON: Thank you.

18 (Pause.)

19 MR. PATON: Mr. Chairman, I have our response.

20 CHAIRMAN BECHHOEFER: Okay.

21 MR. PATON: We did not offer this document in
22 evidence, and we do not intend to offer it into evidence.
23 My suggestion is that I hand it to the Board, and the Board can
24 read it and decide itself whether it is any relevance to
25 this proceeding.

1 MR. MILLER: Well, I guess I really object to
2 that procedure. Mr. Marguglio was examined by Mr. Paton
3 regarding some alleged memorandum or meeting notes with
4 respect to trend analysis, and Mr. Turnbull was then asked,
5 by Mr. Gallagher, to bring his entire files here.

6 We have identified both a memorandum and a
7 summary of meetings, which the Company would be pleased to
8 offer for the record and have accepted into evidence, but that
9 document is not the--is neither a memorandum nor a summary
10 of the meeting notes. It was not prepared by the witness which
11 we have tendered on trend analysis, Mr. Marguglio. It is
12 hearsay as to him. Having the Board read it seems to me just
13 kind of finesses, if you will, the whole issue of whether or
14 not it ought to be admitted into evidence.

15 MR. PATON: I think there are a lot of cases
16 that indicate that Boards are capable of singling out what
17 is of probative value and what is not.

18 CHAIRMAN BECHHOEFER: I might say, at least
19 I personally would like to see it in the record, only because
20 I don't want the record to be a "sanitized" record. I want
21 the record to reveal-- If there are any problems with the
22 trend analysis program, I think the Board ought to be aware
23 of it.

24 Now, I realize-- Maybe Mr. Turnbull should
25 be called to be examined on whatever the thoughts in that

ELL9

1 document are, whether those were his thoughts or whether he
2 considered them.

3 What troubles me is that there are some
4 significant number of questions now on a document which
5 undoubtedly isn't a memorandum. The record will be quite
6 confusing as to what the answers to that meant.

7 I think with suitable explanation, the document
8 should be in the record, but it should be fully explained
9 as well.

10 MR. MILLER: Well, really, the document is now
11 assuming a significance that I don't think it really deserves,
12 and if we could put in, as well as that document, the typed
13 version of the statements that Mr. Turnbull actually made
14 at the meeting, and the memorandum and summary of meeting
15 notes, I think that the Board would then have a complete
16 documentary record of this little episode.

17 CHAIRMAN BECHHOEFER: The Board was not indicating
18 we didn't want the other documents.

19 MR. MILLER: I see.

20 CHAIRMAN BECHHOEFER: It is like the documents
21 that somehow are pulled out of Commission records, showing
22 that somebody disagreed with some position, and then there is
23 an attempt to explain, "Well, that's not really a document.
24 That was just somebody's thoughts given at the moment," and
25 those things can balloon, and I don't like to see that happen.

E1L10

1 We have no objection--in fact, we think it is
2 proper--to the other documents also going into the record.

3 MR. MILLER: All right. We are going to need
4 copies and suitable identification of those documents. Perhaps
5 we can get all of those together before Mr. Marguglio is
6 excused. There will be, I think, four different documents,
7 including the one Mr. Paton has, and we could get them all
8 into the record at once.

9 CHAIRMAN BECHHOEFER: That would be fine. If
10 you desire to have Mr. Turnbull explain, we would be certainly
11 willing to have him do so, if that would be of existence.
12 It certainly would avoid the hearsay problem.

13 MR. MILLER: Yes.

14 MR. PATON: Mr. Chairman, I would suggest that
15 probably if the document is going to be made a part of the
16 record, it probably would be appropriate to have them say
17 for what purpose, or whatever. It is just a blank piece of
18 paper at this point--not a blank piece of paper, but a piece
19 of paper.

20 CHAIRMAN BECHHOEFER: You mentioned Mr. Turnbull
21 was here. It would not take him very long to do so, I wouldn't
22 think, but you may wish to have that done for explanation
23 purposes.

24 MR. MILLER: Sure.

25 CHAIRMAN BECHHOEFER: We can wait until--

E1L11

1 MR. MILLER: Why don't we conclude with Mr.
2 Marguglio.

3 CHAIRMAN BECHHOEFER: Right, right. In fact,
4 we should probably, at the end of Mr. Marguglio's testimony,
5 do that, although we don't want to delay the Kimball testimony
6 too long.

7 MR. MILLER: Direct examination of Mr. Turnbull
8 will take just a very few minutes.

9 CHAIRMAN BECHHOEFER: Ms. Stamiris, we asked
10 about preliminary matters. Do you have anything?

11 MS. STAMIRIS: No.

12 CHAIRMAN BECHHOEFER: We went through some
13 scheduling matters. You might want to consult the other
14 parties as to the order in the August hearing, and that sort
15 of thing.

16 MS. STAMIRIS: I am extremely sorry to be late,
17 and I am glad that you didn't wait for me, and I don't ever
18 want you to wait for me.

19 CHAIRMAN BECHHOEFER: Well, we tried not to
20 cover matters-- Scheduling matters, you can find out from the
21 other parties.

22 MS. STAMIRIS: Yes.

23 CHAIRMAN BECHHOEFER: Let me inquire, do you have
24 to put this in as an exhibit, or should this be put into the
25 transcript as if read?

E1L12

1 MR. MILLER: I don't know. We marked it as
2 Consumers Exhibit No. 1 down in the lower right-hand corner.

3 CHAIRMAN BECHHOEFER: Okay. That would be all
4 right.

5 (The document referred to,
6 was marked for identification
7 as Consumers Exhibit 1.)

8 MR. MILLER: Just for the record, may I ask
9 Mr. Marguglio a few questions?

10 CHAIRMAN BECHHOEFER: Right, right.
11 Whereupon,

12 BENJAMIN W. MARGUGLIO,
13 resumed the stand as a witness on behalf of the Applicant and,
14 having been previously duly sworn by the Chairman, was
15 examined and testified further as follows:

16 MR. MILLER: Mr. Marguglio, do you have in front
17 of you a single sheet of paper that is identified in the
18 lower right-hand corner as Consumers Exhibit 1?

19 THE WITNESS: Yes.

20 MR. MILLER: Is that document in your hand-
21 writing?

22 THE WITNESS: The four columns to the left
23 and the notes are in my handwriting.

24 MR. MILLER: Were the calculations that are
25 found in the three columns to the right and side directed to

ELL13

1 be done by you?

2 THE WITNESS: Yes.

3 MR. MILLER: Would you just explain briefly
4 for the record what this document purports to show?

5 THE WITNESS: By date, it shows the approximate
6 number of Bechtel and Consumers Power Company quality assurance
7 personnel, in Column 2.

8 In Column 3, it shows the approximate number of
9 Bechtel quality control personnel, and in Column 4, the
10 approximate number of Bechtel site manual personnel,
11 recognizing that those numbers include personnel working on
12 both safety-related and non-safety-related activities.

13 Then there are some ratios. The fifth column
14 represents the ratio of the quality assurance personnel to the
15 manual personnel.

16 The sixth column represents the ratio of the
17 quality control personnel to the manual personnel, and the
18 seventh column represents the ratio of both the quality assur-
19 ance and quality control combined to the manual personnel,
20 and again the denominator in that ratio for the manual personnel
21 is for both--is the number for both safety and non-safety-
22 related activities. Those percentages would be significantly
23 higher if no safety-related--personnel who are working on
24 non-safety-related work, manual personnel who were working
25 on non-safety-related work, were deleted from the denominator.

1 MR. MILLER: Just so the record is clear, in
2 the heading of the columns, the letter "B" stands for Bechtel,
3 and "CPC" stands for Consumers Power Company, is that right?

4 THE WITNESS: Yes.

5 MR. MILLER: I'll now ask that Consumers Exhibit
6 1 be admitted into evidence.

7 CHAIRMAN BECHHOEFER: Any objection?

8 MS. STAMIRIS: May I ask a question about it?

9 CHAIRMAN BECHHOEFER: You can ask a question,
10 but usually you wait until it's in evidence.

11 MS. STAMIRIS: It's a definition of a term.

12 CHAIRMAN BECHHOEFER: Well, why don't you wait
13 until it's in?

14 The document will be admitted into evidence as
15 Consumers Exhibit 1.

16 (The document referred to, hereto-
17 fore marked for identification as
18 Consumers Exhibit 1, was received
19 in evidence.)

20 CHAIRMAN BECHHOEFER: I have one question, first,
21 just on the document, and you can ask about your definition,
22 and then we'll go to Board questions.

23 I wanted to make sure that where it says "QA
24 Personnel," that excludes QC.

25 THE WITNESS: Yes, it does, insofar as Bechtel

2WEL 2

1 QC are concerned. In the Consumers Power organization, quality
2 assurance organization, and in the subsequent MPQAD there are
3 persons who are performing inspection activities which have
4 been traditionally equated to approximate the quality control
5 activities.

6 But understand that for the most part, except
7 for heating, ventilating and air conditioning structures and
8 components, these inspection activities are over-inspection
9 activities, not the primary inspection activities being
10 performed by Bechtel quality control personnel.

11 CHAIRMAN BECHHOEFER: Do you want to ask your
12 question now?

13 MS. STAMIRIS: Did you give a definition of
14 "manual personnel"?

15 THE WITNESS: No, I did not.

16 MS. STAMIRIS: Would you define that for me,
17 please?

18 THE WITNESS: I'll try. It's a term used by
19 Bechtel, so I can't say that my definition would be wholly
20 accurate, but I think the essence of the term relates to the
21 fact that these persons are performing manual work as crafts-
22 persons or labor-type persons, or persons who are in non-
23 professional support of crafts and labor-type persons.

24 MS. STAMIRIS: Would I be correct to assume that
25 these are the people who do the work that's being inspected?

1 THE WITNESS: Yes.

2 DR. COWAN: I guess we're ready for the Board
3 questions.

4 BOARD EXAMINATION

5 BY DR. COWAN:

6 Q Mr. Marguglio, I wanted to ask you something
7 about training of quality assurance personnel. I know that
8 this is in your testimony in numerous places. Could you give
9 us a little thumbnail sketch of the type of training that
10 new employees get when they come on board to take up duties
11 in quality assurance?

12 A We have three types of training. One type we've
13 labeled "programmatic." I'll describe each of these in a
14 moment. The second type, "Departmental," and the third type,
15 "Skills Training."

16 Programmatic training familiarizes the employee
17 with the quality assurance program requirements as a whole,
18 stemming from the NRC requirements and the policies and
19 procedures that we have corporate-wide.

20 Departmental training describes the specific
21 responsibilities of the individual in his departmental role
22 toward the fulfillment of the overall programmatic objectives.

23 Skills training provides that kind of training
24 which is necessary for an individual to perform his specific
25 skill and to eventually receive certification if certification

1 is involved for the particular activity to be performed by that
2 individual.

3 Q Is the certification system--this is a company
4 system, rather than an industry-wide system?

5 A There are some aspects of it which are industry-
6 wide with regard to non-destructive examination. But for the
7 most part, it is a company system, yes, sir.

8 Q And the skills training, are those divided
9 according to the type of inspections to be made?

10 A Yes. As a matter of fact, we're quite proud
11 of the fact that we probably have one of the most detailed
12 certification processes in that regard in the industry. For
13 example, it's customary to qualify and certify a civil
14 inspector on the basis of a couple of demonstrations in a
15 couple of skills relating to the civil activity. In our
16 company, we certify a civil inspector to each individual civil
17 inspection process for which he is going to be employed.

18 Q I noticed that in your testimony, and that
19 caused me to wonder how many different subdivisions of qualifi-
20 cation or type of inspection would an individual inspector or
21 employee participate in. They've got a huge number of different
22 things that they're required to do.

23 A To my recollection, there are approximately
24 40 different generic inspection plans. These are plans which
25 identify the minimum inspection requirements for repetitive

1 processes on the site, and these generic plans constitute the
2 basis for our individual over-inspections.

3 I want to mention that I think at approximately
4 May of 1980 Bechtel changed its system for its quality control
5 inspectors, and converted to certify their inspectors on the
6 same basis that we certify ours.

7 Q So would an individual inspector or quality
8 assurance person carry on his activities in a number of these
9 categories, once he has been certified?

10 A Yes. For each individual category. For example,
11 if an individual inspector was certified to inspect anchor
12 bolts, he may inspect anchor bolts; but he wouldn't carry a
13 civil certification which would allow him to inspect, let's
14 say, post-tensioning installation. He would have to be
15 certified as well, as a post-tensioning inspector before he
16 could be allowed to do that inspection work.

17 Q Now, do you have any program for what I would
18 call instilling quality awareness? Perhaps-- Let me explain.

19 In the safety business, I was told at our site
20 visit, that you're very proud of your safety program; a large
21 number of hours of work without lost time accidents, and I
22 know that the safety people carry on safety meetings in which
23 they encourage the actual personnel employees to be aware of
24 safety problems.

25 Do you have a program aimed at getting the

1 people doing the work to be aware of quality assurance
2 programs and, thereby, improve the quality assurance results?
3 A. I wouldn't call it, at this point, a program,
4 but we have many techniques by which we try to make the
5 employee aware of quality. The training you talked of is one
6 technique; or the feedback of non-conformances to the individ-
7 uals who have made those non-conformances, or who are
8 responsible for them, is another technique.

9 From time to time we have specialized training,
10 over and above that which I mentioned earlier, which is a
11 third technique. There are some others that I could mention,
12 but I think most importantly, in response to your question, I
13 should mention that we have most recently participated with
14 Phillip Crosby Associates, a nationally known consulting
15 outfit, which specializes in quality awareness and zero-defects
16 type consultation. The President of our Company and three or
17 four other officer-level personnel, and a half dozen management
18 level personnel, have already spent a couple of days with this
19 consultant, off site, participating in what is called a senior
20 college. The purpose of that was to help us generate some
21 improved approaches to implementing the standard of zero
22 defects--conveying the standard of zero defects.

23 Q. And this conveying the attitude of zero defects
24 I would hope filters down to the people doing the actual work,
25 in some way, right?

1 A. We hope that it will filter down to a greater
2 extent with this improved approach to planning, yes.

3 Q. Now, I did want to ask one question about
4 trend analysis which, perhaps, is a little premature because
5 these documents are coming in. But you did give a little
6 thumbnail sketch of what was involved in regard to Mr.
7 Turnbull's ideas, and my recollection is that he raised the
8 question of quantitative standards for trend analysis, and
9 the idea of normalizing the standards to the size of the work
10 force. And I believe you mentioned those two items.

11 What is your personal reaction to these ideas
12 in regard to trend analysis, and to the idea of trend
13 analysis in general?

14 A. Trend analysis is the kind of activity that
15 can go along for a long while without yielding any apparent
16 results, and then it may help to identify a process or a
17 programmatic problem, and if the followup on that identifica-
18 tion is effective, the savings or avoidances can be significant.

19 So one has to, first of all, be patient in
20 looking for a feedback or a payback from the activity.
21 Secondly, it's not an activity that is required, per se, by
22 the 10 CFR 50 Appendix B rules and regulations. We think we
23 have a very advanced program. As I mentioned in my testimony,
24 it was started in 1974 by Bechtel. It was not at that time
25 a documented program. It was an activity which was being done

1 without a program. We formalized the activity in 1977, and
2 at the same time we improved the plan. And every year--in
3 some cases, as a matter of fact, with the help of the NRC or
4 at the suggestion of the NRC in some cases, we have made
5 improvements to it.

6 So we welcome ideas on how to improve it, and
7 I thought that these two ideas offered by John Turnbull were
8 of that kind. We have since incorporated those ideas into the
9 program.

10 Q. Well, they certainly seem reasonable.

11 I take it, then, that Bechtel has applied this
12 trend analysis method.

13 A. Now it's being applied by the MPQAD, and they
14 are administering it for the project, and Bechtel is the
15 beneficiary.

16 Q. One final question: How has computer tracking
17 of your deviations as a method of keeping track of what's
18 tended to and what isn't, how has that worked out?

19 A. I think it's worked out well. Again, that's
20 relatively new. The reason I think it's worked out well thus
21 far is because it is being used at the management meetings; and
22 incidentally, there are frequent meetings on the subject of
23 quality assurance that also tend to promote awareness at all
24 organizational levels. But it's being used, and it seems to be
25 identifying the types of action items which warrant additional
attention to move them along and speed them.

1 BY MR. DECKER:

2 Q Would you turn to your Exhibit 2, please? It
3 is an organizational chart indicating communication paths
4 between Bechtel and Consumers Power.

5 A Yes.

6 Q I would like to know a little more about
7 MPQAD that is indicated at the bottom.

8 First of all, I would like to get some better
9 idea of what "integrated" means. I have to illustrate this,
10 I think.

11 When I was personally working in the space
12 nuclear propulsion office, it was a joint program between
13 NASA and the AEC, and people were all mixed together where you
14 hardly knew who paid whose salary.

15 For example, here is a group, a subgroup,
16 20 of them, and seven of them from the AEC. Some more of them
17 are from NASA, and a couple of Air Force people were in there.
18 That's one way of thinking of it.

19 Another way of thinking of it is that everybody
20 in this subgroup belongs to Bechtel and everybody in this
21 subgroup belongs to CPC, but they are all under some common
22 name.

23 How is it with the project quality assurance
24 division? In other words, do all Consumers people work within
25 the box to the right, and all Bechtel people work within the

E3L2

1 box to the left, or are they mixed together within some sub-
2 group?

3 A They are mixed together, except in one area
4 dealing with specialized response to the ASME Board on pressure
5 vessel codes. That area is exclusively staffed by Bechtel
6 personnel.

7 In all other areas, it is staffed--the
8 organizations below the managerial level are staffed by a
9 combination of Consumers Power direct employees, contractors
10 for contract personnel under contract to Consumers and Bechtel
11 employees.

12 Q Is there a chart attached to your testimony
13 that shows the suborganizations to MPQAD?

14 A Yes. It is Exhibit 4--or 5. I am not sure
15 which. I can't read it too well. It is a single sheet. Exhibit
16 4, I see.

17 Q Well, under, for example, inspection, examination
18 and test verification, is that further broken down into, say,
19 an electrical group, a mechanical group?

20 A Yes.

21 Q A civil group?

22 A Yes.

23 Q Now, of all these numbers you gave us this
24 morning, can you indicate how many of these people would be
25 directly connected with soils, remedial soils activities?

E3L3

1 A In the quality assurance engineering section,
2 I think the number is three or four.

3 MR. PATON: Judge Decker, I couldn't hear that
4 answer. Could I have it repeated? Could you repeat the
5 answer?

6 THE WITNESS: In the quality assurance
7 engineering section, I think the number is three or four.
8 In the inspection examination and test verification section,
9 I don't know. I can find out very shortly.

10 In the administration services area, there are
11 persons who support the soils and civil activities, but they
12 would have to be prorated, and that would be a very "ify"
13 type of thing. They are not working directly in one area.

14 Q In Attachment 2 of Mr. Keppler's testimony,
15 as a result of an inspection performed by the NRC, under
16 problems identified, one is that the civil QA group is not
17 adequately staffed with sufficient experience, capability
18 and number for the planned complex remedial soils and founda-
19 tions corrective actions.

20 How do you respond to that?

21 A What page, Mr. Decker?

22 MR. MILLER: It is Page 9 of Attachment 2.

23 THE WITNESS: Thank you.

24 A (Continuing) First of all, I don't know when
25 it is categorized as a problem, in view of the fact that Mr.

E3L4

1 Kepler is referring to future work, and I agree that the
2 number of personnel in the civil quality assurance section
3 might not have been adequate to handle the planned future
4 work. We were aware of that. We have made arrangements to
5 increase the quantity of persons to meet the needs.

6 Insofar as experience and capability is
7 concerned, I disagree because I feel that each of the persons
8 within that section is suitably experienced and capable for
9 his work assignment.

10 Q I get the impression that the future is here;
11 that you are ready to start on certain remedial activities.

12 A And we have staffed to the appropriate level.
13 I think we have increased the staff.

14 Q Even though you don't know what that number
15 is?

16 A Well, in the QA engineering section, I think
17 it is four. The question at the time is whether we needed one
18 more quality assurance engineer, and it has been dealt with,
19 and I am almost sure that that person has been acquired
20 and is on board, but I am not absolutely sure, but it is a
21 commitment that he will be available.

22 Q And you can't tell me, though, how many quality
23 control people would be--are available and trained and capable
24 in the area of soils?

25 A No. I'm sorry. I can say that I don't think

E3L5

1 that was at issue.

2 Q How do you go about determining how many
3 people are required to satisfactorily handle all quality
4 problems on a given project? We will confine ourselves to
5 soils, remedial soils.

6 A Two says. First is that we use experience
7 to tell us what the ratio of our inspection force should be
8 to the Bechtel manual persons who are involved in the soils
9 area.

10 Q Do you have a magic number for that?

11 A No, because it varies somewhat, but I
12 would think that--it is a very small percentage because
13 the bulk of the inspection is in the testing activity, if you
14 will, rather than in the placement.

15 We have an inspection plan, which calls for
16 inspection of the material at the borrow area. We inspect
17 the material. We inspect the placement process in terms of
18 making sure that the equipment that's being used is qualified.
19 We inspect the process to make sure that the samples are taken
20 when they are supposed to be taken and at the points they
21 are supposed to be taken, we inspect the testing activity
22 to make sure that the testing activity is done in accordance
23 with the procedure.

24 I would say that two or three percent would
25 handle it.

E3L6

1 Q Well, have you ever done a cost-benefit
2 analysis which might consider such things as cost of remedial
3 action, such as the number of people assigned to attempt to
4 assure that remedial action wouldn't be required?

5 For example, we were told the other day--we
6 were given a piece of paper that indicated the current
7 estimate for remedial action on the soils now is something
8 like 27 million, if I remember correctly.

9 How many people could you have afforded to put
10 on the job to assure that didn't happen for \$27 million?
11 For example, it costs the Company a lot of money for every day
12 that there is a delay before this plant comes on line. Have
13 you ever attempted to determine which would be the most
14 economically advantageous in terms of the number of people
15 that you might apply to the job?

16 A We have not performed such a cost-benefit
17 analysis. On the other hand, I want to emphasize that
18 throughout my tenure, I have never had any difficulty in
19 getting my management's approval of the additional personnel
20 that I thought was necessary to do the job, and I think that
21 the numbers that were tendered here in Consumers' Exhibit No.
22 1 tend to illustrate that point, with the combined Bechtel
23 QA and Consumers QA personnel rising from 16 at the end of
24 1975 to 96 in July of 1981, which is a substantial increase.

25 Q I have a very difficult question for you that I

E3L7

1 don't know what you can do with. All of the testimony over
2 the years, that I have heard over the years, is that after
3 stubbing one's toe on several occasions, there have been
4 major improvements in the quality program.

5 The real question is, although it may get
6 better and better and better, is it good enough to do the job.

7 I started playing tennis about five years ago,
8 and I get a little better every year, but I am far away from
9 being good enough to do the job.

10 Is there some standard, that you know of, some
11 way to determine whether better is good enough to do the job?

12 A One of the ways we have employed is to use
13 an outside industry consultant. We have employed Management
14 and Analysis Company on a number of occasions to make
15 independent third-party assessments of the adequacy of our
16 program and the degree to which it was being followed, and
17 most recently, during the period of March through May of
18 1981, they employed up to 10 persons in this endeavor, and
19 their conclusions were, No. 1, that the program met the
20 NRC requirements, except for five specified findings that they
21 had, all of which, in my judgment, were of a moderate to
22 low consequence.

23 Secondly, they said that the program was
24 adequate to meet the needs of the project.

25 Thirdly, they said the quality assurance

E3L8

1 program was above average in the industry.

2 Lastly, they said that it was especially
3 above average in view of the age of the project, in view
4 of when the project was started.

5 Now, of course, that's a current assessment.
6 It doesn't go back way back when, but we have never had,
7 from independent consultants, starting in 1978--actually
8 starting in 1976, '78 and '80, we had three outside audits
9 by independent consultants, and we have never had anyone
10 tell us that we were not adequate to do the job or not in
11 compliance in general with NRC requirements.

12 It was quite to the contrary. In each case
13 we did have assurances from these folks that we were, in
14 general, meeting NRC requirements.

15 Q Let's change the subject a little bit to
16 the problem of scheduling. Please explain for me how MPQAD
17 is advised of the construction activities scheduled, and how
18 you go about determining which inspections need to be made,
19 and how do you assign MPQAD people to those activities?
20 By "you", I have to mean Mr. Bird, apparently.

21 A The MPQAD personnel participate in the schedule
22 of meetings and are aware--and receive schedules of reports.
23 They are aware of the kind of activities that are taking
24 place before the fact--that are going to take place before
25 the fact of those activities.

E3L9

1 Q How do you get that information? Is it a
2 computer print-out or orally, or what?

3 A Well, there are master schedules, but the best
4 way is to attend the weekly scheduling meetings and to under-
5 stand from the discussions at that meeting what activities
6 are planned to be taken in the near future, and then making
7 sure that the people within MPQAD have knowledge of those
8 activities and continue to coordinate with the Bechtel OC
9 counterparts and with the Bechtel crafts supervision in ques-
10 tion. That's the main way.

11 Of course, there are controls. There are
12 inspection reports, which are called "hold" points, and the
13 craftspersons are instructed that they cannot continue a
14 construction activity beyond a hold point. When they come
15 to a hold point in the sequence of activities, they have to
16 get inspection or MPQAD involvement, as the case may be.

17 Q Well, on that subject--I am glad you raised
18 it--what has your record been in terms of keeping these
19 holds to a minimum duration by having enough people trained
20 to get in there and get the inspection over so that construc-
21 tion activities aren't held up?

22 A The hold point is put in place whenever it is
23 necessary to inspect that characteristic at that point in
24 time, and at no other point in time can it be inspected.

25 If it involves a construction holdup--it would

E3L10

1 certainly have to involve a construction holdup. We will
2 inspect the characteristic when it needs to be inspected
3 and, of course, we will try to have the inspector on the job
4 promptly at the time, but the hold point must be honored.

5 Q I understand that, but that isn't what I
6 asked.

7 A Well--

8 Q Have you got enough trained people, from a
9 Company cost-effectiveness point of view, to get there on
10 time when a hold point is initiated and get the proper
11 inspection over with without delaying construction
12 unnecessarily?

13 A Yes, we do. I think the numbers reflect that
14 we do.

15 Q Well, then, in that case, I certainly don't
16 understand something in your testimony.

17 A Okay.

18 Q Let's look at the bottom of Page 17, the final
19 paragraph on that page. I am talking about QCIR's. It says,
20 "QCIR's describe the construction inspections to be made and
21 provide a record of the status of those inspections."

22 In January of 1980, there were 22,000, is that
23 correct, open QCIR's?

24 A Yes.

25 Q On the top of the next page, it says that in

E3L11

1 May of 1981, there were still 8300 of them.

2 Now, are these inspections that are still to be
3 performed or that were still to be performed as of May 1981?

4 A Yes, but understand that, in large part, the
5 craft work is also yet to be performed. These do not repre-
6 sent inspections which are lagging the completion of the craft
7 work. Let me give you an example.

8 Q Well, I understand your point.

9 A Oh, okay. Does that satisfy your question?

10 Q No. I wish we had some notion of how many
11 inspections are lagging the crafts work. There are some fine
12 words in this testimony about front end loading and trying to
13 find a discrepancy before it gets literally cast into concrete
14 or steel, or something, but I have no way of knowing, have no
15 feel at all for whether that's actually being accomplished
16 or whether the inspections are lagging and deficiencies are
17 found after it is too late.

18 Is there anything you can add that would
19 shed some light on that question?

20 A I think the inspection planning has become a
21 lot more sophisticated since the days of 1975 and '76, and
22 the inspection planning is a very significant tool in assuring
23 that the inspections are identified and timed, if you will,
24 or sequenced in the process appropriately.

25 In addition to that, the inspection planning

E3J-12

1 has improved by changing its emphasis from one of surveillance--
 2 I will use that term for the moment without defining it--
 3 to one of inspection, whereby the inspector is responsible
 4 and accountable for very specific characteristics at very
 5 specified times.

6 I can't tell you how many--you know, how many
 7 inspections are--how many characteristics are awaiting
 8 inspections. It is ceratinly not anything close to 8300.

9 Q Well, I would suggest to you, as a top-level
 10 quality manager, that you might give some thought to cost
 11 effectiveness from that point of view.

12 A Well, one of the tools that I use is a very
 13 effective tool. It is called "orchestrated agony", and I am
 14 very sensitive to a shop superintendent or a site superintendent's
 15 concerns about his activity being held up for lack of
 16 inspection.

17 Quite frankly, there is very little of that
 18 going on. The inspection people seem to be getting to the
 19 job on a timely basis, and the craftspeople understand the
 20 need for the hold point.

21 I would like to point out-- Well, never mind.
 22 I have finished my answer.

23 Q First of all, is there a mechanism available
 24 for a formal request to the quality department to get on
 25 with the job or provide an inspection in a more timely way,

E3L13

1 and if there is, what has been the record?

2 A There are two techniques that we use.

3 One is a call system, and one is an area system.

4 For some types of inspections, the inspector
5 is called by the crafts foreman when the activity is ready--
6 when the hardware is ready for inspection.

7 In other types of activities, the inspector
8 is always in the area, and it is up to him to be alert as
9 to the progress of the activity.

10 Again, there are no quantitative measures
11 of, for example, how many times an inspector is called and
12 how many times he appears within two minutes, within five
13 minutes, within 10 minutes, et cetera. There are no criteria
14 and there are no measurements, but there are expectations
15 that appear to have been developed between the crafts super-
16 visor and the inspection supervisor, and things seem to be
17 working out pretty well, from what I can tell.

18 Q On Page 16 of your testimony, you talk about a
19 truncated--in the center of the page--

20 A Yes.

21 Q --middle of the page, a truncated, prioritized
22 list of actions which warrant special management involvement.
23 Who decides what is priority? What goes into this truncated
24 system, and what doesn't?

25 A Everything gets considered for incorporation

E3L14

1 into the list, and the items are weighted first on the basis
2 of their technical importance; secondly, on the basis of
3 their schedule impact; thirdly, on the basis of the amount
4 of time that they have been in an open state, and lastly
5 on the basis of complexity, if they are very complex.

6 These weighting factors are applied to the open
7 items, and based on the results, the big ticket items seem
8 to rise to the top.

9 (Continued on next page.)

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 Q Fine. But in answer to my question, it is the
2 people from MPQAD that make those judgments?

3 A Yes, they do.

4 Q Would you turn to page 26, please? I don't know
5 that it's very important, but I can't read the first full
6 sentence on that--I can't understand the first full sentence
7 on that page. Is the word "manager" correct?

8 A That's the term applied to the directives in
9 question. That is correct, yes. Instead of Bechtel Engineer-
10 ing Department Directives, they're called Bechtel Manager of
11 Engineering Directives. But they're essentially the same
12 thing. If I were to substitute the words, "Bechtel Engineering
13 Department Directives," that would help.

14 Q Thank you. You talked a minute ago about hold
15 points. The first full paragraph on page 26 apparently extends
16 those procedures into--further than previously.

17 Can you tell us a little more about this
18 apparent improvement?

19 A Well, in speaking hold points, when MPQAD reviews
20 supplier inspection plans, and when MPQAD decides that source
21 inspection by either Bechtel or MPQAD is appropriate, MPQAD
22 may incorporate hold points into the supplier's manufacturing
23 process or inspection process. And these hold points are
24 contractually imposed, because of some standard clause in the
25 contract that they be supplied and honored.

1 Q This is rather new?

2 A Yes, I think it's about a year old. I'm not
3 quite sure of that.

4 Q Again, your end of the bargain would be to
5 have a qualified person available to do these inspections,
6 without holding up the supplier, is that not true?

7 A Yes.

8 Q Have you got them?

9 A We have approximately 275 Bechtel supplier
10 quality representatives who are available to do this kind of
11 work, in addition to any of the persons who are qualified
12 within MPQAD or within Bechtel quality control.

13 CHAIRMAN BECHHOEFER: Could I just interrupt one
14 minute?

15 Does MPQAD have authority to order Bechtel
16 inspectors to do this? I assume these are Bechtel inspectors
17 and are not otherwise--

18 THE WITNESS: Yes, because MPQAD-- I'm sorry;
19 I cut you off.

20 CHAIRMAN BECHHOEFER: Go ahead.

21 THE WITNESS: Yes, because MPQAD serves as the
22 quality assurance department for the project as a whole.
23 MPQAD serves as the quality assurance department to support Mr.
24 Rutgers, as project manager for Bechtel, as well as to support
25 to Mr. Cooke, as Vice-President of the Midland Project, for

1 Consumers.

2 CHAIRMAN BECHHOEFER: Well, are these Bechtel
3 people who are here in Midland, or....

4 THE WITNESS: They're stateswide people, and
5 it is part of the Bechtel commitment for us to employ these
6 people when and if they're called upon.

7 CHAIRMAN BECHHOEFER: Yes, but when you need
8 people with some special background, you can call on the
9 Bechtel organization?

10 THE WITNESS: Yes, and they have to be qualified
11 and certified to do this inspection. And they're certified
12 in accordance, if I may add, with ANSI Standard N45.2.6.

13 BY MR. DECKER:

14 Q I'd like to go back now to Attachment 2 to Mr.
15 Keppler's testimony, the same testimony we discussed
16 previously, beginning on page 4, paragraph 2(a). It says:

17 "Seven of the ten components selected for
18 review were not constructed in accordance with the
19 design requirements."

20 Who determined that?

21 A My understanding is it was determined by Mr.
22 Isa Yin, an NRC inspector.

23 Q "Six of the seven non-conforming components
24 identified in 2(a) above had been QC-inspected and accepted."

25 What's your response to this?

1 4. We have not received the NRC inspection report,
2 which will provide the specifics, but I do have some under-
3 standing of what Mr. Yin was referring to; and in two cases
4 of the seven, the inspections had not yet occurred.

5 In one case there appeared to be damage--obvious
6 damage--after inspection had occurred. The condition was so
7 obviously non-conforming that it would be inconceivable to me
8 that an inspector would not have found it. It's my assessment
9 that the inspector--that the damage occurred after the
10 inspection. And to guard against that going through the
11 system, he had what is called a walkdown inspection. At the
12 time that the equipment is turned over by Bechtel for a
13 checkout and preoperational testing, and turned over to Bechtel
14 to Consumers Power Company, they had preoperational testing.
15 And that walkdown inspection would certainly have found that
16 case.

17 In two other cases we remeasured the character-
18 istics and found them to be within tolerance.

19 Let me see, how many does that account for now?
20 Two yet to be inspected; one, obvious damage; and two which
21 were within allowables. And the other two cases are still in
22 question, and I don't know that I'm really sure, without
23 having the inspection report, as to the two cases remaining.

24 So I don't think that this is an abundantly
25 accurate statement.

1 MR. PATON: Judge Decker, that inspection
2 report we expect will be here Monday, if the Board is
3 interested in seeing it. I expect it's being prepared now.
4 We've asked them to bring it with them.

5 MR. DECKER: We understand.

6 BY MR. DECKER:

7 Q. Could you give me some idea of the timing of
8 this? That is, when the construction of these items was
9 completed, and when the inspections took place? Not the NRC
10 inspections; your inspections.

11 A. No. I just don't know.

12 Q. A year?

13 A. Here is one case where the hanger was accepted
14 by quality control on December of 1980.

15 Here's another case, October 24, 1980 was the
16 QC acceptance date.

17 Another case, accepted by quality control on
18 April, '81.

19 Assuming these are the case references--I'm not
20 absolutely sure--I'm using my best judgment that these were
21 the cases which Mr. Yin had marked.

22 Another case, April 5, 1980; April 19, 1980.

23 That's it.

24 Q. When, again, did MPQAD come into being?

25 A. In March of 1980. It became integrated in, T

1 believe, October of 1980.

2 CHAIRMAN BECHHOEFER: I believe the testimony
3 says August.

4 THE WITNESS: Thank you.

5 BY MR. DECKER:

6 Q The following page, page 5, the small-bore
7 piping system design, since everyone has this in front of
8 them, I won't read it, but I'll ask you again for your comments
9 on these alleged discrepancies.

10 A This is a case in which the procedures for
11 documenting the calculations--the procedure was not being
12 followed, and immediate steps were taken to cause the
13 procedures to start to be followed. Once it was pointed out
14 to us, we also stopped the release of design packages until
15 we were sure that the procedure would be followed. And we
16 have retroactively gone back to look at the packages that
17 were released while the procedure was not being followed. And
18 we're updating those packages

19 I should point out that in our reassessment of
20 the situation, there have been no cases in which an individual
21 hardware problem has been indicated.

22 Q We're not clear as to what the first sentence
23 of paragraph (c) means. Can you tell us what it means to you--
24 beginning, "QA audits conducted by...?"

25 A Yes. From time to time the Quality Assurance

1 Department and its successor, the MPQAD, has audited the
2 activities involving stress analysis and calculations, and
3 although we have found some other items which warranted
4 improvement, and have achieved those improvements, we did
5 not find this particular problem in this particular area.
6 And evidently the NRC inspector felt that the audit process
7 should have found that.

8 Q I'm still a little unclear. Is it the function
9 of QA simply to assure that stress analyses have been
10 performed, or is it your function to attempt to determine
11 whether or not those stress analyses are adequate?

12 A It is our function to assure that they have
13 been performed and to assure that they have been performed
14 in accordance with the administrative procedures, which call
15 for certain reviews and certain documentation.

16 It is not our function to determine whether the
17 calculations are accurate. But let me say this: We've gone
18 farther in this area than almost any quality assurance
19 organization I know, because as part of our program we have
20 taken into the audit team, people who are capable of assessing
21 the design basis on which the stress analyses have been made,
22 and people who are capable of making, re-making the calculations.
23 No one had done this. We have done it. Unfortunately we
24 hadn't done it in this particular area, and didn't find this
25 particular problem--which had nothing to do with the adequacy

1 of the calculations, per se. It had to do with the documenta-
2 tion of the calculations.

end 4

3 (Continued on following page.)
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 Q (By Mr. Decker) On the top of Page 6, it
2 appears to be the NRC's view that primary QC inspectors
3 lacked necessary training and/or experience.

4 A That's a conclusion that appears to be drawn,
5 but-- I'm sorry. Go ahead.

6 Q Nothing. Go ahead, please.

7 A Well, I just wanted to say that that's a con-
8 clusion that appears to be drawn from the seven cases which
9 Mr. Yin identified or actually Mr. Keppler identified on Page
10 4, and I don't believe that that's a fair conclusion.

11 Q The last sentence on Page 6 indicates that the
12 licensee has agreed to take some corrective action. Are
13 you able to tell us what you have agreed to do?

14 A No. 1, follow the procedures and, No. 2--

15 CHAIRMAN BECHHOEFER: I'm sorry?

16 A (Continuing) No. 1, follow the procedures
17 in terms of the way in which the calculations are documented.

18 No. 2, reassess the design packages which
19 have gone on before while the procedure was not being followed,
20 and there were lesser actions which I don't think are very
21 significant.

22 Q Well, are part of the corrective actions
23 that you have agreed to take involved with the comment that
24 primary QA inspectors lacked adequate training and/or experience?

25 A No, because we believe that they are trained,

E5L2

1 experienced sufficiently and certified.

2 Q In other words, you disagree with that--

3 A Very definitely.

4 Q --conclusion?

5 A Very definitely.

6 Q At the middle of Page 7, please, Paragraph 2(a),
7 we seem to be back on our favorite subject of trend analysis.

8 How do you respond to this allegation under
9 2(a)?

10 A The problems with the reactor coolant pumps
11 were found after they were delivered by Byron Jackson to the
12 site.

13 Q Excuse me. Byron Jackson?

14 A Yes.

15 Q Is that a company or a person, or what?

16 A That's a company.

17 Q Excuse me. Pardon my interruption. Would you
18 go ahead, please?

19 A We are not in the practice of trending the
20 activities at a supplier's facility. When we find a problem
21 at the site in a supply component, it is the first time we
22 are aware of that problem. There have been, to our knowledge,
23 no prior repetitions of the problem which would have caused
24 us to assume some trend. The trending activity simply doesn't
25 apply.

E5L3

1 Q Well, it says, "A large number of NCR's, written
2 against the reactor coolant pump during the past two
3 years, indicate a trend which has not been adequately addressed."

4 Who writes these NCR's?

5 A They are written by the Consumers Quality
6 Assurance Department. When we over-inspected the pumps, we
7 found some problems, as I recall, but in some cases the
8 problems might have been found as part of the installation
9 process. I am not absolutely sure on that point.

10 Q Well, the claim is that it indicates a trend,
11 which has not been adequately addressed.

12 A I fail to understand how there can be a trend
13 if one defines a trend as a series of points of information
14 over time exhibiting an upward direction or a downward
15 direction, if it is a downward direction. There is a time
16 period involved in the definition of a trend.

17 Q Oh, I understand. You are telling me that
18 this large number of NCR's were all written very closely
19 together over time, is that it?

20 A That's part of it, yes. The other part of it
21 is that we do not incorporate into the trending program the
22 inspection results of supply components.

23 Q Do you require your major contractors to
24 include a trending program in their quality assurance program?

25 A No, not suppliers of components, we do not.

E5L4

1 Q In Paragraph 3 on Page 7, the NRC claims
2 that, "The licensee was closing out nonconformance reports
3 in some cases without adequate engineering evaluations."

4 Apparently the NRC felt that these engineering
5 evaluations were not adequate. Again, how do you respond
6 to that?

7 A First, let me again repeat that I am not sure,
8 in the absence of the specific inspection report, as to what
9 nonconformances are being referred to. I think I know, but
10 I am not sure.

11 Secondly, let's--

12 Q But in any case, if I understood you correctly
13 before, the function of QA is not to judge, really, the
14 adequacy of an engineering evaluation, but whether or not that
15 evaluation was done and done in accordance with your own
16 procedures, but not to get into the engineering itself to
17 see whether it is adequate, is that correct?

18 A That's right. Our responsibility is to assure
19 that the persons who had the responsibility and authority
20 make the judgments; that the judgments are made in a disciplined
21 fashion, and that the judgments are documented, and that in
22 the event of any use-as-is disposition or repair disposition,
23 justification appears appropriate.

24 It is not our responsibility to perform the
25 design function.

1 Now, in these cases, if they are--in the cases
2 I have in mind, if they are the same as the NRC inspector
3 had in mind, I have documentation here which I think meets
4 the criteria I just enumerated. Now, it may well be that the
5 NRC inspector did not personally agree with the disposition,
6 so I don't know whether he is saying that the system by which
7 the disposition was arrived at was inadequate, or whether he
8 is saying the disposition itself is inadequate. I can't
9 tell from this language.

10 Q All right. Would you turn to Page 10, please?
11 Paragraph C--it is 2(c). It is up at the top of the page.

12 The first thing I would like to know again
13 is about the timing of this. When was the construction, which
14 is referred to here, taking place?

15 A I don't know. What I do know is that we looked
16 at the apparent 18 cases in which inspection hold points
17 were passed or were not honored, and we found that the require-
18 ment for these hold points, in five cases, coincided approxi-
19 mately with the work activity. In other words, five of these
20 cases when the requirement was initiated, the work activity
21 was just-- Let me start again.

22 The time that the requirement was established
23 and the time that the work activity was ready for this inspec-
24 tion were just about the same time in five cases, and in
25 13 cases the work activity had already gone beyond the point

E5L6

1 of inspection for this process hold point, so when the inspec-
2 tor made the final inspection of the characteristics in
3 question, we now had a requirement that involved a hold
4 point upstream, if you will, which he couldn't honor because
5 the work had already gone by--had proceeded beyond the point
6 that the hold point could be honored.

7 In the interest of conservatism, he wrote
8 nonconformance reports.

9 Q Well, that's a fairly sad story, isn't it,
10 that hold points were passed? It may not be the fault of the
11 quality assurance division.

12 A No, they were passed. They didn't exist in
13 13 cases. That's what I am trying to get across, and probably
14 not too well, but the hold point in 13 cases-- At the time
15 that the characteristics would have been ready for inspection,
16 the hold point for these inspections did not exist. In five
17 cases, it was very close time-wise, and we were in a transi-
18 tionary period. In any case, I think the inspector--

19 Q I don't understand at all. If the hold point
20 doesn't exist, how can it be passed?

21 A That's the point. I don't understand it either,
22 why we would be apparently cited for work that was not appli-
23 cable to a hold point because it was already beyond the hold
24 point, and the hold point requirement didn't exist at the
25 time that work was done. The hold point was not meant to

E5L7

1 be retroactive. It was meant to be applicable to new work
2 as it came down the pike.

3 Q It says, however, that, "The site QA manager
4 issued a stop work order as the result of this NRC finding."

5 That must be very recent, right? Is the
6 work still stopped?

7 A No. He issued a stop work order because
8 violating a hold point, even when it appears to be that way,
9 is a very serious matter, and the work stop is to be investigated.

10 After it was investigated, due to the fact
11 that the timing and the circumstances that I just related
12 were there, that stop work order was lifted.

13 In the interest of conservatism, again, there
14 was an immediate stop work order until it could be investigated.

15 Q On Attachment 2, Page 11, please, Paragraph 2(a)
16 reads, "Quality control inspection of May 12, 1981, failed to
17 identify minimum bend violations of Class IE cable."

18 Apparently it was the NRC that did identify
19 that, is that correct?

20 A Yes, sir. It was identified in one area.

21 Q How do you think it happened, that your trained
22 inspectors concluded their inspections and didn't find it?

23 A I think that the fact of not finding this is
24 not indicative of a lack of training or qualification. It
25 is an individual case of a nonconformance being unobserved,

E5L8

1 and there is a possibility that MPQAD over-inspection might
2 have observed this. There is a strong possibility that
3 this might have been observed again during the check-out
4 process, but I don't think it is indicative of a lack of
5 training in and of itself.

6 Q Let's look at Paragraph 3 on Page 12, please.
7 It is apparently the NRC's view that identification of the
8 root causes for repeated nonconforming conditions had not
9 been performed. I don't know whether you agree with that or
10 not. If you do, what has been done about it?

11 A I don't agree with it, but I think that there
12 is always a continuing need to improve the process of
13 identifying the root causes and assigning responsibility
14 for the elimination of those root causes, and following it
15 up on a timely basis to assure that those assignments are
16 carried out, and I think that we have been continually improving
17 in our ability to do this, especially improving in the
18 timeliness in which we do this.

19 Q Isn't it true that the identification root
20 causes and appropriate corrective action is one of the bones
21 that NRC has been picking with you over the years?

22 A It is one of the areas that they have over the
23 years identified as an area that they would like to see further
24 improved, yes.

25 Q But you don't agree with it?

E5L9

1 A No, I didn't say that. I agree that it needs
2 imrpovement, but I disagree with the statement as it is
3 worded in Paragraph 3.

4 MR. DECKER: All right. I have no other
5 questions, Mr. Chairman.

6 BY CHAIRMAN BECHHOEFER:

7 Q Just to continue on that subject, is this some-
8 thing that should be factored into a trend analysis program,
9 either should be or is?

10 A The trend analysis program is to identify
11 cases warranting corrective action. I am being a little
12 technical here, possibly, but the corrective action activity
13 takes over from that time on, and this would be the type of
14 thing that we would have to address in our corrective action
15 procedures as contrasted, technically, to our trend analysis
16 procedures, but they go hand in glove.

17 CHAIRMAN BECHHOEFER: Before we break, I have
18 some questions of my own, and I wanted to find out approximately
19 how long other parties wish to examine Mr. Marguglio. It
20 might be desirable to break and put Mr. Kimball on.

21 MS. BROWN: The Staff would greatly appreciate
22 it if we could proceed that way.

23 CHAIRMAN BECHHOEFER: I just was trying to
24 ascertain the amount of time.

25 MR. MARSHALL: I have two questions.

E5L10

1 CHAIRMAN BECHHOEFER: Will you have very many?

2 MS. STAMIRIS: I don't think I have too many.
3 Fifteen minutes, maybe.

4 MR. PATON: Mr. Chairman, may I have just one
5 minute? Then I will be able to answer that question.

6 CHAIRMAN BECHHOEFER: Well, we will take a break
7 now, in any case.

8 MR. MILLER: I have just about 10 minutes of
9 redirect.

10 MR. PATON: I would have less than 15 minutes.

11 CHAIRMAN BECHHOEFER: Would it pose a problem
12 if we wait until after lunch for Mr. Kimball?

13 MR. PATON: That's the risk-- I'm sorry.

14 MS. BROWN: It would. We really thought that
15 we had gotten a commitment that we could put him on first
16 thing this morning. He does have a scheduling problem this
17 afternoon, and if there are going to be lots of questions, he
18 is not going to be available in the middle of the afternoon.
19 That's why I suggested that we get him on and off.

20 CHAIRMAN BECHHOEFER: I think right after the
21 break, we will put him on, then. We weren't aware that he
22 had to be away this afternoon. We thought he had all day.
23 After the break, we will put him on, and then we will resume
24 with Mr. Marguglio.

25 We will take a 15-minute break.

(Recess.)

1 CHAIRMAN BECHHOEFER: Ms. Brown, Mr. Paton?

2 MS. BROWN: Yes, the Staff would now like to
3 call Jeffrey Kimball.

4 JEFFREY K. KIMBALL

5 was called as a witness by counsel for the Regulatory Staff
6 and, having been first duly sworn by the Chairman, was examined
7 and testified as follows:

8 DIRECT EXAMINATION

9 BY MS. BROWN:

10 Q Would you please state your name and position,
11 for the record?

12 A My name is Jeffrey Kimball. I'm a seismologist
13 with the Geosciences Branch, Division of Engineering, Office
14 of Nuclear Reactor Regulation.

15 Q Mr. Kimball, have you prepared testimony in
16 response to Mrs. Stamiris' Contention 1?

17 A Yes, I have.

18 Q Do you have a copy of that before you?

19 A Yes, I do.

20 Q Is your testimony contained in a document
21 entitled "NRC Staff Testimony of Darl S. Hood, Jeffrey K.
22 Kimball and Eugene Gallagher on Stamiris Contention 1"?
23 Specifically, is your testimony in response to Questions 1, 2,
24 3, 4 and 6?

25 A Yes, it is.

1 Q Are your professional qualifications attached
2 to this document?

3 A Yes, they are.

4 Q Do you have any corrections or additions to
5 make to your testimony or any of the attachments thereto?

6 A No, I do not.

7 Q Is your testimony true and correct to the best
8 of your knowledge and belief?

9 A Yes.

10 MS. BROWN: Chairman Bechhoefer, I request that
11 the entire document be bound into the transcript as if read.
12 However, at this time I'm only moving into the record Mr.
13 Kimball's response to Question 1, Question 2, Question 3,
14 Question 4 and Question 6, and all of the attachments that
15 are referenced in his testimony, which are, specifically,
16 Attachments 1 through 8. To correct that, as far as Attachment
17 1 is concerned, I'm only moving in his professional qualifica-
18 tions statement. Attachment 1 consists of two other profes-
19 sional qualifications statements, but we won't be moving those
20 into the record until a later time.

21 CHAIRMAN BECHHOEFER: I take it, with respect
22 to all of these questions except 6, the portion that you're
23 moving in is only Mr. Kimball's portion, concerning, for
24 instance, the qualifications and--

25 MS. BROWN: Yes, that's correct. If you'd like

1 me to be more specific, I will delineate the paragraph of
2 each response.

3 CHAIRMAN BECHHOEFER: Well, I don't think that
4 will be necessary. I just wanted to make it clear that--
5 It's fairly obvious on its face.

6 Okay. With that, is there any objection to
7 the admission into evidence of Mr. Kimball's testimony?

8 MR. MILLF No objection.

9 CHAIRMAN BECHHOEFER: Without objection, that
10 portion will be admitted into evidence. The entire document
11 will be bound into the record at this point.

12 (NRC Staff Testimony of Darl S. Hood, Jeffrey
13 K. Kimball and Eugene Gallagher on Stamiris Contention 1
14 follows:)

15

16

17

18

19

20

21

22

23

24

25

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF TESTIMONY OF DARL S. HOOD, JEFFREY K. KIMBALL AND EUGENE GALLAGHER
ON STAMIRIS CONTENTION 1

Q. 1. Please state your names and positions with the NRC.

A. My name is Darl S. Hood. I am a Senior Project Manager in the Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

My name is Jeffrey K. Kimball. I am a Seismologist/Geophysicist reviewer within the Geosciences Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission.

My name is Eugene J. Gallagher. I am a civil engineer with the U.S. Nuclear Regulatory Commission. Since February, 1981, I have been assigned to the Reactor Engineering Branch, Division of Resident and Regional Reactor Inspection, Office of Inspection and Enforcement. Prior to February, 1981, I was a reactor inspector assigned to the Region III, Reactor Construction and Engineering Support Branch, Office of Inspection and Enforcement.

Q. 2. Have you prepared statements of professional qualifications?

A. Yes. Copies of these statements are Attachment 1.

Q. 3. Please state the duration and nature of your responsibilities with respect to the Midland Plant, Units 1 and 2.

A. I, Darl Hood, am the Project Manager for the Midland Plant application for operating licenses. I have served in that position from August 29, 1977, when the application for operating licenses was tendered to the NRC for acceptance review, up to the present time. My responsibilities include management of the Staff's environmental and radiological safety reviews. I am responsible for the Staff testimony on the following parts of Stamiris' Contention 1: (a); Supplemental Items 2, 3, 4 and 6; and portions of Supplemental Items 1 and 5.

I, Jeffrey Kimball, have served in the position of Seismologist/Geophysicist reviewer for the Midland Plant since July 1980. I am responsible for the Staff testimony on part 1 (b) of Stamiris Contention 1.

I, Eugene Gallagher, was assigned to the Midland Plant (among others) from October, 1978 until January, 1981. Since October of 1978, I have spent approximately one year of effort performing inspections, reviewing quality control records and procedures, observing work activities, reviewing Consumers Power Company (hereafter CPC or Applicant) responses to 10 CFR 50.54(f) questions 1 and 23, and attending meetings and presentations by CPC and Bechtel regarding the soil settlement matter at the Midland Plant. I am responsible for the Staff testimony for portions of Supplemental Items 1 and 5 to Stamiris' Contention 1.

Q. 4. Please state the purpose of this testimony.

A. The purpose of this testimony is to address Contention 1 of the Contentions of Barbara Stamiris as identified in the Appendix to Prehearing Conference

Order Ruling on Contentions and on Consolidation of Proceedings, dated October 24, 1980, and as supplemented by Intervenor Answer To Applicant's Interrogatories, dated April 20, 1981. This testimony does not address Stamiris Contention 1 (d) since this relates to matters to be addressed at a later time.

Stamiris' Contention 1 reads as follows:

Consumers Power Company statements and responses to NRC regarding soil settlement issues reflect a less than complete and candid dedication to providing information relevant to health and safety standards with respect to resolving the soil settlement problems, as seen in:

- a) the material false statement in the FSAR (Order of Modification, Appendix B);
- b) the failure to provide information resolving geologic classification of the site which is pertinent to the seismic design input on soil settlement issues (Responses to FSAR Questions 361.4, 361.5, 361.7 and 362.9);
- d) the failure to provide adequate acceptance criteria for remedial actions in response to 10 CFR §50.54(f) requests (as set forth in part II of the Order of Modification);

and this managerial attitude necessitates stricter than usual regulatory supervision (ALAB-106) to assure appropriate implementation of the remedial steps required by the Order Modifying Construction Permits, dated December 6, 1979.

April 20, 1981 Supplement to Contention 1

Examples of CPCo. reluctance to provide requested information

1. 3/31/80 NRC meeting notation of Applicant's reluctance to provide NRC consultants with requested information.
2. Vol. III, tab 65 50-54f, 8/6/79 meeting, attitude that "needlessly conservative decisions may be formulated on the 'what if' type questions" by the NRC on dewatering.
3. The 11/24/80 S.A.L.P. assessment on CPCo - NRR interface as presented by D. Hood in the following statements regarding soil settlement issues:

"A big contributor to the inability to make meaningful progress in this matter is the quality of responses gotten. We have set some kind of record on the number of questions re-asked, which speaks poorly for CPCo-NRR interface. ...The bottomline is there seems to be a lack of appreciation or support of Staff review necessities and a tendency to push ahead despite the lack of proper assurances."

4. The perfunctory manner in which CPCo. deponents answered questions. (I will tabulate examples from the depositions I attended.)

Examples of information withheld or incorrectly given:

5. The failure of CPCo. to discuss the Administration Building settlement problem with the NRC, as they did with their consultants, in the early meetings on the DGB settlement.
6. The false FSAR statements beyond the one cited as a "material false statement" in the Dec. 6 Order, as discussed in the 4/3/79 Keppler-Thornburg memo, and the 6/13/79 Thornburg - Thompson memo.

Q. 5. What is the NRC Staff response to Contention 1(a)?

A. Information submitted as part of an application for licenses in accordance with 10 CFR 50.30 is "material" if that information should or could have an influence upon a safety conclusion of the NRR Staff. A material statement which is false is of concern if it could have resulted in an improper finding or a less probing analysis by the NRR Staff.

The material false statement referred to in Contention 1(a) is described in Appendix B to the Order Modifying Construction Permits, dated December 6, 1979. Specifically, the material false statement was made in Section 2.5.4.5.3 of the FSAR. That section provided that "all fill and backfill were placed according to Table 2.5-9". Had the Staff relied on this statement, it would or could have erroneously concluded that the fill and

backfill placed for the support of structures and the Diesel Generator Building consisted of "clay" (Table 2.5-9 under "Soil Types") or "controlled compacted cohesive fill" (Table 2.5-14 under "Supporting Soils") which had been compacted, as a minimum, to 95% of ASTM D 1557-66 T modified to get 20,000 foot-pounds of compactive energy per cubic foot of soil (see Table 2.5-9 under "Compaction Criteria"). The reality of the situation is that the fill and backfill beneath the structures and the Diesel Generator Building are neither "clay" nor a "controlled compacted cohesive fill", but consist of a heterogeneous mixture of sand, clay, silt and lean concrete, and the minimum compaction criterion implied as having been achieved by the quoted statement from FSAR Section 2.5.4.5.3 was not achieved.

Therefore, a conclusion by the Staff that the fills and backfills were of a different type or had been compacted to known minimum standards would have been erroneous and would or could have precluded a more probing analysis or further questioning. Based upon the FSAR information, the Staff would or could have concluded that the structure was adequately supported, that it would not experience detrimental settlement, that its foundations would remain stable under both static and earthquake loading, and that the fill properties would be at least equal to design values provided in the FSAR. The Staff's conclusion would have been relevant to the NRC findings pursuant to 10 CFR 50.57 (3) for issuance of operating licenses and would have contributed to a finding that there is reasonable assurance that the activities authorized by the operating license ~~can be~~ conducted without endangering the health and safety of the public.

I do not agree with Contention 1(a) to the extent that the material false statement is a reflection of "a less than complete and candid dedication to providing information relevant to health and safety standards with respect to resolving the soil settlement problems." In my opinion the material false statement in the FSAR is a reflection of the breakdown in quality assurance and quality control that existed for the Midland plant prior to December 6, 1979 for requirements such as design control (Criterion III of 10 CFR Part 50, Appendix B) and document control (Criterion VI of 10 CFR Part 50, Appendix B). I have no reason to believe, nor do I believe, that this material false statement was intentional. Similarly, I have heard no one else express this view that the was intentional.

Q. 6. What is the NRC Staff response to Contention 1(b)?

A. FSAR Questions 361.4, 361.5 and 361.7 referred to in Contention 1(b) were asked by the NRC's Geosciences Branch as part of its review of the Midland Plant application for operating licenses. Question 361.4 was issued on June 20, 1978; the Applicant's latest response prior to issuance of the December 6, 1979 Order on Modification was by FSAR Revision 15 (Amendment 54) dated November 27, 1978, (Attachment 2) and the current response was by FSAR Revision 30 (Amendment 83) dated October 21, 1980 (Attachment 3). Question 361.5 was also issued on June 20, 1978; the Applicant's latest response prior to December 6, 1979 was by FSAR Revision 14 (Amendment 51) dated October 17, 1978 (Attachment 4), and the current response was by FSAR Revision 30 (Amendment 83) dated October 21, 1980 (Attachment 5). Question 361.7 was issued on February 14, 1979; the Applicant

responded by FSAR Revision 24 (Amendment 69) dated September 28, 1979 (Attachment 6).

Question 362.9 was asked by the NRC's Geotechnical Engineering section on August 30, 1978; the Applicant's latest response prior to December 6, 1979 was by FSAR Revision 24 (Amendment 69) dated September 28, 1979 (Attachment 7) and the current response is by FSAR Revision 26 (Amendment 73) dated January 30, 1980 (Attachment 8).

The Applicant did not fail to provide information in responding to Questions 361.4, 361.5 and 361.7 as alleged in Contention 1(b); however, the information contained in the responses to these three questions did not resolve the open issue involving which tectonic province the Midland site is in. Specifically, the Applicant had used the Michigan Basin tectonic province whereas the NRC staff has been reluctant to accept subdivision of the whole Central Stable Region tectonic province.

Question 362.9 inquired about structural settlement measurements from certain benchmark numbers. The relationship, if any, of this subject to information resolving geologic classification of the site as alleged in Contention 1(b) is not understood, and Question 362.9 was not asked for such a purpose.

The Staff does not view the tectonic province disagreement between itself and CPC as any reflection of "a less than complete and candid dedication" to providing information relevant to resolving the open issue which is necessary for approval of the remedial actions associated with the soil settlement matter.

Q. 7. What is the NRC Staff response to Item 1 in Stamiris' supplement to Contention 1?

A. Item 1 refers to a March 31, 1980 "meeting notation".

This is a reference to the "Summary of February 27 & 28, 1980 Meeting and Site Tour with Consultants to Review Soil Settlement" (Attachment 9). The statement of interest is the first paragraph on page 3 of this meeting summary:

The staff noted that such documents as above are needed by its consultants for their independent assessment of the adequacy of the proposed remedial measures and requested that these be made publicly available. The applicant indicated a reluctance to this end, and noted that these were available through the i&E audit mechanism. The staff will issue a formal request for these documents.

The above statement refers to a discussion by the Applicant during the meeting in response to our request for documents. The Applicant replied, as best I can recall, that many of these documents are of a type not normally found within the docketed material of an application for licenses, and that the documents requested would be quite voluminous. The purpose of the comment, I believe, was to explore the possibility that the Staff's need for the documents might be accomplished through a less burdensome and expensive mechanism, such as the audit mechanism which would provide for NRC review at a local record center such as Bechtel, in Ann Arbor, Michigan.

The Staff, in fact, formally requested the documents by letter dated April 1, 1980 (Attachment 10). The Applicant replied initially by cover letter dated May 5, 1980 forwarding Amendment 77 and copies of Revision 7 to the document

entitled "Responses to NRC Requests Regarding Plant Fill." This coverletter acknowledged that five of the requested reports were not being forwarded at that time; two of the five had been superseded and the two replacement documents, also named in the staff request, would be forwarded as they became available. These four reports discuss the Sondex system and Borros Anchor procedures.

The fifth document identified for submittal at a later time in the Applicant's May 5, 1980 coverletter discussed qualification of compaction equipment. The documentation for qualification of compaction equipment had been previously requested by the Office of Inspection and Enforcement (IE) on December 4, 1978 as described by "Summary of December 4, 1978 meeting on Structural Settlements" (Attachment 11), page 4, which states in part:

The NRC Resident Inspector asked for a list of the equipment, with a discussion of the compaction capability and limitations of each, used for compacting the fill for the DG Building from elevation 618 to 628 feet. Bechtel will provide this information.

This documentation was again requested unsuccessfully during IE site visits around mid 1979 and in May 1980 (Attachment 12). The Applicant's reply of August 15, 1980 forwarded, in part, a report on the Test Fill Program (tab 150 in "Responses to NRC Requests Regarding Plant Fill") which was conducted between May 1979 and October 1979 to requalify various compactors for structural and pit run sands. The August 15, 1980 reply also noted that "further testing is being conducted in order to substantiate qualification of certain equipment."

While the difficulty and delay associated with acquiring documentation with respect to qualification of soils compaction equipment represents an instance of poor cooperation with NRC, the Staff does not believe that the discussions during the meetings of February 27 and 28, 1980, nor the subsequent actions of the Applicant to comply with the Staff request for documents other than those documents on qualification of soils compaction equipment, reflect an overall a deficiency in attitude. However, this poor cooperation reflected adversely upon the responsible officials involved in execution of CPC's quality assurance program.

Q. 8. What is the NRC Staff response to Item 2 in Stamiris' supplement to Contention 1?

A. The statement referred to in Item 2 is found in tab 66 of the document "Responses to NRC Requests Regarding Plant Fill". It specifically appears in the last paragraph of an internal correspondence by T. C. Cooke/RMW (R.M.Wheeler) which was prepared either on August 6 or 7, 1979 to summarize a pre-meeting of June 27, 1979 between CPC, Bechtel and Bechtel's consultants (Attachment 13).

The meeting summary is somewhat ambiguous as to the source of this statement. The entire last paragraph of the meeting summary, including this statement, appears to indicate the views of the consultants. From my reading of this paragraph, I believe the intent is to reflect the expressions of the consultants.

I am unable to conclude that the cited example reflects the view of any member of CPC. Views expressed by Bechtel's consultants on their own behalf, as may possibly be the case here, would not be a reflection on the Applicant's dedication to providing information nor the Applicant's managerial attitude. Furthermore, this cited example has nothing to do with CPC's alleged reluctance to provide requested information. Similarly, the statement does not demonstrate one way or the other whether CPC has a "less than complete and candid dedication to providing information."

Q. 9. What is the NRC Staff response to Item 3 in Stamiris' supplement to Contention 1?

A. Item 3 refers to the SALP assessment of CPC. SALP, or Systematic Assessment of Licensee Performance, is an NRC program for the comprehensive overview of licensee or applicant performance. The program was included as Task I.B.2 in the "Action Plans for Implementing Recommendations of the President's Commission and Other Studies of TMI-2 Accident", NUREG-0660. The program is also discussed in House Report No. 96-1452, by the Committee on Government Operations, entitled, "Evaluating Nuclear Utilities Performance: Nuclear Regulatory Commission Oversight." The objectives of SALP are:

- (1) Identification of unacceptable licensee performance;
- (2) Improvement of licensee performance;
- (3) Improvement of IE Inspection Program;

- (4) Providing a basis for NRC management's allocation of resources; and
- (5) Achieving regional consistency by appraising licensee performance from a national perspective.

Further description of SALP is provided in SECY 80-83 (Attachment 14).

Performance reviews and evaluations for SALP are conducted semiannually by a board consisting of NRC individuals who are involved in the inspection and licensing activities of the applicant or licensee such as resident inspectors, regional inspectors, regional managers, and NRR Project Managers. As Project Manager for the Midland plant, I, Darl Hood, am a member of the SALP Board responsible for the review and evaluation of the Midland Plant, Units 1 and 2. I participated in a meeting on November 24, 1980 between the SALP Board and CPC which was held to advise CPC of the results of the SALP evaluation for its nuclear plants, including Midland Plant, Units 1 and 2. During this meeting I made the statement:

A big contributor to the inability to make meaningful progress in this matter is the quality of responses gotten. We have set some kind of record on the number of questions re-asked, which speaks poorly for CPCo - NRR interface. ...The bottomline is there seems to be a lack of appreciation or support of Staff review necessities and a tendency to push ahead despite the lack of proper assurance.

Two examples that I had in mind when I made the above bottomline statement were associated with the Applicant's decision (1) to place and remove the surcharge for the Diesel Generator Building without first providing an adequate response to 50.54(f) Request 4, and (2) to proceed with construction of the Borated Water Storage Tanks without first performing the analyses for variable foundation properties and cracks as discussed in the response to 50.54(f) Request 14.

The statement cited above notes my agreement with Ms. Stamiris' contention that CPC has exhibited a reluctance to provide requested information.

Q. 10. What is the NRC Staff response to Item 4 in Stamiris' supplement to Contention 1?

A. Without the tabulated examples of "the perfunctory manner in which CPCo deponents answered questions" promised by Ms. Stamiris in her contention, the Staff is unable to evaluate or address this contention.

Q. 11. What is the NRC Staff response to Item 5 in Stamiris' supplement to Contention 1?

A. This contention lists an example which claims to represent information withheld by the Applicant from the NRC. The specific example cited is, "The failure of CPCo. to discuss the Administration Building settlement problem with the NRC, as they [CPCo] did with their consultants, in the early meetings on the DGB settlement."

Ms. Stamiris is correct in her statement that CPC did not discuss the settlement of the Administration Building grade beam with the NRC during early meetings on the Diesel Generator Building settlement or associated site visits of late 1978. Although the Administration Building is not a safety related structure and CPC was not bound by 10 CFR 50.55(e) to report such a problem, the existence of that earlier problem was clearly of relevance to the 50.55(e) reports and reviews regarding Diesel Generator Building settlement.

The NRC first learned of the Administration Building grade beam problem during the NRC investigation into the Diesel Generator Building settlement while at Bechtel's Ann Arbor office in January 1979. At that time, the Bechtel civil design supervisor, Mr. G. Tuveson, informed the NRC of a similiar problem with the Administration Building and provided the NRC with a December 1977 report on the issue.

The NRC documented this information in pages 21-23 of NRC investigation report 78-20 (see Attachment 2 of Staff Testimony on Stamiris' Contention 3), which describes various similarities between the Administration Building settlement and the Diesel Generator Building settlement.

The Staff agrees with the contention that the Adminstration Building example represents information initially withheld from NRC. This information was known to the Applicant and was clearly relevant to the full understanding of the Diesel Generator Building settlement.

Q. 12. What is the NRC Staff response to Item 6 of Stamiris' supplement to Contention 1?

A. Item 6 refers to "false statements" discussed in the April 3, 1979 Keppler - Thornburg memorandum (Attachment 15) and the June 13, 1979 Thornburg - Thompson memorandum (Attachment 16)

The significance or "materiality" of these FSAR statements to NR's review is described in D. Hood's memorandum to file dated August 9, 1979, (Attachment 17). As indicated therein, these other statements would not or could not have had an influence upon a safety conclusion of the NRR staff. Rather, these other statements were viewed as an indicator of poor quality assurance performance.

DARL S. HOOD

OFFICE OF NUCLEAR REACTOR REGULATION
U.S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

I am a Senior Project Manager in the Division of Licensing, Office of Nuclear Reactor Regulation. I am responsible for managing licensing activities by the Commission with respect to Midland Plant, Units 1 and 2.

I have served in the position of Project Manager with the Commission since August 1976. This position provides for the managing of radiological safety reviews of applications for licenses and authorization to construct or operate light water nuclear power plants. As of April 1980, the position also provides for the managing of the environmental reviews of such applications. I assumed responsibility for Midland Plant, Units 1 and 2, when the application for operating licenses was tendered in August 1977. Other nuclear plants for which I have previously served in this capacity are the standardization design of Westinghouse which is designated RESAR-414 (Docket STN50-572), Catawaba Nuclear Station, Units 1 and 2 (Dockets 50-413 and 50-414), and River Bend Station, Units 1 and 2 (Dockets 50-458 and 50-459).

Between June 1969 and August 1976 I held two sequential positions within the Nuclear Power Systems Division of Combustion Engineering, Inc. (C-E) at Windsor, Connecticut. After March, 1973, I was Assistant Project Manager for the Duke Power Project. This position provided assistance in directing all efforts by C-E to design, fabricate, purchase and license the nuclear steam supply systems, reactor core, and associated auxiliary systems for Cherokee Units 1, 2 & 3 and Thomas L. Perkins Units 1, 2 & 3. The position assured that all aspects of the contracts were met and that safe and reliable systems were provided to the required schedule and at a reasonable profit to C-E. I assisted Duke Power in preparing the Preliminary Safety Analysis Report (PSAR) and provided for all C-E licensing support for these units. I also provided coordination of all other nuclear plants referencing the C-E Standard Safety Analysis Report to assure compatibility with C-E standard reference design. Until March, 1973, I was a Project Engineer in C-E's Safety and Licensing Department and was responsible for licensing of nuclear power plants. I coordinated the preparation of the Millstone Unit 2 PSAR and FSAR and the Calvert Cliffs Units 1 & 2 FSAR and interfaced with NRC, the utility, architect engineer and all C-E functional departments on licensing support matters. I ensured that NRC criteria, standards, and guides were incorporated into the nuclear steam supply system design.

Between August 1966 and June 1969, I was a Nuclear Safety and Radiation Analysis Engineer in the Nuclear Safety Unit, Nuclear Division of the Martin Marietta Corporation at Baltimore, Maryland. The purpose of this position was to perform hazard evaluations for nuclear power sources applied in space missions. My primary duty was to determine public exposure to radiation for malfunctions occurring during the intended mission. I also determined means by which the hazard potential for nuclear space systems could be mitigated to the extent that nuclear safety criteria were met. I conducted research with regards to the development of suitable criteria for permissible exposure levels and their probabilities, taking into account the dependence of acceptable risk on the benefit to be derived. My primary assignment was with the SNAP 29 (Systems for Nuclear Auxiliary Power) project. My evaluations of this nuclear power source included the formulation and application of computerized models for the transport of fuel released at high altitudes, in deep ocean and in shallow waters. I derived models for these release areas to incorporate the activity into human food chains and determined the expected ingestion dose, the number of people involved and the exposure probability. Inhalation dose was determined for radioactive fallout from the high altitude release.

Between February 1965 and August 1966 I was a Nuclear Quality Control Engineer within the Electric Boat Division of General Dynamics at Groton, Connecticut. The purpose of this position was to provide control of quality for naval reactor systems, components, and shielding during the construction or overhaul of submarines by this shipyard. My primary area of responsibility was shielding. Duties included establishing procedures for the inspection of fabrication and installation of lead and polyethylene shielding, and resolving problems in complying with these or other shielding procedures. The position required a knowledge of nuclear theory, SSW systems design, Bureau of Ships contract and design requirements, non-destructive testing techniques, and quality control requirements.

Between November 1963 and February 1965, I was an Aeronautical Engineer for Nuclear Propulsion and Power at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration in Huntsville, Alabama. I performed investigations of the nature and magnitude of the nuclear radiation environment, shielding systems and safety systems associated with proposed nuclear space vehicles for candidate space missions.

Between November 1963 and college graduation in 1962, I held various positions including chief of a missile electronics training unit at Redstone Arsenal, Alabama; student at the U.S. Army Signal Officer's Orientation Course at Fort Gordon, Georgia; and Marine Engineer for ordnance and special weapons within the Design Division of the Norfolk Naval Shipyard, Portsmouth, Virginia.

I received a Bachelor of Science Degree in Nuclear Engineering from North Carolina State University in 1962. I am a member of the Health Physics Society.

EUGENE J. GALLAGHER

OFFICE OF INSPECTION AND ENFORCEMENT
U.S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

I am a Civil Engineer in the Division of Resident and Regional Reactor Inspection, Reactor Engineering Branch, Office of Inspection and Enforcement.

I received a Bachelor of Engineering Degree in Civil Engineering from Villanova University in 1973 and a Master of Science Degree in Civil/Structural Engineering from Polytechnical Institute of New York in 1974. I am a registered Professional Engineer in the States of Illinois (#37828), Florida (#29114) and Louisiana (#16376). I am a member of the American Society of Civil Engineers, American Concrete Institute and Tau Beta Pi National Engineering Honor Society.

In my present work at the NRC, I provide technical assistance in the area of civil engineering to Regional offices and resident inspectors with particular emphasis on the design and construction of reinforced and prestressed concrete structures, foundations, structural steel buildings and in structural testing and surveillance. In addition, I provide technical input for the development and interpretation of industry codes, standards and regulatory requirements relating to inspection activities.

From 1978 to 1981 I was a member of the NRC Region 3 inspection staff responsible for the inspections of civil engineering aspects of plants under construction and in operation. This included the inspection of laboratory and field testing of concrete, steel and soils materials, earth embankments and dams, material sources, piping systems and reinforced and prestressed concrete structures. In addition, a review of management controls and quality assurance programs were performed at plants under construction. I participated in approximately 90 inspections of reactor facilities.

Prior to joining the NRC Staff I was employed by EBASCO Services, Inc. in New York City from 1973 to 1978. I performed designs of reinforced concrete and steel structures, design of hydraulic and water supply systems and preparation of specifications for construction. From 1976 to 1978, I was the civil resident engineer at the Waterford 3 Nuclear Plant site responsible for providing technical assistance to construction.

During 1972 and 1973 I was employed by Valley Forge Laboratory in Devon, PA performing inspection and testing on concrete, steel and soil materials.

ADDITIONAL NRC TRAINING

Fundamentals of Inspection, NRC, February 1978 (40 hours)

BWR Fundamentals Course, NRC, March 1978 (40 hours)

Concrete Technology and Codes, Portland Cement Assoc., May 1978 (80 hours)

Quality Assurance Course, NRC, August 1978 (40 hours)

Nondestructive Examination and Codes, Rockwell Int'l., August 1978 (120 hours)

PWR Fundamentals Course, NRC, November 1978 (40 hours)

Welding Metallurgy, Ohio State University, September 1980 (80 hours)

JEFFREY K. KIMBALL
GEOSCIENCES BRANCH, P-314
DIVISION OF ENGINEERING
U. S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

My name is Jeffrey K. Kimball. I am employed as a Seismologist/Geophysicist reviewer, Geosciences Branch, Division of Engineering, Office of Nuclear Reactor Regulation.

I received a B.S. degree in Oceanography from the University of Michigan in 1977 and a M.S. degree in Geology from the University of Michigan in 1979, with a specialty in seismology and geophysics.

I have been employed by NRC since May 1980 as a Seismologist/Geophysicist reviewer as applied to the evaluation of applications for construction and operation of nuclear facilities, and to determine the thoroughness of this information for defining the seismic hazard for which facilities must be designed. Since joining the Nuclear Regulatory Commission staff, I have participated in the licensing activity for approximately ten sites.

From 1977 to 1980, I was a research assistant and teaching assistant at the University of Michigan. My activity as a research assistant included seismic data compilation studies for the U. S. Geological Survey and data analysis and operation of a nine station seismic network. My M.S. thesis work involved a study on surface wave dispersion of the Atlantic Ocean Basins and has been presented at national meetings of professional societies and published in a professional journal. Teaching assistant experience consisted of helping teach both introductory and advanced geology field courses in Wyoming for two summers and an introductory geology laboratory class at the University of Michigan.

I am a member of the American Geophysical Union and the Seismological Society of America, and have co-authored 7 publications including abstracts of presentations to professional societies and NUREG documents.

Question 361.4 (2.5)

You conclude that the Michigan basin fits the Appendix A to 10 CFR Part 100 description of a tectonic province. Yet the basin is characterized by the same geologic structural features and has essentially the same geologic and tectonic history as the remainder of the Central Stable Region (Eardley, 1962).

- a. The Precambrian basement complex in the Michigan basin does not appear to be unique with respect to the surrounding region.
- b. The Precambrian crustal features, the Keweenaw rift zone (see Hinze and others, 1975, on the Mid-Michigan gravity anomaly associated with the Keweenaw rift zone), and Grenville Front transect the boundary of the basin.
- c. The subsidence and deposition in the basin occurred concurrently with subsidence, arching, and doming in other parts of the Central Stable Region during the Paleozoic.

12

Please provide information demonstrating the distinct characteristics of the Michigan basin which distinguish it from the Central Stable Region. Include geophysical and remote sensing data which may reflect structural characteristics of the Basin and adjoining portions of the Central Stable Region.

Response

Subsection 2.5.1.1.3.1 has been revised in response to this question.

14

In addition to the information presented in revised Subsection 2.5.1.1.3, various investigations directed at evaluating inferred structures beneath Lake Michigan were recently completed by Wisconsin Electric Power Company relative to the Haven, Wisconsin, project. The results of this work are to be submitted to the NRC by Wisconsin Electric Power Company in 1979.

15

2.5.1.1.2.4 Cenozoic

Pleistocene unconsolidated surface deposits rest unconformably on the Mesozoic and Paleozoic rocks throughout the lower peninsula of Michigan. These extensive surface deposits are attributable to the last major period of continental glaciation, the Wisconsin stage, active in Michigan from 50,000 to 13,000 years ago. During the numerous periods of glacial advance and retreat of the Wisconsin stage, drift of various types was deposited across the state, including till, outwash, and glaciolacustrine deposits. Figure 2.5-2 shows the surface deposits present in the region. Glacial deposits across the state range in thickness from only a few feet in the northern portion to over 400 feet in the central portion of the state. Beneath the site the glacial drift is approximately 350 feet thick and consists primarily of outwash and till. A detailed discussion of the glacial deposits at the site is presented in Subsection 2.5.1.2.2.

2.5.1.1.3 Regional Geologic and Tectonic Structures

The north central United States is situated in the central portion of the continental craton of North America, the stable core of the continent. The craton is composed of two major tectonic divisions: the Precambrian Canadian Shield to the north and the Paleozoic age sedimentary strata to the south.⁽²⁾ The contact between these major divisions is roughly located along the Canadian-United States border. To the north a complex mixture of metamorphic, igneous, and sedimentary rocks of the Canadian Shield is present in most of the eastern two-thirds of Canada. These rocks have been stable for at least the last 500 million years and contain some of the most ancient rock units exposed on earth. To the south the geologic structure of the Paleozoic portion of the craton is characterized by essentially flat lying sedimentary rocks modified only by a series of broad shallow structural basins separated by low arches. These sedimentary strata of the craton are present under the central United States.

✓ 2.5.1.1.3.1 Michigan Basin

Michigan's entire lower peninsula, as well as part of the upper peninsula, eastern Wisconsin, northern Illinois, Indiana, Ohio, and parts of Canada, are underlain by a broad, shallow, structural depression tectonic province with an area of approximately 122,000 square miles which is known as the Michigan Basin (see Figure 2.5-6). The Michigan Basin underwent nearly continuous subsidence and deposition from the Cambrian through Pennsylvanian Periods⁽³⁾ (see Subsection 2.5.1.1.2). The general shape of the existing basin was first formed in Ordovician time, and has remained fairly constant since the end of Niagaran (Silurian) time.⁽⁵²⁾ The maximum accumulation of sediments in the center of the basin is over 14,000 feet⁽⁸¹⁾ (see Figure 2.5-5).

The forces which produced this nearly continuous subsidence for a period of almost 300 million years were undoubtedly different than those beneath the surrounding structural highs or the Canadian Shield.

The arches and domes surrounding the Michigan Basin remained as essentially stable areas throughout most of the Paleozoic. The Wisconsin dome to the west was a structural high at the beginning of the Cambrian⁽⁸²⁾, whereas the Michigan area was part of a large basin which included the Illinois Basin.⁽⁵³⁾ Lockett⁽⁸²⁾ indicates the structural highs which form the boundaries on the southern half of the Michigan Basin were more or less positive features throughout the entire Paleozoic era. Green⁽⁸³⁾ indicated that the positive regional structures in the Indiana-Ohio area are due to subsidence of the Appalachian, Michigan, and Illinois Basins, rather than uplift between the basins. Eardley⁽⁵³⁾ indicates that the Kankakee and Findlay Arches formed during the Ordovician.

Green⁽⁸³⁾ discusses the Cincinnati Arch geologic province and states:

Subsidence in the Michigan basin began near the close of Niagaran (middle Silurian) time. Before that subsidence, the area of Indiana, Ohio, and southern Michigan is considered to have been part of a sea floor which sloped gently toward the southeast from Illinois to Pennsylvania and Virginia. This relatively flat sea floor may be considered as having then been a structural shelf.

14

Green also indicates that a broad shelf area over 150 miles wide existed between the Illinois and Michigan Basins until Mississippian time. There is general agreement that the "arches" between the Illinois, Michigan, and Appalachian basins have resulted from "resistance to subsidence" rather than from actual uplift.

Development of the Michigan Basin was most rapid during the upper Silurian. About 30% of the total Paleozoic sediments was accumulated during this time. Only small patches of lower Devonian sediments are known in the basin⁽⁸⁴⁾ and the area was probably a low land mass during most of this time. During middle and upper Devonian, deposition resumed and over 3,000 feet of sediments accumulated in the central part of the basin.

Deposition continued into the Mississippian without interruption. There was a short break in sediment accumulation during mid-Mississippian, and another longer break in late Mississippian which continued through mid-Pennsylvanian time. Ham and Wilson⁽⁸⁴⁾ state:

Clearly the most widely developed and profound Paleozoic unconformity of the craton occurs below strata of Early Pennsylvanian age.

Most of the folding related to the development of the small anticlinal features in the Michigan Basin have been assigned by Ells⁽⁹⁾ to this late Mississippian and early Pennsylvanian activity.

Since Pennsylvanian time, the Michigan Basin has apparently been a low land mass subject to erosion. Some localized deposition occurred in the Jurassic, but this deposition appears to have occurred in low areas on the eroded Paleozoic surface.⁽³⁾

As discussed in Subsection 2.5.2 of the FSAR, only eight earthquakes of epicentral intensity greater than III (Modified Mercalli Scale) have been located on the southern peninsula of Michigan in the past 350 years. Around the basin margin, but within the Michigan Basin area as outlined in Figure 2.5-6, an additional 14 earthquakes of epicentral intensity greater than III or magnitude greater than 3.0 have been recorded. None of the events located within the Michigan Basin have had intensities greater than VI. There is no known geological control for the distribution or occurrence of the earthquakes within the basin. It has been suggested that seismic activity in this area may be related to crustal rebound resulting from the retreat of glacial ice since Pleistocene time.⁽⁸⁵⁾

Gravity and magnetic data (Figures 2.5-86 and 2.5-9) indicate that several types of Precambrian basement rocks occur beneath the Michigan Basin. The zoning of these rocks into "structural provinces" and evaluation of their significance to the development of the basin structure have been discussed by several authors.^(84, 86, 81) Distribution of basement rocks into zones or "provinces" by isotopic ages⁽⁸⁷⁾ has been modified⁽⁸¹⁾ based on interpretation of gravity and magnetic data and available drill hole data and is shown in Figure 2.5-87. The basement "provinces" of Hinze⁽⁸¹⁾ are very similar to the areas of basement rocks shown by Ham and Wilson.⁽⁸⁴⁾ The mid-Michigan gravity and magnetic anomaly have been correlated with Keeweenawan igneous activity (1.05 to 1.15 billion years). Isotopic age determinations for samples from drill holes in southeastern Michigan indicate the basement rocks in that area rang from 0.8 to 1.1 billion years. They have been correlated with the Grenville province of southern Ontario. No isotopic age determinations younger than 0.8 billion years have been recorded. Development of the Michigan Basin most likely occurred after activity along Precambrian structural zones had ceased. Movement on these zones apparently had no effect or control on the development of the basin.

Some movement along zones of structural weakness within the Precambrian basement during Paleozoic time has been postulated by Ells,⁽⁹⁾ Hinze,⁽⁸¹⁾ and others, but there is no direct evidence

of differential movement within or between basement provinces since the Precambrian. In discussing the relationship of the Precambrian basement to structures within the Paleozoic sedimentary cover, Hinze states:

In general, the structural (anticlinal) petroleum reservoirs in the Southern Peninsula trend east-southeast to southeast, paralleling the Penokean structural trends and the mid-Michigan and southwest Michigan anomalies south of 43°30'N lat. This correlation suggests a strong relation between the basement and intrabasin structures, perhaps as a result of movement along Precambrian basement zones of weakness caused by sinking of the basin or externally applied stress fields. Hinze and Merritt (1969) cited specific examples of these relations and, as they pointed out, some intrabasin structures may be related to topographic relief on the basement surface. However, this interpretation does not rule out the presence of intrabasin structures that are unrelated to the basement.

In general, the anticlinal structures within the Michigan Basin are small, and there is insufficient data to determine the relationship, if any, between these flexures and the basement rocks. If, however, these anticlinal structures were formed by movement along basement zones of weakness during late Mississippian/early Pennsylvanian time (the date of folding indicated by Ells,⁽⁹⁾) then they have been essentially stable since that time, or for over 300 million years. There are no indications that the basement rocks have had any effect on basin or intrabasin structures since the close of the Paleozoic, about 230 million years ago. Therefore, the extent of lithologic or structural provinces within the Precambrian basement (such as the Keweenaw rift zone) are not relevant to the delineation of the Michigan Basin Tectonic Province.

The Michigan Basin has been largely isolated from the tectonic activity which has affected other major basins in the Central Stable Region. It is located deep within the central craton area and is surrounded by features which have remained essentially stable since the Ordovician. The late Paleozoic activity, which so strongly affected the Appalachian Basin to the southeast and the Ouachita fold belt to the southwest, is also reflected in the development of the LaSalle anticlinal belt in the Illinois Basin,⁽⁵³⁾ uplifts in Texas and Oklahoma,⁽⁸⁴⁾ and the uplift of the Nemaha Ridge in eastern Kansas.⁽⁵²⁾ However, the effect of this widespread late Paleozoic activity in the Michigan Basin was minor. At most, it may have caused the formation of small anticlinal folds trending generally northwest-southeast.⁽⁹⁾

The period of slight tectonic activity within the Michigan Basin roughly correspond in time with tectonic activity elsewhere within the Central Stable Region, but this is also true for tectonic events in orogenic belts outside the Central Stable Region (i.e., the Appalachian Basin and the Ouachita fold belt). The markedly different magnitude of tectonic activity in Illinois, Kansas, Nebraska, Texas, and Oklahoma from that experienced by the Michigan Basin combined with the size of the basin (over 120,000 square miles) supports the concept of the Michigan Basin being a tectonic province as defined in 10 CFR 100, Appendix A. The basin is and has been a persistent, distinct region which has been geologically and structurally distinguishable from the remainder of the Central Stable Region since the upper Silurian over 400 million years ago. There is nothing in the seismic history of the region which suggests that the Michigan Basin should not be considered to be a tectonic province. The seismic history of the Michigan Basin clearly demonstrates that it is a region which has experienced very few events in the past 350 years, the period for which records are available. All of the events which have occurred were small (maximum intensity VI). All the data indicate that the Michigan Basin can be readily separated from the remainder of the Central Stable Region for the purposes of evaluating the potential for future vibratory ground motion.

14

5

2.5.1.1.3.2 Intrabasin Structural Features

2.5.1.1.3.2.1 Folds

Within the Michigan Basin, numerous small anticlinal flexures are present, trending generally northwest-southeast, and occurring throughout the basin (Figure 2.5-7). The knowledge of the existence of these flexures is based mostly upon data obtained from exploratory drilling for oil, primarily in Silurian and Devonian age strata.

These fold structures are described by Ells in reference to a 1930 paper by Newcombe as:

. . . irregular, elongate plunging anticlines with local domes superimposed. In cross section the folds were said to be asymmetrical with the strong dip toward the basinward side

The dips off-structure were shown to vary in the different fields from 125 to 200 feet per mile, and from 50 to 75 feet per mile on the gentle side.

These northwest-southeast trending flexures are best defined in the eastern, southeastern, and central portions of the Lower Peninsula.

5

MIDLAND 1&2-FSAR

The origin of these intrabasin structures is not known, and several mechanisms have been postulated. While the method of structural development is not fully understood, there is general agreement on the age (Paleozoic) of the features. Ells summarizes the type and origin of these structures:

5

Question 361.4 (2.5)

You conclude that the Michigan basin fits the Appendix A to 10 CFR Part 100 description of a tectonic province. Yet the basin is characterized by the same geologic structural features and has essentially the same geologic and tectonic history as the remainder of the Central Stable Region (Eardley, 1962).

- a. The Precambrian basement complex in the Michigan basin does not appear to be unique with respect to the surrounding region.
- b. The Precambrian crustal features, the Keweenaw rift zone (see Hinze and others, 1975, on the Mid-Michigan gravity anomaly associated with the Keweenaw rift zone), and Grenville Front transect the boundary of the basin.
- c. The subsidence and deposition in the basin occurred concurrently with subsidence, arching, and doming in other parts of the Central Stable Region during the Paleozoic.

12

Please provide information demonstrating the distinct characteristics of the Michigan basin which distinguish it from the Central Stable Region. Include geophysical and remote sensing data which may reflect structural characteristics of the Basin and adjoining portions of the Central Stable Region.

Response

Subsection 2.5.1.1.3.1 has been revised in response to this question.

14

30

Question 361.5 (2.5)

The basis for your definition of the safe shutdown earthquake rests upon the acceptance of the Michigan Basin as a separate tectonic province. The staff has been reluctant to accept subdivision of the Central Stable Region into smaller tectonic provinces. Provide additional information, such as a comparative analysis of historic and instrumental seismicity, that would permit acceptance of a lower reference acceleration than that normally used for the Central Stable Region (0.20g). Include in your analysis all those events listed in "Seismic Disturbances in Michigan" Circular 14, Geological Survey Division, Department of Natural Resources, State of Michigan (1977) or provide a rationale for their exclusion. The analysis should compare the seismicity of the region within 200 miles of the site with other similar sized areas in the Central Stable Region.

12

Response

It is our opinion that the Michigan Basin is an area that, for the purpose of evaluating the SSE at the Midland site in the context of 10 CFR 100, Appendix A and Regulatory Guide 1.70, is sufficiently distinctive, when both its geologic and seismic characteristics are considered, to justify its acceptance as a convenient and realistic tectonic or seismotectonic province. With regard to seismic considerations alone, it is difficult to see how reluctance to accept subdivision of the Central Stable Region into smaller tectonic provinces can be based on historical and instrumental seismicity. Several zones of clearly distinguishable, relatively high seismic activity occur within the Central Stable Region. However, no such zones occur within the Michigan Basin tectonic province which, on the contrary, has experienced only a few scattered small events in historic time; the maximum intensity of these was only VI (Modified Mercalli Scale). All earthquakes in the Central Stable Region larger than Intensity VII have been associated with geologic structure, except for the Anna, Ohio, activity (e.g., Marble Hill Nuclear Generating Station Units 1 and 2, Safety Evaluation Report, 1972). However, the clustering of historical seismic activity near Anna argues strongly for the association of localized structure or structures with these events as well. Additionally, several workers^(1, 2) have identified subsurface faults in the basement in this area. The proximity of these faults to three reliably located earthquakes, and the epicentral uncertainty of other nearby historical earthquakes, has led Mauk⁽³⁾ to speculate that the Findlay and Anna-Champaign faults may be the sources of the seismicity for this part of western Ohio. He also states⁽⁴⁾ that, although the data are now inconclusive, it is strongly suspected that the Anna seismic zone's seismicity is related to these fault systems (which includes the Auglaize and the Logan-Hardin faults). On the basis

14

Revision 14
10/78

Responses to NPC Questions
Midland 1&2

of this suspicion, the seismograph and gravity networks in the area have been restructured accordingly.

Recent studies by Algermissen,⁽⁵⁾ Nuttli,⁽⁶⁾ Hadley and Divine,⁽⁷⁾ Algermissen and Perkins,⁽⁸⁾ and Donovan et al,⁽⁹⁾ done with the intent of providing guidance for seismic design or engineered structures, contain information applicable to the Michigan Basin and the Midland site area. These studies are all somewhat different in intent and all show somewhat different results. However, they all have three important features in common: (1) they are all based on both historic seismicity and geologic considerations; (2) all show significant differences in seismic hazard characterization within the Central Stable Region; and (3) all show the area around the Midland site to be among those areas characterized by the lowest seismic hazard level within the Central Stable Region. No later studies are known that call these general features of the Central Stable Region and the site area into questions on the basis of more recent seismicity. In particular, the updated earthquake list in the Midland FSAR does not alter the characterization of the Midland site area as a seismically quiet area within the seismically differentiable Central Stable Region. In our opinion, any new analysis using this data, such as one comparing the seismicity of the region within 200 miles of the site with other similar sized areas in the Central Stable Region, would show very similar results.

As requested, all vents listed in Circular 14, Seismic Disturbances in Michigan, Geological Survey Division, Department of Natural Resources, state of Michigan, have been considered. The FSAR has been amended to reflect this consideration. Of the 34 events listed in this publication as occurring in Michigan since 1872, 22 of them are outside the 200 mile radius site region, or have an intensity that is either too small (\leq III) or which is unknown and presumed to be too small to be of interest. These events are excluded from further consideration in agreement with the approach taken in the FSAR.

Of the twelve remaining earthquakes listed in Circular 14, seven were included in FSAR Table 2.5-2. The intensities listed in the FSAR for these seven events are all greater than or equal to the corresponding intensities listed in Circular 14. Coordinates are given in the FSAR for five of the seven events and they agree well with those given in Circular 14. The remaining two events (May 18, 1945, and February 2, 1967) were not given precise coordinates in the FSAR but coincide in location with the coordinates in Circular 14. The maximum intensity of the remaining five events in Circular 14 is IV. They are discussed briefly below.

October 10, 1899, St. Joseph, Michigan ($42^{\circ}05'N$, $86^{\circ}31'W$, intensity IV). Docekal⁽¹⁰⁾ contains this account: "St. Joseph, Michigan, felt a distinct shock followed by lesser shocks. The

Responses to NRC Questions
Midland 1&2

southern part of the city reported many dwellings swayed, windows rattled, and many families abandoned their homes. The earthquake was clearly felt for a radius of 15 miles. Kenosha, Wisconsin, reported a slight shock which was plainly felt in all parts of the city". It should be noted that Kenosha, Wisconsin is roughly 75 miles from St. Joseph, Michigan, and that this event was not report felt in GRand Rapids which is about the same distance in the opposite direction. At any rate, this intensity IV event appears genuine and has been included in the list of earthquakes felt within the site region.

February 22, 1918, Morrice, Michigan (42°51'N, 84°11'W, intensity IV). "An abrupt bump was felt at Morrice, Michigan. A first crack 150 feet long and 4 feet deep with numerous diverging cracks was reported."⁽¹⁰⁾ This event has been added to the earthquake list.

March 13, 1938, Detroit Michigan (42°22'N, 83°10'W, intensity IV).z "A local shock jarred western Detroit and portions of Ontario bordering the Detroit River."⁽¹⁰⁾ U.S. Earthquakes⁽¹¹⁾ includes this event which is recorded as a "slight shock" without intensity designation.

November 16, 1944, and December 10, 1944, Escanaba, Michigan (both at 45°44'N and 87°05'W). These two earthquakes in the northern peninsula region are taken from Docekal's⁽¹⁰⁾ work. The former, listed as intensity II-III (without reference to specific sources) is described as, "A light shock was felt by several persons at Escanaba, Michigan. A barograph recorded the shock." The latter is listed as intensity IV and is described as, "in a shock at Escanaba, Michigan, caused dishes to shake and rattle." The November 16, 1944, event is listed in U.S. Earthquakes⁽¹²⁾ without intensity; the December 10, 1944, event is not recorded in that journal.

Consideration of these five earthquakes does not alter the conclusions reached in the FSAR. With the exception of the February 22, 1918, Morrice, Michigan, earthquake, the events added from Circular 14 all lie 100 or more miles away from the site. Addition of the events listed in Circular 14 increases the total number of earthquakes with intensity greater than III known to have occurred within the site tectonic province, but it does not alter the maximum historical intensity at the site (estimated to be V), nor increase the maximum historical intensity (VI) within the Michigan Basin tectonic province.

⁽¹⁾ M.L. Kiefer and J.S. Trapp, Report: Interpretation of mechanisms for the Anna, Ohio earthquakes for the Marble Hill Generating Station, Public Service, Indiana, Dames and Moore, 1975

Responses to NRC Questions
Midland 1&2

- (2) Stone and Webster Engineering Corporation, "Faulting in the Anna, Ohio region," PSAR, Wisconsin Utilities Project, Koshkonong Nuclear Plant, Units 1 & 2, Amendment 12, Appendix 21, 1976
- (3) F.J. Mauk, "Geophysical Investigations of the Anna, Ohio Earthquake Zone," NUREG Technical Report Contract No. NRC-04-76-192, Annual Progress Report, August 1, 1978, 1978
- (4) F.J. Mauk, "Geophysical Investigations of the Anna, Ohio Earthquake Zone," NUREG Technical Report Contract No. AT(49-24)-0192 Quarterly Progress Report, May 1, 1977 - November 1, 1977, 1977
- (5) S.T. Algermission, "Seismic Risk Studies in the United States," Proceedings of the Fourth World Conference on Earthquake Engineering, Santiago, Chile, 1969
- (6) O.W. Nuttli, Design Earthquakes for the Central United States, U.S. Army Engineer Waterways Experiment Station Miscellaneous Paper S-73-1, 1973
- (7) J.E. Hadley, and J.F. Devine, Seismotectonic Map of the Eastern United States, U.S. Geologic Survey, publication MF-620, 1974
- (8) S.T. Algermission, and D.M. Perkins, A Probabilistic Estimate of Maximum Acceleration in Rock in the Contiguous United States U.S. Geologic Survey, Open File Report 76-416, 1976
- (9) N.C. Donovan, B.A. Bolt, and R.V. Whitman "Development of Expectancy Maps and Risk Analysis," American Society of Civil Engineers annual convention, Philadelphia, Preprint 2805, 1976
- (10) Docekal, Earthquakes of the Stable Interior, with Emphasis on the Midcontinent (Vol 1 and 2), University of Nebraska, PhD thesis University Microfilms, 1970
- (11) U.S. Department of Commerce, U.S. Earthquakes 1938, 1940
- (12) U.S. Department of Commerce, U.S. Earthquakes 1944, 1946
- A.J. Eardley, Structural Geology of North America, Second Edition Harper Row, 1962

14

Question 361.5 (2.5)

The basis for your definition of the safe shutdown earthquake rests upon the acceptance of the Michigan Basin as a separate tectonic province. The staff has been reluctant to accept subdivision of the Central Stable Region into smaller tectonic provinces. Provide additional information, such as a comparative analysis of historic and instrumental seismicity, that would permit acceptance of a lower reference acceleration than that normally used for the Central Stable Region (0.20g). Include in your analysis all those events listed in "Seismic Disturbances in Michigan" Circular 14, Geological Survey Division, Department of Natural Resources, State of Michigan (1977) or provide a rationale for their exclusion. The analysis should compare the seismicity of the region within 200 miles of the site with other similar sized areas in the Central Stable Region.

12

Response

It is our opinion that the Michigan Basin is an area that, for the purpose of evaluating the SSE at the Midland site in the context of 10 CFR 100, Appendix A and Regulatory Guide 1.70, is sufficiently distinctive, when both its geologic and seismic characteristics are considered, to justify its acceptance as a convenient and realistic tectonic or seismotectonic province. With regard to seismic considerations alone, it is difficult to see how reluctance to accept subdivision of the Central Stable Region into smaller tectonic provinces can be based on historical and instrumental seismicity. Several zones of clearly distinguishable, relatively high seismic activity occur within the Central Stable Region. However, no such zones occur within the Michigan Basin tectonic province which, on the contrary, has experienced only a few scattered small events in historic time; the maximum intensity of these was only VI (Modified Mercalli Scale). All earthquakes in the Central Stable Region larger than Intensity VII have been associated with geologic structure, except for the Anna, Ohio, activity (e.g., Marble Hill Nuclear Generating Station Units 1 and 2, Safety Evaluation Report, 1972). However, the clustering of historical seismic activity near Anna argues strongly for the association of localized structure or structures with these events as well. Additionally, several workers^(1,2) have identified subsurface faults in the basement in this area. The proximity of these faults to three reliably located earthquakes, and the epicentral uncertainty of other nearby historical earthquakes, has led Mauk⁽³⁾ to speculate that the Findlay and Anna-Champaign faults may be the sources of the seismicity for this part of western Ohio. He also states⁽⁴⁾ that, although the data are now inconclusive, it is strongly suspected that the Anna seismic zone's seismicity is related to these fault systems (which includes the Auglaize and the Logan-Hardin faults). On the basis

14

30

14

Responses to NRC Questions
Midland 1&2

of this suspicion, the seismograph and gravity networks in the area have been restructured accordingly.

Recent studies by Algermissen,⁽⁵⁾ Nuttli,⁽⁶⁾ Hadley and Divine,⁽⁷⁾ Algermissen and Perkins,⁽⁸⁾ and Donovan et al,⁽⁹⁾ done with the intent of providing guidance for seismic design of engineered structures, contain information applicable to the Michigan Basin and the Midland site area. These studies are all somewhat different in intent and all show somewhat different results. However, they all have three important features in common: (1) they are all based on both historic seismicity and geologic considerations; (2) all show significant differences in seismic hazard characterization within the Central Stable Region; and (3) all show the area around the Midland site to be among those areas characterized by the lowest seismic hazard level within the Central Stable Region. No later studies are known that call these general features of the Central Stable Region and the site area into questions on the basis of more recent seismicity. In particular, the updated earthquake list in the Midland FSAR does not alter the characterization of the Midland site area as a seismically quiet area within the seismically differentiable Central Stable Region. In our opinion, any new analysis using this data, such as one comparing the seismicity of the region within 200 miles of the site with other similar sized areas in the Central Stable Region, would show very similar results.

As requested, all vents listed in Circular 14, Seismic Disturbances in Michigan, Geological Survey Division, Department of Natural Resources, state of Michigan, have been considered. The FSAR has been amended to reflect this consideration. Of the 34 events listed in this publication as occurring in Michigan since 1872, 22 of them are outside the 200 mile radius site region, or have an intensity that is either too small (\leq III) or which is unknown and presumed to be too small to be of interest. These events are excluded from further consideration in agreement with the approach taken in the FSAR.

Of the twelve remaining earthquakes listed in Circular 14, seven were included in FSAR Table 2.5-2. The intensities listed in the FSAR for these seven events are all greater than or equal to the corresponding intensities listed in Circular 14. Coordinates are given in the FSAR for five of the seven events and they agree well with those given in Circular 14. The remaining two events (May 18, 1945, and February 2, 1967) were not given precise coordinates in the FSAR but coincide in location with the coordinates in Circular 14. The maximum intensity of the remaining five events in Circular 14 is IV. They are discussed briefly below.

October 10, 1899, St. Joseph, Michigan (42°05'N, 86°31'W, intensity IV). Docekal⁽¹⁰⁾ contains this account: "St. Joseph, Michigan, felt a distinct shock followed by lesser shocks. The

Responses to NRC Questions
Midland 1&2

southern part of the city reported many dwellings swayed, windows rattled, and many families abandoned their homes. The earthquake was clearly felt for a radius of 15 miles. Kenosha, Wisconsin, reported a slight shock which was plainly felt in all parts of the city". It should be noted that Kenosha, Wisconsin is roughly 75 miles from St. Joseph, Michigan, and that this event was not report felt in GRand Rapids which is about the same distance in the opposite direction. At any rate, this intensity IV event appears genuine and has been included in the list of earthquakes felt within the site region.

February 22, 1918, Morrice, Michigan (42°51'N, 84°11'W, intensity IV). "An abrupt bump was felt at Morrice, Michigan. A first crack 150 feet long and 4 feet deep with numerous diverging cracks was reported."⁽¹⁰⁾ This event has been added to the earthquake list.

March 13, 1938, Detroit Michigan (42°22'N, 83°10'W, intensity IV).z "A local shock jarred western Detroit and portions of Ontario bordering the Detroit River."⁽¹⁰⁾ U.S. Earthquakes⁽¹¹⁾ includes this event which is recorded as a "slight shock" without intensity designation.

November 16, 1944, and December 10, 1944, Escanaba, Michigan (both at 45°44'N and 87°05'W). These two earthquakes in the northern peninsula region are taken from Docekal's⁽¹⁰⁾ work. The former, listed as intensity II-III (without reference to specific sources) is described as, "A light shock was felt by several persons at Escanaba, Michigan. A barograph recorded the shock." The latter is listed as intensity IV and is described as, "in a shock at Escanaba, Michigan, caused dishes to shake and rattle." The November 16, 1944, event is listed in U.S. Earthquakes⁽¹²⁾ without intensity; the December 10, 1944, event is not recorded in that journal.

Consideration of these five earthquakes does not alter the conclusions reached in the FSAR. With the exception of the February 22, 1918, Morrice, Michigan, earthquake, the events added from Circular 14 all lie 100 or more miles away from the site. Addition of the events listed in Circular 14 increases the total number of earthquakes with intensity greater than III known to have occurred within the site tectonic province, but it does not alter the maximum historical intensity at the site (estimated to be V), nor increase the maximum historical intensity (VI) within the Michigan Basin tectonic province.

⁽¹¹⁾ M.L. Kiefer and J.S. Trapp, Report: Interpretation of mechanisms for the Anna, Ohio earthquakes for the Marble Hill Generating Station, Public Service, Indiana, Dames and Moore, 1975

Responses to NRC Questions
Midland 1&2

- (2) Stone and Webster Engineering Corporation, "Faulting in the Anna, Ohio region," PSAR, Wisconsin Utilities Project, Koshkonong Nuclear Plant, Units 1 & 2, Amendment 12, Appendix 21, 1976
- (3) F.J. Mauk, "Geophysical Investigations of the Anna, Ohio Earthquake Zone," NUREG Technical Report Contract No. NRC-04-76-192, Annual Progress Report, August 1, 1978, 1978
- (4) F.J. Mauk, "Geophysical Investigations of the Anna, Ohio Earthquake Zone," NUREG Technical Report Contract No. AT(49-24)-0192 Quarterly Progress Report, May 1, 1977 - November 1, 1977, 1977
- (5) S.T. Algermission, "Seismic Risk Studies in the United States," Proceedings of the Fourth World Conference on Earthquake Engineering, Santiago, Chile, 1969
- (6) O.W. Nuttli, Design Earthquakes for the Central United States, U.S. Army Engineer Waterways Experiment Station Miscellaneous Paper S-73-1, 1973
- (7) J.E. Hadley, and J.F. Devine, Seismotectonic Map of the Eastern United States, U.S. Geologic Survey, publication MF-620, 1974
- (8) S.T. Algermissen, and D.M. Perkins, A Probabilistic Estimate of Maximum Acceleration in Rock in the Contiguous United States U.S. Geologic Survey, Open File Report 76-416, 1976
- (9) N.C. Donovan, B.A. Bolt, and R.V. Whitman "Development of Expectancy Maps and Risk Analysis," American Society of Civil Engineers annual convention, Philadelphia, Preprint 2805, 1976
- (10) Docekal, Earthquakes of the Stable Interior, with Emphasis on the Midcontinent (Vol 1 and 2), University of Nebraska, PhD thesis University Microfilms, 1970
- (11) U.S. Department of Commerce, U.S. Earthquakes 1938, 1940
- (12) U.S. Department of Commerce, U.S. Earthquakes 1944, 1946
- A.J. Eardley, Structural Geology of North America, Second Edition Harper Row, 1962

14

Responses to NRC Questions
Midland 1&2Question 361.7 (2.5)

You have not responded fully to Question 361.5. Provide a comparative quantitative analysis of the seismicity within 200 miles of the site and other similar sized areas in the Central Stable Region. The purpose of this analysis is to permit a more detailed evaluation of your contention that the Michigan Basin should be considered separate from the Central Stable Region.

18

Response

As stated in the response to Question 361.5, it is our opinion that the Michigan Basin is an area that, for the purpose of evaluating the safe shutdown earthquake at the Midland site in the context of 10 CFR 100 Appendix A and Regulatory Guide 1.70, is sufficiently distinctive in both its geologic and seismic characteristics to justify its acceptance as a convenient and realistic tectonic or seismotectonic province separate from the Central Stable Region as a whole. The historical seismicity is certainly consistent with subdividing the Central Stable Region into smaller tectonic provinces. Several zones of clearly distinguishable, relatively high seismic activity occur within the Central Stable Region in terms of both numbers of events and size of the maximum historical event. However, no such zones occur within the Michigan Basin tectonic province. It has experienced only a few scattered small events in historic time, and none have had an intensity greater than VI. (The Modified Mercalli Intensity Scale has been used to measure the intensities of seismic events referred to throughout this response.)

24

To quantify these observations, a statistical test has been performed using earthquake activity rates in several subareas of the Central Stable Region. In this analysis, the Michigan Basin is compared to similar size subareas within the Central Stable Region. In this context, the Central Stable Region of the eastern United States is as outlined and described⁽¹⁾. This region is shown in Q&R Figure 2.5-3. Although other slightly different characterizations of the precise boundaries of the Central Stable Region exist,^(2,3) the outline shown in Q&R Figure 2.5-3 is conservative for the purposes of this analysis.

All historic earthquakes within this region of intensity greater than or equal to V were tabulated. The principal data sources used in this tabulation were Coffman and von Hake,⁽⁴⁾ Docekal,⁽⁵⁾ and Nuttli.⁽⁶⁾ The total data set thus derived, after all obvious aftershocks are removed, consists of 174 earthquakes, with the earliest noted event occurring in 1776. Because the earthquake detection and recording process has not been uniform during the approximate 200 year interval from the first recorded event to the present (as may be readily seen by plotting a histogram of the number of events per decade for this data set), an

Responses to NRC Questions
Midland 1&2

alternative and more uniform subset was also considered. This subset contains the 141 earthquakes of the original data set that occurred after 1900.

A total of five nonoverlapping subareas within the Central Stable Region were selected for initial analysis. These are shown in Q&R Figure 2.5-3. Subarea A of this group is the 100,000 square mile Michigan Basin as shown in FSAR Figure 2.5-6. Subareas B through E are approximately 180 mile radius circles centered near Middleport, Ohio; Springfield, Illinois; Omaha, Nebraska; and Cherokee, Oklahoma. The subarea centered near Middleport, Ohio, was selected to include the cluster of historic activity in the Anna, Ohio area, while Subarea C, centered near Springfield, Illinois, was chosen to encompass the large historic earthquake sequence north of the Mississippi embayment. Subareas D and E were selected with no particular attempt to include or exclude pockets of seismic events.

For the complete earthquake data set, 4, 25, 42, 13, and 19 earthquakes of intensities greater than or equal to V occur in Subareas A through E, respectively. For the truncated, post-1900 data set, the equivalent numbers are 2, 21, 32, 8, and 19.

The statistical test performed using these subarea earthquake activity rates is as follows: If the Central Stable Region is assumed to be homogeneous in terms of its seismic characteristics, and if the historic earthquake record affords a reasonable estimate of the earthquake recurrence properties of the region as a whole, what are the probabilities of observing the above numbers of earthquakes in each subarea for the time intervals of the two data sets?

Assume, as is generally done, that earthquakes occur as Poisson arrivals. The Poisson process has been found to adequately describe the occurrence of large events when aftershocks are disregarded, and the assumption of this process has been used in previous analyses of eastern United States earthquakes.⁽⁷⁾ Under this assumption, the probability of observing "n" earthquakes in "τ" years given an activity rate "ν" is:

$$P(n \text{ in } \tau/\nu) = \frac{e^{-\nu\tau} (\nu\tau)^n}{n!}$$

Under the conditions of the statistical test proposed above, a reasonable estimate of the activity rate is provided by the historical earthquake data. Considering first the complete data set,

$$\nu = 174 \text{ events}/200 \text{ years}/1,300,000 \text{ square miles}$$

Responses to NRC Questions
Midland 1&2

where the area shown is that of the Central Stable Region. For a subarea of 100,000 square miles, the equivalent activity rate becomes:

$$\nu_{\text{subarea}} = 13.38 \text{ events/200 years/100,000 square miles}$$

Thus, for any subarea with data collection over a 200 year period, $\nu\tau = 13.38$. For a Poisson distribution, this value is both the mean and variance. Therefore, the first integer numbers of earthquakes to fall outside the mean ± 1 standard deviation range are 9 on the low side and 18 on the high side of the mean. Numbers for events outside the mean ± 2 standard deviations are 6 on the low side and 21 on the high side of the mean.

Performing a similar analysis in the case of the truncated data set,

$$\nu_{\text{subarea}} = 10.85 \text{ events/76 years/100,000 square miles}$$

With data collected over a 76 year period, $\nu\tau = 10.85$. The integer numbers of earthquakes falling outside the mean ± 1 and ± 2 standard deviations in this case are 7 and 15, and 4 and 18, respectively.

24

The integer ranges may be compared to the observed number of earthquakes in the various subareas. For the complete data set, only Subarea D falls within the mean ± 1 standard deviation limits, and Subareas D and E fall within the mean ± 2 standard deviation limits. For the truncated data set, only Subarea D falls within either the mean ± 1 or mean ± 2 standard deviation limits.

The Michigan Basin contains far fewer events and the subarea including the Anna, Ohio, activity contains far more events than would be expected from random fluctuation of a statistically homogeneous process under both data set calculations. In particular, the probability of four or less earthquakes occurring within the Michigan Basin in a 200 year period under the assumption of the above analysis is just under 0.003, while the similar probability of two or less events in a 76 year period using post-1900 data only is 0.0014.

It is our opinion that this analysis supports our previous conclusion that historic earthquake data is consistent with subdivision of the Central Stable Region into smaller tectonic provinces. Along with a number of previous and independent studies, (8,9,10,11,12,13) it shows that significant differences

Responses to NRC Questions
Midland 1&2

in seismic hazards within the Central Stable Region exist, and that the area around the Midland site is among the areas within the Central Stable Region characterized by the lowest hazard levels.

Although the separation of Subarea E (containing the Anna, Ohio, activity) and the Michigan Basin is already clearly implied by the above analysis, a more direct consideration of the historical seismicity of the Central Stable Region suggests even more strongly that the area immediately around Anna, Ohio, should be separated both from the Central Stable Region as a whole, and from the Michigan Basin in particular, for the purposes of specifying proper seismic design parameters applicable in the near future. This has been done in all the studies referenced in the previous paragraph.

Consider, for example, the recent characterization of the Anna, Ohio, seismic source zone appearing in Nuttli and Herrman.⁽¹³⁾ With the geography of this source zone so characterized, it has an area of about 14,000 square miles and has been the site of 12 earthquakes since 1875 with intensities of V or more. Four of these events were of epicentral intensity VII, and one was an epicentral intensity of VII to VIII. Body-wave magnitudes of 5.3 are assigned to these five earthquakes in the Nuttli and Herrmann study.⁽¹³⁾

24

A very distinctive feature of the Anna, Ohio, source zone seismicity is this preponderance earthquakes that have intensities of VII or greater. Of the 20 earthquakes in this intensity range within the Central Stable Region, five have occurred very near Anna, Ohio. This represents 1/4 of the earthquakes in this intensity range within approximately 1/90 of the total area. This source zone is also distinctive because 12 earthquakes with intensities of V or greater have occurred in this zone. Under the assumptions of the probability analysis above, the random occurrence of 12 or more events in such a small area is over seven standard deviations from the expected number of approximately two. This concentration of earthquake activity is equalled within the Central Stable Region, as shown in Q&R Figure 2.5-3, only in the Ozark uplift and Wabash Valley outliers of the New Madrid seismic zone.

In these ways (occurrence of large events which have an intensity of V or greater, additional relative concentration of events which have an intensity of VII or greater), the area around Anna, Ohio, is in marked contrast to the Central Stable Region as a whole and in striking contrast to the Michigan Basin.

When this data on historical seismicity is considered along with the facts that the Michigan Basin is geologically distinguishable from the remainder of the Central Stable Region and that the Michigan Basin is characterized by a consistency of the structural features within it, it is our opinion that this is an

Responses to NRC Questions
Midland 1&2

adequate basis for considering the Michigan Basin to be a tectonic province as defined in 10 CFR 100 Appendix A.

-
- (1) P.B. King, The Tectonics of Middle North America, Princeton University Press, Princeton, New Jersey, 1951
- (2) A.J. Eardley, Structural Geology of North America, Harper & Brothers, New York, 1951
- (3) P.B. King, The Evolution of North America, Princeton University Press, Princeton, New Jersey, 1959
- (4) J.L. Coffman and C.A. von Hake, (ed), Earthquake History of the United States, Publication 41-1, Revised Edition, U.S. Department of Commerce, 1973
- (5) J. Docekal, Earthquakes of the Stable Interior, With Emphasis on the Midcontinent, University of Nebraska (Ph.D. Thesis), 1970
- (6) O.W. Nuttli, Magnitude Recurrence Relation for Central Mississippi Valley Earthquakes, Bull. Seismo. Soc. Am. 64, 1974
- (7) R.K. McGuire, Effects of Uncertainty in Seismicity on Estimates of Seismic Hazard for the East Coast of the United States, Bull. Seismo. Soc. Am. 67, 1977
- (8) S.T. Algermissen, Seismic Risk Studies in the United States Proceedings of the Fourth Work Conference on Earthquake Engineering, Santiago, Chile, 1969
- (9) O.W. Nuttli, Design Earthquakes for the Central United States, Miscellaneous Paper S-73-1, Report 1 (1973), U.S. Army Engineer Waterways Experiment Station
- (10) J.B. Hadley and J.F. Devine, Seismotectonic Map of the Eastern United States, Publication MF-620 (1974), U.S. Geological Survey
- (11) S.T. Algermissen and D.M. Perkins, A Probabilistic Estimate of Maximum Acceleration in Rock in the Contiguous United States, Open File Report 76-416 (1976), U.S. Geological Survey
- (12) N.C. Donovan, B.A. Bolt, and R.V. Whitman, Development of Expectancy Maps and Risk Analysis, Preprint 2805 (1976),

Responses to NRC Questions
Midland 1&2

American Society of Civil Engineers Annual Convention,
Philadelphia, Pennsylvania

⁽¹³⁾O.W. Nuttli and R.B. Hermann, Credible Earthquakes for the
Central United States, Miscellaneous Paper S-73-1,
Report 12 (1978), U.S. Army Engineer Waterways Experiment
Station

24

Response to NRC Questions
Midland 1&2

Question 362.9 (2.5.4)

The response to Request 362.4 is insufficient. Table 2.5-14A shows the structural settlement measurements available to date. Provide the reasons for the lack of survey data at Benchmark Numbers A-3 and 4; C-2, 3, 4, 5, 6, and 7; and T-2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15. In Subsection 2.5.4.13.1 of the FSAR, reference is made to Figure 2.5-78. The figure number is in error and should be corrected.

14

Response

Table 2.5-14A has been revised to include the settlement measurements for the subject benchmark numbers.

Subsection 2.5.4.13.1 has been revised to reference the correct figure.

Settlement benchmarks have been installed and monitored at selected locations on the major plant structures. Benchmark locations are shown in Figure 2.5-48A. Benchmark elevation measurements are presented in Table 2.5-14A.

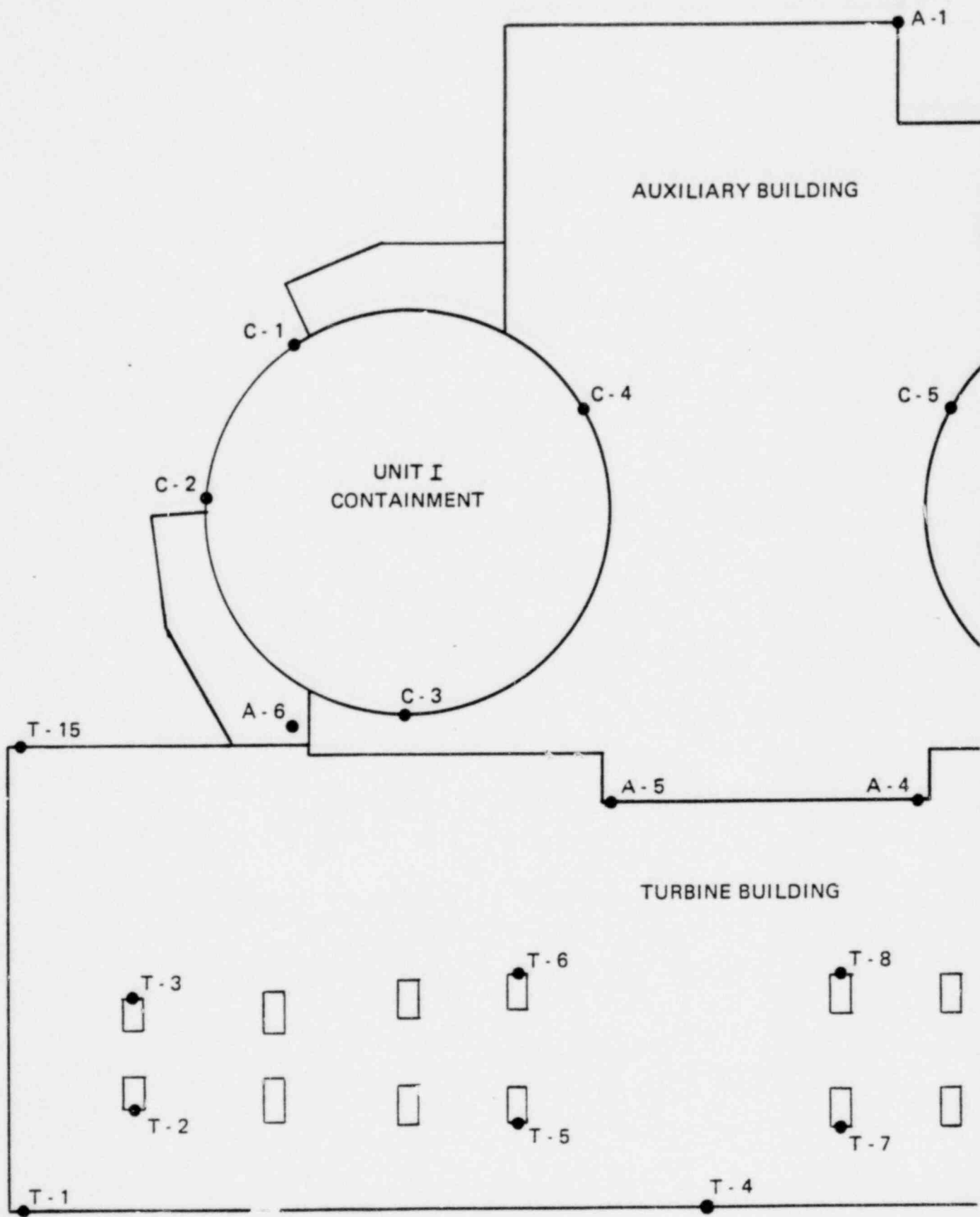
18

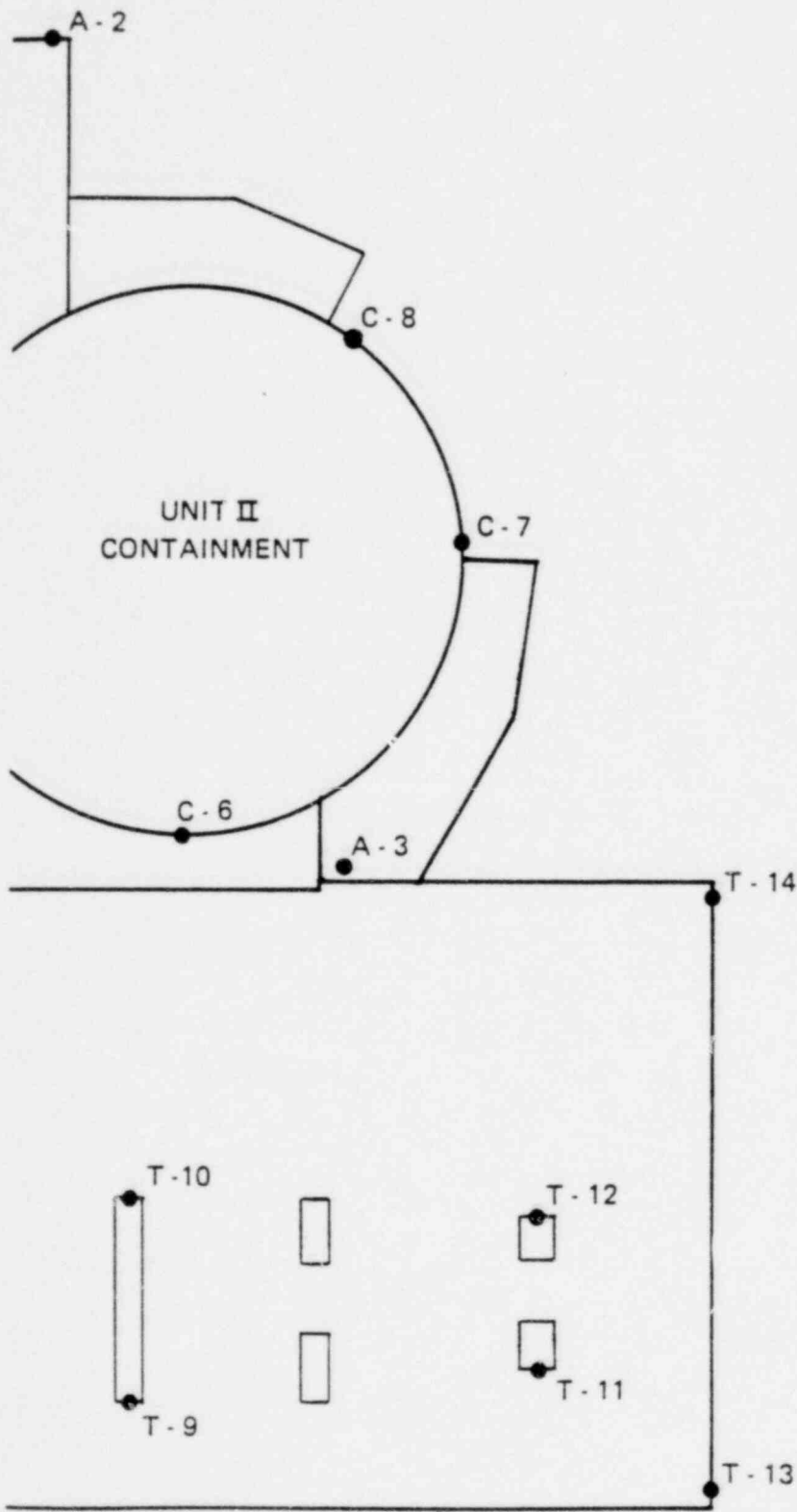
Measured settlements were not measured from the start of construction. Available settlement measurements are presented graphically in Figures 2.5-89 through 2.5-91 for the reactor, auxiliary, and turbine buildings. Building load intensities estimated from actual material quantities used in construction are also shown in Figures 2.5-89 through 2.5-91.

Subsurface conditions for various Seismic Category I structures on fill are under investigation. The maximum predicted settlements will be recomputed based on this investigation. A comparison of the observed settlement and the maximum predicted settlement will be provided by amendment in January 1980.

20

24





NOTE

A-1 MONITORING SETTLEMENT
BENCH MARK LOCATION



**CONSUMERS POWER COMP.
MIDLAND PLANT UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT**

Settlement Bench Mark Location
at the Power Block
(SK-G-209)

FSAR Figure 2.5-48A

Question 362.9 (2.5.4)

The response to Request 362.4 is insufficient. Table 2.5-14A shows the structural settlement measurements available to date. Provide the reasons for the lack of survey data at Benchmark Numbers A-3 and 4; C-2, 3, 4, 5, 6, and 7; and T-2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15. In Subsection 2.5.4.13.1 of the FSAR, reference is made to Figure 2.5-78. The figure number is in error and should be corrected.

14

Response

Table 2.5-14A has been revised to include the settlement measurements for the subject benchmark numbers.

Subsection 2.5.4.13.1 has been revised to reference the correct figure.

Settlement benchmarks have been installed and monitored at selected locations on the major plant structures. Benchmark locations are shown in Figure 2.5-48A. Benchmark elevation measurements are presented in Table 2.5-14A.

18

Measured settlements were not measured from the start of construction. Available settlement measurements are presented graphically in Figures 2.5-89 through 2.5-91 for the reactor, auxiliary, and turbine buildings. Building load intensities estimated from actual material quantities used in construction are also shown in Figures 2.5-89 through 2.5-91.

Subsurface conditions for various Seismic Category I structures on fill are under investigation. The maximum predicted settlements will be recomputed based on this investigation. A comparison of the observed settlement and the maximum predicted settlement will be provided by amendment.

20

26



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Attachment 9

MAR 31 1980

Docket Nos.: 50-329/330

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 & 2

SUBJECT: SUMMARY OF FEBRUARY 27 & 28, 1980 MEETING AND SITE TOUR WITH CONSULTANTS TO REVIEW SOIL SETTLEMENT

On February 27 and 28, 1980, the NRC staff and three organizations recently acquired to support the staff safety review of geotechnical and interfacing matters, met with Consumers Power Company (the applicant), Bechtel and Bechtel consultants at the site for Midland Plant, Units 1 & 2. The three organizations supporting the staff review are the U. S. Army Corps of Engineers, Energy Technology Engineering Center, and U. S. Naval Surface Weapons Center. The purpose of the visit was to review and observe site backfill deficiencies and effects. This was the initial visit for the staff's consultants and the meeting was held to assist these consultants with their review of existing documentation on the background, remedial work and present status of this matter. Meeting attendees are listed in Enclosure 1.

The information reviewed at this meeting is contained in Amendment 72 to the Midland FSAR, December 19, 1979, for which referenced material is forwarded in two volumes by the applicant's letter of February 11, 1980. One of the volumes entitled "10 CFR 50.55(e), Interim Reports, Settlement of Diesel Generator Foundations and Building," consists of the 10 CFR 50.55(e) reports sent by the applicant to the staff's Office of Inspection and Enforcement from November 7, 1978 through September 5, 1979. The other volume, entitled "Responses to NRC Requests Regarding Plant Fill," consists of the applicant's 10 CFR 50.54(f) responses to the Office of Nuclear Reactor Regulation submitted April 24, 1979 through November 13, 1979. These documents represent the applicant's reports upon which the staff's order of December 6, 1979 requiring modification of the construction permits is based. The meeting also included a preview of information to be contained in Revision 5 to the applicant's responses in the latter volume intended for submittal about the end of February, 1980. Revision 5 will include responses to the staff's supplemental requests of November 19, 1979. Only information not contained in these documents is included in this meeting summary.

In opening remarks, Mr. G. Keeley announced that Consumers Power Company has elected to defer all remedial work on inadequately supported structures until acceptance of the proposed work is received from the staff. This action is

MAR 31 1980

voluntary on the applicant's part since the effective date for the staff's December 6, 1979 order is to be established by the Hearing Board pursuant to 10 CFR 2.204. The basis for this decision was said to be to preclude potential loss of revenue associated with expenditures for which staff approval has not been granted. The staff observed that this was a prudent decision, particularly in view of the significant slip in construction completion projected by Bechtel and currently under review by the applicant and due to other causes, principally the TMI-2 accident.

Presentations were also given by Bechtel consultants. Mr. C. H. Gould described the procedure for placement of caissons beneath the electrical penetration area (i.e., wing walls) of the Auxiliary Building and beneath the Feedwater Isolation Valve Pit area. Mr. M. T. Davisson described the procedure for placement of piles to support the northern portion of the Service Water Building. Dr. A. J. Hendron, Jr. reviewed the preloading program completed for the Diesel Generator Building and discussed why the preload option was elected in lieu of other possible corrective alternatives. Dr. R. B. Peck summarized the recommendations of the Bechtel consultants and emphasized that the preloading option is considered to eliminate the need for any further testing or measurements as a basis for establishing confidence for future settlement potential of the Diesel Generator Building. A summary of these discussions by the Bechtel consultants will be submitted as an amendment to the FSAR.

During the meeting, references were made to certain information and reports which have not been made available to the NRR staff, although some of these have been examined by I&E through the audit mechanism. Examples include:

1. Some of the figures listed in the drawing summary for the interim reports to MCAR #24 which are not included with the compilation of reports forwarded by the applicant's letter of February 11, 1980, even after noted figure replacements and redundancy are taken into account.
2. Installation details of each piezometer used to monitor pore water pressures during the preload program (e.g., type and actual elevations of installed piezometers, backfill materials and zone thickness).
3. Reports, meeting summaries, or other written communications with or by consultants recommending or supporting remedial measures for structures and utilities located upon or in questionable soils.
4. Reports of the evaluation (e.g., bases, procedure, execution and results) of the initial qualification and subsequent requalification of compaction equipment.
5. The report "Tank Farm Investigation; Midland Units 1 & 2," issued October, 1979.

MAR 31 1980

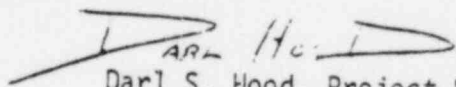
The staff noted that such documents as above are needed by its consultants for their independent assessment of the adequacy of the proposed remedial measures and requested that these be made publicly available. The applicant indicated a reluctance to this end, and noted that these were available through the I&E audit mechanism. The staff will issue a formal request for these documents. The staff also noted that the boring logs provided in Appendix 2A of the FSAR did not reflect those borings associated with piezometer installation; the applicant replied that these would be added.

Site tours were provided in groups based upon the following engineering disciplines: (1) Geotechnical, (2) Structural, (3) Mechanical, and (4) Hydrologic.

During the tour the Corps noted that except for the use of temporary blocks, the service water pipe would otherwise be in direct contact with the base of the penetration through the northern wall of the Service Water Building. It is postulated that this results from the more rapid settlement of the buried pipe relative to the building's cantilevered settlement. The Corps emphasized that special attention should be given this area to avoid stressing the pipe at the penetration, particularly during pile driving and after attachment of the piles to the structure.

The staff noted that the presentation by Mr. C. H. Gould included the specification of some quantitative criteria to be applied during the remedial action for the Auxiliary Building. The staff asked if similar criteria were specified by the other Bechtel consultants, but was advised that these other criteria were more of a qualitative, subjective nature.

The staff also requested the applicant to submit a description of the services to be performed by consultants R. B. Peck, A. J. Hendron, Jr., C. H. Gould and M. T. Davisson through the completion of construction on the remaining remedial fixes. This description should identify the extent of continued involvement of the consultants in overseeing construction operations and in evaluating the effectiveness of completed fixes for which they have provided major design input.



Darl S. Hood, Project Manager
Light Water Reactors Branch No. 4
Division of Project Management

Enclosures:

1. Attendees
2. Agenda

cc w/enclosures:
See next page.

ENCLOSURE 1

ATTENDEES

Consumers Power

G. S. Keeley
T. C. Cooke
T. Thiruvengadam
U. E. Horn

Bechtel

Harris Burke
Sherif Afifi
Don Riat
Bimal Dhar
Bill Paris
Julius Rotc
Jim Wanzeck
Karl Wiedner
John Rutgers
Lynn Curtis
Al Boos
Chuck McConnell
Walter Ferris
US Corp Of Engineers

Consultants

R. B. Peck
A. J. Hendron, Jr.
C. H. Gould
M. T. Davisson

NRC

L. Heller
J. Kane
A. Cappucci
F. Rinaldi
R. Gonzalis
D. Hood
G. Gallagher
R. Cook

ETEC

W. P. Chen
J. Brammer

N. Gehring
J. Grundstrom
W. Otto
W. Lawhead
P. Hadala
J. Simpson
J. Norton
R. Erickson

US Nav, Weapons Center

P. Huang
J. Matra

ENCLOSURE 2

AGENDA FOR

MEETING WITH NRC ON MIDLAND PLANT FILL STATUS AND RESOLUTION

February 27 & 28, 1980

Midland Site

- 1.0 INTRODUCTION G. Keeley
- 2.0 PRESENT STATUS OF SITE INVESTIGATIONS T. Cooke
- 2.1 Meetings with Consultants and Options Discussed (Historical)
- 2.2 Investigative Program
- A. Boring Program
 - B. Test Pits
 - C. Crack Monitoring and Strain Gauges
 - D. Utilities
- 2.3 Settlement
- A. Area Noted
 - B. Preload
 - C. Instrumentation
- 3.0 WORK ACTIVITY UPDATE J. Wanzeck
- 3.1 Summary of work activities and settlement surveys for all Category I structures and facilities founded partially or totally on fill
- 4.0 REMEDIAL WORK IN PROGRESS OR PLANNED (Q4, 12, 27, 31, 33 & 35) S. Afifi
- 4.1 Diesel Generator Structures
 - 4.2 Service Water Pump Structures
 - 4.3 Tank Farm
 - 4.4 Diesel Oil Tanks
 - 4.5 Underground Facilities
 - 4.6 Auxiliary Building and FW Isolation Valve Pits
 - 4.7 Liquefaction Potential
- 5.0 EVALUATION OF PIPING (Q16, 17, 18, 19 & 20) D. Riat
- 6.0 DEWATERING (Q24) B. Paris
- 7.0 ANALYTICAL INVESTIGATION B. Dhar
- 7.1 Structural Investigation (Q14, 26, 28, 29, 30 & 34)
 - 7.2 Seismic Analysis (Q25)
 - 7.3 Structural Adequacy with Respect to PSAR, FSAR, etc.
- 127/80
- 128/80
- 8.0 SITE TOUR All
- 9.0 CONSULTANTS SUMMARY Peck/Hendron
Gould/Davis
- 10.0 DISCUSSION All



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Attachment 10

APR 1 1980

Docket Nos.: 50-329/330

Mr. S. H. Howell
Vice President
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Dear Mr. Howell:

SUBJECT: REQUEST FOR REPORTS, DRAWINGS AND OTHER INFORMATION REGARDING PLANT
FILL SETTLEMENT AND EFFECTS

As indicated in previous correspondence and our meeting with your staff on February 27 and 28, 1980, the NRC staff reviews of the adequacy of the backfill soils, settlement effects and associated remedial actions are proceeding with the support of three outside organizations or agencies: the U. S. Army Corps of Engineers, the U. S. Naval Surface Weapons Center, and the Energy Technology Engineering Center. In order that they may perform the independent assessments of these areas as we have requested, we and they require detailed reports and drawings on these matters.

Drawings

Our review of the "Drawing Summary" in Management Corrective Action Request 24 indicates that several of the 91 drawings listed in Interim Report 8 are not included with the compilation of reports forwarded by your letter of February 11, 1980 as the volume entitled "10 CFR 50.55(e), Interim Reports, Settlement of Diesel Generator Foundations and Building." Some of the drawings listed in the summary are noted to be replaced by other drawings, and overlaps in drawings occur with the successive updating of the list from one interim report to the next. Notwithstanding this replacement and overlap, some drawings are not provided. We request that you amend this volume to include all missing drawings and to provide an index table specifying the location of each drawing.

Reports

We request that you provide 40 copies of all reports, including meeting summaries and other written communications, with or by consultants who have performed investigations or tests or made recommendations regarding the supporting soils or remedial measures for structures and utilities located on or in questionable materials. An example of the reports needed is provided by Enclosure 1 which lists a few of the reports by Bechtel and

APR 1 1980

by Bechtel's consultant, Goldberg-Zonino-Dunnicliff. The list is not intended to be complete nor to identify all consultants involved. Rather, it is intended to illustrate the level of technical detail needed. We request that you include our consultants for direct receipt of a set of these documents.

Other Information

We require information detailing the installation of each piezometer used to monitor pore water pressures during the surcharging program. This should include the type and actual elevations of the installed piezometers, the types of backfill material placed and their extent in the drilled hole.

We also require a description of the services to be performed by consultants R. B. Peck, A. J. Hendron, Jr., C. H. Gould and M. T. Davison. This description should identify the extent of the continued involvement of these consultants in overseeing the remedial construction operations and in evaluating the success of the completed fixes intended to provide stable foundations for the various structures.

We would appreciate receipt of the above documents, drawings and information within 20 days of receipt of this letter. Please advise us within 7 days if you will meet this schedule so that we may adjust our review schedules accordingly.

Sincerely,

L. S. Rubenstein

L. S. Rubenstein, Acting Chief
Light Water Reactors Branch No. 4
Division of Project Management

Enclosure:
List of Reports

cc w/enclosure:
See next page.

Consumers Power Company

ccs:

Michael I. Miller, Esq.
Isham, Lincoln & Beale
Suite 4200
One First National Plaza
Chicago, Illinois 60603

Judd L. Bacon, Esq.
Managing Attorney
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Mr. Paul A. Perry
Secretary
Consumers Power Company
212 W. Michigan Avenue
Jackson, Michigan 49201

Myron M. Cherry, Esq.
One IBM Plaza
Chicago, Illinois 60611

Mary Sinclair
5711 Somerset Drive
Midland, Michigan 48640

Frank J. Kelley, Esq.
Attorney General
State of Michigan Environmental
Protection Division
720 Law Building
Lansing, Michigan 48913

Mr. Wendell Marshall
Route 10
Midland, Michigan 48640

Grant J. Merritt, Esq.
Thompson, Nielsen, Klaverkamp & James
4444 IDS Center
80 South Eighth Street
Minneapolis, Minnesota 55402

Mr. Don van Farowe, Chief
Division of Radiological Health
Department of Public Health
P. O. Box 33035
Lansing, Michigan 48909

Consumers Power Company

ccs (continued):
Resident Inspector/Midland NPS
c/o U.S. Nuclear Regulatory Commission
P. O. Box 1927
Midland, Michigan 48640

William J. Scanlon, Esq.
2034 Pauline Boulevard
Ann Arbor, Michigan 48103

Commander, Naval Surface
Weapons Center
ATTN: P. C. Huang
G-402
White Oak
Silver Spring, Maryland 20910

Mr. L. J. Auge, Manager
Facility Design Engineering
Energy Technology Engineering Center
P. O. Box 1449
Canoga Park, California 91304

Mr. William Lawhead
U. S. Corps of Engineers
NCEED - T
477 Michigan Avenue
7th Floor
Detroit, Michigan 48226

ENCLOSURE 1

Sample Listing of Reports Needed by Staff's Consultants

I. Reports Prepared by Goldberg-Zonino-Dunnicliff

1. Report entitled "Test Pits 1, 2 & 3," dated Feb. 1980
File No. 2190 (Index C-79(Q)-20)
2. Report "Data Summary and Laboratory Procedures," dated Feb. 1980
(Index C-79(Q)-16)
3. Report "Consolidation Tests," dated Feb. 1980
(Index C-79Q-17)
4. Report "Strength Tests," dated Feb. 1980
(Index C-79Q-18)
5. Report "Miscellaneous Tests," dated Feb. 1980
(Index C-79Q-19)
5. "Soil Classification and Moisture Density Relation" dated Feb. 1980
(Index C-79(Q)-21)
7. "Diesel Generator Building Instrumentation," dated October 1979
(Index C-82(Q)-5)
8. "Aquaducer Hose Settlement Gage Instrumentation Manual"
(Index C-79(Q)-4)
9. "Report on Sondex Gages and Borros Anchors"
(Index C-82(Q)-8)
10. "Report on Sondex Gages and Borros Anchors"
(Index C-82(Q)-9)
11. "Procedure for Reading Sondex System"
(Index C-82(Q)-2)
12. "Procedure for Reading Modified Borros Anchors"
(Index C-82(Q)-3)

II. Bechtel Reports

13. "Test Pit 1 Data," dated Sept. 1979 (Index C-79(Q)-10)
14. "Test Pit 2 Data," dated Sept. 1979 (Index C-79(Q)-11)
15. "Test Pit 3 Data," dated Sept. 1979 (Index C-79(Q)-12)
16. "Test Pit 4 Data," dated Sept. 1979 (Index C-79(Q)-13)
17. "Plate Load Test PL-1," dated Sept. 1979 (Index C-79(Q)-14)
18. "Plate Load Test PL-2," dated Sept. 1979 (Index C-79(Q)-15)

19. "Qualification of Compaction Equipment"

20. "Tank Farm Investigation"



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 12 1979

DOCKET NOS. 50-329
50-330

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 & 2

SUBJECT: SUMMARY OF DECEMBER 4, 1978 MEETING ON STRUCTURAL SETTLEMENTS

On December 4, 1978, the NRC staff met in Midland, Michigan with Consumers Power Company (CPCO), Bechtel Associates, and consultants in geotechnical engineering to discuss excessive settlement of the Diesel Generator (DG) Building and pedestals, and settlement of other seismic Category I structures. These technical discussions followed a site tour on December 3, 1978 during which the NRC staff observed each of these structures. Attendees for the tour and technical discussions are listed in Enclosure 1. Enclosure 2 is the agenda used during the technical discussion.

1. Background

Pursuant to 10 CFR 50.55(e), CPCO notified Region III of the Office of Inspection and Enforcement (I&E) on September 7, 1978, that settlement of the Midland DG Building foundation and generator pedestals was greater than expected and that a soils boring program had been started to determine the cause and extent of the problem. An interim status report was provided I&E by CPCO's letter of September 29, 1978. I&E conducted inspections on this matter on October 24-27, 1978 and issued inspection report number 50-329/78-12; 50-330/78-12.

2. History

The Bechtel representative identified the Category I structures and the type of material supporting the structure:

- a. Containment - Glacial Till
- b. Borated Water Storage Tank - Plant Fill
- c. Diesel Generator Building and Pedestal - Plant Fill
- d. Auxiliary Building - Part Glacial Till & Part Plant Fill
- e. Service Water Intake - Glacial Till (Completed portion only)
- Plant Fill (Small portion yet to be constructed)

JAN 12 1979

The settlement monitoring program began in June 1978; to date the measured settlements are as follows:

Containment - 1/4" to 5/8" over last 1-1/2 years

Auxiliary Building - Approximately 1/8" (central portion)

Service Water Pump House - 0 to 1/8"

Diesel Generator Building - 3 to 4" since footing was poured October 1977 and walls in Spring 1978.

The four electrical duct banks rising into the DG Building, and which extend downward into the glacial till, were cut loose to remove the settlement restriction on the north side of the DG Building. When the duct banks were cut loose, settlement on the order of 2" occurred on the north side of the DG Building at a rapid rate. The east wall exhibited rapid settlement (1/8" in one week), but the west wall showed very little subsequent settlement. This indicates that the east wall was being held up by the duct pedestal.

3. Soils Exploration

Bechtel discussed the soil exploration program, including the boring program and laboratory testing of the foundation materials. The conclusion that was made by Bechtel is that the material varies across the site in strength properties, i.e., unconfined compressive strength from 200 PSF to 4000 PSF and shear strength from 100 PSF to 2000 PSF. The soils classification ranged from C1 to M1.

Bechtel also discussed possible causes based on input from a consultant, Dr. R. Peck. Some of these causes were:

- (1) Variable quality of material used in the plant fill; however, the quality control records do not indicate the variation.
- (2) Fill may have been placed on the dry side of optimum moisture, and then when the water table rose inundating the fill, the material may have become "soft."
- (3) Initial fill may have been placed satisfactorily but after installing pipe trenches and duct banks, the fill may have been disturbed.

JAN 12 1979

4. Consultants Perspective

Dr. R. B. Peck stated the following:

- a. The compacted fill is comprised mainly of glacial till and was excavated from the cooling pond area.
- b. Evidence exists from the Dutch cone curve that the looser and softer areas are limited to local zones or lenses.
- c. Water content is higher than at the time the fill was placed. Settlement of the till has been occurring since original placement of fill, accelerated by increased moisture content resulting from filling of the discharge cooling pond. Soil settlement is occurring under its own weight and the added weight of the building is believed to be insignificant.
- d. The DG Building would probably not have settled as much if the material had not been so wet (moisture content is high).
- e. Bearing capacity is not a problem for the footings.
- f. Short of removing all the fill above the hard glacial till, a "preload" program would be the best approach. The preload purpose would be to consolidate the fill materials.
- g. The settlement with the preload would tend to be rapid (a few weeks to a few months).
- h. The preload is a necessary first step even though other measures might be necessary.
- i. The main unknown is what might happen to the rate of settlement as the water table rises and saturates the fill.
- j. Preloading would occur in early 1979 and the sand used as the surcharge would be removed in mid-1979.

Mr. C. J. Dunnicliff of Goldberg, Zoino, Dunnicliff & Associates described the instrumentation program to monitor the settlement of the foundation material and structures during the preload. The purpose of the instrumentation is to determine if the surcharge is doing its job of consolidation and if it is causing any harm to the structures or utility lines under and around the building.

JAN 12 1979

-4-

- a. Instrumentation for the structure will include optical survey measurements as well as monitoring of cracks using electrical devices. Four locations for the electrical devices have been chosen; two on the exterior of the east wall of the DG Building and two on the west wall of bay number four in the DG Building. A mapping of cracks will be developed.
- b. Foundation monitoring will include devices to measure settlement and pore water pressure. A total of 60 anchors will be installed (20 groups of 3 at different elevations). A total of 40 piezometers are to be installed to measure the pore water pressure.

The consultants indicated that 6" settlement would not be a surprise and that up to as much as 18" could occur. The preload will be made up of 15 to 20 feet of sand piled in and around the DG Building. No more than a 5-foot differential in the sand level between bays would be permitted.

The NRC questioned the effect of settlement and preloading on the condensate lines located under the DG Building. Fixed points for the piping, such as the Turbine Building wall, are also of interest for the potential of cantilever effects. Bechtel explained that the 20-inch condensate lines are encased in 24-inch lines surrounded by concrete and resting in well compacted sand. Instrumentation will be included to monitor the condensate lines. The possibility of cutting the lines loose at the DG Building and the Turbine Building is also being studied. The condensate lines have no safety-related function for the Midland design.

The NRC also expressed concern for the effect of settlement on the fuel oil lines under the building. CPCO stated that re-routing of lines can be readily accommodated if necessary. This matter is also under review.

The NRC Resident Inspector asked for a list of the equipment, with a discussion of the compacting capability and limitations of each, used for compacting the fill for the DG Building from elevation 618 to 628 feet. Bechtel will provide this information.

5. Program Status

Bechtel summarized the activities completed, in progress, and planned for the future:

JAN 12 1979

-5-

Activities Completed

- (1) Boring program
- (2) Isolation of the electrical duct banks on the north side of the DG Building

b. Activities in Progress (or soon to be initiated)

- (1) Foundation settlement monitoring program
- (2) Preload instrumentation program
- (3) Actual preload of the structure and foundation
- (4) Filling the cooling pond to maximum elevation (Elevation 627)
- (5) Complete construction of the rest of the DG Building structure

c. Activities Planned

- (1) After removal of the surcharge, assure contact between footings and soil foundation material
- (2) Verify utilities and structure integrity

6. Project Schedule

Bechtel presented the following project schedule information:

- Construction is 58% completed as of November 1978
- Engineering is 80% complete
- Structural concrete is 97% complete
- Fuel load target date is November 1980
- Earliest requirement for one diesel generator is January 1980
- Current completion date for one diesel generator is January 1980
- Latest date for one diesel generator is June 1980

JAN 12 1979

-6-

Bechtel emphasized that the installed instrumentation will show when the preload surcharge may be removed and therefore the present schedule is somewhat tentative. Most settlement is predicted to occur rapidly as the area is being preloaded and frequent readings will be taken during this period and used as a basis for further projections. The rate of settlement will decrease thereafter and the total settlement is expected to be reached within a few months.

CPCO stated that if necessary, temporary diesels could be used during preoperational testing prior to fuel loading and that this matter is presently under study.

7. Response to Open Items in NRC Inspection Report

Bechtel addressed the open items included in NRC inspection report Nos. 50-329/78-12 and 50-330/78-12. CPCO stated that a written response would be sent to I&E Region III to resolve the conflict between the FSAR and site implementing procedures:

- a. Conflict between FSAR Table 2.5-14 and Table 2.5-10 regarding the description of fill material and what was actually used in the random fill: Bechtel stated that this conflict was an oversight and that an FSAR amendment would be issued. The NRC staff stated that any such amendment should address both the previous and the adjusted entries such that the basis for the previous staff review is not obscured in the documentation.
- b. Conflict between FSAR Table 2.5-21 and Bechtel Specification C-210 regarding number of passes for compaction: Bechtel stated that FSAR Table 2.5-21 is for the embankments for the cooling pond dikes.
- c. FSAR Section 3.8.5.5 regarding expected settlement: Bechtel stated that 1/2-inch indicated in the FSAR was a mistake and that the FSAR would be amended to correct this mistake.
- d. Conflict between FSAR Figure 2.5-47 and project drawing regarding foundation elevation: Bechtel stated the elevations in the FSAR was also a mistake and would be corrected.
- e. Conflict in Bechtel Specification C-210 regarding compactive effort: Bechtel stated that Field Change Request C-302 dated 10/31/75 clarified this conflict and permitted the "Bechtel Modified Protector" using 20,000 ft-lbs compactive effort rather than the ASTM standard of 56,000 ft-lbs.

JAN 12 1979

- f. Conflict between Dames & Moore recommendation regarding lift thickness of 6 to 8 inches and the Bechtel specification permitting up to 12 inches: Bechtel stated that the greater depth permitted by their specification should not matter because of performance qualification tests. However, the NRC was then informed that the test qualifications performed were for Zone 1 clay only, and that no test qualifications on the random fill material using 12 inches was performed to qualify such lift thicknesses. Dr. Peck stated that the thicker the layer, the more differences in compaction through the thickness of the layer would occur.
- g. Tolerance of $\pm 2\%$ in moisture content permitted in Bechtel Specification C-210: Bechtel stated that this tolerance is in line with industry practice.

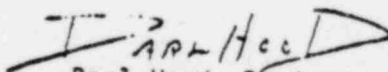
Dr. Peck was asked his view on this $\pm 2\%$ tolerance. He stated that the important question is " $\pm 2\%$ of what material." Since the material used in the fill was variable, the $\pm 2\%$ tolerance could cause a problem if the material is not consistent.

- h. Cracks in the building structure: Bechtel stated that all cracks greater than the ACI 318-71 limit would be identified and repaired after the preload program.
- i. FSAR question 362.2: Bechtel stated that the answer had been sent to NRC via FSAR revision 15 in November 1978.

CPCO stated that the reply to the inspection report is in process, and that the reply will include copies of all data, slides, and drawings presented during this meeting.

In concluding remarks, CPCO stated its intent to proceed with the preloading program as described during the meeting.

In its closing comments, the NRC staff stated that the proposed solution is at the risk of the applicant and that NRC intends to review and evaluate this matter in accordance with the original compaction requirements as set forth in the commitments in the PSAR. The staff also stated that while attention to remedial action is important, determination of the exact cause is also quite important for verifying the adequacy of the remedial action, assessing the extent of the matter relative to other structures, and in precluding repetition of such matters in the future.


Darl Hood, Project Manager
Light Water Reactors Branch 4
Division of Project Management

Enclosures:
As stated

Consumers Power Company

JAN 12 1979

ccs:
Michael I. Miller, Esq.
Isham, Lincoln & Beale
Suite 4200
One First National Plaza
Chicago, Illinois 60670

Judd L. Bacon, Esq.
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Mr. Paul A. Perry
Secretary
Consumers Power Company
212 W. Michigan Avenue
Jackson, Michigan 49201

Myron M. Cherry, Esq.
One IBM Plaza
Chicago, Illinois 60611

Mary Sinclair
5711 Summerset Drive
Midland, Michigan 48640

Frank J. Kelley, Esq.
Attorney General
State of Michigan Environmental
Protection Division
720 Law Building
Lansing, Michigan 48913

Mr. Windell Marshall
Route 10
Midland, Michigan 48640

Mr. S. H. Howell
Vice President
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

ENCLOSURE 1

JAN 12 1979

ATTENDEES DECEMBER 4, 1978 MEETING

P. A. Martinez, Bechtel
Karl Wiedner, Bechtel
* S. S. Afifi, Bechtel
R. B. Peck, Bechtel Consultant
* W. R. Ferris, Bechtel
M. O. Rothwell, Bechtel
* D. B. Miller, CPCO - Project
* J. P. Betts, Bechtel
W. L. Barclay, Bechtel
* A. J. Boos, Bechtel
G. L. Richardson, Bechtel
* D. E. Horn, CPCO - QA
W. R. Bird, CPCO-QA
* R. M. Wheeler, CPCO - PMO
* C. A. Hunt, CPCO - Engineering Services
D. E. Sibbald, CPCO Project
John Dunnicliff, Bechtel Consultant
* Austin Marshall, Bechtel - Geotech
* Y. K. Lin, Bechtel - Geotech
* B. C. McConnel, Bechtel - Geotech
* B. Dhar, Bechtel
* N. Swanberg, Bechtel
* Darl Hood, NRC LPM
* Gene Gallagher, NRC Region III (I&E)
* Daniel Gillen, NRC/NRC Geosciences
* Lyman Hiller, NRC/NRR Geosciences
* Ronald Cook, NRC Resident Inspector

*Present during both the 12/3/78 site tour and the 12/4/78 meeting.

Enclosure 2

SUBJECT:

CPCo Midland Plant Units 1 & 2
Diesel Generator Building

JAN 12 1979

Meeting with NRC at Midland

DATE:

December 4, 1978

AGENDA

- I. Introduction by CPCo
- II. History by Bechtel (N. Swanberg)
 - a. Plant description
 - b. Settlement monitoring program
 - c. Brief history of site fill placement
 - d. Settlement of Category 1 structure
 - e. Settlement of diesel generator building and pedestals
 - f. Review settlement data and drawings (SK-C-620/623)
 - g. Consultants
- III. Soil Exploration by Bechtel (S. Afifi)
 - a. Soil borings
 - b. Dutch cone penetrations
 - c. Laboratory tests
 - d. Possible causes
- IV. Consultant's Recommendation by Dr. R.B. Peck and C.J. Dunnicliff
 - a. Preload
 - b. Instrumentation
- V. Status report by Bechtel (B.C. McConnell)
 - a. Activities completed
 - b. Activities in progress
 - c. Activities planned for future
 - 1) Corrective action
 - 2) FSAR conformance
- VI. Schedule by Bechtel (P. Martinez)
 - a. Overall project
 - b. Impact on project schedule
 - c. Schedule for remedial measures

VII.

Responses to open items in NRC Inspector's report dated 11/17/78 by Bechtel (B. Dhar)

JAN 12 1979

- a. Responses to Gallagher's concerns:
- 1) Conflict between FSAR Table 2.5-14 and Table 2.5-10 regarding fill material description
 - 2) Conflict between FSAR Table 2.5-21 and Specification C-210 regarding required number of passes for compaction
 - 3) FSAR Section 3.8.5.5 - expected settlement
 - 4) Conflict between FSAR Figure 2.5-47 and project drawing regarding foundation elevation
 - 5) Conflict in Specification C-210 regarding compactive effort in test method
 - 6) Conflict between consultant's recommendation and Specification C-210 regarding lift thickness
 - 7) $\pm 2\%$ tolerance in moisture content permitted in Specification C-210
 - 8) Cracks in the building structure
- b. FSAR Question 362.2 (Section 2.5.4.5.1)

VIII.


Closing Comments by CPCo

Final -
Bill - NCI

ORAL COMMUNICATIONS RECORD

 PROJECTS, ENGINEERING
 AND CONSTRUCTION -
 QUALITY ASSURANCE DEPARTMENT

 CROSS FILE NO WRB 51-80

 PAGE 1 OF 2

 Consumers
 Power
 Company

QA5-0

 DATE OF COMMUNICATION 5/12/80 & 5/13/80 SA-PERM PERSONNEL PARTICIPATING WRBird (DHorn 5/13/80 only)

 TITLE OF COMMUNICATION _____ OTHER PARTY(S) G Gallagher, NRC

 PREPARED BY WRBird

PROJECTS AND/OR SUBJECTS DISCUSSED

DIESEL GENERATOR SETTLEMENT PROBLEM - 50.54(f) COMMITMENTS ON
EQUIPMENT QUALIFICATION

SUMMARY OF CONVERSATION

5/12/80 - Mr Gallagher asked my assistance in obtaining compaction equipment qualifications.

NRC had asked for their submittal. The latest 50.54(f) response did not submit the data.

We said he had talked to D Horn several times over the last weeks about the NRC concerns

that the qualification records were not available. The following three points were made:

- 1) Qualifications are considered a permanent "Quality Record." 2) If they don't exist how can CP&C justify old work or justify continuing work? 3) Letters stating equipment is qualified is not good enough - a qualification report is needed.

I stated that I would investigate the situation and take appropriate action. Mr Gallagher stated that he would ask to see report on his next visit, and that there are other vehicles to accomplish their needs.

5/13/80 - We called Mr Gallagher back to give him a status of what my investigation

revealed and what specific actions we had directed:

- 1) Bechtel will release an official design disclosure (most likely SCH to Specification C-211) which will list the equipment qualifications and the limits of the qualification.

(OVER)

- 2) Bechtel Engineering had completed their review of the qualification report and Consumers will be finishing up our review today.

Mr Gallagher wondered how we could have been placing soils since last summer if a qualification report had not been reviewed and approved by Quality. He stated it would be a very serious situation if the analysis of the report showed there was equipment deemed to be not qualified which had been used for soils placement. Don Horn stated that his review to date has resulted in some questions on qualifications for placement of clay but that no Q placements have been made with this equipment. The qualification of the equipment for placement of sands appear to be substantiated. To our knowledge, no Q placements had been made prior to Bechtel Project Engineering's release of the equipment in writing to the field.

We stated that the qualification report was planned to be submitted in a June submittal.

WRB/lr

Editorial Note - Neither our 50.54(f) response nor the Bechtel Program requirements require a Quality Assurance line involvement in the Engineering activities to certify the qualification of the compaction equipment. FIC 1.100 places the qualification and records for qualification of compaction equipment with Geotech.

CC: JWCook, P14-113A
JLCorley, Midland
LRCurtis, Bechtel AA
LEDavis, Bechtel-Midland
LADreisbach, Bechtel-Midland
~~W. J. ...~~
DEHorn, Midland
BWMarguglio, JSC-220A
JMilandin, Bechtel AA
DEMiller, Midland
JARutgers, Bechtel AA

To File
Attachment 13
FROM TCCooke/RNW
DATE August 7, 1979
SUBJECT MIDLAND PROJECT GWO 7020
PRE-MEETING WITH CONSULTANTS 6/27/79
File: B3.0.3 Serial: CSC-4274 UFI#-00234-S-

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

CC Attendees
GSKeeley, P14-408B
DBMiller
KCBrooks (2)

Attendees:

Karl Wiedner, Bechtel Power
Phil Martinez, Bechtel Power
Sherif Afifi, Bechtel Power
Dr. Ralph Peck, Consultant
Dr. A. Hendron, Jr., Consultant
Dr. M. T. Davisson, Consultant
Tom Cooke, Consumers Power Company

There was a brief discussion on the various options. One of the main reasons for Option Five (Areal Dewatering) was that it grew to a large extent out of the dewatering process for Option One. The consultants expressed the opinion that we had to answer liquefaction questions wherever anyone might think they could occur (for example, the control tower at 6KSF loading). It could be a real thorn in the job at a later date, and areal dewatering is the only clean method. It is very hard to argue against dewatering, and it would be very difficult to prove the effectiveness of grouting. The question was asked about the water that could be trapped in clay. The consultants responded that over the long haul, it would drain with permanent drainage and could be proven by piezometers. While peripheral wells would probably do the job, there would be some intermediate wells. Any vein of water would be drained. Piezometers would convincingly prove that the area was dry. The construction dewatering process for the Auxiliary Building electrical penetration areas will assist in determining how much dewatering and how many wells, etc., are required. P. Martinez indicated that Bechtel would have to take another look at the design calculations in the foundation areas.

The Auxiliary Building electrical penetration area is a high narrow structure with a torsion box at the lower portion. The soil was designed to take the horizontal shear. The low soil blow counts values indicate that this structure is possibly being cantilevered to some extent off of the control tower. Dr. Peck expressed the need for the design basis for this structure. Dr. Hendron indicated that the borings were not necessarily indicative of what was beneath the structure. A parametric study for the structure should be made based on a range of soil properties. A quick rough analysis should first be done, followed by a detailed analysis. Karl Wiedner discussed the possible outer end settlement and his theory on how the structure had possibly picked up a cantilevered load during construction phases.

August 6, 1979

Tom Davisson then mentioned that, since we were thinking of permanent dewatering, a different underpinning method may be acceptable (one that would take vertical loads only). The Auxiliary Building control tower and the material below the electrical penetration areas have potential for horizontal shear resistance. The three options would be to: (1) do nothing, (2) supply something for vertical loads only, and (3) supply something for vertical loads and horizontal shear. The first step would be to check the horizontal shear resistance required. Possibly horizontal support could be picked up from the Reactor Building and/or Turbine Building. If we remove material and fix the end of the Auxiliary Building electrical penetration areas, we still would have to analyze for an unsupported mid span. Caissons were mentioned as another option. It was noted that even clay with an average blow count of three would have modest shear strength. The consultants noted that they did not have sufficient design information. Karl Wiedner and other Bechtel personnel present did not have all the answers on the design basis at the time of this meeting. However, at T. C. Cooke's suggestion, the consultants agreed to formulate their questions in writing for Bechtel response.

The consultants noted that in their opinion, \$ [redacted] Dollar Amounts Withheld for the underpinning of the Auxiliary Building electrical penetration areas was very low, especially when compared to the estimate of \$ [redacted] for permanent dewatering. They also stated that we definitely have a diesel-generator liquefaction problem although the sand would probably never actually liquefy during an earthquake. The problem was the difficulty in providing calculations which verify this and would not be subject to argument.

A brief discussion then followed concerning possible liquefaction regarding utilities, sand backfill around buildings, tank farm, railroad bay and control tower, etc. For the tank farm, railroad bay and control tower, a safety factor of 1.5 is generally acceptable. However, if for any reason, the acceleration criteria goes up in the future, Dr. Peck felt that it may be difficult to prove no liquefaction problems. The borings may not be completely satisfactory for the purpose of proving beyond a shadow of a doubt that everything was satisfactory because needlessly conservative decisions may be formulated on the "what if" type questions. The consultants noted that they were still in favor of a general dewatering program, especially in light of possibly more stringent seismic requirements in the future and the knowledge now available to the effect that generally speaking sand exists in more areas than originally anticipated in the power block area. The consultants believed that the permanent dewatering program, in general, was a must. The temporary dewatering system would show how the permanent system would work. The water can be lowered sufficiently to make the site acceptable in the new licensing arena. Dr. Peck stated that he could attend a meeting on the 18th of July in Washington to discuss the situation with the NRC.

To File

FROM TCCooke 

DATE August 10, 1979

SUBJECT MIDLAND PROJECT GWO 7020 - PRE-MEETING AND
GENERAL MEETING WITH CONSULTANTS

File: B3.0.3 UFI: 00234-S Serial: CSC-4306

**Consumers
POWER
Company**

INTERNAL
CORRESPONDENCE

CC Attendees
GSKeeley, P14-408B
DBMiller

RMWheeler
KCBrooks(2)

Attendees:

Karl Wiedner, Bechtel
Phil Martinez, Bechtel
Sheriff Afifi, Bechtel
Bimal Dhar, Bechtel
Al Boos, Bechtel
Art Arnold, Bechtel
Dr. Ralph Peck, Consultant
Dr. A. Hendron, Jr., Consultant

Dr. M. T. Davisson, Consultant
Chuck Gould, Consultant
Dick Loughney, Consultant
Tom Cooke, Consumers Power Company
Don Sibbald, Consumers Power Company
Don Horn, Consumers Power Company
Thiru Thiruvengandam, Consumers Power Co.

Please note that serials CSC-4274 and CSC-4255, above subject, omitted the location and dates of the meetings. Both meetings were held in Denver, Colorado. The Pre-Meeting (CSC-4274) was held on June 27, 1979, and the General Meeting (CSC-4255) was held on June 28, 1979.

Please attach this letter to your copy of the meeting notes.

sld

February 12, 1980

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SECY-80-83

Attachment 14

INFORMATION REPORT

For: The Commissioners

From: Victor Stello, Jr., Director
Office of Inspection and Enforcement

Thru: Executive Director for Operations *W. J. Stello*

Subject: SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Purpose: The purpose of this paper is to inform the Commission regarding the status of efforts by the Office of Inspection and Enforcement in the evaluation of licensee performance.

Discussion: In October 1978, IE submitted SECY 78-554 "Licensee Regulatory Performance Evaluation," which requested, and subsequently obtained, Commission approval for a two-year trial program for evaluating licensee regulatory performance. "Regulatory performance" was defined as the licensee's ability to meet regulatory requirements and to avoid reportable events.

SECY 78-554 indicated that an "integrated methodology" would be developed that incorporated selected aspects of the three previously considered methods (Statistical, Trend Analysis, and Regional Survey) that were described in the paper. The objectives of this methodology were defined as:

- . Identification of factors that lead to different levels of regulatory performance;
- . Effective and efficient use of NRC inspection resources; and
- . Evaluation of various aspects of the NRC inspection program.

The trial program was developed, but was never implemented because of the Three Mile Island (TMI) Accident.

A program for the comprehensive overview of licensee performance has been included as Task I.B.2 in the "Action Plans for Implementing Recommendations of the President's Commission and

Contact:
H. C. Thornburg, IE
49-16484

Other Studies of TMI-2 Accident" (NUREG-0660). This program is described in the enclosed paper and is entitled "Systematic Assessment of Licensee Performance" (SALP). The objectives of SALP are:

- . Identification of unacceptable licensee performance;
- . Improvement of licensee performance;
- . Improvement of IE Inspection Program;
- . Providing a basis for NRC management's allocation of resources; and
- . Achieving regional consistency by appraising licensee performance from a national perspective.

The SALP Program has been developed for power reactor licensees, but may, with modifications, be applicable to major materials licensees.

As was the case with the Licensee Regulatory Performance Evaluation, the SALP Program is designed to identify licensees whose regulatory performance warrants increased emphasis in licensing and inspection activities. If such licensees are identified, appropriate action will be initiated to upgrade the licensee performance; a major thrust of the SALP. The methodology has five (5) basic features:

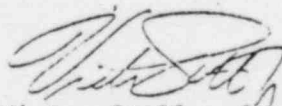
- . Evaluation of licensee performance by a board of regional inspectors, regional supervisors, and the NRR Project Manager (NMSS Project Manager for Materials licensees);
- . Determination by regional management of the action necessary to upgrade performance;
- . Holding annual meetings with licensee management to discuss the regional evaluations and planned actions;
- . Review of the evaluations of licensee performance and planned corrective action by a SALP Review Group, composed of senior NRC management personnel, with inputs from the regional evaluations, NRR appraisals, and the appraisals of other NRC offices (i.e., AEOD, PAB, etc.); and
- . Recommendations by the SALP Review Group to the appropriate NRC office director for major enforcement sanctions, license modifications, or increased (or decreased) inspection emphasis (frequency or scope) as warranted by the licensee evaluations.

Selected portions of the three previously considered methods of performance appraisal have been incorporated into the regional evaluations of licensee performance. An IE Manual Chapter (MC) defining the program for the regional evaluation of licensee performance is currently being reviewed by the regions. This MC will be issued in March 1980.

Regional evaluations will begin in April 1980 and will be completed in June 1980. The composition of the SALP Review Group, the procedures for Review Group operation, and details of the evaluations by the offices providing input to the Review Group, will be finalized by June 1980. The initial evaluations of the SALP Review Group will be completed in December 1980.

Coordination: The Offices of Nuclear Reactor Regulation, Management and Program Analysis, Analysis and Evaluation of Operational Data, and Standards Development concur. The Office of Nuclear Material Safety and Safeguards has no objection to the proposed program for reactor licensees.

The Executive Legal Director has no legal objections.



Victor Stello, Jr.
Director
Office of Inspection
and Enforcement

Enclosure:
"Systematic Assessment of
Licensee Performance"

This paper is scheduled for consideration at an open meeting on February 14, 1980.

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

1. INTRODUCTION

This paper describes the Systematic Assessment of Licensee Performance (SALP) which is a refinement of a program previously referred to as the "Integrated Approach" to Licensee Regulatory Performance Evaluation (LRPE). SALP, like LRPE, is defined as an evaluation of the ability of a licensee to meet regulatory requirements and to avoid significant events that appear to be directly under the control of the licensee.

The SALP Program was developed for power reactor facilities in operation and construction, and is based on certain aspects of previously conducted NRC studies, with the methods substantially modified. The SALP Program, with modifications, may be applicable to major fuel facilities and major by-product licensed facilities.

The requirements for licensee performance appraisal were first established in NUREG-0397, "Revised Inspection Program for Nuclear Power Plants", which includes a national performance appraisal capability that provides the following elements:

- Evaluation of the performance of NRC licensees from a national perspective;
- Evaluation of the effectiveness of the NRC inspection program; and
- Confirmation of the objectivity of NRC inspectors.

During October 1978, IE submitted SECY 78-554, "Licensee Regulatory Performance Evaluation", to the Commission. As described in SECY 78-554, the objectives of LRPE were as follows:

- Identification of factors that lead to different levels of regulatory performance;
- Effective and efficient use of NRC resources; and
- Evaluation of various aspects of the NRC inspection program.

SECY 78-554 described three methods (Statistical Method, Trend Analysis Method, and Regional Survey Method) of licensee performance appraisal which had been studied by NRC. It also proposed the implementation of a trial program which was referred to as the "integrated approach" methodology to Licensee Regulatory Performance Evaluation (LRPE). This methodology was to be used to evaluate operating reactor licensees using 1978-1979 data. The trial program was developed, but its implementation was interrupted by the Three Mile Island Accident.

As a result of the investigative studies of the Three Mile Island Accident, a program for the comprehensive evaluation of licensee performance has

been included as Task I.B.2 in the "Action Plan for Implementing Recommendations of the President's Commission and Other Studies of TMI-2 Accident" (NUREG-0660). The program outlined by Task I.B.2 is a refinement of the LRPE methodology. This program which is the subject of this paper has been entitled the Systematic Assessment of Licensee Performance (SALP) to coincide with the recommendations of the Kemeny Report. The objectives of SALP have been defined as:

- Identification of unacceptable licensee performance;
- Improvement of licensee performance;
- Improvement of IE Inspection Program;
- Providing a basis for NRC management's allocation of resources; and
- Achieving regional consistency by appraising licensee performance from a national perspective.

These objectives will be accomplished through the performance of periodic evaluations of licensees by IE and NRR. The evaluations will be reviewed by a SALP Review Group of senior management personnel from NRC offices. The results of the evaluations, the reviews by the SALP Review Group, and the plans for appropriate action by NRC will be documented and distributed to the appropriate office director, to the licensees, and to the Public Document Rooms. In addition, the regional offices will hold annual management meetings with each of the evaluated licensees to discuss the results of the evaluations.

The appropriate action to upgrade licensee performance will be initiated by the regional offices as a result of the evaluations and may include enforcement action, or increased inspection frequency and scope.

2. INTEGRATED ASSESSMENT OF LICENSEE PERFORMANCE

a. Program Inputs

Several groups within the NRC will provide inputs to SALP as follows:

- (1) The IE regional office will perform an evaluation of the performance of each licensee semiannually. This evaluation will be used to determine the need for an increase or decrease in the frequency and scope of regulatory activities. The region will document the results of the evaluation and their plans for action, and forward this documentation to the SALP Review Group.
- (2) NRR Project Managers will participate in the regional evaluations discussed in (1) above. The NRR Project Managers and technical support program personnel will also provide input

to the SALP Review Group. In addition, NRR will perform an independent study of the management capabilities and overall training of licensee employees. The results of this study will be submitted to the SALP Review Group for consideration during their initial evaluations.

- (3) The IE Performance Appraisal Branch will perform Management Appraisal (MA) and Program Appraisal (PA) inspections at licensee facilities. The reports of their inspections will contain an appraisal of licensee management which will be forwarded to the SALP Review Group. All licensees will not receive these inspections during the first two years of this program. However, it is expected that the number of licensees inspected will be sufficient to verify regional consistency.
- (4) Other NRC Offices (such as AEOD, etc) may provide input to the SALP Review Group as appraisal methodologies are developed with proven correlation to the safety of operations.

The regional evaluation discussed in (1) above will utilize appropriate portions of the three previously developed methods of performance evaluation. The details of the above evaluation/appraisal techniques will be discussed in Section 3 of this paper.

b. Review of Evaluation Results

Review of NRC evaluation results and the appropriate plans for upgrading performance will be conducted by the SALP Review Group consisting of senior managers from the NRC offices appointed by the Executive Director for Operations. The Review Group will provide an overview function of the evaluations and render an assessment of the safety adequacy of each facility and the adequacy of upgrading plans. Based on the findings, the Review Group is specifically charged to recommend major enforcement sanctions or license modifications to appropriate office directors. The Review Group will also confirm the consistency of regional evaluations and the regional implementation of NRC inspection programs.

The SALP Review Group, in addition to receiving inputs from regional evaluations, will receive inputs from NRR, IE Headquarters, and from other NRC offices as appropriate. The Review Group will convene at least once every six (6) months and review the evaluations of the licensees that are classified as needing "increased inspection scope/frequency." The remaining licensee evaluations will be evaluated once every twelve (12) months.

c. Feedback of Evaluation Results

The primary objectives of SALP are to identify unacceptable elements of licensee performance and to subsequently improve (upgrade) licensee performance. The former objective is achieved by the regional

evaluations and the reviews by the SALP Review Group, but to improve performance the results of these evaluations must be communicated to NRC management. The results of the regional evaluations and the recommended plan for the appropriate corrective action is forwarded to the Regional Director for review and approval. The results of the SALP Review Group are forwarded to the appropriate office director indicating a concurrence with the proposed regional action or recommending additional or alternate action.

NRC offices providing evaluation information will document the results of their evaluations with distribution to the licensee, PDR, and to the SALP Review Group. In addition, the region will submit an interoffice memorandum detailing the future plans for action by the region to correct the deficiencies identified during the evaluation.

The Review Group will issue a report at the conclusion of their periodic reviews to document the extent of their concurrence with the regional evaluations and proposed actions; or their recommendations for additional or alternate action.

Annual meetings will be conducted by regional management with the managements of the licensees evaluated by this program. These meetings will be utilized to discuss the results of the licensee performance evaluations and the NRC's general plan of action for correcting deficiencies.

3. METHODOLOGIES

a. Regional Evaluation

Each region will perform a detailed evaluation of their power reactor licensees semiannually. The evaluations will be performed by a board of the inspectors (including the resident inspector) and supervisors involved in the inspection program for that licensee. The board will also include the NRR Project Manager for the facility. The board will consider the enforcement actions, deficiency/event reports, technical and management performance, and safety attitudes of the licensee. The evaluations will also be based on the observations of the board members and their judgments of the licensee's performance. The evaluation will be the board's consensus of licensee performance; however, dissenting opinions with substantive comments will be included and transmitted to the SALP Review Group for concurrent evaluation. A number of functional areas will be evaluated by the board and a classification of "increase," "decrease," or "no-change" in the frequency and scope of inspection effort will be assigned for each functional area. The board will also provide an overall evaluation of the licensee and a detailed plan of the appropriate actions to upgrade performance.

The evaluation of each functional area will include the following considerations:

- . Adequacy of administrative controls;
- . Adequacy of supervisory review in the functional area;
- . Adequacy of training and qualification of personnel;
- . Adequacy of documentation and records control systems;
- . Overall effectiveness in complying with NRC requirements;
- . Attitude in assuring safe operations; and
- . Significant performance deviations or trends noted from previous evaluations.

The board's evaluation of the licensee's enforcement history in each functional area will include identified items of noncompliance and escalated enforcement actions. A statistical analysis will not be performed on noncompliance data; but an indepth analysis of indicated trends and sanction points will be determined and will be considered in the evaluation.

The board's review of deficiency/event reports will consider the number, significance and repetitive nature of the non-routine events or construction deficiencies in each functional area. The board will provide an indepth analysis of these reports to identify adverse trends (causally-linked events) which indicate insufficient attention to the correction of the events or insufficient capabilities of licensee management in the functional areas. This analysis is similar to that developed in the Trend Analysis Method described in SECY 78-554.

The NRR Project Manager will provide input on the licensee's performance in those functional areas in which he is knowledgeable.

A manual chapter is being developed that specifies the functional areas to be evaluated and the methodology for performing the evaluations.

This evaluation differs from the Regional Survey Method performed by the Hays Associates (referenced in SECY 78-554) in that it is a structured evaluation which represents the consensus of regional personnel and is supportable by inspection results and event reports as opposed to the Hays questionnaire which contained anonymous unsupported opinions.

b. Evaluations by NRR

NRR project managers and NRR technical support program personnel will perform an evaluation of each power reactor licensee semiannually and will submit the evaluation to the SALP Review Group for inclusion in their review. The details of this evaluation are yet to be developed.

In addition, the NRR QA Branch and selected contractors are developing acceptance criteria to describe the capabilities (number of people, kinds of people, background, experience, training, etc.) required of licensee management. This program is Task I.B.1 in NUREG-0660. They will subsequently evaluate all licensees against these criteria. Deficiencies identified in this study will be discussed with each licensee and will be documented in a report. NRR plans to complete this effort in the spring of 1980. The results of this one-time study will be provided to the SALP Review Group for their initial evaluations.

c. Performance Appraisal Branch (PAB) Inspections

Management Appraisal (MA) Inspections will be performed by the PAB on selected licensees in each Region. The objectives of these inspections are to provide a national perspective of licensee performance; to identify performance traits that licensees may have in common; and to confirm inspector objectivity.

The MA inspections are conducted at the licensee's corporate offices and at the reactor site with emphasis on evaluating the effectiveness of the licensee's management in controlling licensed activities and in providing technical support to ensure compliance with regulatory requirements and safety of operations. Results of these inspections will be furnished to the the SALP Review Group.

The technique for appraising licensee management performance is discussed in detail in the PAB annual report for FY 79. Basically, the MA inspection involves an appraisal of the licensee in a number of functional areas. The appraisals in these functional areas are based on a management control system which should contain the following features:

- . Written policies and procedures
- . Adequacy of the program to cover current requirements and guidance
- . Qualification and training of personnel implementing the program
- . Awareness by the personnel implementing the program of their responsibilities

Implementation of the program

IE Program Appraisal (PA) Inspections will also be conducted. These inspections are primarily designed to determine IE program effectiveness; however, information from these inspections will be provided to the SALP Review Group when the inspection results indicate a licensee performance problem or a significant program weakness.

Manual chapters are being developed specifying the methodologies of the MA and PA inspections and appraisals.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Attachment 15
1007

April 3, 1979

MEMORANDUM FOR: Harold D. Thornburg, Director, Division of Reactor
Construction Inspection, IE

FROM: James G. Keppler, Director

SUBJECT: ENFORCEMENT ACTION RE: MIDLAND DIESEL GENERATOR
BUILDING AND PLANT FILL AREA

As you are aware, we have sent to Consumers Power Company a report on our two meetings held with them and a report of the investigation into the causes of the diesel generator building settlement. In my memorandum to you dated March 12, 1979, I summarized our findings and our concerns resulting from this investigation.

In view of NRR's involvement in the technical issues in this case, and the need for a determination as to the materiality of FSAR statements we consider to be false, we are not in a position at this time to recommend specific enforcement action which should be taken.

Attached to this memorandum are the specific FSAR statements and the basis for our conclusion that they are false. Also attached are copies of our letter dated March 22, 1979, which transmitted the Investigation report to the licensee and a draft Notice of Violation setting forth the items of noncompliance based on the investigation findings. The draft Notice of Violation includes all of the FSAR discrepancies described in Attachment 1 as examples of noncompliance with Criterion III of 10 CFR 50, Appendix B. If it is determined that any of these matters constitute material false statements, we assume they would then be treated separately, and removed as examples of noncompliance with this criteria.

Harold D. Thornburg

- 2 -

April 3, 1979

We request that the items of noncompliance be given technical and legal review and that a determination be made of the materiality of FSAR discrepancies so that upon resolution of the technical issues, we will be in a position to move more promptly toward taking enforcement action.

James G. Keppler
James G. Keppler
Director

Attachments:

1. FSAR False Statements
2. Draft Notice of Violation
3. Ltr dtd 3/22/79, with
Investigation Report

cc w/attachments:

D. Thompson, IE

Midland FSAR Statements

1. Statement

Section 2.5.4.5.3, Fill, states: "All fill and backfill were placed according to Table 2.5-9."

Table 2.5-9, Minimum Compaction Criteria, contains the following:

<u>"Function</u>	Zone ⁽¹⁾ <u>Designation</u>	<u>Soil</u> <u>Type</u>	<u>Compaction Criteria</u>	
			<u>Degree</u>	<u>ASTM Designation</u>
Support of structures		Clay	95%	ASTM D 1557-66T (modified) ⁽²⁾

(1) For zone designation see Table 2.5-10.

(2) The method was modified to get 20,000 foot-pounds of compactive energy per cubic foot of soil."

Section 2.5.4.10.1, Bearing Capacity, states: "Table 2.5-14 shows the contact stress beneath footings subject to static and static plus dynamic loadings, the foundation elevation, and the type of supporting medium for various plant structures."

Table 2.5-14, Summary of Contact Stresses and Ultimate Bearing Capacity for Mat Foundations Supporting Seismic Category I and II Structures, contains, in part; the following:

<u>"Unit</u>	<u>Supporting Soils</u>
Diesel Generator Building	Controlled compacted cohesive fill.

Finding

Construction Drawing C-45, Class I fill material areas, specifies the foundation material for Class I structures to be Zone 2 material which is identified in FSAR Table 2.5-10, Gradation Ranges for Fill Material, as Random Fill and is described as "Any material free of humus, organic or other deleterious material." It was ascertained that materials other than "clay" or "controlled compacted cohesive fill" were used for support of structures.

2. Statement

Section 2.5.4.10.3.1, Plant Layout and Loads, states: "The building loads superimposed by the structures on undisturbed soil or compacted fill are given in the soil pressure plan, Figure 2.5-47."

Figure 2.5-47, Soil Pressure Diagram Category I and II Structures, shows the superimposed load density for the Diesel Generator Building to be 4.0 KSF (4000 lbs. per sq. ft.).

Finding

It was ascertained through a review of the settlement calculations and an interview of the individual who performed those calculations that 3.0 KSF was used.

3. Statement

Section 2.5.4.10.3.3, Soil Parameters, states: "The soil compressibility parameters used in the settlement calculation are presented together with soil profile in Table 2.5-16."

Table 2.5-16, Idealized Soil Profile and Parameters for Elastic Half-space Settlement and Heave Analysis, contains the following:

<u>Layer</u>	<u>Idealized Soil Type</u>	<u>Elevation Interval (ft)</u>	<u>Thickness (ft)</u>	<u>Average $C_c \cdot r^{(1)}$ $\frac{1+e_o}{}$</u>
A	Fill (CL)	634-609	25	0.003
B	Fill (CL)	609-603	6	0.003

NOTE: Final groundwater table is taken at elevation 627.

(1) Values were estimated from the mathematical relationship between Young's Modulus and Compression and rebound indexes and averaged with those obtained from consolidation tests. Young's Modulus was estimated from empirical relationship with shear strength.

Finding

It was ascertained through a review of the statement calculations for the Diesel Generator Building and an interview with the individual who performed these calculations that an index of compressibility of 0.001 not 0.003, was used for the elevation interval 603-634.

4. Statement

Section 2.5.4.10.3.5, Analysis, states: "For settlement computations, a total of 41 settlement points are established on a grid and at selected structure locations as shown in Figure 2.5-48. . . . To account for possible time-dependent relationship, the estimated total settlements at each of the 41 points were obtained respectively by adding 25% of the calculated settlement values of loading Case A to the calculated ultimate settlement values of loading Case B. These values are presented in Figure 2.5-48."

Section 3.8.4.1.2, Diesel Generator Building, states: "The walls are supported by continuous footings with bases at elevation 628'-0". Each diesel generator rests on a 6'-6" thick reinforced concrete pedestal which is not structurally connected to the building foundation for purposes of vibration isolation."

Finding

It was ascertained through a review of the settlement calculations for the Diesel Generator Building and an interview with the individual who performed these calculations that the data in Figure 2.5-48 regarding the Diesel Generator Building are based on calculations performed on the erroneous assumption that the Diesel Generator Building was constructed on a mat foundation.

5. Statement

Section 3.8.5.5, Structural Acceptance Criteria, states: "Settlements of shallow spread footings founded on compacted fills are estimated to be on the order of 1/2 inch or less. These settlements are essentially elastic and occur as the loads are applied."

Finding

It was ascertained through an interview with the individual who wrote this section of the FSAR that the above statement was taken from the Dames and Moore report submitted as part of the PSAR. He assumed the statement was valid for inclusion in the FSAR. He said there was no other basis to support the statement.

(NOTE: In this regard the licensee has subsequently stated this statement ". . . is not applicable to the as-built configurations and conditions of the diesel generator building and has been eliminated from the FSAR in Revision 18.")

Appendix A

NOTICE OF VIOLATION

Consumers Power
Company

Docket No. 50-329
Docket No. 50-330

Based on the results of an NRC investigation conducted on December 11-13, 18-20, 1978, and January 4-5, 9-11, 22-25, 1979, it appears that certain of your activities were not conducted in full compliance with NRC requirements as noted below. These items are infractions.

1. 10 CFR 50, Appendix B, Criterion III requires, in part, that measures shall be established and executed to assure that regulatory requirements and the design basis as specified in the license application for structures are correctly translated into specifications, drawings, procedures and instructions. Also, it provides that measures shall be established for the identification and control of design interfaces and for coordinates among participating design organizations.

CPCo Topical Report CPC-1-A policy No. 3, Section 3.4 states, in part, "the assigned lead design group or organization (i.e., the NSSS supplier, A&E, supplier or CPCo) assure that designs and materials are suitable and that they comply with design criteria and regulatory requirements."

CPCo is committed to ANSI N45.2 (1971), Section 4.1, which states, in part, "measures shall be established and documented to assure that the applicable specified design requirements, such as a design basis, regulatory requirements . . . are correctly translated into specifications, drawings, procedures, or instructions."

Contrary to the above, measures did not assure that design basis were included in drawings and specifications nor did they provide for the identification and control of design interfaces. As a result, several inconsistencies were identified in the license application and in other design basis documents. Specific examples are set forth below:

- a. Construction Drawing C-45 (Class I fill material areas) specifies the foundation material for Class I structures to be Zone 2 material, defined as any material free of humus, organic or other deleterious material with no restrictions or gradation while FSAR Tables 2.5-9 and 2.5-14 indicate the foundation material for support of Class I structures to be controlled compacted cohesive (clay) material.

- b. The FSAR is internally inconsistent in that FSAR Figure 2.5-48 indicates settlement of the Diesel Generator Building to be on the order of 3" while FSAR Section 3.8.5.5 (structural acceptance criteria) indicates settlements on shallow spread footings founded on compacted fill to be on the order of 1/2" or less. The Diesel Generator Building is supported by a continuous shallow spread footing.

- c. The design settlement calculations for the diesel generator and borated water storage tanks were performed on the assumption of uniform mat foundations while these foundations were designed and constructed as spread footing foundations.

- d. The settlement calculations for the Diesel Generator Building indicate a load intensity of 3000 PSF while the FSAR, Figure 2.5-47, shows a load intensity of 4000 PSF, as actually constructed.

- e. The settlement calculations for the diesel generator building were based on an index of compressibility of the plant fill between elevations 603 and 634 of 0.001. These settlement

values were shown in FSAR Figure 2.5-48. However, FSAR, Table 2.5-16, indicates an index of compressibility of the same plant fill to be 0.003.

- f. PSAR, Amendment 3, indicated that if filling and backfilling operations are discontinued during periods of cold weather, all frozen soil would be removed or recompact prior to the resumption of operations. Bechtel specification C-210 does not specifically include instructions for removal of frozen/thawed compacted material upon resumption of work after winter periods.
 - g. PSAR Amendment 3 indicates that cohesionless soil (sand) would be compacted to 85% relative density according to ASTM D-2049. However, Bechtel specification C-210, Section 13.7.2 required cohesionless soil to be compacted to not less than 80% relative density.
2. 10 CFR 50, Appendix B, Criterion V requires, in part, that activities affecting quality shall be prescribed and accomplished in accordance with documented instructions, procedures or drawings.

CPCo Topical Report CPC-1-A Policy No. 5, Section 1.0 states, in part, that, "Instructions for controlling and performing activities affecting quality of equipment or operation during design, construction and operations phase of the nuclear power plant such as procurement,

manufacturing, construction, installation, inspection, testing
. . . are documented in instruction, procedures, specifications
. . . these documents provide qualitative and quantitative acceptance
criteria for determining important activities have been satisfactorily
accomplished.

CPCo is committed to ANSI N45.2 (1971), Section 6 which states, in
part, "activities affecting quality shall be prescribed by documented
instructions, procedures, or drawings, of a type appropriate to the
circumstances and shall be accomplished in accordance with these
instructions, procedures or drawings."

- a. Contrary to the above, instructions provided to field
construction for substituting lean concrete for Zone 2 material
did not address the differing foundation properties which
would result in differential settlement of the Diesel Generator
Building.
- b. Also, contrary to the above, certain activities were not accom-
plished according to instruction and procedures, in that:
 - (1) The compaction criteria used for fill material was 20,000
ft-lbs (Bechtel modified proctor test) rather than a

compactive energy of 56,000 ft-lbs as specified in Bechtel Specification C-210, Section 13.7.

- (2) Soils activities were not accomplished under the continuous supervision of a qualified soils engineer who would perform in-place density tests in the compacted fill to verify that all materials are placed and compacted in accordance with specification criteria. This is required by Bechtel Specification C-501 as well as PSAR, Amendment 3 (Dames and Moore Report, page 16).
3. 10 CFR 50, Appendix B, Criterion X requires, in Part, that a program for inspection of activities affecting quality shall be established and executed to verify conformance with the documented instruction, procedures and drawings for accomplishing the activity.

CPCo Topical Report CPC-1-A Policy No. 10, Section 3.1, states, in part, that "work activities are accomplished according to approved procedures or instructions which include inspection hold points beyond which work does not proceed until the inspection is complete or written consent for bypassing the inspection has been received from the organization authorized to perform the inspections."

CPCo is committed to ANSI N45.2 (1971), which states, in part, "A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance to the documented instructions, procedures, and drawings for accomplishing the activity."

Contrary to the above, Quality Control Instruction C-1.02 the program for inspection of compacted backfill issued on October 18, 1976, did not provide for inspection hold points to verify that soil work was satisfactorily accomplished according to documented instructions.

4. 10 CFR 50, Appendix B, Criterion XVI requires, in part, that measures shall be established to assure that conditions adverse to quality such as failures, deficiencies, defective material and nonconformances are promptly identified and corrected. In case of significant conditions adverse to quality, measures shall assure that corrective action is taken to preclude repetition.

CPCo Topical Report CPC-1-A Policy No. 16, Section 1.0 states, in part, "corrective action is that action taken to correct and preclude recurrence of significant conditions adverse to the quality of items or operations. Corrective action includes an evaluation of the

conditions that led to a nonconformance, that disposition of the nonconformance and completions of the actions necessary to prevent or reduce the possibility of recurrence."

Contrary to the above, measures did not assure that soils conditions of adverse quality were promptly corrected to preclude repetition.

For example:

- a. As of January 25, 1979, moisture control in fill material had not been established nor adequate direction given to implement this specification requirement. The finding that the field was not performing moisture control tests as required by specification C-210 was identified in Quality Action Request SD-40, dated July 22, 1977.
- b. Corrective action regarding nonconformance reports related to plant fill was insufficient or inadequate to preclude repetition as evidenced by repeated deviations from specification requirements. For example, nonconformance reports No. CPCo QF-29, QF-52, QF-68, QF-147, QF-174, QF-172 and QF-199 contain numerous examples of repeated nonconformances in the same areas of plant fill construction.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137
M10 22 1979

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. Stephen H. Howell
Vice President
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This refers to the investigation conducted by Messrs. G. A. Phillip, E. G. Gallagher and G. F. Maxwell of this office on December 11-13, 18-20, 1978, and January 4-5, 9-11 and 22-25, 1979, of activities at the Midland Nuclear Plant, Units 1 and 2, authorized by NRC Construction Permits No. CPPR-81 and No. CPPR-82. The investigation related to the settlement of the diesel generator building at Midland and the adequacy of the plant area fill. The preliminary results of this investigation were discussed with Consumers Power Company and Bechtel Corporation representatives in our office on February 23 and March 5, 1979. The report on the matters discussed during those meetings were included with my letter to you dated March 15, 1979. That letter also set forth the principal matters of our concern as a result of this investigation.

Enclosed is a copy of the report of this investigation. In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed investigation report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office within twenty days of your receipt of this notice, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

22 1976

The results of this investigation continue to be under review by the NRC staff. Upon completion of this review you will be advised of any enforcement action to be taken by the Commission.

Should you have any questions concerning this investigation, we would be pleased to discuss them with you.

Sincerely,

James G. Keppler
Director

Enclosure: IE Investigation
Reports No. 50-329/78-20
and No. 50-330/78-20

cc w/encl:
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Dr. Wayne E. North
Myron M. Cherry, Chicago

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 050-329/78-20; 050-330/78-20

Subject: Consumers Power Company
Midland Nuclear Power Plant, Units 1 and 2
Midland, Michigan

Settlement of the Diesel Generator Building

Period of Investigation: December 11-13, 18-20, 1978 and January 4-5,
9-11, 22-25, February 23, March 5, 1979

Investigators: *G. A. Phillip*
G. A. Phillip

3-19-79

E. J. Gallagher
E. J. Gallagher

3-19-79

G. F. Maxwell
G. F. Maxwell

3-19-79

Reviewed By: *D. W. Hayes*
D. W. Hayes, Chief
Engineering Support Section 1

3/19/79

G. Fibrelli
G. Fibrelli, Chief
Reactor Construction and
Engineering Support Branch

3/19/79

C. E. Norelius
C. E. Norelius
Assistant to the Director

3/19/79

REASON FOR INVESTIGATION

On September 7, 1978, the licensee notified Region III, by telephone, that the settlement of the Diesel Generator Building and foundations experienced constituted a matter reportable under the requirements of 10 CFR 50.55(e). Written interim reports were subsequently submitted by the licensee by letters dated September 29 and November 7, 1978. An investigation was initiated to obtain information concerning the circumstances of this occurrence to determine whether: a breakdown in the Quality Assurance program had occurred; the occurrence had been properly reported; and, whether the FSAR statements were consistent with the design and construction of the plant.

SCOPE

This investigation was performed to obtain information relating to design and construction activities affecting the Diesel Generator Building foundations and the activities involved in the identification and reporting of unusual settlement of the building. The investigation consisted of an examination of pertinent records and procedures and interviews with personnel at the Midland site, the Consumers Power Company offices in Jackson, Michigan, and the Bechtel Power Corporation offices in Ann Arbor, Michigan.

SUMMARY OF FACTS

By letter dated September 29, 1978, the licensee submitted a report as required by 10 CFR 50.55(e) concerning an unusual degree of settlement of the Diesel Generator Building (DGB). This report confirmed information provided during earlier telephone conversations on or about August 22, 1978, with the NRC Resident Inspector and on September 7, 1978, with the Region III office. This report was an interim report and was followed by periodic interim reports providing additional information concerning actions being taken to resolve the problem. Further testing and monitoring programs and an evaluation of the resulting data have been undertaken by the licensee to determine the cause of the settlement and the adequacy of the corrective action being taken. The results of these efforts will be submitted in a final report to the NRC.

Information obtained during this investigation indicates: (1) A lack of control and supervision of plant fill activities contributed to the inadequate compaction of foundation material; (2) corrective action regarding nonconformances related to plant fill was insufficient or

inadequate as evidenced by the repeated deviations from specification requirements; (3) certain design bases and construction specifications related to foundation type, material properties and compaction requirements were not followed; (4) there was a lack of clear direction and support between the contractors engineering office and construction site as well as within the contractors engineering office; and, (5) the PSAP contains inconsistent, incorrect and unsupported statements with respect to foundation type, soil properties and settlement values.

DETAILS

Persons Contacted

During this investigation approximately 50 individuals were contacted. Twelve CPCo personnel which included corporate engineering and quality assurance personnel as well as site management, quality assurance and quality control personnel. Thirty-two Bechtel personnel were contacted. These largely consisted of site engineering, quality assurance, quality control, survey and labor supervisors and personnel in project engineering, quality assurance and Geotech at the Ann Arbor, Michigan office. Three individuals employed by U.S. Testing Company were also interviewed.

Introduction

On August 22, 1978, the licensee informed the NRC Resident Inspector at the Midland site that unusual settlement of the Diesel Generator Building (DGB) had been detected through the established Foundation Data Survey Program. While the licensee regarded the matter as serious it was not considered to be reportable under the provisions of 10 CFR 50.55(e) until further data was obtained.

Following the acquisition of additional data from further surveys and a core boring program which was initiated on August 25, 1978, the licensee concluded the matter was reportable and so telephonically notified Region III on September 7, 1978. The notification was followed up by a series of interim reports the first of which was submitted to Region III by letter dated September 29, 1978. Subsequent interim reports were transmitted by letters dated November 7, 1978 and January 5, 1979.

An inspection was conducted by Region III during the period October 24-27, 1978, to review the data then available; to observe the current condition of the structure; and, to review current activities. Information regarding the inspection is contained in NRC Inspection Report No. 50-329/78-12; 50-330/78-12.

On December 3-4, 1978, a meeting with NRR and Region III representatives was held at the Midland site to review the status of the problem, to discuss open items identified in the aforementioned inspection report and possible corrective actions.

Identification and Reporting of Diesel Generator Building Settlement

Surveys to establish a baseline elevation for the DGB were completed by Bechtel on May 9, 1978. As a result of these surveys, the Chief of Survey Parties noted what he considered to be unusual settlement. He

indicated that from his experience he would have expected about 1/8" settlement. The July 22 data showed a differential settlement between various locations ranging from 1/4" to a maximum of 1 5/8". He promptly instructed his survey personnel to resurvey to determine whether the data was accurate. The resurvey confirmed the accuracy of the survey data. The Chief of Survey Parties reported the survey results to the Bechtel lead civil field engineer.

The lead civil field engineer said that in July 1978 the settlement of a pedestal in the DGB was noted from surveys and about a week later a 1" discrepancy was noted when scribes on the DGB were being moved up. He said that at that time he was uncertain as to whether actual settlement had occurred, the survey was in error or the apparent discrepancy was a construction error. He instructed the Chief of Survey Parties to check his survey results and to perform surveys more frequently than the 60-day intervals required by the survey program as a means of determining whether actual settlement had occurred and whether settlement continued.

The Field Project Engineer was also informed of the apparent settlement and concurred with the lead civil field engineer's actions. He said he had toured the building at that time and he saw no visible indications of stress which could be expected when unusual settlement occurs.

The lead civil field engineer said the DGB was monitored for about a month. He compared the amount of settlement being experienced with the settlement values reflected in Figure 2.5-48 of the FSAR and did not consider it reportable until those values were exceeded. When the settlement did exceed those values as indicated by survey data obtained on about August 18, 1978, he prepared a nonconformance report with the assistance of OC personnel.

The July 22 survey data was transmitted by the site to the Bechtel Project Engineering office in Ann Arbor by a routine transmittal memo dated July 26, 1978. The data was received at Ann Arbor, processed through document control on August 9, 1978, and was routinely routed to the Civil Engineering Group Supervisor. He stated he did not review the data but placed a route slip on it indicating those members of his group who should review it.

The engineer in the Civil Group, who had established the survey program and who was responsible for assuring it was being carried out, stated he reviewed the data and did not regard it as unusual. For that reason he did not bring the matter to anyone's attention but merely routed it to other personnel in the civil group. The engineer responsible for the DGB said he did not see the data before the settlement problem was identified by the field in a nonconformance report.

With the issuance of the nonconformance report, No. 1482, on August 18, 1978, CPCo was also informed of this condition. On or about August 21, 1978, the NRC Resident Inspector was orally informed of the matter by CPCo. It was indicated at that time that although CPCo regarded the matter as serious, they did not consider it to be reportable under 10 CFR 50.55(e).

Construction on the DGB was placed on hold on August 23, 1978 and a test boring program was initiated on August 25, 1978. After preliminary evaluation of soil boring data, a Management Corrective Action Report (MCAR), No. 24, was issued by Bechtel on September 7, 1978. The MCAR stated that based on a preliminary evaluation of the data, the matter was reportable under 10 CFR 50.55(e), 1, iii and Region III was so notified by telephone on that date.

The telephone notification was subsequently followed up by a letter dated September 29, 1978, from CPCo enclosing a copy of MCAR 24 and Interim Report 1 prepared by Bechtel.

On the basis of the above, it is concluded that in this instance the licensee complied with the reporting requirements of 10 CFR 50.55(e).

Review of PSAR/FSAR Commitments on Compacted Fill Material

In a previous NRC Inspection Report, No. 329/78-12; 330 78-12, an apparent inconsistency was identified between FSAR Table 2.5-14 (Summary of Foundations Supporting Seismic Category I and II Structures), Table 2.5-9 (Minimum Compaction Criteria) and the site construction drawing C-45 (Class I Fill Material Areas) regarding the type of foundation material to be used for plant area fill. Table 2.5-14 identifies the supporting soil materials for the Auxiliary Building D, E, F, and G, Radwaste Building, Diesel Generator Building and Borated Water Storage Tanks to be "controlled compacted cohesive fill." Table 2.5-9 also indicates the soil type for "support of structures" to be clay. Contrary to these FSAR commitments, drawing C-45 indicates Zone 2 (random fill) material, defined in Table 2.5-10 as "any material free of humus, organic or other deleterious material," is to be used with "no restrictions on gradation." Boring samples substantiated that Zone 2 (random fill) material was in fact used.

During this investigation a review of documentation showed that the commitment to use cohesive soils was also made in response to PSAR question 5.1.11 and submitted in PSAR Amendment 6, dated December 12, 1969, which states, "Soils above Elevation 605 will be cohesive soils in an engineered backfill." This response also indicated that certain class 1 components such as, emergency diesel generators, borated water storage tanks and associated piping and electrical conduit would be founded on this material.

CPCo quality assurance issued a nonconformance report QF-66, dated October 10, 1975, which stated that contrary to the PSAR statement (quoted above) Specification C-211 being implemented at the site required cohesionless (sand) material to be used within 3 feet of the walls of the plant area structures. The corrective action taken was for Bechtel to issue SAR Change Notice No. 0097 which stated, "The FSAP will clarify the use of cohesive and cohesionless soils for support of Class 1 structures." As noted above, the FSAR tables 2.5-14 and 2.5-9 once again stated that cohesive (clay) material was used for support of structures while the construction drawing continued to permit the use of random fill material.

This investigation included efforts to ascertain whether procedures were established and implemented for the preparation, control and review of the technical criteria set forth in the safety analysis report (SAR). This included the role of both Bechtel and CPCo in the review of the SAR. Bechtel had established control of the SAR in procedure MED 4.22 (Preparation and Control of Safety Analysis Report Revision 1, dated June 20, 1974). The SAR preparation and review flow chart requires the Engineering Group Supervisor (EGS) to review the originator's draft for technical accuracy and compliance with the standard format guide. Records indicated that Section 2.5.4 was originated by the Bechtel Geotech group on January 3, 1977. It was reviewed and approved for technical accuracy by an engineer in the civil project group on April 29, 1977. No technical inaccuracies were noted in the documentation. The Civil EGS advised that he did not personally review Section 2.5.4.

The designated engineer stated that in his review of the section he was primarily concerned with the Auxiliary Building not the Diesel Generator Building. He said the review of FSAR material was performed by members of a group set up for this purpose. Not all of the content was checked since they relied to some extent on the originator. The author of Section 2.5.4 said he was not aware that changes regarding fill material had occurred since the preparation of the PSAR. It was ascertained that Field Engineering did not review the FSAR prior to its submittal.

A partial review of the FSAR revealed that although Figure 2.5-48 indicates anticipated settlement of the Diesel Generator Building during the life of the plant to be on the order of 3 inches. Section 3.8.5.5 (Structural Acceptance Criteria) contains the following statement: "Settlements on shallow spread footings founded on compacted fills are estimated to be on the order of 1/2" or less."

Section 3.8 was prepared by Project Engineering. Geotech, who prepared Section 2.5, said they were unaware of the presence of the statement regarding 1/2" settlement in Section 3.8. The originator of Section 3.8

said that the above statement was taken from the Dames and Moore report submitted as part of the PSAR. Since the PSAR did not show any change in this regard, he assumed the statement was valid for inclusion in the FSAR. He said there was no other basis to support this statement.

CPCo also has an established procedure for the review and final approval of the SAR by procedure MPPM-13 dated June 23, 1976. Section 5.6 states that "CPCo shall approve all final draft sections of the FSAR prior to final printing." Discussion with the responsible licensee representatives for review of Section 2.5.4 indicated that a limited amount of cross-reference verification of technical content of the FSAR is performed by CPCo.

The CPCo Project Engineer in Jackson stated that the review of drawings and specifications was an owner's preference kind of thing. No attempt was made to review all drawings and specifications since they did not have the manpower or expertise for that type of review. The staff engineers of the various disciplines were asked to indicate the drawings and specifications they wanted to review.

Regarding the review of the FSAR, he said that he had prepared a memorandum to the staff engineers stating the procedure that would be followed in performing the review. An examination of this memo, dated July 28, 1976, showed that prime reviewers would perform a technical review, resolve comments made by other reviewers and perform the CPCo licensing review to assure compliance with required FSAR format and content.

As portions of the FSAR were received from Bechtel, CPCo sent comments to Bechtel. Following this review, meetings between Bechtel and CPCo were held to clear up any unresolved matters before each section was released for printing. A review of the files at CPCo relating to Section 2.5 and 3.8 showed that no comments were made concerning the above inconsistent and incorrect content. The apparent inconsistent and incorrect statements were not identified during the review of the FSAR prior to submittal and the review procedures did not provide any mechanism to identify apparent inconsistencies between sections of the FSAR.

Based on the above, measures did not assure that design basis included in design drawings and specifications were translated into the license application which resulted as an inconsistency between the design drawings and the FSAR. This is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion III as identified in Appendix A. (329/78-20-01; 330/78-20-01)

Effect of Ground Water in Plant Area Fill

Final plant grade will be established at elevation 634. The normal ground water was assumed to be at ground surface prior to construction, approximately elevation 603. The surface of the water in the cooling water pond will be at a maximum of approximately elevation 627.

The Dames and Moore report on Foundation Investigation submitted with PSAR Amendment No. 1, dated February 3, 1969, stated that, "The effect of raising the water level to elevation 625 in the reservoirs will cause the normal ground water level in the general plant area to eventually rise to approximately elevation 625. However, a drainage system will be provided to maintain the ground water level in the plant fill at elevation 603."

A supplement to Dames and Moore report was submitted in PSAR Amendment No. 3, dated August 13, 1969, which changed the above planning of a drainage system to control the ground water. The supplement states, "The underdrainage system considered in the initial report has been eliminated; consequently it is assumed that the ground water level in the plant area will rise concurrently to approximately elevation 625."

A Bechtel soils consultant theorized in a December 4, 1978, site meeting that if soils beneath the diesel generator building had been compacted too dry of optimum, changes in moisture after placement could cause the soils to settle significantly. Therefore, the total effect of the ground water being permitted to saturate the plant fill material is undetermined at this time. An evaluation of this condition is under review by the licensee. This item is considered unresolved. (329/78-20-02; 330/78-20-02)

Review of Compaction Requirements for Plant Area Fill

During the investigation a review of the history of the compaction requirements was performed in order to determine whether the compaction of the plant fill was implemented in compliance with the commitments in the PSAR and in site construction specifications.

PSAR, Amendment 1, dated February 3, 1969, presented the Dames and Moore report "Foundation Investigation and Preliminary Exploration for Borrow Materials." The recommended minimum compaction criteria for support of critical structures is stated on page 15. It indicates 95% of maximum density for "cohesive soils" as determined by ASTM D-1557-66T and 100% for "granular soils."

PSAR, Amendment 3, dated August 13, 1969, included a supplement to the Dames and Moore report entitled, "Foundation Investigation and Preliminary

Exploration for Borrow Materials." Page 16 of this report lists the recommended minimum compaction criteria for sand soils and cohesive soils. For the fill material for supporting structures the minimum compaction is 85% relative density for sand and 100% of maximum density for clay as determined by ASTM D-698 modified to require 20,000 ft-lbs. of compactive energy (equivalent to 95% of ASTM D-1557, Method D which provides 56,000 ft-lbs of compactive energy). Subsequent to the filing of Amendment 3, no amendments were made to the PSAR to indicate that the recommendations contained in the Dames and Moore report would not be followed or would be further modified.

Bechtel Specification C-210, Section 13.0 (Plant Area Backfill and Berm Backfill) indicates the compaction requirements for cohesive soil (13.7.1) to be "not less than 95% of maximum density as determined by ASTM D-1557, Method D" and for cohesionless soils (sand) (13.7.2) to be compacted "to not less than 80% relative density as determined by ASTM D-2049."

A comparison of the PSAR commitments to the specification requirements shows that the compaction commitments for cohesive soil (clay) were translated into the construction specification i.e. 95% of maximum density using ASTM D-1557, Method D (compactive energy of 56,000 ft-lbs). However, the compaction commitment in the PSAR for cohesionless soil (sand) was not the same as in the construction specification, i.e. 85% relative density versus the 80% relative density, translated in the construction specification.

The compaction requirements actually implemented were as follows:

- a. Cohesive soil (clay): 95% of maximum density as determined by the "Bechtel Modified Test," a compactive energy of 20,000 ft-lbs was used instead of 56,000 ft-lbs of compactive energy as committed to in the PSAR and required by the construction specification C-210, Section 13.7.1.
- b. Cohesionless soil (sand): 80% relative density as determined by ASTM D-2049 was used instead of 85% as committed to in the PSAR. However, this is consistent with construction specification C-210, Section 13.7.2.

The compaction requirements implemented during construction of the plant area fill between elevations 603 and 634 were, therefore, less than the commitments made in the PSAR for cohesive and cohesionless fill material. In addition, the cohesive (clay) material was also compacted to less than that required by the Bechtel specification. (Specification C-210, Section 13.7).

A review of Specification C-210 (specification controlling earthwork contract) beginning with Revision 2, dated July 27, 1973, which was issued for subcontract showed that it contained conflicting sections relating to the plant area backfill compaction requirements.

Section 13.7, Compaction Requirements, from revision 2 to the latest revision of specification C-210 consistently specified that the backfill in the plant area shall be compacted to 95% of maximum density as determined by ASTM 1557, Method D.

Section 13.4, Testing Plant Area Backfill, of specification C-210 contained the statement that tests would be performed as set forth in Section 12.4.5, Laboratory Maximum Density and Optimum Moisture Content, which in turn specified a lesser standard, 20,000 foot-pounds per cubic foot, which is commonly referred to as the Bechtel Modified Proctor Density Test (BMP). This is contrary to the requirements of Section 13.7. Section 12 of the specification applies to Dike and Railroad Embankment Construction.

It was also noted that this control inconsistency was reflected in the applicable Midland QA Inspection Criteria, SC-1.10, Item 2.3(d) Compaction which states "Backfill material for the specified zones has been compacted to the required density as determined by Bechtel Modified Proctor Method" and yet references C-210, Section 13.7 as the inspection criteria.

The inconsistency in control is further indicated in Specification C-208 which defined the testing contract requirements of subgrade materials, Section 9.1 (Testing) required compaction tests to be in accordance with ASTM D-1557 and only when directed was the BMP compaction criteria to be used. It was determined contrary to this U.S. Testing was only orally advised that the BMP was the standard to be applied to the tests they performed of plant area fill.

Through interviews and an examination of internal documents it was ascertained that because of these inconsistencies, the question of the applicable compaction standard for cohesive materials in the plant area was a recurring one.

The following is a summary of the documentation regarding the confusion of the compaction requirements for plant area fill:

1. Letter 7220-C-210-77 dated June 10, 1974, (subcontracts to Field Engineering) states "there has been some confusion as to the interpretation of the following item: 13.7 Compaction Requirement: all backfill in the plant area and berm shall be compacted to not less than 95% of maximum density as determined by modified Proctor method

(ASTM 1557, Method D), with the exception that Zones 4, 4A, 5, 5A, and 6 Materials need no special compactive effort other than as described in Section 12.8.1 (emphasis included in specification). Quality Control questioned whether the exception stated above applies only to Zones 4, 4A, 5, 5A, and 6 or did construction have to abide by Section 12.8.1 for Zones 1 and 2. Section 12.8.1 clearly requires Zone 2 material to be placed with a 50 ton rubber tired roller with a minimum of four roller passes per lift. OC's interpretation was that the field needed "to obtain 95% of maximum density by the modified Proctor method (ASTM 1557, Method D), with no restrictions as to the method used to obtain these results."

2. Letter 7220-C-210-23, dated June 24, 1974, (field Engineering to construction) responded to Item 1 above. It states, "We have reviewed your June 10, 1974, IOM concerning compactive effort required on Zones 1 and 2 in the plant and berm backfill areas. We agree with your interpretation; i.e. a 95% of maximum density is the acceptance criteria, and the number of roller passes listed in Paragraph 12.8.1 does not apply to plant and berm backfill. We feel the specification is now clear and no FCR is required."
3. Letter BCBE-370, dated July 25, 1974, (field construction to project engineering) lists outstanding items requiring Project Engineering's action. This includes the question, "Is the 95% compaction required in the plant area to be 95% of Bechtel Modified or 95% of ASTM-1557, Method D."
4. Letter BEBC-456, dated August 1, 1974, (Project Engineering to Field Construction) states that Geotech is addressing the question posed in BCBE-370 (Item 3 above).
5. Memorandum from Geotech to Bechtel Field, dated September 18, 1974, responds to the question raised in BCBE-370 (Item 3 above). It states, "It is our opinion that all the compaction requirements that are needed for Zone II material in the plant fill is as stated in 13.7 with the exception that Zones 4, 4A, 5, 5A, and 6 materials need no special compactive effort other than described in Section 12.8.1." Geotech reiterates the specification requirement of 95% of ASTM 1557, Method D. This was confirmed with the Geotech personnel.
6. Telecon dated September 9, 1974, from R. Grote (Field Engineering) to Rixford (Project Engineering) states, "I made an analogy (an exaggeration admittedly but applicable) that if the compaction could be achieved with a herd of mules walking over the fill it would be acceptable as long as it got the required 95% compaction. Rixford agreed."

7. Telecon Consumers to Bechtel Engineering dated September 19, 1974, expressed Consumers Power Company concern about what they felt was a lack of control of compaction in the plant area fill. CPCo addressed the added responsibility this lack of control places on the inspector. Bechtel told CPCo that it "was the inspector's job to make sure we got proper placement, compaction, etc."
8. Telecon dated September 18, 1974, by Bechtel Field Engineering to Bechtel Project Engineering discussed compaction requirements for specification C-210. It stated, "Compaction acceptance is based on meeting an 'end product' requirement, i.e. 95% of maximum density only. No method of achieving this 'end product' is specified or is required. Rixford fully agrees with the above."
9. Telecon dated October 7, 1977, from Bechtel Field Engineering to Bechtel Project Engineering states, "QA has asked for clarification of subject specification (C-210), Section 13 for plant area and berm backfill. Section 13.4 for testing of materials refers to Section 12.4 and therefore, requires the Bechtel Modified Proctor Density Test for Compaction of cohesive backfill. Section 13.7 for compaction of the same materials refers to testing in accordance with ASTM D-1557, Method D Proctor, without specific reference to Bechtel Modification." Bechtel Engineering responded to this question as follows: "This apparent conflict is clarified by Specification C-208, Section 9.1.a, direction to the testing subcontractor, which calls for ASTM D 1557 test for these materials and also allows Bechtel Field (the contractor) to call for the Bechtel Modification of that test. Either method is therefore acceptable to project engineering."
10. Telecon dated October 7, 1977, from Bechtel QA to Bechtel Project Engineering questions, "Is the intent of Paragraph 13.7 of Specification C-210 that the test be run to the 'Bechtel' modified proctor test as is indicated in the FSAR Paragraph 2.5.4.5.3 and in response to NCR 88." Engineering's response was "yes."

Various interviews were held with Bechtel construction field engineers, U. S. Testing personnel and Bechtel Ann Arbor Geotech and Project Engineering personnel to ascertain their understanding of the compaction requirements. Four predominant versions of the understood compaction requirements were stated by various individuals within the Bechtel organization. They are as follows:

- a. Specification C-210 required the contractor to perform compaction to the ASTM 1557, Method D, however, the testing requirements would be performed to the less stringent "Bechtel Modified Test Method."

- b. The required compaction and testing was always understood to be based on the "Bechtel Modified Test Method."
- c. The required compaction and testing was always understood to be based on the standard ASTM 1557, Method D requirements.
- d. A tacit understanding had been established to use the Bechtel Modified Method, but to exceed this requirement by enough to also satisfy the requirement of ASTM 1557, Method D.

It is apparent from the above four distinctly different understandings of the compaction requirements, that the apparent confusion was not resolved. A member of the Bechtel QA staff in Ann Arbor who had previously been a QA Engineer at the Midland site said that QA audits of QC inspection criteria did not identify the above inconsistencies.

This failure to accomplish activities affecting the quality of the plant area fill in accordance with procedures is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion V as identified in Appendix A. (329/78-20-03; 330/78-20-03)

Review of Moisture Control Requirements for Plant Area Fill

Specification C-210, Section 13.6 (Moisture Control) requires moisture control of the plant area fill material to conform to Section 12.6. The moisture control requirement in Section 12.6.1 states, in part, "Zone 1, 1A and 2 material which require moisture control, shall be moisture conditioned in the borrow areas," and that "water content during compaction shall not be more than two percentage points below optimum moisture content and shall not be more than two percentage points above optimum moisture content."

Contrary to the above, Bechtel QA identified in SD-40 dated July 22, 1977, that "the field does not take moisture control tests prior to and during placement of the backfill, but rather rely on the moisture results taken from the in-place soil density tests."

The following is a summary of the documentation that followed the identification of the above deviation from specification C-210.

1. Letter BCBE-1533R (dated August 15, 1977) field to project engineering states, "it was found that densities meeting specification requirements could be attained, irrespective of the use of moisture tests," and that "moisture tests were not used to control backfill moisture." The field requested "that project engineering agree to acceptance of backfill materials installed in the past, along with the records thereof, irrespective of the use of the moisture tests."

2. Letter BEBC-1859 (dated September 30, 1977) responded to the field request in BCBE-1533R. Engineering states, "It should be noted that it is ideal to control the moisture of backfill material at the borrow areas by conditioning" and that "the procedure used to take moisture content tests after compaction would not have direct impact on the quality of work." Engineering then agreed with the field request that "backfill placed prior to modification of testing methods to be accepted as is."
3. Telecon October 10, 1977, (Bechtel QA Site to Bechtel Engineering, Ann Arbor) indicated that, "there are no moisture requirements at the time of density testing, only density requirement. The moisture requirement is prior to compaction."
4. Telecon October 13, 1977, (Bechtel Engineering to Bechtel QA Site) changed what was indicated in the telecon on October 10, 1977, (Item 3 above). Engineering then stated, "The moisture requirement (+ 2% of optimum) is mandatory and must be implemented at the time of placement and testing." This is contrary to what was stated on October 10, 1977.
5. Letter BCBE-1669R (dated November 18, 1977) once again is a field request to Bechtel engineering requesting, "written clarification of the 2% tolerance on backfill moisture content during compaction."
6. Letter BEBC-1998 (dated December 15, 1977) provides engineering's response to BCBE-1669R requesting clarification of the moisture requirement. Engineering stated, "The moisture content of the soil should be within 2% of optimum during placement and compaction. However, this property of the soil is not necessarily a measure of its adequacy after compaction."
7. Letter O-1631 (dated December 21, 1977) closes QA Action Request SD-40 (dated July 22, 1977) which first identified the moisture control deficiency.
8. Telecon (dated April 7, 1978) from Field Engineering and Quality Control to Project Engineering once again requests them "to clarify BEBC-1998" (December 15, 1977), Item 6 above. Two situations were presented to engineering as follows: (a) The moisture sample taken from the borrow area at the start of the shift is acceptable, however, the moisture test taken in conjunction with the density test fails while compaction was attained, and (b) The moisture sample taken from the borrow area at the start of the shift fails and the material is conditioned to meet moisture content required,

however, the moisture test later fails at the time the passing compaction test is taken. Engineering responded, "the above two situations are acceptable as is." This response is contrary to the direction previously given in telecon dated October 13, 1977 (see Item 4 above).

9. Letter GLR-249 (April 16, 1978) is a Bechtel Site QA request to Project Engineering to resolve the moisture content situation and "to provide clear direction for the control of moisture content." QA recommends "one possible solution would be to delete the requirement to control the moisture content and rely on the compaction requirement only for completion of soils work."
10. Letter BEBC-2286 (June 1, 1978) was Project Engineering's response to GLR-249 (Item 9 above). It states, "moisture content is not necessarily a measure of a soil's adequacy to act as a foundation or backfill material," and that "soil with the specified density following compaction would not be rejected on the basis that its moisture content was not controlled in the borrow area."

Based on the reviews of documentation, moisture control had not been implemented as the specification required. In addition, the matter had not been resolved for the period of time from the issuance of QA Action Request SD-40 on July 22, 1977, until June, 1978, during which time soils safety-related work continued.

According to the licensee, although moisture control was not strictly followed in accordance with specification requirements, final density tests were used as a basis for acceptance of soil placement.

As pointed out to the licensee, moisture control is a required control point to assure attainment of percent compaction specified in specification C-210.

This failure to assure that conditions adverse to quality are promptly identified and corrected to preclude repetition is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion XVI as identified in Appendix A. (329/78-20-04; 330/78-20-04)

Review of Subgrade Preparation for Plant Area Fill

The Dames and Moore report on foundation investigation submitted with PSAR Amendment 3, dated August 13, 1969, states, "the clay soils are susceptible to loss of strength due to frost action, disturbance and/or the presence of water. If the construction schedule requires that foundation excavation be left open during the winter, it is recommended that excavation operations be performed such that at least

3 1/2 feet of natural soil or similar cover remain in place over the final subgrade or overlying the mud mat. This layer of protective material is necessary to prevent the softening and disturbance of subgrade soils due to frost action." The licensee indicated that instructions for winter protection of foundation excavations were transmitted by sketch C-271.

The Dames and Moore report also stated, "If filling and backfilling operations are discontinued during periods of cold weather, it is recommended that all frozen soils be removed or recompacted prior to the resumption of operations."

After review of the applicable sections of specification C-210 (i.e. Sections 12.5.1, 12.10, 10.1 and 11) the inspector has determined that the Bechtel specification did not provide specific instructions for removal or recompaction of frozen/thawed soils upon resumption of work after the winter period to preclude the effects of frost action on the compacted subgrade materials.

This failure to assure that regulatory commitments as specified in the license application are translated into specification, drawings or instructions is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion III. (529/78-20-05; 330/78-20-05)

Review of Nonconformance Reports Identified for Plant Area Fill

The following examples of nonconformance and audit reports regarding the plant area fill were reviewed relative to the cause of the nonconformance and the engineering evaluation and corrective action:

<u>No.</u>	<u>Nonconforming Condition</u>	<u>Engineering Evaluation</u>
(1) CPCo QF-29 (10/14/74)	Failure to perform inspection and testing of structural backfill (sand) delivered to jobsite 29 of 30 day in Aug. and Sept. 74. Bechtel QC not informed of deliveries.	"Use as is" based on samples taken from stock pile.
(2) CPCo QF-52 (8/7/75)	Moisture control out of tolerance of specification C-210, Section 13.6.	Accepted in place material with low moisture.
(3) CPCo QF-68 (10/17/75)	Compaction test had been calculated using incorrect maximum lab density. Test recorded as passing was actually a failure.	Failing tests were cleared by subsequent passing tests.

- | | | | |
|-----|--------------------------------|---|---|
| (4) | Bechtel
NCR 421
(5/5/76) | Material placed did not meet moisture requirements. | Engineering stated that this ramp area is temporary and would be removed. This was removed based on note added to NCR 421 on 3/18/77. |
|-----|--------------------------------|---|---|

Note: In the vicinity of this ramp a Geotech engineer determined the material to be "soft" and directed a test pit to be dug for investigation in September 1978 after the D. G. Bldg. settlement was identified.

- | | | | |
|-----|------------------------------|--|---|
| (5) | CPCo
QF-120
(9/21/76) | Lift thickness exceeded maximum of 4" in areas not accessible to roller equipment. Insufficient monitoring of placing crews. Laborer foreman not familiar with requirements. | Material was removed and recompactd. |
| (6) | CPCo
QF-130
(10/18/76) | Inspection plan C-210-4, Rev. 0, permits 12" lift thickness for areas inaccessible to rollers caused by "misinterpretation of specification requirements. Spec. permitted 4" lift thickness. | Corrected inspection plan requirements. |
| (7) | CPCo
QF-147
(2/2/77) | Failure to perform inspection and testing of structural backfill (sand) on 12/1/76, 12/14/76 and 1/11/77 (same as QF-29 dated 10/14/74) material lacked gradation test requirements. | Engineering accepted the material in place "use as is." |
| (8) | CPCo
QF-172
(7/8/77) | Moisture control out-of-tolerance and compaction criteria not met. | Engineering accepted materials. |
| (9) | CPCo
QF-174
(7/15/77) | Gradation requirements for Zone 1 materials not met. | Engineering accepted materials. |

- | | | | |
|------|--|--|--|
| (10) | CPCo
QF-199
(11/4/77) | Moisture content not met; compaction requirements for cohesive and cohesionless soil not met. Materials had been accepted using incorrect testing data. | Issued Bechtel NCR's No. 1004 and 1005; No. 1004 still open; No. 1005 "accepted as is." |
| (11) | CPCo
QF-203
(11/22/77) | Gradation requirement not met yet materials accepted. | Engineering "accepted as is." |
| (12) | CPCo
Audit
F-77-21
(5/77 &
6/77) | Moisture content requirements not met; test frequency not met. | Bechtel QC to inform foreman <u>directing</u> soils work of requirements. |
| (13) | CPCo
Audit
F-77-32
(10/3/77) | Compaction requirement for both cohesive and cohesionless materials not met; moisture requirements not met; tests had been accepted yet failed requirements. | Project Engineering to justify the materials these failing tests represent. NCR OF-195 still open. |
| (14) | Bechtel
NCR 686
(2/1/77) | Same deficiency as NCR 698. | Accepted, "use as is." |
| (15) | Bechtel
NCR 698
(2/9/77) | Structural backfill (sand) was delivered without acceptance tests on Oct. 26, 29, Nov. 12, 1976 and Jan. 11, 12, 1977. | Engineering accepted "use as is." |
| (16) | Bechtel
NCR 1005
(10/26/77) | Moisture content requirements not met. | "Accepted as is" based on density test only. |

Based on a review of the above nonconformance and audit reports corrective action regarding nonconformances related to plant fill was insufficient or inadequate as evidenced by the repeated deviations from specification requirements.

This failure to assure that the cause of conditions adverse to quality are identified and that adequate corrective action be taken to preclude

repetition is considered an item of noncompliance with 10 CFR 50, Appendix E, Criterion XVI as identified in Appendix A. (329/78-20-06; 330/78-20-06)

Review of Calculations of Settlement for Plant Area

A review of the settlement calculations for the structures in the plant area was performed during a visit to the Bechtel, Ann Arbor Engineering office. Specific attention was given to structures founded on plant area "compacted fill." The following specific findings were made:

1. FSAR, Section 3.8.4.1.2 (Diesel Generator Building) indicates the foundation of the DGB to be continuous footings with independent pedestals for each of the Diesel Generators. Contrary to the structural arrangement described in the FSAR, the settlement calculations for the DGB were performed on the premise that the building and equipment loads would be uniformly distributed to the foundation material by a 154' x 70' foundation mat. The settlement calculations were performed between August 1976 and October 1976 by Bechtel Geotech Division.

Discussion with the Geotech Engineer who performed the settlement calculations indicated that he had not been informed of the design change of the foundation until late August 1978 when the excessive settlements of the DGB and pedestal became apparent.

2. FSAR Figure 2.5-47 indicates the load intensity for the DGB to be 4 KSF (4000 lbs. per sq. ft.); however, the settlement calculations reviewed indicate a uniform load of 3 KSF (3000 PSF). This appears to be a conflict between the FSAR and settlement calculations.
3. The settlement calculations for the borated water storage tanks were performed assuming a 54' diameter circular foundation mat with an assumed uniform load of 2500 PSF. Instead, the tanks are supported on a continuous circular spread footing and compacted structural backfill as detailed on the construction drawings. The Geotech engineer was also not made aware of the revised foundation detail.

FSAR Figure 2.5-48 (Estimated Ultimate Settlements) indicates the anticipated ultimate settlement for Unit 1 and 2 plant structures. The values indicated for the Diesel Generator Building and Borated Water Storage Tanks are the values developed assuming uniformly distributed loads founded on mat foundations as was indicated in the settlement calculations reviewed even though the actual design and construction utilizes spread footings. The FSAR does not indicate the foundation

type assumed in the settlement calculations and therefore the values in the FSAR figure appear to represent the settlements estimated for the as-constructed spread footing foundation.

4. During a review of the settlement calculations, it was observed that the compression index (C_c) for the compacted fill between elevations 603 and 634 in the plant area was assumed to be 0.001 (estimate based on experience). FSAR Section 2.5.4.10.3.3 (Soil Parameters) indicates the soil compressibility parameters used in the settlement calculation are presented in Table 2.5-16. This table indicates that for the plant fill elevations 603 to 634, the compression index used was 0.003. Contrary to the FSAR value, 0.001 was used in the settlement calculations reviewed. This value is directly used to determine the estimated ultimate settlement of structure supported by plant fill material.

Based on the above examples, measures did not assure that specific design bases, included in design documents, were translated into the license application resulting in inconsistencies between design documents and the FSAR. This is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion III as identified in Appendix A. (329/78-20-07; 330/78-20-07)

Discussions with CPCo personnel responsible for the technical review and format indicated that a comparison between the design documents and FSAR had not been performed. Likewise, Bechtel personnel indicated that a detailed comparison for the technical accuracy of design documents to the FSAR statements had not been performed; instead reliance was placed on the originator's input.

According to the Civil Engineering Group Supervisor, a mat foundation was considered for the DGB only during the conceptual stage. All drawings generated show a spread footing foundation. The supervisor stated that the Geotech engineer apparently based his calculations on the conceptual stage information. He went on to say that an individual in Geotech was responsible for checking the calculations and the first thing he is supposed to do is determine that the basis for the calculations is correct. He said that apparently this was not done.

Review of Settlement of Administration Building Footings

During the investigation, it was disclosed that the Administration Building at the Midland Site had experienced excessive settlement of the foundation footings. Although the Administration Building is a non-safety-related structure, it is supported by plant area fill material compacted and tested to the same requirements as material

supporting safety-related structures and therefore pertinent to the current settlements being experienced by the Diesel Generator Building. The following are the events relating to the settlement of the Administration Building footings.

During the end of August, 1977, a Bechtel field engineer observed a gap between a slab and the grade beam of the Administration Building. On August 23, 1977, a survey was taken of the settlement. The results indicated that the footings supporting the grade beam had experienced settlement ranging from 1.32" (north side) to 3.48" (south side). This settlement took place between July 1977, and the end of August 1977. The footings were supported by "random fill" (Zone 2 material).

The concrete footings on the order of 7' 6" by 7' 6" by 1' 9" deep were removed along with the grade beam. The random fill material was also removed. According to U. S. Testing personnel, it was observed during excavation of the fill material that there were voids of 1/4" to 2" or 3" within the fill and these were associated with large lumps of unbroken clay measuring up to 3 feet in diameter.

The Civil Field Engineer assigned responsibility for plant fill work said that, although he was no soils expert, it was his opinion that the problem was caused by the presence of pockets of water due to drainage from the steam tunnel. The Lead Civil Field Engineer also indicated a drainage problem caused the Administration Building footings settlement. They were, however, unclear as to how the water pockets were formed, i.e. whether they were formed as the fill was being placed or how they could develop after the fill was compacted.

The excavated fill was replaced with concrete and the design of individual footings was changed to a continuous spread footing design for support of the building.

As a result of the settlement of the Administration Building footings a total of seven borings were taken of which five were in the Administration Building area, one in the Evaporator Building area and one south of the Diesel Generator Building. In the Administration Building area the foundation material was found to be "soft" with "spongy characteristics." The two other borings did not indicate unusual material properties in that the blow counts were reasonable. These borings were taken in September 1977.

The licensee indicated that reports from Bechtel concluded that the primary cause of the settlement in the Administration Building area was insufficient compaction of the fill. Bechtel also concluded that "deviations from specific compaction requirements was the result of

repeated erroneous selection of compaction standard," i.e. the incorrect optimum moisture-density curve was used for the soil material being compacted. In effect, the moisture-density curve was erroneously assumed to represent the soil being used and therefore soil was compacted to less than maximum density.

Bechtel personnel, including the Civil Group Supervisor, Project Engineering, the Field Project Engineer, the Lead Civil Field Engineer, and the Chief Civil QC Inspector, all stated that the Administration Building footing settlement was regarded as a localized problem. The question as to the adequacy of the entire plant area fill did not arise even though the following similarities existed between the Administration Building area and rest of plant fill; (1) same soil specification applied, (2) same material (random fill) was used and (3) same control procedures and selection of laboratory compaction standards was used. The Diesel Generator Building area required even more fill than other safety-related structures since its base is located at a higher elevation than the others.

Review of Interface Between Diesel Generator Building Foundation and Electrical Duct Banks

A review of the design interface between the electrical and civil sections of the Bechtel organization was performed to determine whether the design accounted for the interaction of the electrical duct banks and spread footings on the differential settlement of the northside of the DGB. It was determined that the electrical and civil groups made accommodations in the design to permit settlement of the spread footings around the electrical duct banks by including a styrofoam "bond breaker" around the duct banks. Both electrical and civil groups reviewed and approved electrical Drawing E-502 which includes the appropriate detail.

However, Bechtel Drawing C-45 which identifies Class I fill material areas permits the use of Zone 2 (random fill) which includes "any material free of humus, organic or other deleterious material." This, in effect, does not preclude the use of concrete around the electrical duct banks beneath the spread footings. Due to the difficulty in compacting, Bechtel elected to replace the soil material with concrete. Letter from project engineering to field construction, dated December 27, 1974, states, "lean concrete backfill is considered acceptable for replacement of Zone 1 and 2." The instruction is considered inadequate, in that, the concrete placed around the duct banks restricted the settlement on the north side of the DGB where electrical duct banks enter through the footing. This contributed to the excessive differential settlement in the North-South direction across the building.

This failure to prescribe adequate instructions for activities affecting the quality of safety-related structures is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion V as identified in Appendix A. (329/78-20-07; 330/78-20-07)

Review of Soils Placement and Inspection Activities for Plant Area Fill

A subcontractor, Canonie Construction Company, South Haven, Michigan, performed the major portion of the earthwork at the Midland site. Although Canonie was primarily engaged to construct the cooling pond dike, they also performed most of the plant area fill work. Bechtel, however, also performed plant fill work prior to and after Canonie left the site in mid-October 1977. The last Canonie daily QA/QC fill placement report is dated October 16, 1977.

According to Canonie QA/QC records the first fill in the DGB area was placed in late October and early November 1975. No further fill was placed in the area until July 1976. After that time, fill work in the area was interspersed with soils work in other areas.

While it would be difficult to identify the soil work performed by Bechtel versus that performed by Canonie, records reviewed indicated that most of the Bechtel work was done during the latter part of 1976 and continued through 1977 and 1978. Although most of the Bechtel work related to placing sand around piping and ducts after they were laid and placing sand adjacent to walls, some motorized work compacting clay fill was also done by Bechtel.

Regarding the plant fill work performed by Bechtel, CPCo Audit Report No. F-77-21 dated June 10, 1977, identified a number of deficiencies which recommended the corrective action to be as follows: (1) "the foremen directing the soils work should be instructed as to the required moisture content limits" and (2) "the foreman directing the soils work should be instructed as to the correct test frequency requirements." Interviews with two such Bechtel foremen confirmed the fact that they were directing soil operations. They indicated they received their instruction regarding lift thicknesses and testing requirements verbally from field engineering through a general foreman.

Bechtel design criteria C-501 (Page 8) and PSAR Amendment No. 3 (Dames and Moore Report, Page 16) states that, "Filling operations should be performed under the continuous technical supervision of a qualified soils engineer who would perform in-place density tests in the compacted fill to verify that all materials are placed and compacted in accordance with the recommended criteria."

Based on the above, the soils activities were not accomplished under the continuous technical supervision in accordance with Bechtel design criteria. This failure to provide a qualified soils engineer to perform technical supervision for activities affecting quality as required by specifications and the PSAR is considered an item of noncompliance with 10 CFR 50, Appendix B, Criterion V. (329/78-20-08; 330/78-20-08)

The foremen indicated that Bechtel Field Engineers and QC inspectors were rarely in the areas where soils activities were going on. The foremen decided when and where tests were taken. The locations of tests were approximated by pacing or visually estimating distances from columns or building walls. Lift thicknesses were determined visually, usually without the use of grade stakes.

Soils testing services are provided by U. S. Testing Company based on the requirements of Specification C-208. The two U. S. Testing technicians who said they performed an estimated 90% of the soil testing during the years 1975-77 indicated that they rarely saw a Bechtel field engineer or QC inspector in the areas where plant fill activities were going on. One technician said he could recall only one occasion when a QC inspector was present when he took an in-place density test. The other technician estimated he had contact with a QC inspector in the field about once a month. A Bechtel QC inspector, however, was assigned to the testing laboratory on a full-time basis.

U.S. Testing personnel stated that erroneous test locations were a chronic problem regarding the Bechtel placed fill. The location of a test was usually given at the time of the test by a labor foreman or a laborer if the foreman wasn't there. Sometimes, however, a foreman was not familiar with the area in which he was working and the location was not provided until sometime after the test. It became necessary on occasion to withhold test results as a means of getting the test location. Test elevations were approximated sequentially.

The technicians further advised that rarely did a Bechtel QC inspector request a test. Normally, labor foremen requested them. On occasion a technician passing through an area would be asked by a foreman if a test should be taken. Upon completion of in-place tests, the results were usually communicated to the foreman directing the work. Test failures were also reported by telephone to QC or Field Engineering. A weekly report of test was provided to Bechtel QC and Field Engineering who reviewed any test failures and resolved them.

U. S. Testing personnel advised that they were requested to take tests of clay fill while it was raining and in order to do so, plastic was held over them to protect their equipment while the test was made. Even though it was raining, the fill placement work was not stopped on

some occasions. A Bechtel foreman confirmed that density tests were on occasion taken while it was raining. While this is not contrary to the specification instructions, it is contrary to standard practice.

U. S. Testing personnel indicated that when moisture was added, the procedure did not include blending the material which resulted in mushy seams. It is commonly accepted good practice to disc the fill after spraying it with water to add needed moisture. A Bechtel foreman stated that if moisture was needed they compacted 6" then sprinkled it and then added another 6".

The field engineer who was assigned responsibility for plant fill work stated he did not spend full time on soils work since he also had responsibility for two structures, the steam tunnel and general yard work. He said he tried to get out to the area where fill work was being done once a day. Some times he did and sometimes he did not. He indicated it was his impression that the QC Inspector responsible for the soils work on the day shift visited those work areas once or twice a week. He confirmed that only oral instructions were furnished to the foremen whom he felt were conscientious. The main problem he experienced with the foreman was maintaining proper lift thickness.

The QC inspector who was primarily responsible for the plant fill work is no longer employed by Bechtel. The QC inspector who was responsible for the plant fill work on the night shift stated that he tried to devote about one hour a night to the plant fill activities. He indicated that during 1976-1977 there was much emphasis being placed on cadwelding and rebar work and it was necessary to spend the majority of his time on those activities. He maintained that he did have fairly frequent contacts with the technicians who performed the in-place density tests, particularly when test failures occurred. He indicated it was his impression that the labor foremen were directing fill placement adequately.

Review of Inspection Procedures

The following procedures which are relative to backfill operations at Midland Units 1 and 2 between August 1974 through December 1977 were reviewed.

- a. Bechtel Master Project QC Instruction for Compacted Backfill - C-1.02 was issued for construction October 18, 1976, and it is presently the current instruction which is used by Bechtel QC (when Bechtel is the inspection agency, providing first level inspections during backfill operations). Further, this instruction was used by Bechtel-QC when monitoring the activities of

other inspection agencies (Canonie) when such agencies were performing the first level inspections of backfill operations during the time periods of October 18, 1976, until June 28, 1977.

- b. Bechtel Quality Control Master Inspection plan for Plant Foundation Excavation and Cooling Pond Dikes (Plant Area Backfill and Berm Backfill) - Procedure No. C-210-4 was the instruction utilized by Bechtel QC when monitoring the activities of other inspection agencies that were providing the first level inspections of backfill operations (this instruction was utilized during time periods prior to October 18, 1976).
- c. Bechtel Quality Control Master Inspection Plan for Structural Backfill Placement - No. C-211-1 is an instruction utilized by Bechtel QC when performing first level inspection of backfill activities prior to October 18, 1976.

Bechtel Procedure C-1.02, listed above, was written as a replacement for both Procedures C-210-4 and C-211-1. The inspection activities which were delineated in Procedures C-210-4 and C-211-1 were compared with those described in Procedure C-1.02. The following are some of those activities which were compared:

Activities/Task Description	Inspection Code for--		
	C-210-4	C-211-1	C-1.02
<u>Backfill Material</u>			
(*) 1. Free of brush, roots, sod, snow, ice or frozen soil.		I	S(V)
(*) 2. Material moisture conditioned to required moisture content.	S	I	S(V)
3. Structural backfill used with 3" of plant structure, shall be cohesionless and free-draining.		I	
(*) 4. Material not placed upon frozen surface.		I	S(V)
5. Foundation approved prior to backfill placement.	H	H	R/H
6. Prior to start of work, area free of debris, trash and unsuitable material.			I(V)

Compaction Requirements

1.	Cohesionless material compacted not less than 80% relative density.	S	S	S(V)
(*) 2.	Cohesive material compacted to not less than 95% max. density.	W	S	S(V)
(*) 3.	Zones 1, 1A, 2 and 3 material in uncompacted lifts not exceeding 12"; areas not accessible to roller equipment the material placed in uncompacted lifts no exceeding 4".	W	I	S(V)

Material Testing

1.	Verify testing and test results are as per engineering requirements.			
a.	Materials	S	S	S(V)
b.	Moisture	S	S	S(V)
c.	Compaction	S	S	S(V)
2.	Review lab test report verifying:			
a.	Proper test method.	R	R	R
b.	Proper test frequency.	R	R	R
c.	Technical adequacy.	R	R	R

I - Inspection point
H - Hold point
W - Witness point
S - Surveillance (V) - visual
R - Review records

Those activities identified by an (*) asterisk indicate inspection requirements which have been relaxed from the original procedural requirements.

It is considered that the relaxation of actions relating to the confirmation that soils placement activities were conducted according to

specifications contributed to inadequate compaction of foundation and fill material and the increase incidence of deviations from specifications regarding lift thickness, moisture control and frequency of testing.

This failure to provide adequate inspection of activities affecting quality is considered an item of noncompliance with 10 CFR 30, Appendix B, Criterion X. (392/78-20-09; 330/78-20-09)

Exit Meetings

Members of the NRC staff met with Consumers Power Company and Bechtel Corporation at the NRC Region III office on February 23, 1979 to present the scope, purpose, and preliminary findings of the investigation. That meeting was subsequently followed by a second meeting held on March 5, 1979, during which Consumers Power Company responded to the preliminary investigation findings. The documents used during these meetings were transmitted to Consumers Power Company by NRC letter dated March 15, 1979.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 13 1979

Docket No. 50-329/330

MEMORANDUM FOR: Dudley Thompson, Executive Officer for Operations Support, IE

FROM: Harold D. Thornburg, Director
Division of Reactor Construction Inspection, IE

SUBJECT: COMMENTS ON RIII ENFORCEMENT PACKAGE ON MIDLAND SETTLEMENT PROBLEMS DATED APRIL 3, 1979

We have reviewed the above referenced package which under J. Davis's memorandum of March 21, 1979 was forwarded to X00S as the responsible coordinating group within IE. These comments are provided to be consistent with this memorandum and the follow-up memorandum you provided to your enforcement personnel also on March 21, 1979.

In summary, it is our opinion that four of the five false statements identified by the Region will probably be substantiated to be material false statements and that they were made in careless disregard of the facts. Therefore, it would follow that there would probably be four instances of a material false statement each of which would have a civil penalty of \$5,000 imposed for it. The fifth item is not, in our opinion, a material false statement.

The enclosure presents our detailed recommendations on this matter. If you have questions please contact us.

Harold D. Thornburg
Harold D. Thornburg, Director
Division of Reactor Construction
Inspection, IE

Enclosure:
Comments on Midland
- Enforcement Package

CONTACT: R. E. Shewmaker, IE
49-27551

COMMENTS ON MIDLAND ENFORCEMENT PACKAGE TRANSMITTED TO THORNBURG
FROM KEPPLER, DATED 4/3/79

1. The material false statement items (probably 4) should be put into an Appendix A entitled, "Notice of Violation," and will be those items with a civil penalty. An Appendix B entitled, "Notice of Proposed Imposition of Civil Penalties" should be prepared. The other items of noncompliance should be addressed in an Appendix C, "Notice of Violation."

2. All statements quoted from the SAR in the citations should be clearly identified by amendment number and/or revision number and date.

3. A check of Statement 1 regarding fill and backfill placement shows it is apparently from the original version of the FSAR. Revision 1, 11/22/77 has a different statement and is the current version. Some of the other statements referenced have been revised now after the investigation. This must be reexamined. If the statements quoted in the RIII draft can be utilized in an enforcement action then we judge the statement to be a material false statement. In reaching this conclusion we note that there is a need to quote or provide a copy of the text from construction drawings C-45 stating that Zone 2 material is to be used as Class I fill if the citation is to be properly supported.

4. Statement #2 can probably be classed as a material false statement if the results of the interview with the cognizant engineer and/or the calculation sheet prove that 3.0 ksf was used in the settlement calculations.

5. Statement #3 is viewed to be a material false statement, but there is a need to fully document what was actually done in the execution of the calculations. Again a copy of the calculation sheet and/or a statement of the cognizant engineer is needed to properly support the finding.

6. Statement #4 can probably be classed as a material false statement if the results of the interview and/or the calculations are provided to support the finding.

7. Statement #5 is judged to not be a material false statement. This is due to the fact that the statement quoted is written as a predicted future value for settlement.

8. For those statements which will become material false statements with a civil penalty, remove them from the draft Appendix A and move the remainder to the new Appendix C.

9. All statements judged to be material false statements must be examined to see in what "state of mind" or in what circumstances the licensee made the statement. This is relevant to the question of "civil penalty" vs. "second chance." In our judgment these instances appear to be situations of "careless disregard" of the facts which would warrant civil penalty.

see Item 3
I-4 in
SO SA Request

see I-4
PCU response
SO SA Request

"
see I-4

"
see I-4

JUN 13 1979

cc w/enclosure:

J. G. Keppler, RIII
D. W. Hayes, RIII
T. W. Brockett, X00S
G. W. Reinmuth, RCI
R. E. Shewmaker, RCI

118 1979



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Attachment 17

AUG 9 1979

MEMORANDUM FOR: File

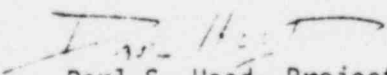
FROM: Darl Hood, Project Manager, Light Water Reactors Branch
No. 4, DPM

SUBJECT: NRR COMMENTS REGARDING ENFORCEMENT ACTION ON MIDLAND SOIL
DEFICIENCIES

An April 3, 1979 memorandum from J. Keppler to H. Thornburg identified five statements from the FSAR regarding the backfill deficiency at the Midland site which I&E considered to be false, and requested a determination as to the materiality of these statements. Following receipt of this memorandum by NRR on May 7, 1979, it was distributed to technical review branches for review and a meeting was held August 1 to provide NRR comments. Meeting attendees, listed by Enclosure 1, included both I&E and OELD. A summary of the NRR comments as to the materiality of the five same-numbered statements of the Keppler memo is given in Enclosure 2.

OELD defined "materiality" of FSAR statements. This definition served as the basis for judgments in the meeting. A statement was deemed to be "material" if, notwithstanding the fact that it was detected by the I&E investigation, it would or could have an influence upon a safety conclusion of the NRR staff (i.e., if it could have resulted in an improper finding or less probing analysis by the staff). The technical significance and willfulness of any such false statement is relevant to selection of the specific enforcement action deemed to be appropriate.

It was noted that some of the technical reviewers had not yet completed review of some of the relevant background material, and therefore only preliminary comments could be given at the meeting. A subsequent meeting on or about August 3, 1979 was scheduled to confirm or modify these preliminary comments.


Darl S. Hood, Project Manager
Light Water Reactors Branch No. 4
Division of Project Management

Enclosures:
As stated

cc: See next page

cc: All Attendees

G. Gower
L. Rubenstein
S. Varga
D. Vassallo
W. Olmstead
H. Thornburg
J. Keppler
W. Haass
D. Skovholt
J. Murray

ENCLOSURE 1

ATTENDEES
August 1, 1979

R. Shewmaker	(I&E HQ)
T. Brockett	(I&E HQ)
D. Gillen	(NRR GSB)
J. Lieberman	(OELD)
D. Bachman	(OELD)
D. Hood	(NRR DPM)
L. Heller	(NRR GSB)
J. Gilray	(NRR QAB)
J. Spraul	(NRR QAB)
J. Knight	(NRR AD:Eng)
P. Baci	(I&E HQ)
R. Lipinski	(NRR SEB)
F. Schauer	(NRR SEB) (part-time)
C. Moon	(NRR LWR#4:Acting BC)
R. Jackson	(NRR GSB:Chief)

ENCLOSURE 2

NRR COMMENTS ON APRIL 3, 1979 KEPPLER MEMORANDUM

1. This statement is considered by NRR to be material; the fact that the Midland fill is of the wrong type (random fill verses structural fill) and was not sufficiently compacted is viewed by NRR as the core of the settlement problem. Other findings in the report appear to be subparts of (contributors to) this central problem and NRR suggested consideration be given to combining all five findings.
2. NRR stated that the difference between use of 3.0 KSF and 4.0 KSF for the load density for the Diesel Generator Building calculation would not or did not influence a safety conclusion by the NRR staff, and therefore, was not considered to be "material". Rather, the finding is viewed as an indicator of poor QA performance.
3. NRR stated that the difference between use of 0.001 and 0.003 for the index of compressibility for the Diesel Generator Building calculation would not or did not influence a safety conclusion by the NRR staff, and therefore, was not considered to be "material." Rather, the finding is viewed as an indicator of poor QA performance.
4. NRR recognizes the statements in FSAR sections 2.5.4.10.3.5 and 3.8.4.1.2 regarding the type of mat for the Diesel Generator Building to be inconsistent. However they are not false insofar as they reflect what was actually done. In its review, NRR interpreted the use of 41 points to represent a mat foundation, whereas FSAR section 3.8.4.1.2 accurately identified the building to have continuous footings. The improper calculation is viewed by NRR as an indicator of poor QA performance.
5. This statement is considered to be a subpart of statement 1. It also appears to be relevant to poor QA performance.

1 Q (By Ms. Brown) Have you read Ms. Warren's
2 limited appearance statement which appeared in the transcript
3 of July 7th?

4 A Yes, I have.

5 Q Here statement refers to a report entitled,
6 "Salzburg Hazardous Waste Disposal Site: Initial Design
7 Assessment." Have you read that particular report?

8 A Yes. I read that last evening.

9 Q Does this particular report address the Midland
10 Nuclear Plant site?

11 A The report does not address the Midland site
12 directly.

13 Q What does it directly address?

14 A It addresses the hazardous waste disposal site
15 that Dow Chemical is proposing, which is near the Midland
16 plant.

17 Q Do you know exactly where the waste disposal
18 site is?

19 A That information has been difficult to come by,
20 but it seems, from the best information I have, it's somewhere
21 between one and two miles east of the Midland plant.

22 Q What is the focus of this particular report?

23 A This report deals with solution mining of salt,
24 ground subsidence and cavities and sink holes.

25 Q Have any of those issues been addressed by

1 the NRC reviewers in connection with the Midland Nuclear site?

2 A. Yes. These issues were first identified in
3 a review of the preliminary safety analysis report. They have
4 been addressed in questions from the Staff on possible
5 subsidence near the nuclear site, because Dow Chemical was
6 involved in solution mining of salt deposits.

7 The Applicant has committed to subsidence
8 monitoring over the life of the facility. The information is
9 being updated in the FSAR and FSAR amendments, and the Staff
10 is continuing to factor this information into its operating
11 license review.

12 Q. Is the Staff aware of a type of mining called
13 reduction and reinjection mining?

14 A. Yes.

15 Q. Could you describe for the Board what that
16 process is, and if they are concerned with it?

17 A. Let me describe the two types of mining that
18 Dow Chemical is involved in near the nuclear plant.

19 The first type is called reduction and rein-
20 jection. What is done is to put in two bore holes down to a
21 formation that contains saltwater. Dow extracts the saltwater
22 out. They take out the bromine, and they put in--they put back
23 in, the wastewater.

24 The second type of mining is actual dissolution
25 of the salt deposit. They again put in two wells, pump in fresh

1 water into the salt deposit, dissolve the salt out, and pump
2 out the saltwater.

3 The first basically replaces essentially what
4 it takes out; whereas the second has a potential for creating
5 a cavity where the salt has been mined.

6 Q In Ms. Warren's limited appearance statement
7 she refers to a letter from Dr. Jaworski to William Marks,
8 who is Chairman of the Michigan Hazardous Waste Site Approval
9 Board. Have you read those portions of Dr. Jaworski's letter
10 which Ms. Warren believes that the Staff should address?

11 A Yes, I have read the letter, and I have looked
12 at questions 1, 3, 4 and 5 which were contained in Ms. Warren's
13 limited appearance statement.

14 Q The first question which Dr. Jaworski raised
15 is the following:

16 "Whose responsibility is it to fully investi-
17 gate the data of the GeoSpectra Corporation of Ann
18 Arbor regarding the anomalous dips and faults in
19 the area of the proposed landfill?"

20 That's the end of the question.

21 Are there anomalous dips and fills on or around
22 the Midland site, to your knowledge?

23 A The information that GeoSpectra Corporation has
24 given Dr. Jaworski was given to the Staff about three months
25 ago. The interpretation of the data that GeoSpectra had

6 wel 7

1 included-- Their interpretation was that there were anomalous
2 dips and possible faults in this region. The final safety
3 analysis report for the Midland site states that the formations
4 in the area have no structure.

5 With this new information, however, the
6 Applicant, to the best of my knowledge, has hired a consultant
7 to gather more information, more detailed information, which
8 includes both well log information and geophysical information,
9 which may in fact include them going to GeoSpectra Corpora-
10 tion and getting the information from them. They will
11 interpret the data that they collect.

12 To the best of my knowledge, this will be
13 incorporated in an FSAR amendment or as a special report which
14 they will give to the Staff. Staff will then look at the
15 data itself, to see if in fact there are anomalous dips or
16 faults in the area.

end 6

17 (Continued on following page.)
18
19
20
21
22
23
24
25

E7L1

1 Q (By Ms. Brown) Dr. Jaworski also asks, and
2 I quote, "In addition, a probable fault trend approximately
3 20 miles in length is evident along the relatively straight
4 stretch of the Tittabawassee River near Midland. If this is a
5 fault, it appears to have influenced the course of the
6 Tittabawassee River which developed its drainage pattern during
7 the past 14,000 years."

8 That's the end of his question.

9 Is the NRC Staff aware of this probable fault
10 trend?

11 A We are aware of the statement by Mr. Jaworski.
12 I have contacted Mr. Jaworski. In fact, the latest conversa-
13 tion I had with him was yesterday. On the maps that he gave
14 us, he colored in for me where the probable fault would be.
15 The map that he gave me showed no faults that parallel the
16 Tittabawassee. The faults that he colored in in his map
17 basically are perpendicular to the Tittabawassee River, so
18 we know of no fault which is coincident to the straight
19 stretch of the Tittabawassee River.

20 Q Are you aware of any faults in the general
21 region of the Midland plant site?

22 A With the latest information we have, we are
23 aware of no specific fault; however, as I stated before,
24 the Applicant is gathering more detailed information. This
25 information may show some types of minor structures in the

E7L3

1 area, and this type of structure might include some folds or
2 faults.

3 Q The third question that Dr. Jaworski poses is
4 the following:

5 "It is my understanding that Dow Chemical
6 Company is disposing of waste brine via on-site plant disposal
7 wells at 10,000 PSI and via field wells at about 200 PSI.

8 "Are these disposal structures correct?

9 "What are the geologic implications of waste
10 injection at 10,000 PSI at the Dow Chemical plant site on
11 the plugged wells, anomalous dips and/faults, and other possible
12 structural bedrock weaknesses in the landfill area?"

13 Is it the NRC Staff's understanding that Dow
14 is pumping at 10,000 pounds per square inch?

15 A To the best of our understanding, Dow is not
16 pumping at 10,000 pounds per square inch. When we first heard
17 of that number, we became concerned immediately because that's
18 an extremely high pressure. It is a pressure that most
19 commonly is achieved in the laboratory.

20 We attempted, through various sources, to
21 find out where that number specifically came from. We asked
22 Consumers Power if they could find out--if they could verify
23 that number in phone conversations with Dow Chemical. They
24 got back to us and told us that they were not pumping at
25 10,000 pounds per square inch, although they could not give us

E7L3

1 a specific number.

2 Further, we acquired one page of a book called,
3 "The Dow Story". I think it was Page 154 of this book that
4 we got. It was a verbal description of some early pumping
5 that was done in the Dow area.

6 Included in this description was a statement
7 that they were pumping to 10,000 pounds. That description
8 did not give what area that pumping was, over 10,000 pounds
9 per square foot, or what it was.

10 In conversations with Dr. Jaworski, I asked
11 him if he thought that's where the 10,000 pounds may have
12 come from, and someone had converted that basically to 10,000
13 pounds per square inch. He told me that that's where he
14 had seen the number, and I told him yesterday, basically,
15 that, you know, it said 10,000 pounds, not 10,000 pounds per
16 square inch.

17 Q What is the significance of the difference
18 between 10,000 pounds and 10,000 pounds per square inch?

19 A Well, 10,000 pounds per square inch at the
20 approximate depth that they are pumping to, which I think
21 is around 4,000 feet, would be enough pressure to hydrofract
22 the rock. It would be enough pressure to split apart competent
23 bedrock. Ten thousand pounds, however, if it is 10,000 pounds
24 per square foot as opposed to per square inch would be a much
25 lower pressure, and it would not be enough pressure to fracture

E7L4

1 rock, so it is significant. If very high pressures were
2 achieved, you could fracture the competent rock.

3 Q The fourth question that Dr. Jaworski proposes
4 is the following:

5 "Are geologists at Dow Chemical Company aware
6 of any earthquake or earth movements in the landfill region
7 which were caused by waste fluid injection?

8 "Is it likely that injected waste brine or
9 other injected liquid waste will migrate up under the proposed
10 hazardous waste landfill via an accident, spill or blow-out?

11 "Have any blow-outs or brine fill problems
12 occurred previously in the proposed landfill area?"

13 Does the NRC have any information in response
14 to this question?

15 A . speak to earthquakes in general, not
16 earthquakes, you know--earthquakes which are caused by natural
17 stress release or by waste fluid injection in the following
18 manner:

19 The area has been--has had sufficient popula-
20 tion, and I am fairly certain that during the last hundred
21 years, that an earthquake, if it had been perceived by humans,
22 would be reported as an earthquake.

23 The second thing I can state is that the Univer-
24 sity of Michigan has run a world-wide seismic station since
25 the mid to early 1960's. The sensitivity of this station is

E7L5

1 such that it could pick up something approximately at half
2 a magnitude unit lower than what is perceptible to humans.

3 The records from the Ann Arbor station have
4 shown no earthquake in this area.

5 About two years ago, the University has put in a
6 much more sensitive seismic station near Kalamazoo. I talked
7 with the seismic lab yesterday at the University of Michigan,
8 and asked their judgment as to what size earthquake they
9 could see in the Midland region in the last two years from
10 this more sensitive station. This would bring this down to
11 approximately another half a magnitude unit lower again,
12 so in the last two years, I am fairly certain in saying that
13 there have been no earthquakes approximately one magnitude
14 lower than humans could detect.

15 In any area where you do not have seismic
16 station coverage, you can miss earthquakes that are too small
17 to be detected by the stations that are available, so it is
18 not impossible, I would say, that very, very small earthquakes
19 could be occurring in this region, although I think based
20 on my experience with seismic networks and with areas that
21 have had small earthquakes, they usually have earthquakes
22 that are felt by people, and that it is unlikely that any
23 earthquakes are occurring in this region.

24 Q The fifth question which Dr. Jaworski posed
25 is the following:

E7L6

1 "Could the Site approval Board be
2 furnished with an official summary of
3 Dow Chemical Company's most recent annual
4 subsidence survey?"

5 What response, if any, do you have to this ques-
6 tion?

7 A I have no response to this question.

8 Q Thank you. In Ms. Warren's Limited Appearance
9 Statement, she posed several questions of her own. The first
10 question she asked was the following:

11 "Has the issue of ground collapse
12 been addressed during the design of the
13 Midland Nuclear Units 1 and 2?"

14 I would ask if you would please respond to that
15 question.

16 A The response is yes, the issue of ground
17 collapse has been addressed. As part of the preliminary
18 safety analysis report, when the types of salt mining were
19 identified, the Staff required the Applicant to set up a
20 subsidence monitoring program. In the final safety analysis
21 report also, the Applicant has estimated the size of the cavern
22 that might exist within one-half mile of the site. This estimate
23 was based upon the approximate volume of salt that was removed
24 by Dow Chemical within a half mile of the site.

25 The monitoring is continuing. The results of
the monitoring are being updated as part of an FSAR amendment,

E7L7

1 and what results we have had so far have not indicated subsidence
2 in the site region.

3 Q The second question that Ms. Warren asked
4 is the following: I would like your response please.

5 "What are the sizes of the galleries
6 that have been produced by the solution
7 mining of brine in the area of the plant?"

8 A The size of the gallery within one-half mile
9 of the site was estimated based, if I recall, on a volume of
10 approximately 1.1 million cubic yards of salt that had been
11 removed.

12 In the FSAR, I think the cavity size is
13 approximately estimated at 700 foot in diameter, with a thick-
14 ness, basically, of about 25 feet.

15 The salt layers themselves have varying thick-
16 nesses. Some have thicknesses of more than 25, some less.

17 If the thickness was more than 25 feet, the
18 diameter would be smaller. If it was greater-- If it was
19 smaller than 25 feet--excuse me--the diameter would be larger.

20 Based upon the estimate of the size of the
21 gallery, the Applicant hired two consultants--I think Woodward-
22 Clyde and General Analytics, Incorporated--to estimate the
23 impact of these galleries. They used a technique which
24 estimates how far up the--if collapse was occurring into the
25 gallery, how far up this collapse might occur. I think the

E7L8

1 estimate was basically it would come up another 500 feet.

2 The mining itself, I should say, was done at
3 41 to 43 hundred feet near the Midland site in the Detroit
4 River formation.

5 Q Excuse me. That figure you just gave, 4100
6 feet, that's at the depth of the mining?

7 A Yes.

8 Q The third question that Ms. Warren asked of
9 the Staff is the following:

10 "Is it true that the NRC Staff
11 has based its geologic information and
12 decisions on Michigan Department of
13 Natural Resources facts which, according
14 to the SH&G report, are not complete?"

15 A The answer is no. The main source of informa-
16 tion that the Staff relies on is the Applicant. The applicant
17 is required to give the Staff its information, enough informa-
18 tion that the Staff can make an independent review of that
19 information. Staff does have resources, when necessary, to go
20 out and get its own information, if need be; however, we do
21 base most--we put most of the burden on the Applicant to actually
22 gather the information, which they give to us, along with their
23 interpretation.

24 Q Ms. Warren's fourth question is the following:

25 "What is the 'cone of influence' of

E 7L9

1 the chemical and brine disposal wells?"

2 A I cannot answer that question because it
3 basically goes outside my area of expertise.

4 Q The fifth and last question is the following:

5 "What is the cause-and-effect rela-
6 tionship between earth faults and high
7 pressure chemical disposal wells?"

8 Mr. Kimball, have you responded to that question
9 earlier in your testimony?

10 A I could have.

11 Q Would you like to repeat your response?

12 Q If high pressure injection is put into an earth
13 fault, which is under stress, it would be of concern; however,
14 in this area, to the best of our knowledge, the pressures that
15 they are injecting to are not, you know, overly high, to the
16 best of our knowledge, and we do not think there are any
17 significant earth faults in this region, and also we make a
18 judgment that based on the seismic history of the region,
19 that the stress in the earth, the tectonic stress in the earth
20 is probably fairly low in this region, which would be less
21 conducive if high-pressure injection was occurring on an earth
22 fault to cause something like an earthquake.

23 MS. BROWN: Chairman Bechhoefer, the Staff
24 has no further questions at this time.

25 MR. MARSHALL: I have a couple of questions.

E7L10

1 CHAIRMAN J ECHHOEFER: Do you want to start,
2 then?

3 MR. MARSHALL: I just have a couple of questions.

4 CROSS EXAMINATION

5 BY MR. MARSHALL:

6 Q Witness, I believe you testified that the
7 distance between the hazardous proposed landfill and that
8 of the nuclear site was two miles. I think that's what you
9 testified to. I would like to know how you arrived at that.

10 A The information was extremely difficult to come
11 by. I initially asked the Applicant if they could find out
12 where the hazardous waste site was, and they could not. I
13 attempted to ask Dr. Jaworski if he could find out where the
14 hazardous waste site was.

15 Yesterday, in discussing this with Dr. Jaworski
16 on the phone, he gave me an approximate description and it is
17 about three to five miles east of the site.

18 This morning, Mrs. Warren showed me a map,
19 and on that map the site is actually drawn, and we roughly
20 scaled it off as between about one to two miles.

21 Q One is better. I believe one is better because
22 Mapleton is one and an eighth mile from it, and this is
23 within the City limits. Both are within the City limits. so
24 it is a further eighth mile outside of Mapleton.

25 A The map that I read off this morning did not

E7L11

1 have a sacle, so one to two miles is the best estimate I
2 could make.

3 MR. MARSHALL: That's all I wanted to know.

4 CHAIRMAN BECHHOEFER: Okay. Would the Applicant
5 prefer to follow Ms. Stamiris or precede?

6 MR. MILLER: Yes, we would prefer to follow.

7 CHAIRMAN BECHHOEFER: Ms. Stamiris.

8 MS. STAMIRIS: Judge Bechhoefer, I remember
9 reading a provision some place in the Rules that would allow
10 me to have somebody, who is more qualified than myself,
11 conduct some questions for me, and I was hoping that I would
12 be able to let Mr. Castellanos ask some questions since I am
13 not able to address--

14 CHAIRMAN BECHHOEFER: I think that's the provi-
15 sion dealing with technical experts.

16 First I would ask the other parties whether
17 they have any objection. I don't know the qualifications--

18 MR. MILLER: If it is going to expedite the
19 examination, we have no objections.

20 MS. STAMIRIS: It would definitely expedite
21 it because otherwise I am going to try to do it on my own.

22 MR. MARSHALL: He speaks for Mapleton, too,
23 and the people of Ingersoll Township.

24 MS. BROWN: The Staff also has no objections,
25 and we would just like to make sure that the Rules and the

E7L12

1 procedures still apply to this individual who will be asking
2 questions.

3 CHAIRMAN BECHHOEFER: That is correct.

4 MS. STAMIRIS: I would like to introduce Mr.
5 Vicente Castellanos and have him come up and ask some questions.

6 MR. CASTELLANOS: Thank you.

7 MS. STAMIRIS: Are you going to tell them your
8 background?

9 MR. CASTELLANOS: Yes. If it please the Chair,
10 I became involved in this hearing to date because of the
11 investigative work that we have been doing in relationship
12 to a hazardous waste proposal that is approximately one mile
13 from the nuclear facility.

14 CHAIRMAN BECHHOEFER: What does "we" mean?

15 MR. CASTELLANOS: I'm sorry. Let me start out
16 this way.

17 My name is Vicente Castellanos. I am a
18 resident of Mapleton, Ingersoll Township, Midland County. I am
19 the designated spokesperson for Ingersoll Township in the
20 matter of the hazardous waste proposal.

21 Specifically, my background is I am just a
22 layperson in the community. Professionally I am a commercial
23 and industrial electrician, although I do have a Baccalaureate
24 Science Degree, and I am three credits short of my Master's
25 Degree, as well as electronics specialties from the United

E7L13

1 States Air Force.

2 CHAIRMAN BECHHOEFER: Thank you.

3 MR. CASTELLANOS: Now may I proceed?

4 CHAIRMAN BECHHOEFER: Yes.

5 CROSS EXAMINATION

6 BY MR. CASTELLANOS:

7 Q Mr. Kimball, would you describe an injection well
8 for us, please, its function?

9 A I would like to point out that what I have
10 been able to do with the questions up until now is give a
11 summary of the information that has been presented to the
12 Staff. My training is as a seismologist. The Staff has
13 geologists, geotechnical engineers and hydrologists who
14 specifically review this information. I am not a geotechnical
15 engineer or a geologist by profession, although I do have quite
16 a bit of background in geology. I am a seismologist by
17 profession, and the specific review areas that I was able to
18 give an updating summary of this morning are being reviewed
19 by the technical professionals on the staff.

20 Q Did you just state that your testimony is
21 still being concluded by specialists on your staff?

22 A No. My testimony is my testimony. It goes
23 to the seismic and geologic questions, which I can answer.

24 Q Okay. That's what I want to address, whatever
25 you just mentioned here, and that was-- For example, you

E7L14

1 discussed that injection well system would not have an
2 influence on the anomalous dip. Did you not state that earlier?

3 A I don't think I made that statement directly.
4 I was discussing what effects pressure injections might have
5 on faults.

6 Q Okay. Do you know what those pressures are?

7 A As stated, I specifically do not know the
8 exact pressures that they are pumping to.

9 Q I'm sorry. I didn't understand this. How
10 could you conclude that they have no effect?

11 A It was a judgment statement. I qualified
12 the statement. I could make the same statement again.

13 Q Okay.

14 A The three things you would need for it to be a
15 problem are, one, you would need a region that has a high
16 degree of tectonic stress.

17 Second, you would need faults in this region.

18 Third, you would have to pump to pressures
19 high enough that the--you would basically overcome the stress
20 that the fault could withstand compared to the tectonic stress,
21 thereby causing earthquakes.

22 A good example of that is the Rocky Mountain
23 arsenal near Denver, Colorado. It is a region of fairly high
24 tectonic stress. They had had seismicity before the pumping
25 was started. They started pumping into a fault zone, and they

E7L15

1 caused earthquakes.

2 In the Midland area, I can state, to the best
3 of our knowledge, we know of no faults. It is not, in my
4 judgment, a region of tectonic stress. I would say it is a
5 region of fairly low tectonic stress, so those two factors
6 went into making the judgment that presently I don't think
7 that would be a problem.

8 Q But you did say that your staff or the experts--
9 other experts are studying this matter, right?

10 A Yes. The Applicant is doing a much more detailed
11 review on its own, gathering the information.

12 The consultant they have hired, to the best
13 of my knowledge, is Weston Geophysical. Weston is gathering
14 well log information. They will be mapping tops of certain
15 formations.

16 I do not know the exact formations which they
17 will be mapping. They will most likely be reviewing some
18 other geophysical information, such as seismic reflection
19 refraction that has been done for different oil companies
20 that are looking for different gas and oil resources, and they
21 will provide the data to the Staff, and they will give the
22 Staff their interpretation. The Staff will also look at
23 the data and make its own interpretation of the data.

24 Q Are you aware of GeoSpectra's report?

25 A Yes, I have seen parts of it I have had for

E7L16

1 about three months. One page of the letter I just saw yesterday.

2 Q I see. Well, it has only one letter page.

3 A What is the date on that?

4 Q March 10th, 1981.

5 A I have had that for approximately three months.

6 Q Oh, okay. It states in here, "The amount
7 of structural activity going on in Midland Township is rather
8 great for the Michigan Basin."

9 What is it he is referring to there?

10 A What is Mr. Parrish referring to?

11 Q Yes, Dr. Parrish.

12 A Dr. Parrish. The Michigan Basin region does
13 not have many structures that are mapped within it, many
14 folds or faults. The rocks themselves are fairly underformed.

15 This is my interpretation of this. When
16 GeoSpectra looked at the more detailed information that they
17 had available to them, they interpreted it as having some
18 minor structure folds or faults in this region. They in fact
19 interpreted it as having some faults.

20 I would say probably based on their knowledge
21 of the Michigan Basin in general, that it is fairly under-
22 formed and their interpretation that there possibly are some
23 faults here--they stated that it has more structure than they
24 probably would have anticipated compared to the region as a
25 whole, which is fairly underformed.

E7L17

1 Q So now we have a geophysicist and a geologist
2 both claiming, indeed, that there are faults in the area.

3 A Yes. GeoSpectra, the company itself, is
4 in business to find structures, basically. They are out
5 there gathering information to attempt to sell this informa-
6 tion to clients, and like any other organization, their interpre-
7 tation may differ from somebody else looking at the same data,
8 and before I judged whether that interpretation--or before
9 the NRC judged whether that interpretation was in fact the
10 best interpretation, we would need to look at the data itself,
11 and we will look at Consumers' consultants' interpretation
12 of the data that they have collected.

13 I think, based on a phone conversation I had
14 with Mr. Thureaux at Consumers Powers--I'm sorry I can't say
15 his last name--that their consultant, Weston Geophysical,
16 is getting more data than went into the map that I have from
17 Mr. Jaworski. Whether GeoSpectra itself has more informa-
18 tion, I don't know, more data than was put down on the map.
19 There were some numbers put down on top of the, I think,
20 foundation.

21 Q Just one question on injection wells before
22 I leave it. Are you familiar with any fracture due to injec-
23 tion wells?

24 A Not directly.

25 Q Are you familiar with this book?

TT

E7L18

1 A I am familiar with one page out of that book.

2 MS. BROWN: Could that book, please, be
3 noted or read into the record, the title of it?

4 MR. CASTELLANOS: This is, "The Dow Story",
5 by Don Whitehead, which is supposed to be a--I am not sure if
6 you could call it a documentary on Dr. Herbert Dow, but it
7 is supposed to be a history of Dr. Herbert Dow and the establish-
8 ment of the Dow Chemical Company in Midland.

9 MS. BROWN: I just ask that the title of that
10 book be read into the record.

11 Q (By Mr. Castellanos) This page--are you familiar
12 with this page?

13 CHAIRMAN BECHHOEFER: Would you tell us the page
14 number?

15 MR. CASTELLANOS: The page number is 154.

16 A Yes, Page 154 is the page that was sent to Mr.
17 Darl Hood, the project manager, by yourself, and Darl passed
18 along copies to me.

19 Q Good. Go down to about the middle of that page,
20 starting with, "As Bechtel recalled".

21 A Yes.

22 Q Would you mind reading that paragraph, please?

23 A He states, "I set up a rig in Midland to pump
24 the waste brine down vertically in what they call the parma
25 sand formation, which is one level higher than the Marshall

E7L19

T

1 foundation. The parma sand was in the range of about 900 feet
2 deep. I got some tanks from salvage and got some big high
3 pressure pumps that went up to about 600 pounds of pressure.
4 I hooked the pumps up to brine fill tanks and began pumping
5 the brine into a well. After a time, the pressure was
6 building up, but nothing was happening. The brine wasn't
7 moving out of the tanks. Then suddenly everything let go.
8 The pumps started to pump like hell, and you could see the
9 brine level going down. I couldn't get enough brine into the
10 tanks. I had to shut off the pumps and refill the tanks.
11 We left the valve open, and the brine poured down the well.
12 My first thought was that we might be pushing brine through
13 the sand all the way to outcroppings of Saginaw Bay."

14 Q Then would you read the next two sentences?

15 A "What I had done with that pressure was to
16 lift the earth and fracture the zone. The brine wasn't being
17 forced into the sand. It was pouring into the fracture.."

18 Would you like me to go on?

19 Q No. That's fine. Would you agree with what
20 he apparently concluded; Dr. Bechtel?

21 A That's a very difficult question. It is totally--
22 You are asking me to make a judgment as to whether he is
23 telling the truth or not.

24 I would point out the following: They were
25 pumping to 900 feet deep there at that time. The pumping that

E7L20

1 is in the site region, to the best of my knowledge, is about
2 41 to 43 hundred feet deep. There would be a difference in
3 pressure at that depth. If you were to cause hydrofracture,
4 you would have to pump in at a higher pressure at a deeper
5 depth.

6 Q This says 600 pounds. Is that PSI or pounds
7 per square feet?

8 A I have no idea.

9 Q What would fracture at 900 feet? Would it be
10 pounds per square foot or PSI?

11 A That would have to be a calculation made by
12 a geotechnical engineer. We went through the calculation I
13 made with Mr. Gerald Hayne for the 10,000 PSI at 4,000 feet.

14 Q How many injection wells are you familiar with
15 that are at 900 feet?

16 A In the site region?

17 Q Yes, and do you have a--

18 A In the final safety analysis report--I don't
19 recall the section. It is part of 252--there are maps that
20 show the different wells within one-half mile of the site, and
21 possibly out further. These include the reduction and re-
22 injection wells and the salt solution mining wells. The salt
23 solution mining wells, within one-half mile of the site, were
24 all at an approximated depth of 41 to 43 hundred feet, to the
25 best of my knowledge. The reduction and reinjection wells,

E7L21

1 I do not recall the actual depth.

2 Q So you don't know?

3 A No.

4 Q Why was it only a half mile from the site
5 that was selected for evaluation into the galleries of solution
6 mines?

7 A I am not familiar with that portion of the
8 Code of Federal Regulations, but it may be an exclusionary.

9 Q I mean we are here for safety. Is it safe
10 to assume that all we have to do is go a half mile away from
11 the site?

12 A There are exclusionaries for certain types of
13 activities. For certain types of faulting, particularly
14 in California, we do have certain areas that we look at for
15 the size of the faults. Now, I do not know the specific
16 numbers for this type of process, but I would expect it to
17 be some type of exclusionary that they want to look at in
18 detail.

19 Q When you refer to the site, are you referring
20 to the building structures or the entire facility which would
21 include the nuclear pond?

22 A The entire site. I think they probably took
23 it from the containment, a half mile, or something like that.
24 I don't recall the figures.

25 Q I have a map of the Midland brine well system,

E7L22

1 as delivered to me by the Dow Chemical Company approximately
2 in February, perhaps March, of this year. Are you familiar
3 with this document?

4 MR. CASTELLANOS: Could I ask him this?

5 CHAIRMAN BECHHOEFER: There is going to be
6 some difficulty for the Board to know what the answer means.
7 Do you want to--

8 MR. CASTELLANOS: I wanted to address
9 specifically the disposal system and the solution mine system
10 on this map, and its relationship to the nuclear facility.

11 CHAIRMAN BECHHOEFER: I was wondering--

12 MR. CASTELLANOS: I'm sorry; I'm sorry. We
13 have made copies.

14 CHAIRMAN BECHHOEFER: I think all the parties
15 should have--or at least the Applicant ought to have a copy.

16 MR. CASTELLANOS: Do you have a copy of this?

17 MR. MILLER: This appears to be a copy, the
18 first part of it, at least, of Mrs. Warren's Limited Appearance
19 Statement.

20 MR. CASTELLANOS: If I may, the map, I do
21 believe, that was given to you-- Oh, it is. Okay. I'm sorry.

22 Mr. Miller, do you have one of these?

23 MR. MILLER: Yes, sir.

24 MR. CASTELLANOS: Are you having a difficult
25 time finding it, or do you have it?

MR. MILLER: I have it.

E7L23

1 Q (By Mr. Castellanos) Mr. Kimball, could you
2 illustrate where the nuclear facility is in relationship to
3 this Midland brine system map?

4 A The best that I can tell from the map, it
5 would be just northeast of No. 28, I think, north, northeast
6 from No. 28.

7 Q That's the nuclear facility, including the
8 nuclear pond?

9 A The pond itself--

10 Q You did say that's included in whatever you
11 referred to as the nuclear facility.

12 A I do have the figure. I did find the figure.
13 It is from the final safety analysis report, Figure 25-2 .
14 I don't have copies of it, but that figure gives the types
15 of wells within one mile on the power block area. These
16 include plugged and abandoned brine wells, operational and
17 standby brine wells, operational and standby salt wells,
18 and plugged and abandoned wells within one mile, and they
19 took that reference from the power block. I do recall seeing
20 another map, although I can't give you the figure, that was
21 also a half-mile radius.

22 (Continued on next page.)
23
24
25

1 Q So it is possible, then, they have a gallery,
2 really, right next to the nuclear pond?

3 A Yes. In the FSAR they estimated the size of
4 the gallery that could be under the site, that would be
5 within one-half mile of the site. The seismic gallery
6 that I was discussing before is that gallery.

7 Q It could be in the vicinity of the site?

8 A Yes.

9 Q Can you tell us how far is the pond from the
10 center of the containment that was used as the center?

11 A Without a map, I cannot tell you. The gallery
12 itself is the reason that subsidence monitoring will continue
13 over the life of the facility.

14 Q Do you believe that this matter should be
15 further investigated?

16 A Which matter?

17 Q Do you think, as far as the relationship of
18 knowing or not knowing what the pressures are of the wells,
19 where they're at? Would the galleries--

20 A In terms of the nuclear plant, the matter is
21 being further investigated. The Staff continues to factor
22 information that it gets into its operating license review,
23 which we are doing. And we are currently in the middle of
24 the operating license review.

25 Q Can you tell me how far back they go in the

1 history of solution mining as to drawing their conclusions
2 of subsidence?

3 A. In terms of the galleries, they have probably
4 gone back to when Dow started the mining in the area. I don't
5 know the exact dates.

6 Q 1897?

7 A. I have a copy of a portion of the final safety
8 analysis report, which may give the specific dates.

9 On page 2.5.20 of the FSAR there's a sentence
10 which says, "Since 1944 the Dow Chemical Company has been
11 operating salt and brine extraction wells and brine disposal
12 wells near the Midland plant site."

13 So that is a date in the FSAR.

14 Q So from 1897 to 1944 there hadn't been any
15 evaluation?

16 A. Well, from the statement in the FSAR that the
17 salt wells-- From the way I read the FSAR, there were no wells
18 specifically in the Midland region. I'm not sure of the
19 distance, and I'm not sure where Dow's pumping or wells were
20 prior to 1944. So I can't come to a definite conclusion. I
21 would have to see where those wells were between 1897 and 1944.

22 Q Do you know when the injection well was
23 developed?

24 A. No.

25 Q Would you consider yourself familiar with the

1 injection well system as to the basic operation of an
2 injection well?

3 A. I'm not specifically familiar with that system,
4 no.

5 Q. Will somebody be coming later on next week
6 that can address that?

7 CHAIRMAN BECHHOEFER: One question I do have
8 is: To what extent will material such as you have testified
9 to this morning be developed further, when we get to the
10 seismic hearings? I assume the information on faults in the
11 area will be factored into that review. Is that not correct?
12 I guess this would be in October or later.

13 THE WITNESS: The faults themselves, in terms
14 of having a direct impact on earthquake, or direct impact on
15 an estimation of the seismic ground motion, would have to be
16 capable, within the meaning of Appendix A, 10 CFR Part 100.
17 Faults are common in the central and eastern U. S. They happen
18 to be, usually, very old faults. To the best of my knowledge,
19 no faults have been identified about east of the Rocky
20 Mountains which have been found to be capable within the
21 meaning of Appendix A, with one possible exception which is
22 continuing to be researched, which is the New Madrid region
23 which has experienced some very large earthquakes in 1811 and
24 1812.

25 In terms of these faults, the faults are most

1 likely in rocks that are hundreds of millions of years old.
2 When the mapping is completed, they will see if the faults
3 terminate vertically, that they will be capped by a very old
4 rock which has not broken, if the faults exist at all, or
5 any other structure.

6 CHAIRMAN BECHHOEFER: Well, will that be part
7 of the analysis, at least, to conclude that the faults are
8 not capable, or that the faults in question have been
9 analyzed in terms of--

10 THE WITNESS: That will be part of the Staff's
11 operating license review. As we get the information in the
12 FSAR, we will look at that information.

13 CHAIRMAN BECHHOEFER: I might ask you: Is that
14 the type of information which will be brought into the seismic
15 portion of this hearing?

16 MS. BROWN: Mr. Chairman, may we confer for a
17 minute, in order to respond?

18 (Staff counsel conferring.)

19 MS. BROWN: Chairman Bechhoefer, when we present
20 our site-specific decision in the fall, the Staff will take
21 into consideration these wells, to the extent that they feel
22 it is necessary, or to the extent they feel it is relevant in
23 generating a response spectra. Otherwise, it will be
24 addressed at the operating license stage of the proceeding.

25 CHAIRMAN BECHHOEFER: I see. Thank you.

1 Q (By Mr. Castellanos) How do you intend to find
2 out the question of the injection wells, or do you intend to?

3 A Well, we have asked the Applicant in phone
4 conversations if they could continue to try to get that infor-
5 mation. I might add, we have no power over Dow Chemical
6 Corporation, and I'm not sure that Consumers Power has any
7 power over Dow Chemical Corporation. And if Dow feels it is
8 necessary not to release that information, it might be difficult
9 to get.

10 Q So, then, this is an uncertainty or an unknown
11 that may possibly always be there?

12 A The specific numbers currently are unknown.

13 MR. MILLER: Well, just for the record,
14 Consumers Power has received a written request from the NRC
15 Staff which inquires into-- I'm sorry. Beg your pardon.

16 The Company has written to Dow Chemical, seeking
17 that information, and has every expectation that Dow is willing
18 to cooperate and provide the information.

19 THE WITNESS: The information that he's
20 discussing was the result of phone conversations that we had
21 with Consumers.

22 Q (By Mr. Castellanos) Disposal wells are a matter
23 of public record and their pressures are available at the
24 Michigan Department of Natural Resources. But unfortunately
25 they only go back since the law of 1969 was passed, and that

1 was to keep a record on disposal wells. So their information
2 is only--history-wise, goes back to as early as 1970, '71, '72.

3 MS. BROWN: Objection, Your Honor, to Mr.--

4 MR. CASTELLENOS: I'm sorry, I--

5 MS. BROWN: He should not be testifying.

6 MR. CASTELLENOS: Yes. I'm sorry.

7 Q (By Mr. Castellenos) So that scenario still
8 has to be investigated, then, as far as the injection pressure
9 is known?

10 A. Yes. As stated, Consumers is looking into that.

11 Q. Okay. Just on this cavern that was discussed--
12 you call it "gallery"--what's the difference between a cavern
13 and a gallery?

14 A. I used the word "gallery" because it was in,
15 I think, Ms. Warren's limited appearance statement. I think
16 of them as cavities. So I guess I would say, basically, it's
17 a void that exists in the subsurface.

18 I'm not sure..."cavern," The definition of
19 cavern might be that it's open at some end that you could
20 walk into it. I'm not sure. Probably you could think of them
21 as the same thing.

22 Q. Could you tell us the location of this gallery?

23 A. Specifically, I can't; no.

24 Q. Do you know where the location is of Well No. 13,
25 NW, NW, NW Section 28?

1 A. I'm not sure if the numbering system you have
2 in front of you is the same as mine. From the figure I quoted
3 before, from the FSAR, the two closest salt wells that I have
4 on that map are saltwells No. 10 and No. 17. They look like
5 they're on the furthest western side of the site.

6 Q. Excuse me. Which--

7 A. That was the FSAR Figure 2.5-25.

8 Q. Which one would they be on this map? I can't
9 understand the difference.

10 A. Could you identify 13 on that map for me? Is
11 13 one of the X'd-out wells?

12 Q. No, it's not. 13 is the designated number for
13 the cavern storage well that's in the same section as the
14 nuclear facility.

15 A. The number that looks closest to me on this is
16 No. 28.

17 Q. Yes. Those are production wells. I'm talking
18 about a cavern storage well.

19 MR. MILLER: Mr. Kimball, look about an inch
20 to the left in the upper-- I see a number 13 up there.

21 THE WITNESS: That's also a production well.

22 Q. (By Mr. Castellenos) That's a production well,
23 also.

24 A. I just don't think the numbering systems match
25 up.

1 Q Okay. Apparently what's established, I guess,
2 is the fact that there's a well that isn't on this map, or
3 this cavern is not designated on this map.

4 A On the map that you have. The two saltwells
5 that I identified in the FSAR figure, if those were the salt-
6 wells that they actually went in and mined the salt formations
7 out of, I would expect that the cavern was probably somewhere
8 underneath those two wells, which would be basically at the
9 furthest western end of the site. And those are wells Nos.
10 10 and 17.

11 Q You have this, don't you, Mr. Kimball?
12 (Indicating).

13 A No, I don't have that.

14 Q It should be in the back of the report that you
15 have.

16 (Document handed to the witness.)

17 Q (Continuing) Do you see the Section 28, and
18 No. 13?

19 A Yes.

20 Q Is that the same gallery that you were
21 mentioning earlier, that they diagnosed as to size and so on?

22 A It looks approximately in the right place, in
23 relation to the two wells that I discussed, wells 10 and 17.

24 Q (By Ms. Stamiris) Mr. Kimball, I would like to
25 ask if that cavern storage well that you were just comparing and

1 trying to decide, if, in fact, it is the same one that you
2 were comparing it to? Has that already been identified and
3 taken into consideration by the NRC, or has it been submitted
4 in information in the FSAR? Is that what you're saying?

5 A. Yes. The volume of the cavern was based on the
6 estimate of the amount of salt that was removed. Consumers
7 hired two consultants to assess whether the cavern itself
8 would have any impact on the plant. Those two consultants
9 said that they did not think it would have an impact on the
10 plant. They based this on estimates--if the material around
11 the cavern started collapsing into the cavern, they based it
12 on something called a bulking factor. The rock that would
13 burst out, when they burst out, would increase in volume,
14 thereby gradually filling up the cavern as the cavern went up
15 vertically.

16 I think they estimated--what is stated in the
17 FSAR is a conservative estimate--that from about a 4,000-foot
18 depth, that the cavern would be filled in by about a 3,500-foot
19 depth, based on this bulking factor that they used.

20 Also, when you have a cavern, the roof, the
21 ceiling, is not the only thing that will burst into the
22 cavern. The sides will probably also burst into the cavern.
23 And if no bulking factor was taken into account, and you just
24 propagated this cavern up to the surface, by the time it got
25 to the surface it would increase its areal extent. It's for

1 that reason that the subsidence monitoring is continuing, and
2 will continue for the life of the facility around the plant.

3 Q Could you tell me where I would find that
4 report, that consultant's report?

5 A The report itself would probably have to come
6 from the Applicant.

7 Q It is not an NRC document, in the public
8 document room?

9 A To tell you the truth, I'm not sure. Between
10 the PSAR and FSAR, the report itself may have been docketed.

11 Q Is it referenced in the PSAR and FSAR?

12 A Yes, it's referenced in the FSAR.

13 Q And is it in that 2.5 section that you referred
14 to under one of the sub-numbers?

15 A It's in 2.5.1.2.5.4.1.

16 Q Would you repeat that, please? I'm sorry. I
17 want to check it.

18 A 2.5.1.2.5.4.1.

19 Q You mentioned that an SH&G report-- Do you
20 remember that? I don't know if that came from your--

21 MS. BROWN: Objection, Your Honor. I think
22 she's misquoted the witness. My question referenced an SH&G
23 report, which is taken from Mrs. Warren's limited appearance
24 statement.

25 Q (By Mr. Castellanos) Mr. Kimball, when you

1 mentioned the-- 700 feet, was it--the size of this gallery,
2 that was specifically referred to in your--

3 A. The diameter; yes, sir.

4 Q. Okay. That's a circular cavity?

5 A. No. I think these are estimates based upon
6 assuming it is a circular cavity, and working from the fact
7 that they know the amount of salt that was removed.

8 Q. They know the amount of salt removed, but they
9 don't know the shape; is that correct?

10 A. Right. They have assumed a thickness that the
11 saltbed was, I think, of 25 feet. And from that, they worked
12 backwards from the volume of material that was used, and came
13 up with an equivalent radius, if it was a circle.

14 Q. So, therefore, it's really difficult to
15 determine what the size of the subsidence would be if such an
16 event should take place, is that right?

17 A. The Applicant's consultants specifically made
18 an estimate of the effect on the surface. However, they did
19 assume a certain shape, basically, to the cavity. They could
20 probably work through numbers, assuming different shapes--
21 assuming different thickness in material removed, and in the
22 shape of it.

23 Q. In the cone of influence of an injection well,
24 how far, laterally--or what determines the lateral movement and
25 the vertical movement of your material?

1 A. The question is outside my area of expertise,
2 and I can't give you an answer. It would have to be answered
3 by a geotechnical engineer.

4 Q. That's being studied, then, and evaluated; is
5 that right?

6 A. The specific question, I'm not sure.

7 Q. On the cone of influence, what determines the
8 cone of influence of an injection well? How far, laterally,
9 does this material move, and vertically does this material
10 move, upward?

11 (Pause.)

12 The reason why I'm asking that question is that
13 it's possible, is it not, then, that materials that are being
14 discarded in an injection system can actually rise in a vertical
15 fashion and perhaps create some activity somewhere else, say,
16 a half mile or a mile away from the injection well? Is that a
17 possibility?

18 A. The materials, once they're pumped into the
19 earth, can migrate, yes. However, it would take a more
20 qualified person to specifically address how far they could
21 migrate, how fast they could migrate, and specifically if it
22 was to a certain concern, whether this could be applicable.

end 8

23 (Continued on following page.)
24
25

E9L1

1 Q (By Mr. Castellanos) Do you know if that's
2 ever been studied--

3 A Ground water movement?

4 Q --In relation to this nuclear site?

5 A I am not aware of the hydrology section of the
6 FSAR or what the Staff has looked at, but the ground water
7 movements in the site region would be in the hydrology and
8 geotechnical engineering sections.

9 Q Could the stability of the soils surrounding
10 the nuclear facility be affected by solution mining, injection
11 mining?

12 A Could they? Yes, they could, and that's why
13 the subsidence monitoring has taken place, to see if that is
14 happening.

15 Q And the earth fault, in combination or singularly,
16 any one of those could affect the soils integrity, is that
17 not correct?

18 A The earth fault-- Could you clarify that?

19 Q Well, I mean if there was movement.

20 A If there was movement along--

21 Q It would change the characteristics of the soils,
22 would it not, in that particular area? I mean the aquifers
23 might move up, or they might move down.

24 A For that to happen from an earthquake would
25 take a probably fairly sizable event, events which are

E9L2

1 uncommon in this region of the country. It is not impossible
2 for an earthquake to cause soil deformation, liquefaction,
3 soil failure, and things like that.

4 Q Would the epicenter have to be here to
5 have that happen?

6 A No. The areas I just mentioned, though, are
7 being discussed also as part of the Staff's review; lique-
8 faction, et cetera.

9 MS. STAMIRIS: I have a couple of questions.

10 MS. BROWN: Objection. I was under the under-
11 standing that Mr. Castellanos was asking the questions for Ms.
12 Stamiris.

13 MS. STAMIRIS: The question I was going to ask
14 didn't have to do with the-- It has to do with the availability
15 of reports on this. It doesn't have to do with the substance
16 of his testimony.

17 MR. MILLER: Can't we do that off the record?

18 MR. CASTELLANOS: I am finished, Mr. Chairman.
19 Could I turn it over to her?

20 MS. STAMIRIS: I have two questions that are
21 very brief.

22 MR. CASTELLANOS: Should she give them to me
23 and I ask them?

24 CHAIRMAN BECHHOEFER: Are they on your conten-
25 tions, or are they other questions?

1 MS. STAMIRIS: They are not on my contention.
2 I remember in the 50.54(f) Volume 3--and I can't remember the
3 exact tab, but I remember request from Dr. Peck in the fall
4 of 1978 in a letter to Consumers, when he was first called
5 in to Consumers as a consultant, requesting the soils records
6 of Dow Chemical Company, yet I didn't see those soils subsidence
7 records in the 54(f) volumes, and I would like to know if
8 they were provided for Dr. Peck as requested, if we could--

9 CHAIRMAN BECHHOEFER: Well, I don't think this
10 witness could answer that.

11 MS. STAMIRIS: Well, all right. I meant to ask
12 if this witness knows whether such reports were provided to
13 the NRC in early 1978.

14 THE WITNESS: No, I don't know.

15 MS. STAMIRIS: Okay. My other question would
16 really not be directed to this witness, although may I ask
17 one question on the subject, and then if you want to overrule
18 it-- It just might be the most expedient time to ask.

19 Mr. Miller mentioned that Consumers was following
20 through on some of these reports, and asking questions of
21 Dow Chemical having to do with this, and I am wondering if
22 I could get a copy of their correspondence, or will it be
23 something that will go into this record, the answer that they
24 do get back from Dow.

25 CHAIRMAN BECHHOEFER: I think you will have to

E9L4

1 ask counsel.

2 MS. STAMIRIS: May I?

3 CHAIRMAN BECHHOEFER: Not on the record. I
4 think you may ask counsel off the record. I don't think it is
5 specifically-- Do you have any further questions on the
6 portion of Mr. Kimball's testimony that dealt with your
7 contentions?

8 MS. STAMIRIS: No. On my contentions, did you
9 say?

10 CHAIRMAN BECHHOEFER: Yes. There is a page
11 and a half that was put into the record.

12 MS. STAMIRIS: I think that's all.

13 MR. CASTELLANOS: Thank you, Mr. Chairman. Thank
14 you, Mr. Kimball.

15 CHAIRMAN BECHHOEFER: Do you have questions?

16 CROSS EXAMINATION

17 BY MS. STAMIRIS:

18 Q Regarding Answer 6 in your testimony--it starts
19 on Page 6 and goes through Page 6 and Page 7--I was concerned
20 in setting forth contentions as to the length of time that
21 these questions were asked and reasked, and I don't-- What I
22 want to know, in the middle of the paragraph on the third
23 line, it says, "However, the information contained in the
24 responses to these three questions did not resolve the open
25 issue involving which tectonic province the Midland site is in."

E9L5

1 I am just not aware--and maybe I should be,
2 but has that been identified now, or is that no longer something
3 being used in the newer seismic approach that the Applicant
4 has taken on?

5 A In October the Staff sent a letter to the
6 Applicant. The letter basically was written on the premise
7 that the site was located in the Central Stable Region Tectonic
8 Province. In fact, as I recall a sentence from the letter,
9 it said the Staff would be reluctant to accept subdivision
10 of that province, and the letter was based upon the entire
11 Central Stable Region.

12 The two approaches--two acceptable approaches
13 which the Staff put forth in that letter, one of which
14 Consumers is pursuing, are consistent with the site being in
15 the Central Stable Region Tectonic Province.

16 MS. STAMIRIS: Thank you. I have no further
17 questions on this testimony.

18 MR. MILLER: I have a few questions.

19 CROSS EXAMINATION

20 BY MR. MILLER:

21 Q Mr. Kimball, turning to your qualifications
22 that are attached to the testimony, you received an M.S.
23 Degree in Geology from the University of Michigan. Did you
24 write a thesis in order to obtain that degree?

25 A Yes, sir.

E9L6

1 Q What was the subject matter of that?

2 A The subject matter of the Master's thesis
3 was surface water dispersion in the Atlantic Ocean.

4 Q All right, sir. You state in your qualifications
5 that you have coauthored seven publications. Do any of those
6 publications deal with the classification of tectonic provinces
7 in the United States?

8 A No.

9 Q Now, in your testimony at Page 7--Ms. Stamiris
10 was just inquiring into that--the second full paragraph, the
11 last sentence states that, "The NRC Staff has been reluctant
12 to accept subdivision", and so on.

13 To your knowledge, Mr. Kimball, has the NRC
14 Staff ever accepted subdivision of the Central Stable Region?

15 A Yes.

16 Q Have any of those subdivisions included the
17 subdivision known as the Michigan Basin?

18 A Yes, they have.

19 Q For which power plant, sir?

20 A The power plant was the Greenwood facility.

21 Q And that power plant is located where, do you
22 know?

23 A Northern Detroit, to the best of my knowledge.
24 It has not been completed.

25 Q Was that done in connection with the preliminary

L7

1 safety analysis report for the Greenwood facility?

2 A To the best of my knowledge, yes.

3 Q Do you know the date on which that was
4 accepted by the Staff as a tectonic province in connection
5 with the Greenwood facility?

6 A I don't have the date. I don't know the date
7 specifically, but it would be contained in the Staff's
8 CP SER, I would imagine.

9 Q That's a matter of public record, is that
10 correct?

11 A I would assume.

12 Q Now, have you personally worked on the seismic
13 analysis of any other nuclear power plants in Michigan?

14 A Yes.

15 Q Which other plants?

16 A The Enrico Fermi plant, which the Staff just
17 finished writing its operating license safety evaluation for.

18 Q What tectonic province was assumed for the
19 operating license for the Enrico Fermi plant?

20 A The seismic design input is consistent with
21 the Central Stable Region Tectonic Province. It assumes
22 an earthquake similar in size in other areas
23 in the Central Stable Region could occur close to the facility.

24 Q Just one last question. Could you express
25 that in terms of maximum ground acceleration?

E9L8

1 A That is difficult to do. Let me try to explain
2 it this way: In the past, the Staff has used mainly one
3 approach to define the ground motion from the controlling
4 earthquake. That approach took the maximum intensity,
5 generally, which could not be associated with the tectonic
6 pressure, and moved that intensity to the site.

7 From that intensity, they used an empirical
8 relationship to get the peak acceleration, the acceleration
9 that you are talking of.

10 Then from that, they went to what is called a
11 standardized response spectrum, Reg Guide 1.60 response
12 spectrum. The first plant where a deviation came about was
13 the Sequoia plant. Basically, there were changes in the art,
14 and as you get more information, the Staff determined that we
15 think that magnitude is a better estimator of source strength
16 than intensity would have been. Magnitude is something
17 that is more widely measured on many instruments. It is not
18 a subjective number. It is a quantitative number.

19 Using this approach and using magnitude,
20 what is called the site specific spectrum approach has been
21 adopted. In this approach there is no specific peak accelera-
22 tion that you get out of using the other approach. In the
23 end, you can take the curve, the response spectrum curve that
24 is being utilized, and interpolate the peak acceleration
25 off that response spectrum; however, the approach gets a spectral

T

E9L9

1 shape. It gets the entire response spectrum for a specific
2 site that does not use a standardized curve.

3 Q Can you do that interpolation for us with
4 respect to the Enrico Fermi plant?

5 A I think I-- I can remember, generally, the
6 number Fermi used. When we have written the letters which
7 give the options, we have given the utilities the option
8 to use a site specific spectrum for their soil and rock sites
T 9 that was developed by Lawrence Livermore, national levels
10 as part of the systematic evaluation program.

T 11 The Fermi applicant decided to use the Lawrence
T 12 Livermore response spectrum, along with a response spectrum--
13 site-specific response spectrum that was developed by their
14 consultant. They enveloped both of those response spectrums.

15 They were able to envelope both of those response
16 spectrums, to the best of my recollection, with a reg guide
17 1.60 spectrum in the high frequency range, and it corresponded
18 at 153, however, the frequencies which the site-specific
19 spectrum terminate at in the information that we have been
20 provided are at lower frequencies.

21 It would be difficult to judge, if you took the
22 site specific spectrum itself and went out to very high fre-
23 quencies, where you do have a peak acceleration, but it was
24 .513, and they were able to envelope both of those response
25 spectrums.

E9L10

1 Q If I may pursue this just a little bit further--

2 MS. BROWN: Mr. Chairman, I am going to object.

3 I have been letting a lot of these questions go forward
4 without objection, but I really believe it is far outside
5 the scope of his written testimony in response to Mrs. Stamiris'
6 Contention 1-B, which simply alleges that Consumers failed to
7 respond fully and adequately to these questions, and as far
8 as the technical basis of other response spectra in other
9 sites, I don't see it having a bearing on that particular
10 subcontention.

11 CHAIRMAN BECHHOEFER: Let me ask you, will
12 Mr. Kimball, or somebody in his shoes, be here in October?

13 MS. BROWN: Most definitely. I have informed
14 the Board before that Mr. Kimball is here for the limited
15 purpose of responding to Mrs. Warren's Limited Appearance State-
16 ment, which the Board requested, and is also here to respond
17 to Subcontention 1-B. We had been hoping that he wouldn't
18 be asked questions on the whole range of the status of the
19 seismic report.

20 CHAIRMAN BECHHOEFER: I am only asking this
21 because Mr. Miller's questions gave rise to some questions
22 in my own mind, which at some point in this proceeding,
23 before we render a decision on the subject, I want to have
24 answered.

25 I don't want to get into the Fermi justification

E9L11

1 either at this stage or what other questions this would lead
2 to. I don't think it is an appropriate time, but I do think
3 at some time in the proceeding it will be.

4 As long as we know that Mr. Kimball will be
5 back, that's fine.

6 MS. BROWN: Certainly. We have always said
7 that we would be prepared to present witnesses at a seismic
8 hearing in the fall, and Mr. Kimball will be available at that
9 time.

10 MR. MILLER: On that basis, I will quit right
11 now.

12 CHAIRMAN BECHHOEFER: I would rather not ask
13 questions of my own at this time on that then.

14 BOARD EXAMINATION

15 BY CHAIRMAN BECHHOEFER: Mr. Kimball, first,
16 just one very general question about the Dow wells. Is it
17 your opinion that on the basis of what you know now, the
18 activity by Dow will not have a substantial effect on the
19 site, and particularly on the soils settlement activities,
20 the remedial activities which may be undertaken?

21 A I think that is a two-part question.

22 Q On the basis of your present knowledge. It
23 is.

24 A I can state an opinion that the subsidence,
25 due to the fact that solution mining has taken place, presently

E9L12

1 is not occurring.

2 As to the remedial actions and the remedial
3 fixes, that is really outside my area of expertise, and
4 I cannot render a judgment on that.

5 Q You had stated that the Staff is relying
6 on the Applicant's data. Are you informed where that data
7 comes from, the source of that?

8 A Yes, usually.

9 Q Do you know in this area where the Applicant
10 got his figures on the wells, et cetera?

11 A Specifically, I do not. I would assume from
12 the FSAR, that most of that information on the salt wells
13 comes from Dow Chemical.

14 Q I don't know if this wording really is correct,
15 but if the activity that Dow is undertaking would have an
16 effect at the Midland site, would there be some advance warning
17 of that so that perhaps Dow activity could be modified before
18 any substantial effect occurred?

19 A To the best of my knowledge, the subsidence
20 monitoring itself would give sort of a warning if something
21 was occurring in the region. It would tell you that if
22 subsidence was occurring, you would have to look into the
23 reason why it was occurring, and that might include investigating,
24 as best as possible, what is going on in the subsurface of
25 the plant, by borings, and there are other types of ways to do

E9L13

1 it.

2 I think it would give-- It would not just
3 happen overnight, no. I think it would give sufficient warning,
4 at least to make more detailed investigations to explore why
5 it was occurring.

6 Q Now, turning to your response to the Stamiris
7 contention, I notice that-- If you turn to your Attachment 6,
8 I guess it is, does this--

9 A Could you give me the question number? I don't
10 have attachment numbers on this.

11 Q Question 361.7(2.5).

12 A Thank you; thank you.

13 Q I think you have it identified as Attachment 6.

14 A Oh, yes. I do see it now.

15 Q That's the page I was referring to.

16 A Yes.

17 (Continued on next page.)

18

19

20

21

22

23

24

25

1 Q Has the Applicant provided the Staff now with
2 the analysis it sought of seismicity within 200 miles of the
3 site, and of a similar sized area of the Central Stable Region--
4 and I want to distinguish that between an analysis of the
5 Michigan Basin.

6 Maybe I'm misreading the answer, but I wondered
7 whether the Staff got what it was asking for in that question?

8 A The question itself--maybe this will help
9 clarify this.

10 I think when the Staff looked at the answer to
11 those questions in order to attempt to make judgment, they--
12 I was not on the Staff at that time; I haven't looked into it--
13 but they needed a judgment, more of a quantitative judgment--
14 quantitative number to make a judgment, saying that the
15 seismic design that the Applicant was proposing was adequate.

16 The answer to this question does not include
17 an estimate of return period, or-- It basically says the number
18 of events which occurred in this certain-sized area. It does
19 not go to the size of the event that has occurred, or to how
20 often that particular size of event has occurred.

21 As part of the entire seismic review, the
22 Applicant has provided Staff with a probability study. It
23 specifically does not address seismicity of other similar-sized
24 area in the Central Stable Region. It does use seismicity
25 throughout the Central Stable Region in the probability study

1 itself, however, and in that study does give more quantitative
2 numbers on return periods of events on different source zones,
3 one of which does include the Michigan Basin, or the approxi-
4 mately 200 miles around the site.

5 Q Well, does 200 miles around the site encompass
6 the Michigan Basin area?

7 A It would go slightly outside some parts of
8 the Michigan Basin, and slightly inside other parts of the
9 Michigan Basin. The Michigan Basin itself is roughly circular,
10 and, if my recollection serves me correctly, would have about
11 a radius of 180 miles. So the Michigan Basin itself would be
12 slightly less than a 200-mile circle.

13 Q Well, is the Staff satisfied that it got the
14 information for the analysis, asked for? Is Staff now
15 satisfied?

16 A The probability study, I think, if you look at
17 the probability study in relation to getting information they
18 were looking for on that question, yes, I think it would
19 probably satisfy them.

20 If the probability study hadn't been done, I
21 think the next type of question which would have come about,
22 under 361.8, let's say, would be, "Specifically give the
23 return period of the events which have occurred in the Michigan
24 Basin as part of the number of earthquakes," or something like
25 that. It would go more toward a probability-type of study.

1 And the Applicant has done that as one of the parts of the
2 seismic submittals.

3 CHAIRMAN BECHHOEFER: That's all I have.

4 (The Board conferring.)

5 That's all the Board has. Ms. Brown?

6 MS. BROWN: No, the Staff has no redirect.

7 CHAIRMAN BECHHOEFER: Are there further
8 questions based on the Board's examination?

9 MR. MILLER: No, nothing.

10 MR. MARSHALL: I had one question, just a
11 clarification is all.

12 CROSS-EXAMINATION

13 BY MR. MARSHALL:

14 Q When he was answering questions to the Staff
15 Attorney over here, it was stated that you was having something
16 to do with nuclear power in the Enrico Fermi plant near
17 Detroit. Is that one near Monroe?

18 A Yes.

19 Q Did you have some trouble with that plant before?
20 I'm just trying to find out if this is the same plant that I'm
21 thinking about, if you encountered some difficulty with that.

22 MS. BROWN: Objection. What kind of difficulty?
23 Also, I don't know what--

24 MR. MARSHALL: It seemed like a meltdown, or
25 something like that

1 MS. BROWN: I think Mr. Marshall should ask
2 this to the witness when he's off the stand. I don't believe
3 it has any bearing on the issues in this case.

4 MR. MARSHALL: Well, I was really wondering if
5 there was two of them, or just one. He said, "near Detroit,"
6 and I was wondering if it was Cook or Monroe. That's all.

7 THE WITNESS: The plant which was licensed is
8 Unit 3. There are two other units.

9 MR. MARSHALL: That's all. I just wanted to
10 get it straight in my head.

11 CHAIRMAN BECHHOEFER: The Board can guarantee
12 that he was not talking about the one that had a meltdown.

13 (Laughter.)

14 MR. MARSHALL: I wanted to find out. That's
15 all.

16 CHAIRMAN BECHHOEFER: The witness is excused.

17 (Witness excused.)

18 We will recess for an hour and fifteen minutes.

19 (Whereupon, at 1:00 p.m., the hearing was
20 recessed, to reconvene at 2:15 p.m., this same day.)

21

22

23

24

25

E11L1

AFTERNOON SESSION

(2:15 p.m.)

1
2
3 Whereupon,

4 BENJAMIN W. MARGUGLIO

5 resumed the stand as a witness on behalf of the Applicant,
6 and having been previously duly sworn by the Chairman, was
7 examined and testified further as follows:

BOARD EXAMINATION (Resumed)

BY CHAIRMAN BECHHOEFER:

8
9
10 Q Mr. Marguglio, I have just a few questions to
11 fill in some of the areas of which we have been talking about
12 in the last day or so.

13 I would like you to address the question--not
14 the question, but the practice of overinspection, and I would
15 like to find out how you determine what areas will be over-
16 inspected, if that's the proper term.

17 A The practice started at Consumers Power on the
18 Midland project in 1976 as one of the corrective actions
19 in response to the rebar situation. I mentioned a couple of
20 other actions that were taken earlier. For that specific
21 activity, Consumers Power Company's Quality Assurance Department
22 commenced a practice of reinspecting 100 percent of the rebar
23 placements. I say "reinspecting" because these inspections
24 were subsequent to the Bechtel quality control inspections.
25 The term "over-inspection" is synonymous with reinspection by

1 quality assurance after an initial inspection by Bechtel.

2 To get a little technical, in certain cases,
3 of necessity, the inspections have to be done concurrently
4 between Bechtel and Consumers or MPQAD, and in those cases
5 Bechtel's quality control establishes its inspection position

6 (Continued on next page.)

7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

WILERS HALLS
ERASE
COTTON CONTENT

E11L2

1 initially before the over-inspection decision is made.

2 The purpose of the over-inspection is two-fold:
3 One, to assure that the project is in accordance with its
4 assigned design requirements and, secondly, to make an
5 assessment of the effectiveness of the Bechtel quality
6 control.

7 Q Now, is over-inspection different from what used
8 to be the Consumers Power overview types of inspections?

9 A No, except the term "overview" may be applied
10 to things other than inspection. For example, over-viewing
11 the Bechtel approach to the application of quality assurance
12 requirements to procurement packages. It is not an over-
13 inspection, per se. It is an overview, so the term "overview"
14 applies to the same kind of activity, except that it is not
15 an inspection, but a review of what was done by Bechtel.

16 Q Is there any difference between what existed
17 once-- Tell me if I am drawing the wrong conclusion, but
18 at least the quality control area involved in inspections,
19 is there any difference between what once existed, which is,
20 the way I see it, an inspection by Bechtel and an overview
21 by Consumers, and what now exists, which is an inspection
22 by the MPQAD overinspection, in some areas, at least, by
23 Consumers?

24 A Prior to 1976, the Consumers quality assurance
25 overview did not include an over-inspection. Subsequent to

E11L3

1 1976, the overview also included an over-inspection. The
2 over-inspection activities after 1976 were enlarged to cover
3 the electrical and the mechanical areas, and now, most recently,
4 to cover the soils work, civil work.

5 Q Well, what I am trying to determine is when the
6 MPQAD system was first brought into play, did that, in essence,
7 insofar as QC material is concerned--QC construction was
8 concerned, did that, in effect, result in one less layer of
9 review than was previously the case, in terms of review?

10 A With regard to inspection?

11 Q Yes.

12 A No, because the MPQAD continues to perform
13 an over-inspection of the Bechtel quality control inspection.

14 Q Now, what about insofar as other QC activities
15 are concerned? Is there now one less layer of review or
16 potential review?

17 A There is a single review or a single performance
18 of the quality assurance activity, and the performance of that
19 activity is performed by a combination of Bechtel and QA
20 personnel. I think that the advantages that I cited in my
21 testimony are that the Consumers personnel are getting to
22 perform this activity up front, as opposed to after it has
23 been accomplished by Bechtel QA, and therefore if Consumers
24 has any impact, the impact is felt on a more timely basis.

25 From that point of view, I guess you could

E11L4

1 consider it to be a single review as contracted to in the past
2 when the Consumers Quality Assurance Department overview
3 was a second layer, but recognize that that second layer
4 was only on a sampling basis.

5 Q Right, but as a spot check on some of those
6 activities, I assume on a sampling basis it had some utility.

7 A We continue to have an overview of a different
8 kind, of course. We continue to have independent quality
9 assurance audits made by the Bechtel Corporate Quality Assurance
10 organization, made by the Consumers Corporate Quality Assurance
11 organization, and made by external consulting organizations.

12 Q Would that enlarge the scope of what Consumers
13 previously exercised in its oversight function?

14 A Yes.

15 Q We have had a considerable amount of discussion
16 about the trend analysis program. What I would like to find
17 out--and maybe I missed something before, but I never did
18 ascertain when a series of activities becomes a trend and how
19 that is determined.

20 Let me ask you, in your computer tracking
21 system, every time a particular event happens, does it get
22 put into the tracking system, and then if it happens a second
23 time, it gets put into the trend analysis program, or how
24 would something like that work? How would a particular event,
25 if it happened, in fact, get into the trend analysis program?

1 A We start the program recognizing that there
2 are certain types of activities and also that there are certain
3 types of defects for each area of activity, and as the
4 individual nonconformance reports are originated by Bechtel
5 quality control or by the quality assurance organization, they
6 are counted for a given period of time. They are coded and
7 categorized as to their area and defect type, and the number
8 of nonconformances for a given work activity area, for a given
9 defect type, are simply plotted, and overtime, one looks
10 at the nature of that plot.

11 If the frequency of a given type of defect
12 or nonconformance in a given area appears to be increasing,
13 then one can say that an adverse trend is developing which
14 warrants corrective action.

15 Yesterday I testified to the fact that there
16 is a judgment as to when a trend is deemed adverse, and I
17 testified that one of our quality assurance personnel had
18 recommended that we try to establish a more definitive basis
19 by which to decide when the trend is adverse and warrants a
20 corrective action over and above the corrective actions that
21 are attempted to be taken on each individual nonconformance
22 report.

23 Q That, I understand.

24 A Okay.

25 Q Is there any-- I take it there isn't a given

P11L6

1 number of events which would trigger this system.

2 A Now there are because we have since instituted
3 that quantitative criterion beyond which I spoke yesterday.

4 Q I see. So that would happen? You plug
5 in what the average occurrence rate is among more than your own
6 experience for the type of activity, or do you go outside
7 Consumers experience, or is it based pretty much on what you
8 have had in the past?

9 A No. It is based on our own experience, but
10 that's the mandatory level. It has to be understood also that
11 the quality assurance personnel are expected to take action
12 even when there is not an upward trend, if the absolute
13 number of nonconformances is, by judgment, deemed to be too
14 high. In other words, the quality assurance personnel are
15 trained to recognize a number--a high number of nonconformances,
16 regardless of whether or not that number is increasing, but
17 is still not a satisfactory condition, and we want to reduce
18 that absolute number even if there is not an upward trend of
19 that number.

20 Q I see. Turning to the very first page of your
21 testimony, in the middle of that first paragraph you said you
22 were undertaking to--you use the word "establish" a QA
23 program, as well as certain other words.

24 What did you mean by that? Was there a need at
25 that time, or did the Company feel a need at that time to

E11L7

1 restructure or improve to a great extent the program which
2 they had already had?

3 A There was a program in being, and the Company
4 recognized that it wanted to make improvements to the program,
5 and the word "establish" in that sentence is merely in recogni-
6 tion of the need from time to time to add certain types of
7 programmatic elements, depending upon changing work activities.
8 A program is not something which is cast in concrete and sits
9 there unrevised. It is something which is a living document,
10 and it has to be revised periodically to accommodate needs,
11 so from that point of view, I meant "establish"; but, in
12 essence, the program was there to begin with.

13 Q When you first became involved in that program,
14 you had no intent of, in essence, establishing a completely
15 new program?

16 A No.

17 Q You were not directed to do so?

18 A No.

19 (Continued on next page.)

20

21

22

23

24

25

1 Q I was trying to find the chart...the organization
2 chart.

3 A You mean Exhibit 4?

4 MR. MILLER: Let me give it to the witness.

5 (Document handed to the witness.)

6 Q I'm a little confused about this chart which,
7 for the record, is Exhibit 1 to Mr. Cooke's testimony. I'm
8 a little confused about the lines of reporting to Mr. Cooke
9 in two capacities which he serves.

10 First, he's one person, and I wonder, how do
11 you report to him in his capacity as Vice President of Project
12 Engineering and Construction, or do you, rather, report to him
13 in his capacity as head of the Midland project office?

14 A No, I report to him in his capacity as Vice
15 President of Projects Engineering and Construction.

16 Q Well, if it's the same person, in terms of
17 level of reporting can one really make that differentiation?
18 Does it go through different subordinate people, or how does
19 that work?

20 A Well, for example, I have an environmental
21 department, which reports to me, which is composed of
22 environmental scientists and environmental professionals who
23 are worried about regulatory matters and environmental
24 compliance. And for things of that nature that warrant Mr.
25 Cooke's involvement, I report those things to him in his

1 capacity as Vice President of Projects Engineering and
2 Construction.

3 Q If one were evaluating it from the outside, how
4 would we know that it wasn't in his capacity as Vice President
5 in charge of the Midland project office?

6 A We would have to tell you, I guess.

7 For example, hypothetically, if Mr. Keeley and
8 I were to have a difference of opinion with regard to a quality
9 assurance programmatic matter, and it needed to be escalated,
10 I would escalate it to Mr. Cooke in his capacity as Vice
11 President of Projects Engineering and Construction.

12 Q Now, does Mr. Bird report more directly to Mr.
13 Cooke, or does he report to Mr. Cooke through you? There are
14 lines indicating both.

15 A He reports to me for programmatic direction. In
16 other words, he has to obtain my approval on any policy changes,
17 on any procedural changes, and things which impact the program
18 from an overall viewpoint.

19 In his day-to-day managing activities and working
20 relationships, he reports to Mr. Cooke as a member of the
21 project office, as part of the project team.

22 A But he has to satisfy the requirements of policy
23 and procedure.

24 Q Now, if he wanted to resolve a particular
25 quality assurance deficiency, a specific item, he would go

12 wel 3

1 directly to Mr. Cooke?

2 A. It would depend upon what kind of deficiency it
3 would have to be, before-- If it were a procedural matter, he
4 would probably discuss it with me before he discussed it with
5 Mr. Cooke.

6 Q. Well, if he were closing out a non-conformance,
7 would that go through you or directly to Mr. Cooke?

8 A. It would probably go to Mr. Cooke if it were
9 the kind of non-conformance report which warranted that level,
10 if it was a non-conformance identified by the NRC.

11 Q. So he would resolve that in his capacity as
12 Vice President of the project office?

13 A. Yes, sir.

14 Q. On page 4, there's a discussion of three
15 sections applicable to the Midland Project. Does that
16 indicate that there are other sections that are applicable
17 to other projects?

18 A. Yes. Applicable to projects involving plant
19 modifications. And at one time, a project involving construc-
20 tion of a coal-fired plant.

21 Q. The first section--is that the one that became
22 MPQAD?

23 A. No. Those three sections--two of those sections
24 became MPQAD; the Quality Assurance Engineering Section and
25 the Inspection, Examination and Test Verification Section for

1 the Midland project, became parts of MPQAD. The Audit and
2 Administration Section continues to report--did not become part
3 of the MPQAD, and is part of my organization.

4 Q Are there any problems with Mr. Bird reporting
5 to you for some purposes and to Mr. Cooke for other purposes?

6 A I haven't detected any. I find--

7 Q In terms of efficiency in resolving questions,
8 or whatever the question may be, has he ever gone the wrong
9 course?

10 A No. We work very closely together. He seeks
11 my advice on matters even outside of my direct line of
12 responsibility. He and I work very well together, I think.

13 Q On page 6 of your testimony, there's mention
14 that five persons have been transferred out of the department
15 and replaced with others with perhaps differing educational and
16 experience levels.

17 Are those individuals still with Consumers?

18 A Yes. Four of the five of them are, as I recall.

19 Q Were they transferred out only because-- Were
20 they transferred out because they lacked certain experience or
21 training, or because their replacements have more of those,
22 more education and more experience?

23 A In all cases, the individuals involved were
24 people whom I consider to be very capable of making a significant
25 contribution. In two cases, as I recall, the persons were in a

1 role which was not suited to their background. They were
2 given an opportunity to change their roles such that they'd
3 become suitable to their background and their ability to make
4 meaningful contributions to the Company. In three other cases,
5 as I recall, it was a matter of philosophical approach to
6 the quality assurance role, and it was a matter of--

7 Q Could you explain that a little?

8 A Well, it was a philosophical difference between
9 me and them, because I was a little too aggressive in my
10 defining the rule of quality assurance within Consumers Power.
11 They didn't feel as I did with regard to the way the role
12 should be defined. So they chose to go back to some other
13 roles with which they felt more comfortable.

14 Q Were any of those transfers motivated in any
15 way by the existence of the soil settlement question?

16 A No, that had nothing whatever to do with it.
17 We didn't know about the soil settlement at that time.

18 Q Oh, I thought this was 1980.

19 A No, this was 1977, when I first joined the
20 Company. The work had largely been done, but the discovery
21 had not been made.

22 Q Turning to the chart of employees, Exhibit 1,
23 in terms of a relationship between numbers of QA and QC
24 employees to the numbers of manual personnel, it appears that
25 particularly in the QC area that June, 1980 is really the

1 peak, and this is particularly in the QC area; this is your
2 second to the last column. Could you explain why that's so?
3 In other words, why did you need more QC people then, in
4 relationship to the work force, than you did either before or
5 since? You had more before than you apparently have now.

6 A. The reason for that peak in the percentage or
7 ratio is that the number of Bechtel site manual personnel had
8 decreased substantially, while the number of Bechtel quality
9 control personnel had not decreased as much, proportionately.
10 And there's good reason for that; it being that quality
11 control activity usually lags the construction activity by
12 some amount.

13 So it wasn't a matter of our needing more
14 people. It was a matter of our really needing less people.
15 But the numbers weren't reduced correspondingly as quickly as
16 they were being reduced in the Bechtel manual--in the number
17 of Bechtel manual personnel.

end 12

18 (Continued on following page.)

19

20

21

22

23

24

25

E13L1

1 Q (By Chairman Bechhoefer) Do you know why
2 there was a relative decline in QC people in the time between
3 the end of 1975 and the end of 1978?

4 A In December 1975 the-- Strike that.

5 The only reason that I can see--or reasons
6 that I can see are these:

7 No. 1, at the outset of a job, one tends to
8 acquire a larger--a large number of supervisory or core
9 personnel--who tend to form the basis of the organization as
10 it develops, and while those core personnel are available
11 earlier than are really needed, because they are doing planning
12 work and set-up work, the ratio appears higher than it might
13 be necessary later on.

14 The second reason is that there could be some
15 change in the nature of the work, some shifting in the nature
16 of the work from safety-related to non-safety-related, or
17 vice versa, but I suspect that the first reason is the more
18 accurate reason.

19 Q Well, this, is it not, was the period of time
20 when soils placement activities were undertaken?

21 A My understanding is that the soil placement
22 activities for the diesel generator building were from 1975
23 through the late summer or early fall of 1977, so I guess
24 I would have to say yes.

25 Q Would you attribute any of the problems which

E13L2

1 later were discovered to the relative decrease in QC personnel
2 on the site at that time?

3 A I don't think so, sir. I think that the testing
4 problem is far more significant. You must understand that U.S.
5 Testing's personnel are not included in the numbers in Column
6 3, but yet they were performing, through their testing
7 function, quality control activities. This only includes the
8 Bechtel control personnel.

9 Q Turn to Page 11. By the last sentence in the
10 first paragraph, are you saying that there have been no major
11 regulatory guides or changes in the standards issued since
12 1976?

13 A No. I am saying that there haven't been any
14 major changes since 1976 with which the Midland project does
15 not now comply.

16 MR. DECKER: With which do you not comply?

17 THE WITNESS: I can think of one. It has to
18 do with-- First of all, it is a standard that was originated
19 after the project's inception, long after. We voluntarily
20 adopted that standard in Revision II, except for this one
21 factor. The standard deals with the certification of lead
22 auditors, and somewhere in the depths of that standard is
23 a clause to the effect that a lead auditor must perform a
24 certain number of audits periodically in order to retain
25 his status as a lead auditor, and we have taken an exception

E13L3

1 to that aspect of it because we do feel that there are
2 many other ways, besides performing an audit, by which a
3 lead auditor can retain his qualifications and ability to
4 do the job well.

5 That's the only one, that I can think of,
6 offhand.

7 I would say that we probably comply with 99
8 percent or more.

9 Q (By Chairman Bechhoefer) The Staff occasionally
10 also issues some draft guides which companies may or may not
11 use as guides. Do you include those as well?

12 A Do you have one in particular?

13 Q No, I don't. I just wondered how you react
14 to those draft guides when the Staff says, "You may use
15 them while we are considering adopting the filing of them."
16 They usually have a big--the word "Draft" across the front.

17 A Well, let me give you an example of one which
18 comes to mind. There is a draft of a Revision II of the standard
19 review plan, of the NRC standard review plan. This is a plan
20 by which the NRC goes about reviewing an Applicant's quality
21 assurance program.

22 We comply with the large majority, well over
23 95 percent, of the new divisions incorporated into Revision
24 II of that standard review plan, even though that revision
25 has not yet been published as an official publication.

E13L4

1 Q That's the kind of document I was referring to.
2 Your organization does make an attempt to comply with whatever
3 the latest version is?

4 A We have a system by which we review new documents,
5 in final or draft form, to ascertain their impact or potential
6 impact on our policies and procedures, and a system by which
7 these, you know, can result in changes to the policies and
8 the procedures, if necessary.

9 Q Turning to Pages 29 and 30, I wanted to find
10 out--the sentence beginning at the bottom of 29, how are the
11 major procurements that you are talking about selected?

12 A These were procurements that represented
13 work packages that were outside of the scope of the then
14 existing Bechtel responsibilities, and since they were
15 outside of Bechtel's existing scope, it gave us an opportunity
16 to decide whether we wanted to take the primary quality
17 assurance role or continue with Bechtel taking the primary
18 quality assurance role, and our playing an overview role.

19 In the two cases cited here, we decided to
20 take the primary quality assurance role.

21 Q Well, how did you make that decision?
22 I mean how did you select the two?

23 A These happened to be procurements that were
24 necessary. For example, it is necessary--or it was necessary
25 at that point in time in the project to issue a contract for

E13L5

1 pre-service inspection activities, and recognizing that that
2 was a work package that was not in the Bechtel scope of
3 work, we simply made some judgment as to which of the two
4 quality assurance organizations could most effectively handle
5 that job from a QA point of view, and we decided that the
6 Consumers Power Quality Assurance Department would be
7 better able to handle that work package from a QA point of
8 view.

9 Q What I understand, then, is that every procure-
10 ment, which is not subject to Bechtel's system, went to your
11 organization for this kind of review, to determine whether
12 you should do it or whether Bechtel should do it.

13 What I am trying to figure out is if any
14 slipped through the crack, if there were any which didn't get
15 any review.

16 A I don't think so, but let me see if I can add
17 some more information which may help.

18 When Bechtel, on behalf of the project, made
19 procurements of its suppliers, those procurement packages
20 were reviewed by the Bechtel Quality Assurance organization.
21 On an overview basis, they were reviewed by the Consumers
22 Quality Assurance organization later in time. This was not
23 always the case from the outset of the projection, but later
24 in time, this was the case.

25 After the integration of Bechtel Quality

E13L6

1 Assurance and Consumers Quality Assurance in' o what was
2 called the MPQAD, then the review of Bechtel procurement
3 packages was made by the MPQAD.

4 These particular procurements were made prior
5 to the existence of the MPQAD, and t' e procurements were
6 made, in essence, by Consumer. Power Company as contracted
7 to by Bechtel, so that Consumers Power Company utilized its
8 own Quality Assurance Department to provide the quality assur-
9 ance and quality control, rather than utilizing Bechtel. We
10 had that option because Bechtel was obligation to provide
11 us with that service on this project.

12 Q Turning to the inspection requirements that
13 you mention on Page 31, I would like to--the only thing I
14 would like to inquire about that is, when you first adopted
15 the system, were any inspection personnel, well, in legal
16 terms, grandfathered in? Were there any on board--

17 A No.

18 Q --who you did not make conform to the new
19 requirements?

20 A No. No one was grandfathered in.

21 Q Turn to Page 38. You mentioned the study that--
22 an assessment performed by this MAC Corporation or the
23 Management Analysis Corporation.

24 Did MAC make any recommendations for further
25 improvements at that time?

E13L7

1 A Yes, they did, specific to individual findings.
2 They had five findings, and they made recommendations with
3 regard to those findings.

4 Q Did Consumers respond to those recommendations?

5 A We are in the process of doing so. Some of
6 those have already been responded to. Some of those findings
7 have been closed out. Some are in the process of being
8 closed out.

9 Q Have you ever-- I know that this corporation,
10 MAC, offers a service where they will make available QA
11 type employees to companies for particular purposes. Have you
12 ever used that service of the company?

13 A No.

14 Q Have you ever considered that as a source of
15 personnel?

16 A We have asked MAC from time to time to try
17 to help us in locating personnel whom we can hire as permanent
18 employees or whom we could hire on a contract basis through
19 some other companies; but, quite frankly, I think that
20 consultants need to make a judgment as to whether they are
21 going to be in the business of supplying bodies to do work
22 or whether they are going to be in the consulting business, and
23 I am a little leery of companies that are both in the consulting
24 business and in the business of supplying bodies because there
25 is a potential for a large conflict of interest.

E13L8

1 If I didn't know that the MAC personnel, whom
2 we had on this job, were of high technical caliber, I would
3 have been concerned. The reason we chose MAC for this job
4 is that they are familiar with the Midland project, and they
5 had a few individuals to offer to do this job, who we think
6 were of high technical caliber.

7 Q Are you aware that at least on occasion they
8 have these bodies available upon request?

9 A Yes. Yes, I am.

10 Q You may have mentioned this this morning. I
11 am not positive, but how is a QC inspector kept informed
12 of the progress of a nonconformance report which he or she
13 initiates?

14 A The originator of the nonconformance report
15 is responsible for verifying that any re-work or repair
16 resulting from that nonconformance is accomplished such as
17 to the enable the closure of the nonconformance.

18 The inspector is not necessarily made aware
19 of whether the corrective actions preclude recurrence unless
20 he is a part of that process which contributed to the non-
21 conformance to begin with.

22 Q So if the determination is made to use as is,
23 is the initiator of the report advised of the reasoning behind
24 that interpretation?

25 A He is the recipient of a copy of the

E13L9

1 nonconformance report, and he is responsible for making sure
2 that the justification is a part of the nonconformance report.

3 Within the MPQAD, being that we are staffed
4 very largely with degreed engineers and many at the Master's
5 level and some professional, professionally registered engineers,
6 from time to time questions have been raised by the originators
7 of nonconformance reports as to the adequacy of this position,
8 but in the final analysis, the final determination of that
9 must rest with the project engineer, and I think because
10 of the high degree of respect that has developed over the
11 years in the personnel in the MPQAD, a good communication
12 exists between MPQAD and the project engineering people.

13 We have another mechanism which we utilize
14 very often when we have some question regarding a matter.
15 We have performed what is called a request for information,
16 on which we identify our concern with regard to the design,
17 and we receive a response from the design agency.

18 Q What I was trying to determine mostly was
19 whether if a QC inspector initiated a nonconformance report,
20 then he might see-- If nothing happened, if what he inspected
21 was accepted as is, was that person-- What I was trying to
22 find out was whether that person would see anything, for
23 whether he would be advised why it was accepted as is, or
24 would it be like he was sending a report in, and that was the
25 last he ever heard of it, and nothing happened.

E13L10

1 That could, in my view, perhaps have an
2 effect on morale, if that happened too frequently, and I was
3 trying to determine whether it did happen or could happen.

4 A A QC inspector is informed by virtue of his
5 receiving a copy of the nonconformance report which he orig-
6 inated, which bears the use-as-is disposition and the justifica-
7 tion, and sometimes I'm sure he may ask his supervisor about
8 it or some others about it. Other times the supervisor may
9 take the initiative and tell him about it, but there is no
10 formal procedure on that score.

11 There is, however, a requirement that when a
12 use-as-is disposition is made because the initial design
13 requirement was too stringent and that use-as-is disposition
14 is becoming repetitive because the design requirement is
15 known to be too stringent, it doesn't have to be what it is,
16 there is usually a process corrective action associated with
17 that, and that is to get the design requirement altered.

18 It doesn't make any sense to keep identifying
19 a condition as nonconforming if the tolerance for that could
20 be opened up and still do the job, so we ask that the design
21 be adjusted accordingly, if it is appropriate.

22 Q Now, carrying this step one step further,
23 assume that--we are going into a hypothetical--a nonconformance
24 report has been prepared. The decision has been made to use
25 as is. It has been explained to the QC inspector. He is

E13L11

1 convinced that that isn't right, that somebody made a mistake.

2 Are there other appeal panels, or is he at
3 least aware that he can go to the NRC, if he has to, as a
4 last resort?

5 A There are a number of appeal panels. One
6 is that he can appeal to his supervisor because remember, his
7 supervisor is not the person who made the disposition, so his
8 supervisor doesn't have any particular ax to grind in the
9 matter, and can help him get an assessment of that.

10 The second way is that they can bring in the
11 quality assurance engineering personnel to help, if the
12 quality control personnel do not have the educational back-
13 ground possible to fully understand the reasoning behind
14 his disposition.

15 Another way is to make a request to engineering
16 as to why the design is the way it is, and the last way
17 is to notify the NRC, unofficially or officially,
18 of the concern.

19 Q Does your site have the usual signs on it, that
20 NRC can be contacted?

21 A Yes, yes.

22 Q I think you made a conclusion at one point
23 or expressed your opinion that the QA program, speaking in
24 general terms, was equal to or even better than comparable
25 programs.

E13L12

1 Did you have any specific programs in mind
2 that you were comparing that to, or some scope of what
3 that conclusion meant?

4 A I have two--

5 Q I don't care if you name names of other projects.

6 A I have really a few bases for that statement.

7 One basis, as I mentioned, is the result
8 of the MAC assessment that I cited.

9 The second basis is my informal communications
10 with other people in the industry, and part of my responsibility
11 is to keep in communication with other quality assurance
12 professionals throughout the industry and to have a feeling
13 for how things are going elsewhere in the way of programmatic
14 development so we don't fall behind on that score.

15 Another element of information that I have is a
16 statistic which I keep, or a series of statistics which I
17 keep, which identify the number of items of noncompliance.
18 That's a technical term. It relates to a nonconformance
19 found by the NRC. It is called an item of noncompliance.
20 The number of items of noncompliance in relation to the number
21 of NRC inspection mandates, and the point value--until
22 recently, the items of noncompliance were categorized into
23 three categories--a deviation, an infraction or a violation--
24 and each one of these categories carries a different number
25 of points, so there is a point value for each item of

E13L13

1 noncompliance, and the point value cumulative, relative
2 to the total number of NRC inspection mandates, and these
3 figures are compared by a small number of utility companies
4 and are exchanged among a small number of utility companies,
5 and our information indicates that we are doing reasonably
6 well in relation to other utility companies.

7 Q Do you attend many meetings of any of the
8 QA trade associations?

9 A I attend the Energy Division--that's the
10 Energy Division of the Society for Quality Control--meetings,
11 and I usually attend the American Society of Quality Control's
12 Annual Technical Conference.

13 From time to time I attend the ASME Quality
14 Assurance Committee meetings, and the Atomic Industrial
15 Forum Quality Assurance Committee meetings.

16 Q Are you informed in any committee work in any
17 of these organizations?

18 A I am a member of the Inspection and Enforcement
19 Subcommittee of the Design and Construction Committee of the
20 AIF, the Atomic Industrial Forum, and I am a member of the
21 Personnel Qualifications Subcommittee of the Nuclear Quality
22 Assurance Committee of ASME, and for a long time--until last
23 year, as a matter of fact, I was the Chairman of the work
24 group charged with the responsibility of maintaining ANSI
25 Standard N45.2 which deals with these qualifications of

E13L14

1 inspection, examination and test verification personnel.

2 CHAIRMAN BECHHOEFER: That's all the questions
3 the Board has.

4 Mr. Miller, do you have any redirect?

5 MR. MILLER: Yes, I have.

6 CHAIRMAN BECHHOEFER: Would you like a break
7 beforehand?

8 MR. MILLER: No. I am prepared to go forward
9 right now. Thank you.

10 REDIRECT EXAMINATION

11 BY MR. MILLER:

12 Q Mr. Marguglio, calling your attention to the
13 Zack nonconformance that was discussed yesterday and today,
14 to your knowledge, has it ever been suggested by the Nuclear
15 Regulatory Commission that Consumers Power Company did not
16 report the problem with Zack to the NRC in a timely fashion?

17 A Not to my knowledge.

18 MR. MILLER: I would like the record to reflect
19 that I have distributed to the Board and parties and have
20 handed to Mr. Marguglio two documents, which I will ask be
21 marked for identification. In chronological order, they are
22 a letter from Mr. James Keppler to Mr. James Cook, dated
23 January 12th, 1981, to which is attached an inspection report,
24 which is identified as 80-10 and 80-11, and as Consumers Power
25 Exhibit No. 3 for identification, a letter from Mr. Cook to

E13L15

1 Mr. Victor Stello, Director, Office of Inspection and
2 Enforcement, U.S. Nuclear Regulatory Commission, dated January
3 30th, 1981.

4 (The documents referred to,
5 were marked for identification
6 as Consumers Exhibits 2 and 3.)

7 Q (By Mr. Miller) Now, Mr. Marguglio--

8 MR. PATON: Are they both Exhibit 2, both of
9 them?

10 MR. MILLER: The first one was Exhibit 2, and
11 then the second one was Exhibit 3.

12 Q (By Mr. Miller) Mr. Marguglio, do you recall,
13 without looking at the documents that we have identified as
14 exhibits, whether or not the Zack matter was being investigated
15 by Consumers Power Company prior to the time that allegations
16 were made by a Zack employee directly to the Nuclear Regulatory
17 Commission?

18 A Yes, I do.

19 Q What is your recollection?

20 A My recollection is that we were aware of certain
21 nonconformances that had been written by Zack and by Bechtel,
22 that we were concerned that the nonconformances were not
23 being resolved as quickly as we thought they could have been.

24 I know that the quality assurance organization
25 issued a management corrective action request on the subject,

E13L16

1 but I am not absolutely sure that it preceded the NRC
2 inspection or investigation.

3 Q Would you look at the fifth page of what
4 we have marked as Exhibit 2, which is the letter from Mr.
5 Keppler to Mr. Cook, the one that has the words, "Reason
6 For Investigation" on the top of the page?

7 A Okay.

8 Q I call your specific attention to the paragraph
9 under the heading "Summary of Facts". Would you just look
10 those over and see whether they refresh your recollection
11 as to the timing of the issues and of the management corrective
12 action request that you referred to?

13 A It states here that it was January 8, 1980.

14 Q Can you tell, either from memory or from
15 refreshing your recollection by continuing on with this
16 summary of facts, the date on which the allegations were made
17 by the Zack employees to the NRC? I direct your attention
18 to the top paragraph on the page, Mr. Marguglio.

19 A Evidently it March 6 and 10.

20 Q Okay. Mr. Marguglio, is there any indication,
21 or do you know from memory, that nonconformance reports were
22 issued in connection with the Zack matter prior to March of
23 1980?

24 A Oh, I am sure there were nonconformance reports
25 issued, yes.

E13L17

1 Q All right, sir. To your knowledge, were those
2 transmitted to the Nuclear Regulatory Commission?

3 A It is customary for all nonconformance reports
4 to go to the NRC.

5 Q Do you know whether or not the management
6 corrective action request was transmitted to the NRC?

7 A I am not sure about that.

8 Q All right, sir. In this time period, January--
9 well, through 1975 and into 1980, was there an NRC resident
10 inspector at the Midland site?

11 A Yes.

12 Q Do you know that gentleman's name?

13 A Yes.

14 Q What is it?

15 A Ronald Cook.

16 Q Do you know whether or not Mr. Cook was informed
17 of the Zack situation prior to March 6th, 1980?

18 A I did not discuss it with him personally, but
19 I was told that there were discussions with him on the subject.

20 Q Have you ever seen this document dated January
21 12th, 1981, which we have marked as Consumers Power Exhibit
22 No. 2, before today?

23 A Yes.

24 Q Can we agree that Consumers Power Exhibit 3,
25 the January 30th letter from Mr. Cook to Mr. Stello, is the

E13L18

1 Company response to the investigation report that's attached
2 to the letter that's part of Exhibit 2?

3 A Yes.

4 Q Have you seen Exhibit 3 before today?

5 A Yes.

6 MR. MILLER: I would ask that Exhibits 2 and
7 3 be received in evidence.

8 CHAIRMAN BECHHOEFER: Any objection?

9 MR. PATON: No objection.

10 MR. MARSHALL: No objection.

11 MS. STAMIRIS: No.

12 CHAIRMAN BECHHOEFER: Consumers Exhibits 2 and
13 3 will be accepted into evidence.

14 (The documents referred to,
15 previously marked for identifi-
16 cation as Consumers Exhibits
17 2 and 3 for identification,
18 were received in evidence.)

19 Q (By Mr. Miller) Now, yesterday, Mr. Marguglio,
20 you were asked concerning, I believe it was, Stamiris' Exhibit
21 2, which I don't have before me, but it was those audit
22 quality findings. Do you remember that?

23 A Yes.

24 Q It was a collection of some seven pages or so.
25 Do you recall you were asked about the box on the document

E13L19

1 which talked about whether or not the particular audit
2 finding was reportable under Section 50.55(e)?

3 A Yes.

4 Q Mr. Marguglio, is there a written procedure
5 which sets out guidelines for determining whether or not an
6 item is reportable under 50.55(e)?

7 A There are three which cover the subject.

8 (Continued on next page.)

9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 Q All right. Would you briefly describe them for
2 the Board and the parties, please?

3 A The first procedure involves the processing of
4 the non-conformance report, and it provides the responsibilities
5 of the originator of the non-conformance report and his
6 supervisor for making a determination as to whether the non-
7 conformance is reportable under 50.55(e).

8 The originator is referenced to the guidelines
9 for reportability, and he is responsible for identifying on
10 a non-conformance report whether or not the non-conformance
11 is reportable and the supervisor is responsible for verifying
12 or over-viewing the decision, and their joint signatures on the
13 document indicate that they are in agreement as to the report-
14 ability.

15 If it turns out that they are not sure as to
16 whether or not a non-conformance should be reportable, we go
17 into another system which enables a more detailed analysis to
18 be made. This is when we're in a fuzzy area, and this more
19 detailed analysis is documented, and it provides the, so-to-
20 speak tracks, if you will, which demonstrate that the decision
21 as to reportability was made in a disciplined and thoughtful
22 manner.

23 The third procedure identifies the criteria for
24 reportability, identifies the timing for reportability, it
25 identifies the elements of information that have to be

1 communicated with a report is made, and who is responsible for
2 making the report.

3 Q Mr. Marguglio, I'd like for you to turn for just
4 a second to Consumers Power Exhibit 1, which is your tabulation
5 of Quality Assurance, Quality Control and Bechtel manual
6 personnel.

7 There is a footnote (b) on that chart which,
8 if I'm reading correctly, references the quality assurance
9 personnel as of July, 1981, as--96 of them, it says, including
10 approximately 25 persons for HVAC(Zack).

11 First of all, what is HVAC?

12 A Heating, Ventilation and Air Conditioning.

13 Q And Zack is the same Zack we've been talking
14 about in connection with the inspection report and so on?

15 A Yes.

16 Q All right. Now, can you tell us why there are
17 25 persons identified as quality assurance personnel for the
18 Zack effort?

19 A Because on July 1, the MPQAD assumed the primary
20 quality control, as well as quality assurance, role with
21 regard to the HVAC installation. In other words, the primary
22 inspection agency for the receipt of the inspection, and any
23 fabrication inspection that's done on site, the installation
24 inspection is now MPQAD.

25 Q Prior to July 1, 1981, who had that responsibility?

1 A. Zack.

2 Q. Now, you were examined this morning, I believe,
3 by Judge Decker concerning the training that crafts workers
4 were given--perhaps it was by Judge Cowan. Have you ever heard
5 the words "craft orientation for quality"?

6 A. Yes.

7 Q. Is that-- Could you describe it for us, please?

8 A. Those craftspersons are given an orientation,
9 and a large part of that orientation has to do with the
10 responsibility of the individual toward the quality objectives.

11 The individual is familiarized with the quality
12 assurance program in general, with the fact that we're working
13 on a nuclear plant project and, as such, the attention to
14 detail and the compliance with procedures is mandatory and
15 very important. And during their orientation, we urge the
16 individuals to make sure that they understand the requirements
17 of their jobs before they undertake those jobs.

18 Q. Mr. Marguglio, I'd like you to turn to the
19 attachment to Mr. Keepler's testimony about which you were
20 examined by Judge Decker.

21 A. Do you mean Attachment 2?

22 Q. Attachment 2; yes, sir.

23 Now, calling your attention first to page 7,
24 which discusses the large number of NCR's written against the
25 reactor coolant pumps. First of all, how many pumps are we

1 talking about?

2 A. Two, I believe. At least two. Two, possibly--
3 I think it's two. Maybe four. I'm not sure.

4 Q. Were they all delivered at the same time?

5 A. In close proximity to one another.

6 Q. Are they all presently on the site?

7 A. Yes.

8 Q. Would you explain for us why the trend
9 analysis would not be an effective tool in dealing with the
10 NCR's written against the reactor coolant pumps?

11 A. First, the trend analysis activity is not
12 intended to cover work performed by pump suppliers off site.

13 Secondly, a trend, by definition, is predicated
14 upon having various data points over time. And in this
15 particular case, there were no such previous indications of
16 the problem prior to the identification of the problem
17 initially.

18 So the problem couldn't have been prevented by
19 any previous knowledge that we had available to us.

20 Q. Are there any other pumps that are currently
21 on order--reactor coolant pumps that are currently on order
22 from Byron Jackson?

23 A. No. So we took only those corrective actions
24 that were appropriate to any rework or repair of these pumps,
25 as far as Byron Jackson is concerned.

1 Q We've had a great deal of testimony by you
2 regarding the trend analysis. Is trend analysis the only
3 method by which corrective action is implemented with respect
4 to quality assurance matters?

5 A No, there are a number of other techniques
6 that are used. As a matter of fact, more prevalent techniques.

7 Q Could you just briefly describe them for the
8 record?

9 A The most significant corrective actions are
10 taken on the basis of evaluations of individual non-conformance
11 reports and individual audit finding reports. Corrective
12 action is also taken on the basis of documents which are
13 called management corrective action reports.

14 A Corrective actions of a preventive nature are
15 taken largely on the basis of our review of documents such as
16 fabrication plans and inspection plans before those documents
17 are put into effect.

18 Q I'd like you to turn now to page 9 of attachment
19 2 to Mr. Keppler's testimony.

20 A Calling your attention to paragraph 2(a), 'here's
21 a reference in 2(a) to planned complex remedial soils and
22 foundations corrective action.

23 Q Mr. Marguglio, do you know whether there are
24 any remedial actions for soils foundations that are presently
25 underway out at the site?

1 A To my knowledge, there are none.

2 Q Do you know when the first such remedial
3 action is planned?

4 A Possibly mid-fall; possibly early next spring.
5 Mid-fall, 1981.

6 Q Is MPQAD cognizant of the schedule for the
7 planned remedial work?

8 A Yes.

9 Q Do you know whether or not their plans include
10 the hiring of the necessary qualified individuals to perform
11 a quality control/quality assurance function for the remedial
12 work?

13 A The plans definitely include that. Insofar as
14 the quality assurance engineering organization is concerned,
15 as I testified earlier, I think we may have increased the
16 number of personnel in that section. I'm not absolutely sure,
17 but I think we may have already done that.

18 Q All right. Finally, Mr. Marguglio, I'd like
19 you to turn to page 12 of Attachment 2 to Mr. Keppler's
20 testimony. Paragraph 3 says:

21 "Identification of the root causes for
22 repeated non-conforming conditions has not been
23 performed."

24 First of all, Mr. Marguglio, is there a portion
25 of the non-conformance reports that deals with root causes?

1 A Yes.

2 Q Would you describe briefly how that form deals
3 with root-cause questions?

4 A The form is set up into a number of major areas
5 or categories. The first category of information is identify-
6 ing information, to identify what is non-conforming where it's
7 indicated.

8 The second category of information is to
9 identify what the non-conformance is; that is, what is
10 required versus the "as-is" condition.

11 The third category of information required by
12 the form is the recommended corrective action.

13 The fourth category is a determination of the
14 cause of the non-conformance; preferably the root cause, if
15 you will, or causes.

16 And the fifth category of information is the
17 corrective action commitment.

18 Lastly, there's a category of information which
19 is aimed at verifying that the corrective action has been
20 taken. And in this case, we're talking about both the
21 corrective action to the hardware, if that's appropriate and
22 the corrective action to the process which may have allowed
23 the non-conformance to begin with.

24 MR. MILLER: I have no further questions of Mr.
25 Marguglio.

14 wel 7

1 CHAIRMAN BECHHOEFER: Ms. Stamiris, do you have
2 any questions?

3 MS. STAMIRIS: Unfortunately, I have quite a
4 few. A lot more questions came to mind, listening to Mr.
5 Marguglio's testimony today than I had planned this morning.
6 I mean they're followups to questions which were explored
7 today.

8 CHAIRMAN BECHHOEFER: Yes, they have to be on
9 Board questions or questions Staff asked, or Mr. Marshall.

10 MR. MARSHALL: I have two questions.

11 CHAIRMAN BECHHOEFER: No, I don't mean that.
12 I mean they have to be related to questions following the
13 time that you cross-examine.

14 MS. STAMIRIS: Shall I begin?

15 CHAIRMAN BECHHOEFER: About how much time?
16 We're just trying to determine whether we should take a short
17 break, or whether we should finish up and take a break before
18 we....

19 MS. STAMIRIS: I would say possibly an hour,
20 but 45 minutes? I don't know. If I'm--

21 CHAIRMAN BECHHOEFER: Let's take a short break;
22 10 minutes.

end 14

23 (Recess.)
24
25

E15L1

1 Q (By Mr. Miller) Mr. Marguglio, before Ms.
2 Stamiris begins her cross examination, is there some evidence
3 you gave yesterday that requires some amendment?

4 A Yes. Yesterday I testified that we became
5 aware of problems with Zack via the trend program, and that
6 is not the case. We became aware of problems with Zack by
7 means of reviewing Zack and Bechtel nonconformance charts,
8 and the trend program at the time did not cover the Zack
9 HVAC installation activities. It does now.

10 Q Anything else, Mr. Marguglio?

11 A No, sir.

12 MR. MILLER: Thank you very much.

13 CHAIRMAN BECHHOEFER: Ms. Stamiris.

14 RECROSS EXAMINATION

15 BY MS. STAMIRIS:

16 Q Well, I will start with your last statement
17 first and ask you--and I may be misunderstanding from the
18 testimony, but I thought the trend program covered everything.
19 Are there certain safety systems-- What is not under the
20 trend program?

21 MR. MILLER: If we could have a time period
22 established, that would be helpful. We were talking about
23 Zack, and we are here in 1981.

24 Q (By Ms. Stamiris) What systems were not
25 covered by the trend program in 1980? I am interested in the

E15L2

1 beginning of 1980.

2 A That's a difficult question to answer because
3 the evolution of the activity has been so great. For example,
4 it started in--just concerning itself with welding, and
5 nothing else. I will try to answer it.

6 First, off-site activities of any kind.

7 Second, non-repetitive types of activities.

8 Third, selected activities being performed by
9 selected subcontractors to Bechtel.

10 THE WITNESS: Are we going to-- Maybe my
11 question is out of order, but are we going to have to wait
12 while notes are taken?

13 MR. MILLER: No. We can continue to talk.

14 THE WITNESS: I am finished.

15 Q (By Ms. Stamiris) Can you tell me what safety
16 systems were covered in 1980, from the beginning of 1980, by
17 the trend analysis program?

18 A The program isn't designed to cover systems,
19 per se. It is designed to cover repetitive activities in
20 given areas, geographic areas. It is not on a system-by-system
21 basis. It is on a geographic-by-geographic area basis,
22 and then within those geographic areas, it is by the type
23 of activity, such as building or pipe support installation,
24 that kind of thing.

25 Q Well, do you believe, then, that the trend

E15L3

1 analysis program could have caught the Zack problem?

2 A If the Zack activities had been in the program
3 at the time, yes.

4 Q I am still confused, but I won't ask any
5 more questions about that.

6 This morning you mentioned--and it is in
7 your testimony--the MAC consultation that took place from
8 March to May of 1981, and you mentioned the five areas that
9 were pointed out by this consultation service as areas of
10 deficiencies or needing improvement. Are those areas discussed
11 in your testimony--

12 A No.

13 Q --or any of the attachments?

14 A No.

15 Q Could you tell me what those five areas were
16 that MAC identified?

17 A One was a case of a crane which was not
18 yet installed, and it was being stored in a--what is called a
19 lay-down area, and the MAC consultants found some welds which
20 were of questionable quality, and they found some welds which
21 were not identified on the summary-type drawings, if you will,
22 that were available on the site at the time.

23 Another was a case in which there was--actually
24 there were a couple of cases in which there was not a full
25 documentation of non-destructive examination on supplied

E15L4

1 components. The components had been inspected, examined and
2 accepted, but the documentation in the procurement package
3 was lacking either technique sheets or interpretation
4 sheets. I can't go into it.

5 Q I don't expect-- I just want a brief summary
6 of the five different areas.

7 A That's three, to my recollection. There were
8 two others, which I can't recall, other than to say that
9 they were of a documentary nature and of a relatively minor
10 nature, but I forget the details.

11 Q Was the case of the crane and then the
12 questionable welds, were those two separate?

13 A Yes-- Well, no, no. The case of the crane
14 had to do with-- There were two major concerns. I don't
15 know whether you would call them problems at this point.
16 One was that there were welds that appeared to be nonconforming
17 and another one was that there were welds that appeared to be
18 in places where no welds were called for.

19 Q You said there were three, and I only have
20 the crane and the documentation of an examination. Did I
21 miss something?

22 A Okay. The crane is one, and I gave you two
23 examples of the welding situation, so that's three.

24 Q Yes, yes.

25 A Two cases dealt with the ce of interpretation

E15L5

1 sheets or reader sheets in the procurement documentation,
2 so that makes a total of three cases.

3 Q Okay.

4 A Then there were two other cases which also
5 dealt with some minor documentation concerns, which I can't
6 recall, for a total of five findings.

7 Q Did this Management Analysis Corporation--
8 Has the report been submitted to the NRC, or is it in
9 the public documents room anywhere, that you know of?

10 A Yes, this has been submitted to Region III
11 and to the quality assurance branch of the NRR.

12 Q Do you have any idea where I would locate that,
13 or could it be provided to me?

14 A I would imagine you could get a copy from
15 the public document room.

16 Q I know, but I have had a lot of difficulty
17 finding things that are there when I don't know where they are.
18 I just wondered if you happened to know.

19 Did this Management Analysis Corporation
20 consultation go into, instead of--you seem to list more or
21 less isolated incidents and separate incidents. Did they
22 attempt to go into root causes or go looking back into time
23 for problems?

24 A Yes. They undertook a large number of tasks.

25 Q Could you identify or explain to me more about

E15L6

1 the scope of the investigation and the goals of the MAC
2 investigation?

3 A Yes. It was an assessment. The first objec-
4 tive was to assess the adequacy of our actions in response
5 to nonconformances which eventually became 50.55(e) reportable
6 items, and they were concerned in that assessment with two
7 factors, the first being did we or did we not take the
8 appropriate actions relative to fixing the hardware, and
9 the second being did we or did we not take the appropriate
10 actions relative to preventing recurrence of the identical
11 problem in other hardware or a similar problem in other
12 hardware.

13 The second major task that they had was to
14 assess the quality of supply components, and they did this
15 in a number of ways. The first was that they made physical
16 inspections of supply components.

17 The second was that they reviewed supplier
18 procurement packages to look for evidence of inspection
19 acceptance.

20 The third was that they assessed the adequacy
21 of our personnel inspection examination and test personnel
22 qualifications and certification activities.

23 Another was that they assessed the degree to
24 which--the appropriateness of our responses to a previous
25 audit, which they had made. Their concern was had we taken

E15L7

1 taken action on their previous audit findings, and was that
2 action appropriate and timely.

3 Q Excuse me. When was that previous audit?

4 A It was concluded in September of 1980.

5 Q Thank you.

6 A They did a few other things, which I can't
7 recall off the top of my head at this time, but the ultimate
8 activity that they had was to assess the overall program,
9 utilizing all of the information they had, past and present,
10 and that was the basis for the conclusions that they drew,
11 which I cited earlier.

12 Q I want to ask about the inspection that took
13 place at the end of March 1981--no--May of 1981, the most
14 recent, I believe, when the inspection team from the NRC
15 came in.

16 Did you know that Mr. Keppler and the NRC
17 inspection team was coming?

18 A I think we knew a couple of days or so before
19 the fact.

20 Q Okay. I don't mean to ask you if you knew
21 what day they were coming, but did you know for some time
22 that indeed they were planning to come and inspect your
23 program before this hearing?

24 A I think that as a matter of fact, no, but as a
25 matter of intelligence, it would be imprudent for us not to have

E15L8

1 recognized that there was a very strong potential for such
2 an inspection at that time.

3 Q Was it not a suggestion of the Vice President,
4 Mr. Cook, at the--I believe it was--I think I read it in a
5 meeting report of March 13th, 1981. It was a meeting where
6 Consumers initiated a meeting at Region III to tell about
7 their improvements.

8 Do you know whether it was Mr. Cook's idea
9 to have Mr. Keppler come and spend a week at the site?

10 A Mr. Cook issued an invitation to Mr. Keppler
11 to come and familiarize himself in more detail with the
12 quality assurance program. Mr. Cook is not in the position
13 to tell Mr. Keppler or Region III when or when not to make
14 an inspection. An invitation to become familiar with the
15 program and to exchange information is a different thing
16 entirely from an NRC inspection.

17 Q Was this a visitation at the end of May,
18 1981?

19 A That was not a visitation. That was an inspec-
20 tion.

21 Q I didn't think so. Okay. All right.

22 Would you say that the results of that inspec-
23 tion represent your Company's best effort?

24 MR. MILLER: Objection to the form of the
25 question. Best effort with respect to what?

E15L9

1 MS. STAMIRIS: With respect to implementing
2 their quality assurance program.

3 MR. MILLER: I am going to renew my objection.
4 I think the question is vague.

5 CHAIRMAN BECHHOEFER: Can you specify it
6 any more or sharpen it?

7 MS. STAMIRIS: No. That's okay. I will skip
8 it.

9 Q (By Ms. Stamiris) I want to ask you about a
10 small bore pipe problem that was identified at the inspec-
11 tion. There was some question that was reported in the papers
12 the first day between the NRC on-site inspector and Consumers'
13 position as to whether or not this work on the small bore
14 pipe should go forward pending an analysis of the rest of the
15 problem.

16 Are you aware of that difference of opinion
17 on the days following that investigation report?

18 A No, I am not.

19 Q Was any type of stop put into effect with
20 the rest of the small bore pipe work that had yet to be done?

21 A Yes. There was a decision made to not release
22 additional design packages until we were assured that these
23 packages included the appropriate calculational documentation.

24 Q Had the full extent of the problem been explored
25 going back to time? Are you-- Maybe you can answer that.

E15L10

1 A Yes.

2 Q Are you aware of any statements that were made
3 by Consumers' officials that indicated that there was--I
4 can't remember who made them--a feeling that you could
5 proceed without having to know all of the details of what--
6 I will strike that question.

7 Earlier this afternoon you spoke of a concern
8 that you had, in a hypothetical sense. You indicated that
9 you would be wary of MAC Corporation or any corporation
10 supplying the bodies, I think was your phrase, and also
11 coming in to do the auditing work. Do you remember that?

12 A Yes.

13 Q You expressed that it was because there was a
14 potential for a conflict of interest.

15 A Yes, going against super conservatism. A
16 company of that kind is more likely to be super critical,
17 and I think it takes--it imposes a larger risk on a person
18 like me to receive criticism from a company which is more
19 likely to give it in good dose. That's a possibility, and
20 a conflict would work against, you know, me, for example, from
21 my viewpoint.

22 Q You were concerned that-- Was your concern
23 with conflict of interest related to the fact that a company
24 doing the inspection should not--or the auditing should not
25 also be the company that is being audited?

E15L11

1 A No, that's not at all the point.

2 Q Oh, then I misunderstood you. Do you have
3 any problems in the same vein? Do you see any concerns,
4 or are you ever bothered by this system that is in effect
5 at the Midland plant where Bechtel audits are done on Bechtel
6 QC work, and that in fact being an inspection of Bechtel
7 construction work?

8 A I don't have any concern with that. It is a
9 custom in the industry. It is a viable organizational alterna-
10 tive. It is one of a number of different types of organiza-
11 tional structures which is well accepted in the industry and
12 proves effective.

13 Q You were in your present position beginning
14 in 1977, January 1st, 1977, is that correct?

15 A That's when I started with the company, but
16 I don't have the same position now that I had then, so your
17 term "present position"--

18 Q I want to explore some of the quality assurance
19 management decisions related to the diesel generator building
20 settlement. Were you involved in those?

21 A Yes.

22 Q In what way? What was your position or your
23 involvement in it?

24 A I was the Director of Quality Assurance when
25 it was identified.

E15L12

1 Q Did your organization identify what you
2 believe to be the root causes? I just want a very brief
3 summary of the diesel generator building settlement.

4 A Yes, we did, and we believe the Quality
5 Assurance Department at the time believed that the two main
6 causes for the settlement were the failure to compact the
7 soil to the required density and, secondly, that was compounded
8 by the failure of the testing process to detect the poor
9 compaction.

10 Q Did your quality assurance program make any
11 root cause determination insofar as quality assurance or
12 quality control was concerned and the diesel generator
13 building?

14 MR. MILLER: Excuse me. Judge Bechhoefer,
15 really object. I think this is really beyond the scope of
16 any questions that were asked by the Board or by me on redirect
17 examination. This goes back into Mr. Marguglio's direct
18 testimony, I think.

19 CHAIRMAN BECHHOEFER: I think that was beyond
20 the scope. Could you tie it to anything he was talking about
21 in response to either Board questions or the Staff's questions?

22 MS. STAMIRIS: I couldn't tell you. I thought
23 that someone mentioned this time period and was discussing
24 this, and I couldn't tell you who or when. I was just making
25 notes and thinking of things as I was listening to the questions.

E15L13

1 I would like to ask, Judge Bechhoefer-- I have
2 an unusual problem, and it is something that's going to have
3 to be resolved . . . is the position that I am in of being
4 the only person who is prepared to pursue quality assurance
5 problems prior to December 6th, 1979, and I know that you
6 have assured me many times that I would be able to explore
7 these areas fully on my own, even if the other two parties
8 chose not to.

9 If it was not directly addressed in his
10 testimony or-- I just wonder if I am--I have a few other
11 questions that have to do with this time period, and I don't
12 know if other parties mentioned it or not. Like I say, it
13 came to mind this morning, and I thought someone mentioned
14 that time period, but I am not positive.

15 CHAIRMAN BECHHOEFER: I can't remember.

16 MR. PATON: Judge Bechhoefer, may I make a
17 comment?

18 CHAIRMAN BECHHOEFER: Yes.

19 MR. PATON: My recollection is that Judge
20 Decker asked the witness if the failure to recognize root
21 problems had not been a complaint with the NRC for some
22 period of time. I am not sure if that's enough to connect
23 up her question.

24 CHAIRMAN BECHHOEFER: I guess we will allow
25 this question, but you can't just ask questions about

E15L14

1 past deficiencies at this stage. You probably should have
2 when you were doing this yesterday. That has a sufficient
3 connection, so I will allow it.

4 Do you remember the question?

5 THE WITNESS: Would you repeat it?

6 (Question read by reporter.)

7 A Yes.

8 Q What did you identify was the quality assurance
9 or quality control problem contributing to the diesel
10 generator building?

11 MR. MILLER: I am going to object again.

12 An exhibit to Mr. Marguglio's testimony is the latest version
13 of the Company's answer to 50.54(f) Question 23, which goes
14 into great detail on just that subject. Mrs. Stamiris has
15 had the testimony since June 8th, or shortly thereafter, and
16 to do this on recross examination just seems inappropriate.

17 (The Board conferring.)

18 MS. STAMIRIS: I wanted to ask a question
19 about something that was in his Question 23.

20 CHAIRMAN BECHHOEFER: Well, why don't you try
21 to ask it that way because we don't want him to read Question
22 23 into the record at this stage. You could ask him.

23 MS. STAMIRIS: Isn't it going to go into the
24 record?

25 CHAIRMAN BECHHOEFER: It is in the record.

MS. STAMIRIS: Oh, okay.

1 Q Did you identify problems with the Bechtel
2 quality assurance department to be one of the main causes of
3 the diesel generator building settlement problem in Question
4 23?

5 A I don't mean to nit-pick the question, but I
6 would say that our concern was not with the Bechtel quality
7 assurance department, but I'm sure we had an item or two with
8 regard to an activity being performed by the quality assurance
9 department.

10 I'd have to go through the response to Question
11 23 in detail.

12 Q Do you, by any chance, remember an assessment
13 of Bechtel quality assurance something to the effect of them
14 being more concerned with procedures than getting at the base
15 of the problem?

16 A I don't recall it. That doesn't mean it isn't
17 there. It's a matter of record, if it is.

18 Q Okay. Are you aware of any records that have
19 been kept by Consumers Power Company, in which Bechtel is
20 blamed, for lack of a better word, more or less for the soil
21 settlement deficiencies? Are there any confidential records
22 on this subject?

23 A I'm not aware of any confidential records.

24 Q In December of 1977 when the administration
25 building experienced a settlement problem, were you aware of

16wel 2

1 that problem?

2 A. No, ma'am.

3 Q. When were you first informed of the settlement
4 of the administration building?

5 A. Approximately August of 1978.

6 Q. And is the reason because it was a non-safety
7 building?

8 A. Yes.

9 Q. In 1978, when the diesel generator building
10 problem had been identified, did you have any input or
11 oversight responsibility on those decisions made by the task
12 force that has been previously identified, the Consumers/Bechtel
13 decision-making task force?

14 MR. MILLER: I'm going to object. It's not only
15 beyond the scope of recross, but beyond the scope of Mr.
16 Marguglio's original direct testimony. There's nothing about
17 any activity with respect to the task force looking into the
18 soil settlement issues in Mr. Marguglio's testimony.

19 CHAIRMAN BECHHOEFER: Can you connect that,
20 because I don't--

21 MS. STAMIRIS: Well, I have to agree that I
22 didn't find that in his testimony, and I would like to know
23 who, in Consumers organization, can I address about quality
24 assurance problems prior to December 6, 1979? If Mr. Marguglio
25 didn't address it in his testimony, did someone else, that I

1 would be able to cross-examine?

2 CHAIRMAN BECHHOEFER: The task force is dealt
3 with in other testimony.

4 MS. STAMIRIS: Mr. Keeley's, perhaps?

5 CHAIRMAN BECHHOEFER: Yes.

6 MS. STAMIRIS: Is there anyone else in the
7 Consumers organization who is going to answer questions that
8 I might have about this time period prior to the December 6
9 order?

10 CHAIRMAN BECHHOEFER: I don't know.

11 (The Board conferring.)

12 Ms. Stamiris, some of these questions could
13 have been asked this witness yesterday. You should have done
14 that, perhaps.

15 Now, Staff will have witnesses that could
16 perhaps be asked the questions, as well.

17 MS. STAMIRIS: May I ask a procedural question?

18 I wonder how hard and fast are these cutoffs,
19 once a person has testified? You know, what is the usual
20 procedure? Is there any procedure that would allow for any
21 exceptional circumstances, or for showing of good cause, or if
22 something particular came up later that needed to be briefly
23 readdressed to someone who had already closed their testimony?
24 I mean if it's someone that is reasonably available, is there
25 any procedure that allows anything like that?

1 CHAIRMAN BECHHOEFER: Well, the record could be
2 reopened, but it has to take a fairly strong showing of need
3 to address a particular subject.

4 MS. STAMIRIS: Okay. I'll ask Mr. Marguglio
5 some questions that are specifically, then, about things he
6 said today.

7 Q (By Ms. Stamiris) You described a conflict or
8 a problem at one point, and you used the phrase that you were
9 too aggressive in defining QA roles, and there was some
10 disagreement between yourself and Consumers Power Company.
11 I think it was in establishing the quality assurance--

12 A You misquote my testimony.

13 Q I'm sorry. I mean to ask you to explain that,
14 because I was confused. Would you go over that portion of
15 your testimony briefly for me?

16 MR. MILLER: Excuse me. I really do object
17 to the form of the question. Mr. Marguglio has testified
18 once. If there is something specific that Mrs. Stamiris has
19 in mind examining about, let's ask him about that. But to
20 simply ask him to rehash his testimony on that subject is
21 improper, and I object.

22 CHAIRMAN BECHHOEFER: I think you'll have to be
23 more specific, because I don't think we can expect him to--

24 MS. STAMIRIS: Well, I had this question when
25 he was speaking, and I just wrote it down because I assumed

1 I would be able to ask him later. But I thought he said that
2 Consumers considered, or somehow he considered, that he was
3 maybe too aggressive in defining quality assurance roles, and
4 I would like him to explain how I misunderstood that.

5 MR. MILLER: Well, I really do believe that
6 that's a mischaracterization of Mr. Marguglio's testimony.

7 CHAIRMAN BECHHOEFER: Well, I think he answered
8 the question in response to my question concerning why certain
9 personnel were transferred, and I think he said one or two
10 of them, there was a difference in philosophy.

11 Now, you can take it from there. But that was,
12 as I remember it, the context of the question. I'm not sure
13 whether that clarifies things for you, but that was the
14 context of the question.

15 Q (By Ms. Stamiris) Does the Quality Assurance
16 Department have a system for catching design errors?

17 A Yes.

18 Q Would you explain it, please?

19 A The designs are subject to a process of design
20 review, and the designs, when they are transformed into
21 hardware, are evaluated as part of the qualification tests of
22 the hardware and the acceptance tests of the hardware. And
23 analytical activities are used as well in the design process
24 to independently assess the quality of the design.

25 Q And the designs have been basically supplied

1 by Bechtel?

2 A. And suppliers to Bechtel. I should add, B&W
3 Lynchburg, and General Electric.

4 Q. So their designs are subject to this review in
5 the design stage and approval, then, by top Consumers Power
6 management before they are put into effect, or put into
7 hardware?

8 MR. MILLER: Object to the form of the question.
9 I believe that's a mischaracterization of his testimony, and
10 I really--

11 MS. STAMIRIS: I didn't mean to characterize
12 his testimony that way. I was just asking. I don't understand.

13 MR. MILLER: I've refrained from objecting too
14 strenuously on technical grounds, but this goes beyond the
15 scope of proper recross-examination. Again, I don't recall
16 any examination either by the Board or by me or by Mr. Paton
17 with respect to design reviews.

18 CHAIRMAN BECHHOEFER: Let me just ask Mr. Paton
19 if he can recall.

20 MR. PATON: No, I don't recall.

21 MS. STAMIRIS: I'm sorry. I mean I have
22 admitted that some of them, when I was talking about the
23 administration building, that I knew were new. But I did
24 think someone discussed it. But I couldn't... I don't know.
25 So I won't ask anymore questions about that.

1 (Pause.)

2 MS. STAMIRIS: I'm sorry. There was one partic-
3 ular question that I remembered, and it was a very specific
4 question, that I wrote down about something he answered this
5 morning.

6 Could I ask that question after Mr. Paton, or
7 after the NRC, as opposed to looking for it right now?

8 CHAIRMAN BECHHOEFER: Do you have any objection
9 to letting Ms. Stamiris come back and ask one question?

10 MR. PATON: No.

11 CHAIRMAN BECHHOEFER: Mr. Marshall?

12 MR. MARSHALL: I only have three questions.

13 CHAIRMAN BECHHOEFER: Well, you ask yours right
14 now, and we'll see how Ms. Stamiris comes along.

15 MR. MARSHALL: I hope I don't receive objections
16 right off the bat, because I'm going to ask you, Witness, if
17 you recall, yesterday with reference to pumps, making a
18 statement into the record that you didn't give any guarantee.
19 That's what I'm interested in--the word "guarantee"--from
20 purchases, I took it, from outside suppliers, sending you in
21 stuff that you've got no guarantee with them as to their--well,
22 I concluded you meant as to whether they were perfect or not.

23 THE WITNESS: I think the record will show that
24 I never used the word "guarantee."

25 MR. MILLER: I object. I really don't think that

1 this witness has testified to a guarantee. His recollection
2 is the same as mine.

3 MR. MARSHALL: What I was getting at is, it
4 impressed me when I heard it at the time, that he was implying
5 that any imperfections went beyond whoever was supplying them,
6 went with them and not with you. That's how I got it.

7 MR. MILLER: I am going to object again, Mr.
8 Chairman. The witness has now verified that he did not use
9 the word "guarantee" in his testimony.

10 MR. MARSHALL: Well, if not the word "guarantee,"
11 did you use a word along that order, that it would impress
12 me that that was what you were trying to say, that if there
13 was any imperfections that you were getting, it was coming
14 from the other fellow, beyond your quality control, or quality
15 assurance on stuff that's being shipped in. That's what I
16 was--

17 THE WITNESS: I'm sorry, Mr. Marshall. I just
18 don't understand the context of your question.

19 MR. MARSHALL: Well, I was sure that you, when
20 talking--I think you were talking about pumps, but I think you
21 said--I sincerely think you said something to the effect that
22 led me to conclude that you didn't get a guarantee beyond--
23 there was no guarantee--and I'm familiar with warranties, et
24 cetera, and stuff like that, so it impressed me; and I was
25 wondering if you were implying that if any imperfections in

1 anything you bought, was with the person supplying it, and
2 that you weren't responsible for it. That's what I'm getting
3 at.

4 MR. MILLER: I am going to object again.

5 CHAIRMAN BECHHOEFER: We're speculating. Is
6 this-- There were some questions about--

7 MR. MILLER: Maybe I can be of assistance.
8 Your quality assurance program with respect to trend analysis
9 with outside suppliers--that's the closest I can come to it--

10 MR. MARSHALL: It was late yesterday afternoon,
11 just before we quit.

12 CHAIRMAN BECHHOEFER: Well, I don't remember
13 that. If you have a question with respect to trend analysis
14 with respect to outside suppliers, that's the context I think
15 the question was asked.

16 MR. MARSHALL: The thing is, I was trying to
17 get to--the thing I was trying to get to was here awhile back
18 I recall there was some bolts and nuts that were going to
19 piece^r down there, and they sent them back to the supplier--
20 Do you recall about this? They did X-rays on them to see if
21 the fabrications were bad at the time they were sent to you.
22 They snapped. And they sent them back to the company that
23 had done the fabrication in the first place, and I saw pictures
24 of those imperfections. And I wondered if that's what you had
25 in mind when you was talking.

COTTON CONTENT

1 THE WITNESS: That's not at all what I had in
2 mind. I don't know--

3 MR. MARSHALL: That's all I wanted to know.
4 That's the answer. I just wanted to clear that up for me.

5 MS. STAMIRIS: I found the question I was
6 looking for.

7 Q. (By Ms. Stamiris) This morning someone asked a
8 question about your testimony on page 16. You probably
9 remember it. It was about a truncated prioritized list of
10 actions which warrant special management involvement due to
11 their complexity or importance, and so on. And I believe you
12 made the statement that the Midland Project Quality Assurance
13 Department makes a judgment, and was asked on what was this
14 judgment based, and you listed four items: Technical importance,
15 schedule impact, amount of time--this had been an open item--
16 and the complexity.

17 Is that list also prioritized?

18 A. Offhand, I don't know what weights are given
19 to each of those four factors. But I suspect that they're
20 given approximately equal weights.

21 MS. STAMIRIS: I have no further questions.

22 CHAIRMAN BECHHOEFER: Mr. Paton?

23 Q. (By Mr. Paton) Mr. Marguglio, for the year 1975,
24 do you know how many people were working in the quality
25 assurance area in soils work?

1 A No.

2 Q In 1976; the same question. How many people
3 were working in the quality assurance on soils work?

4 A No.

5 Q 1977?

6 A I think two in the quality assurance section.

7 I don't know how many in the inspection, examination and
8 test verification section.

end 16 9 (Continued on following page.)

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

E17L1

1 Q (By Mr. Paton) Your answer to that last
2 question, 1977, was two?

3 A I think two. I am absolutely sure that Don
4 Horn was employed in the quality assurance section at that time,
5 and I think he had one other person working with him in the
6 quality assurance section. I don't know how many were
7 employed in what is called the IE and TV section.

8 Q Is IE and TV, would that be quality control
9 as opposed to quality assurance?

10 A It is inspection, examination and test verifica-
11 tion, which is somewhat equivalent to what some other companies
12 call quality control, but it is not-- Oh, I beg your pardon.
13 It is not the primary quality control that is employed by
14 Bechtel quality control. That's important to understand.

15 Q You are limiting your answer to soils work,
16 is that correct?

17 A Well, at that time it would be. Anything
18 that was done by the inspection, examination and test
19 verification section of the quality assurance department was
20 over-inspection. You might want to call it re-quality control
21 or over-quality control or over-inspection is what was done by
22 the primary Bechtel quality control organization.

23 Q My question related to how many people-- Let
24 me try this: In the year 1977, how many people were working
25 in the quality control with respect to soils work?

E17L2

1 A I don't know.

2 Q You began work in January of 1977?

3 A Yes.

4 Q Do you recall that the Board had requested
5 that when you gave the Board the numbers that are on
6 Consumers Power Exhibit No. 1, you break out the number of
7 people involved in soils work?

8 A I recall that, yes.

9 Q Did you attempt to do that?

10 A Yes.

11 Q Am I correct that you don't report any of
12 those numbers on Consumers Exhibit No. 1?

13 A That's correct because they are not available.

14 Q Even in the year 1981?

15 A Not within the time limitation that this informa-
16 tion was requested. It would take a little bit of research.

17 Q Approximately how much research would it take
18 to determine for the year 1981 how many people worked in
19 soils work?

20 MR. MILLER: I am going to object because
21 this whole line of questioning is just designed to impeach
22 Mr. Marguglio's good faith or his effort to bring this informa-
23 tion to the Board.

24 The Board seemed to be satisfied with Mr.
25 Marguglio's efforts in this regard. I don't understand this

E17L3

1 line of cross examination.

2 MR. PATON: I will be glad to explain my
3 cross examination. It seems to me that the Board was fairly
4 clear that they wanted that information. They had overnight
5 to come up with it, and I don't see it, and I don't see any
6 explanation for not getting it.

7 I am not just sure whether there was no attempt
8 made or whether it couldn't be obtained, and even more so,
9 I can't understand how much research it would take to determine
10 that information for the year 1981. That would seem that
11 it would be immediately available somewhere.

12 MR. MILLER: Excuse me. It seems to me that
13 having gotten this information together, as Mr. Paton concedes,
14 overnight, that we have more than fulfilled our best efforts
15 in getting this information for the Board.

16 If the Board wishes additional information,
17 we will do our best to obtain it.

18 I object to this whole examination because
19 the clear implication of Mr. Paton's question is that somehow
20 the Company is not being cooperative or not being forthright
21 in obtaining the information, and that's totally wrong, and
22 it is just unreasonable to have him insisting that some greater
23 degree of cooperation should have been forthcoming.

24 MR. PATON: Mr. Chairman, I don't think my
25 last question was unreasonable, and I would like to have it

1 answered.

2 (The Board conferring.)

3 CHAIRMAN BECHHOEFER: Well, as we look over
4 it, we think we are not-- There should be no implication
5 that the Company hasn't done its best efforts, and we
6 certainly don't want that to be implicated, but we would
7 like such information as the Company could get together,
8 perhaps by the time we leave this session.

9 MR. MILLER: You are talking about the end
10 of next week?

11 CHAIRMAN BECHHOEFER: The end of next week,
12 or something like that. We would like it in terms of, I
13 would say, both QA and QC personnel engaged in soils work.
14 Some of that information may not be available, and we will
15 accept that, but to the extent the information can be obtained,
16 I think it would be useful.

17 MR. MILLER: All right, sir. We will do
18 our best.

19 CHAIRMAN BECHHOEFER: Mr. Paton, will that--

20 MR. PATON: Yes, I will be ending that line
21 of questioning.

22 CHAIRMAN BECHHOEFER: I mean will that informa-
23 tion satisfy Staff's needs as well?

24 MR. PATON: Certainly, yes.

25 Q (By Mr. Paton) Mr. Marguglio, I direct your

1 attention to Page 4 of your testimony. Right in the middle
2 of the page there is a sentence that begins, at the left-
3 hand side, "My predecessor served as the Quality Assurance
4 Director in 1975 and 1976." Who was that?

5 A Mr. Fred Southworth.

6 CHAIRMAN BECHHOEFER: Who?

7 THE WITNESS: Southworth.

8 Q (By Mr. Paton) Mr. Marguglio, does Mr. Cook,
9 Mr. James Cook--is he assigned full-time to Midland?

10 MR. MILLER: Really, I am going to object.
11 Mr. Cook is going to be the next witness. Can't we get on
12 with the progress of this hearing a little bit?

13 MR. PATON: This is really my last line of
14 questioning. It relates to some questions that you asked,
15 Mr. Chairman.

16 I can go at it more directly. That's just a
17 background question, and it is not going to take me but a
18 minute to get where I am going.

19 CHAIRMAN BECHHOEFER: I think I will overrule
20 the objection. It related to questions I did ask.

21 MR. PATON: I will go directly to the point.

22 Q (By Mr. Paton) Mr. James Cook, is his assign-
23 ment full-time at the Midland project?

24 A Let me answer by saying that he has responsi-
25 bilities outside of the Midland project, but my guesstimate

E17L6

1 is that he puts in full-time, in the normal sense of a 40-hour
2 week, on the Midland project.

3 Q Does Mr. Bird, who is the manager of quality
4 assurance, report to Mr. Cook?

5 A Yes.

6 Q Does Mr. Cook have scheduling responsibility
7 for the construction of the Midland plant?

8 A Mr. Cook has total responsibility, including
9 scheduling, yes.

10 Q All right. Do you agree with this statement;
11 That persons performing quality assurance functions should
12 have sufficient authority and organizational freedom to perform
13 their crucial functions effectively and without reservation?

14 A Yes.

15 Q When Mr. Bird reports to Mr. Cook, does Mr.
16 Bird have sufficient authority and organizational freedom to
17 perform his crucial functions effectively and without reserva-
18 tion?

19 A Yes. If I may add, I think that the implica-
20 tion by your question is that the quality assurance organiza-
21 tion has to be other than the President, who has full
22 responsibility, including scheduling responsibility. The
23 implication is an unreasonable implication. I am convinced
24 that on the Midland project, the separation of the design
25 function and the construction function, the quality function,

E17L7

1 the cost and schedule considerations are at an appropriately
2 high level. They are at the highest level they can be,
3 other than taking the quality assurance function outside
4 the general managerial level, and how can that be accomplished
5 reasonably?

6 MR. PATON: That's all.

7 CHAIRMAN BECHHOEFER: Do you wish to ask
8 any more questions?

9 MR. MILLER: I have very brief re-redirect,
10 just off of Mr. Paton's examination.

11 FURTHER REDIRECT EXAMINATION

12 BY MR. MILLER:

13 Q Mr. Marguglio, the organization which you
14 described in which Mr. Bird reports to Mr. Cook, who has
15 total responsibility for the Midland project, was that
16 organizational arrangement described for representatives
17 of the Nuclear Regulatory Commission at or shortly after the
18 time it was implemented?

19 A Yes.

20 Q Did the representatives-- Who were the
21 representatives of the Nuclear Regulatory Commission?

22 A It was described to Mr. Keppler and Mr.
23 Fiorelli, among others.

24 Q Those were all employees of the NRC at Region
25 III, is that correct?

1 A Yes.

2 Q Did they approve the organizational set-up
3 which you described in which Mr. Bird reported to Mr. Cook?

4 A They neither approved it nor rejected it. It
5 is not their perview to approve it or reject it.

6 Q Well, did they indicate that it was not in
7 accordance with NRC requirements?

8 A They did not indicate any such thing.

9 MR. MILLER: No further questions.

10 MR. PATON: Mr. Chairman, I would like to state
11 that both the questions and the answers indicated that I was
12 raising some implication. I merely asked the question.
13 I would agree that the NRC does approve of that organizational
14 structure.

15 MR. MILLER: Fine.

16 MR. PATON: I just asked Mr. Marguglio some
17 questions. That's all.

18 CHAIRMAN BECHHOEFER: We don't have further
19 questions, so this witness can be excused.

20 MR. MILLER: Thank you very much.

21 (Witness excused.)

22 MR. MILLER: I would like to call Mr. Cook to
23 the stand now.

24

25

E17L9

1 Whereupon,

2 JAMES W. COOK

3 was called as a witness on behalf of the Applicant and,
4 having been first duly sworn by the Chairman, was examined
5 and testified as follows:

6 DIRECT EXAMINATION

7 BY MR. MILLER:

8 Q Would you state your name for the record,
9 please?

10 A James Cook.

11 Q By whom are you employed, Mr. Cook?

12 A Consumers Power Company.

13 Q In what capacity?

14 A I am Vice President, Projects, Engineering
15 and Construction.

16 Q Mr. Cook, do you have before you a 22-page
17 document which bears on the first page the words, "Introduc-
18 tion and Scope of Testimony", and then the next sentence
19 says, "My name is James W. Cook", to which is attached two
20 exhibits?

21 A Yes, I do.

22 Q By whom was the 22-page document prepared?

23 A By myself.

24 Q Are there any corrections or additions that
25 you wish to make to the testimony?

E17L10

1 A Yes. I believe there was one typographical
2 error on Page 11. In the first full paragraph on the page,
3 in the second sentence, the sentence reads, "The general
4 approach has been to be conservative", et cetera. The
5 error is that the sentence should read, "The general approach
6 has been to err on the side of conservatism."

7 MR. PATON: Mr. Chairman, could we get that
8 again, please? What page?

9 THE WITNESS: Page 11, the paragraph that
10 begins, "Although not directly".

11 In the fifth line down, the line reads, "general
12 approach has been to be conservative". The "be conservative"
13 should be deleted, and the words "err on the side of conserva-
14 tism" should be inserted in its place.

15 (By Mr. Miller) Mr. Cook, with that one change,
16 is the testimony true and correct, to the best of your knowledge
17 and belief?

18 A It is.

19 Q Did you cause the two exhibits that are
20 attached to the testimony to be prepared?

21 A Yes, I did.

22 Q Are they true and correct, to the best of your
23 belief?

24 A They are.

25 MR. MILLER: Mr. Chairman, at this time I ask

E17L11

1 that Mr. Cook's prepared testimony, together with the two
2 attached exhibits, be bound into the record, the testimony
3 as if read, and the exhibits to be attached to the prepared
4 testimony.

5 CHAIRMAN BECHHOEFER: Let me ask one minor
6 corrective question about a possible correction. In the
7 second line of Page 7, should the word "derive" have a
8 "s" on it?

9 THE WITNESS: Yes, it should.

10 MR. MILLER: Is there any objection to the
11 testimony?

12 MS. BROWN: The Staff has no objection;
13 however, we don't recall whether Mr. Cook has been sworn.

14 CHAIRMAN BECHHOEFER: Yes.

15 MS. BROWN: I do have one question. In
16 light of Ms. Stamiris' withdrawal of Contention 2-E, what
17 is the status of Mr. Cook's testimony in response to that?
18 Is that deleted, or would that also be--

19 MR. MILLER: It wasn't intended to be deleted.
20 We have acknowledged that Mrs. Stamiris has in fact withdrawn
21 that contention, but in the event the Board had any questions
22 about the subject matter and really so the record would
23 be complete, the testimony continues.

24 CHAIRMAN BECHHOEFER: Yes. I believe there
25 was a statement concerning another contention which we didn't

E17L12

1 allow. It used to be, I think, 1-C. On Page 20 there is a
2 statement that I related to 1-C, but be that as it may--

3 MR. MILLER: I don't believe that there is.
4 I certainly don't find it on Page 20, Judge Bechhoefer.
5 I believe that that's the only specific contention that--

6 CHAIRMAN BECHHOEFER: Wait a minute. Let
7 me check. It is what started out as 1-C, and we didn't allow
8 1-C, and that concerned the Company's availing itself of
9 an appeal right, and there is a statement on Page 20 that
10 seems to justify that.

11 MR. MILLER: Oh, I see.

12 CHAIRMAN BECHHOEFER: I don't think we would
13 allow the contention on that.

14 MR. MILLER: No, but the testimony was offered
15 in connection with Contention 2-E, with respect to Mr.
16 Cook's reception of the manner in which the soil boring
17 issue was handled. That's why there is a reference to the
18 Company's appeal. He is simply describing-- He can speak
19 for himself, but he is simply describing what took place
20 with respect to the soils boring issue.

21 CHAIRMAN BECHHOEFER: Well, I don't see any
22 harm in leaving it in, in any event.

23 I think the testimony will be accepted,
24 admitted and bound into the record.

25 (Following is the prepared testimony of James W.
Cook:)

I. INTRODUCTION AND SCOPE OF TESTIMONY

My name is James W. Cook. I am Vice President Projects, Engineering and Construction for Consumers Power Company. In this capacity, I am responsible for the engineering and construction, including quality assurance, for all the Company's production, generation and transmission facilities and major modifications thereto. Because of the nature of the Company's construction program, both currently and for the immediate future, the vast majority of my responsibilities focus on the construction of the Midland Nuclear Plant. I have been in my current position since October 1980, and I have been directly responsible for the Midland Project since March 1980 when I was appointed Vice President for the Midland Project. In my present position, I retain the direct responsibility for and involvement with the Midland Project.

I graduated from Princeton University in 1962 with a Bachelor of Science Degree in Chemical Engineering. I also attended Pennsylvania State University and received a Master of Engineering Degree in Nuclear Engineering in 1965. In addition, I attended, on a part-time basis, the Polytechnic Institute of Brooklyn (now part of the State University of New York) where I took a number of graduate courses in the Chemical Engineering Department. I am a registered professional engineer in the State of New York.

After graduation from Princeton, I joined the American Electric Power Service Corporation, the technical and management services arm of the American Electric Power System. During my 10 years as part of the AEPSC

Advisory Committee on Nuclear Power of the Edison Electric Institute. I am a member of the Steering Committee of the Utility Occupational Radiation Standards Group (UORSG). I am a member of the Policy Committee of the Atomic Industrial Forum's Industry Degraded Core Rulemaking (IDCOR) Group. I have also recently joined the Atomic Industrial Forum's Policy Committee on Nuclear Regulation.

I am testifying today about the commitment of Consumers Power Company management to construct the Midland Nuclear Plant in a manner so as to comply with all applicable regulatory requirements and to operate safely and reliably when the plant is placed into operation. My testimony on the subject of this commitment is limited in light of the ruling of the Atomic Safety and Licensing Board (ASLB) dated October 24, 1980 which limited the scope of the intervenor Stamiris's contentions on "management attitude" as follows:

" We note that the contentions are to be understood as limited to the resolution of the soils settlement issues, to the implementation of the QA/QC program with respect to the resolution of such issues and to factors which could be said to bear upon the Applicant's managerial attitude in resolving such issues."

Accordingly, my testimony on management attitude covers the time period beginning March of 1980 and running to the present. The period prior to March 1980 is covered in the testimony of Mr Stephen H. Howell.

My testimony will generally address the points raised in the ASLB order; ie, how management has gone about trying to resolve the soils settlement issues and how we have implemented the QA/QC program. In addition, I will follow the same general approach utilized in Mr Howell's testimony but describing activities that occurred only in the time period of my direct involvement. This approach was chosen because I agree that any useful discussion of Consumers Power Company management attitude must focus on actions taken or planned to assure that the Midland Plant is built in a manner consistent with the protection of public health and safety. The actions I describe will be organized according to the following criteria which seem appropriate with regard to management attitude:

1. The existence of an organizational structure to keep management informed of construction and quality issues and management's willingness to be informed on those subjects;
2. Prompt, effective and complete communication with the NRC on matters affecting the construction permit and the operating license;
3. Prompt and effective investigations of deviations from design or construction specifications;
4. Expedited management decision-making on programs and measures essential for the successful completion of the project; and
5. Management's willingness to expend effort and resources to meet regulatory requirements.

II. INDICATORS OF A POSITIVE MANAGEMENT ATTITUDE

A. Information Flow to Management - Midland Project Organization

The recognition in the second half of 1979 that the Midland Nuclear Plant could not be completed on the then existing schedule led to a reappraisal by many knowledgeable individuals in the Company, including the Chief Executive Officer, of how the entire project could best be organized to successfully complete the project. This reappraisal was in full swing when I was approached in March 1980 to become directly involved in completing the project. I accepted the assignment of heading the Midland Project and was thereafter involved in the reorganization of the project. The general format of the organizational planning was to identify and evaluate every idea and experience that the Company's management had accumulated over the years in their individual participation in building nuclear power plants both for Consumers Power Company and elsewhere. This retrospective included my own experience in both another utility's and an architect/engineer's organization and the views of the Company's Chief Executive Officer from his experiences at General Electric prior to joining Consumers Power Company.

In my view the Company was able to benefit from industry's collective experience and management's own perspective of the specific external environment that the Company would face in proceeding with the project. The major results of this project restructuring were put into place starting in March of 1980 and

continuing until August. The general objectives that the reorganization sought to achieve can be summarized as follows:

- Increasing participation by Consumers Power Company in all aspects of the project while still recognizing that major portions of the project would be the direct undertaking of the other major participants; ie, Bechtel and B&W.
- Evaluating all the participating organizations with regard to the quality and depth of personnel in the leadership positions and the adequacy of the project resources to accomplish the work required to finish the project.
- Making the project within Consumers Power Company as self-contained as practicable. This meant that any resource being utilized on more than a minimal basis would be reassigned to full-time project involvement.
- Aligning the resources of all the participating organizations to the extent possible to reinforce the concept of a single project team working together as opposed to separate organizations working more or less as independent contractors. This organizational concept spanned all phases of the project including quality assurance, operations and the various contractor organizations.

The net result of this reorganization when combined with the replanning of the work required to complete the project resulted in significant increases in the professional personnel assigned to the

job in all of the major organizations participating in the job. One of the benefits that derive from this approach, which culminated in the March reorganization but had been evolving for several years previously, was more direct Consumers Power Company involvement and control over the subtier activities in the contractor organizations. This involvement meant that more timely decisions can be made due to the Consumers Power project personnel now dealing more closely with the activities within the contractor organizations. This also meant that potential problems can be identified and escalated to Consumers' management attention earlier. Also the utility personnel, with more of a hands-on approach, become more sensitized to the specific problems encountered by contractor personnel. As a result, better working relationships and mutual respect can be developed, and the single team approach can be fostered within the entire project organization.

The CP Co Midland Project organizational structure that resulted from the 1980 reorganization is depicted in general form in Exhibit 1 to my testimony. Although not detailed here, considerable thought was given to making the major organizational units interface properly. The importance of proper interfaces and communications becomes apparent when recognition is given to the fact that over 500 employees currently report through the CP Co project organization and well over 4,000 employees are currently at work on Midland through the Bechtel organizational structure.

I should also note that during the time frame of the overall reorganization (second half of 1979 through the first half of 1980) most of the key management positions for the Midland Project at both Bechtel and B&W were restaffed and expanded in recognition of the magnitude and complexity of the remaining work.

The specific organizational change effecting quality assurance was to completely integrate the Consumers Power Company and Bechtel quality assurance organizations into a single entity called the Midland Project Quality Assurance Department (MPQAD). This organization, headed by Consumers Power Company quality assurance personnel, was made a direct part of the Midland Project and not only directly reports to me as the head of the Midland Project Office but also supports the Bechtel Project Manager in terms of his needs for quality assurance staff. The details of the quality assurance organization are more fully discussed in the testimony of Mr Benjamin W. Marguglio.

The ability of the corporate and project management to be informed on the progress and problems of the project under the new organization can be described in several ways. First, by having a corporate officer involved directly in the day-to-day management of the project, corporate management's involvement and awareness has to be increased. Second, the extent of management's access to information can be charted by the amount of correspondence, of which a large fraction is in the quality assurance area, that is sent

directly to the Vice President Projects, Engineering and Construction. In addition, there are a number of monthly and other periodic project management level meetings that directly discuss project progress and problems and are either partially or totally devoted to quality assurance matters. Further, there have been and continue to be ad hoc problem-solving sessions chaired by myself which are directly related to quality matters.

Finally not only am I fully informed, both on a formal and informal basis of the overall project status, but also considerable information goes directly to the Company's Chief Executive Officer (CEO). Shortly after the Midland Project was reorganized, the project established biweekly briefings for the Company's CEO on all aspects of the project and specifically including quality assurance. The majority of these briefings take place at the jobsite. These meetings were established to increase the level of information flow to the CEO in addition to his previous level of regularly scheduled and informal briefings.

B. Communication with the NRC

As one who has dealt on and off with the NRC over the past 16 years, I must express amazement with the amount of information which has been forwarded to the NRC as part of this proceeding. To have lack of information as even a potential issue in this proceeding caused me some initial puzzlement. In fact, my perception upon joining the project was to sense a frustration that existed based on the

conclusions of those involved in this matter that nobody was listening on the other end. However, I also realized as I became more familiar with the detailed issues that the complete analytical responses sought by the NRC staff in certain areas were still to be provided on a schedule tied to the completion of detailed engineering. My concern over the lack of review rapidly changed as significant review activities proceeded in 1980; and, as these activities proceeded, significant additional submittals to the staff also followed. In addition to the amount of written material that has been presented to the staff, there have been numerous meetings with staff personnel on both the working level and management level on an ongoing basis throughout the period that I have been associated with the project. As a result, it is my firm belief that the lines of communication were wide open for the entire time period that my testimony covers. As I will discuss further here and under Section II D of this testimony, there has been and continues to be direct management level communication regarding the items in this proceeding that are deemed to be significant and which are in need of resolution between the Company and the NRC. These include both engineering and quality assurance topics. The meetings with the NRC in which I have participated during the past year are summarized in Exhibit 2 of this testimony.

In the quality assurance area, I have had a number of direct conversations with Mr Keppler, the Director of Region III. The majority of these discussions have occurred as a result of his

report to me and others in Consumers Power's management with regard to the NRC's systematic analysis of licensee performance (SALP). I have met with Mr Keppler and his senior staff three times at his headquarters as part of my follow-up to his report. The culmination of this effort was the March 13, 1981 presentation to Mr Keppler and his staff by me and my associates regarding a number of quality assurance program improvements, some of which are directly discussed in this proceeding in Mr Marguglio's testimony. During that March 13 presentation to Mr Keppler, I urged him to personally visit the Midland site to view on a first hand basis the operation of our Midland Project organization. Mr Keppler did visit the site during May as part of an exhaustive NRC audit of our quality assurance program; and I believe that as a result of his visit, he now has an improved understanding of the MPQAD operation.

Although not directly related to the soils issues, the general approach the Company has always taken with regard to reporting to the NRC under Section 50.55(e) of the Code of Federal Regulations, Part 10, is indicative of a positive management attitude. The general approach has been to be conservative on the side of conservatism and report any potentially reportable situation including those that are still indeterminate because of the need to conduct more analysis. This policy gives the NRC staff an additional opportunity to review and comment on our internal evaluation logic. It is my perception that the NRC staff are generally supportive of and appreciate this approach.

In conclusion, I believe we have implemented and are currently maintaining a significant level of communication with the NRC not only on soils related activities but also on the entire range of project activities. It is my belief that this policy and its continued execution are paramount to the successful completion of the Midland Plant. I believe that the NRC staff management shares this belief and is committed to working with me to the extent they are able within the requirements of the overall discharge of their duties.

C. Investigation of Deviations from Construction Specifications

Since this testimony is limited to the specific soils deviations that occurred in the period of 1975 through 1977, this topic has been fully covered in the testimony of Mr Stephen H Howell.

Nevertheless, I would emphasize that we are committed to investigate thoroughly any deviations from specifications, as they are identified. This will continue until the completion of the project.

D. Improved Decision-Making Via the Midland Project Organization

The general aspects of the reorganization of the Midland Project were discussed under Section II A of this testimony. In this section let me address specifically how that organization has operated in a decision-making mode in relation to the matters of this proceeding. Very shortly after joining the project, I recognized that the scope and depth of the soils related activities

required considerable senior supervisory attention. This realization led to the assignment, on an essentially full-time basis, of Consumers Power's second ranking manager for Midland, the Project Manager, Mr Gilbert S Keeley, to oversee all activities associated with this proceeding. Mr Keeley's involvement soon led to a comparable commitment in the Bechtel organization and an Assistant Project Manager, Mr Al Boos, was named to work directly with Mr Keeley. The scope of the activities required to resolve and complete the matters related to the "soils" area has led to the development of essentially a mini-project working within the overall project on nothing but "soils" issues. This arrangement means there is continuous senior project supervision for soils matters.

The soils mini-project does not mean that either myself or others in the Company's top management are not involved or aware of the major issues in this matter. A specific example will illustrate my point. As analyses and detailed design of the remedial fixes proceeded, and NRC preferences and positions about them became better known, certain decisions of considerable importance in this matter have been undertaken. By the first of this year, it became clear that the original remedial fixes, particularly, the service water pump structure underpinning design would not have sufficient margin above the original design basis for the plant to meet the new NRC staff position for seismic margin analysis as communicated by the NRC letter of October 14, 1980. Certain options as to how we could best meet this new staff position were prepared, and a technical summary

and recommendation was presented to me in late January, 1981 by those directly involved in formulating the design. Based on my evaluation of the ultimate acceptability of the various options as inferred from this new, initial stage of design information, I reversed the recommendation and selected the more extensive and therefore more costly revision to the underpinning design for the service water structure. This information was then conveyed to the NRC staff management by a telephone call in February and formally documented together with a number of additional "soils" items by letter in March. The above example is indicative of management involvement and their attitude in the resolution of the various issues in this proceeding, both technically and as a matter of policy. It is not an isolated example. Over the course of the past year, I have had continuing discussions on various "soils" related issues with both NRR technical management and as mentioned previously with the I&E quality assurance management.

My contact with the NRR technical management, specifically Mr Vollmer and Mr Knight, began in the summer of 1980. The Company had requested an opportunity to ask the NRC to reconsider its request for additional soils borings. These borings were deemed necessary by the NRC to supplement the data supporting the conclusion of preeminent consultants, Bechtel, and ourselves that the preload program for the diesel generator building had been successful. The Company, with the benefit of advice from our consultants, believed that these borings were unnecessary for a variety of reasons. I

pursued this matter with the staff management both formally and informally trying to achieve a responsible resolution. Upon finally recognizing that we would be unable to convince the staff to alter their request, rather than appeal further or resort to the litigation of this issue, I directed the project to undertake the additional borings. I did this even though I remained concerned that these borings may be inconclusive or even confusing and may not aid either the Company or the NRC in resolving the issues in question. My decision rested on a conviction that it was more productive to supply the NRC with the information they sought rather than to vindicate our initial position by means of long hearings on the question.

In addition to the ongoing discussions regarding the borings, I have expended considerable effort in both direct meetings and telephone conversations with the NRR technical management to explore ways to satisfy the NRC concerns on the other outstanding issues in a manner that will be productive to all parties - the NRC, the Company and the public. These discussions have included the issues of the seismic input parameters for the Midland Plant margin check and the underpinning designs for both the auxiliary building and the service water pump house. I believe, based on the good faith efforts to resolve the issues in this hearing on the basis of a full exchange of relevant technical data, that we are significantly closer to resolving many of the NRC's concerns than we were when these discussions commenced. It is also clear to me that the decisions

being made are probably going to increase to some extent the direct costs of the Midland Plant.

E. Management's Willingness to Expend Effort and Resources to Successfully Execute Quality Assurance Programs

Earlier portions of my testimony, specifically Section II A, provide an indication of the Company's willingness to essentially put all available resources into the effort to successfully complete Midland. That this was not a single occurrence but a continuing trend has been indicated in both Mr Stephen H. Howell's and Mr Benjamin W. Marguglio's testimony. During my tenure, this commitment has been particularly gratifying based on the generally depressed economic conditions in which the Company has been operating. In a time of severe cost-cutting and a Company-wide hiring freeze, the nuclear power program at Consumers Power Company has been the only area in which requests for additional resources have been fully supported. With specific reference to the quality assurance organization, we have continued to build an expanded organization in both scope and depth. The only constraint that we have experienced has been the difficulty in locating and recruiting top quality, experienced quality assurance professionals. The problem is that the market for these individuals is difficult because demand far outweighs supply. Even so, we have met with considerable success in this effort as can be demonstrated by a review of the background of the current quality assurance staff.

In addition to building a top level quality assurance staff, we have also been willing to look outside the Company for additional assistance and consultation. Mr Howell's and Mr Marguglio's testimony have identified the use of an outside consulting firm to conduct a biennial audit of the Company's quality assurance program. As part of the Company's response to the Midland Plant portion of our SALP review, we commissioned the same consultant, Management Analysis Company, to perform a more extensive quality assessment of not only the overall program but also of our responses and follow through to past quality problems and an assessment, on a sampling basis, of the in-place hardware at the plant. This study has been completed and the consultant's report has been forwarded to the NRC for their information.

Further, in the management consulting field, the Company has retained and is currently proceeding with a review of quality management approaches utilizing the services of Phillip Crosby and Associates. Mr Crosby is a nationally known quality assurance consultant whose experience chiefly relates to manufacturing operations but whose overall philosophy and quality management approach appear to have generic applications and are therefore of possible value in the nuclear power field. One of the first major steps in working with Mr Crosby is a consultation over a two-day period at his offices with the 10 or so top officers and managers directly involved in the Midland Project, including the Company's CEO and myself. This consultation will be held in June. The

necessary research and orientation of Mr Crosby's staff to our Company and the Midland Project has already been completed.

III. CONTENTIONS OF INTERVENOR STAMIRIS

Allegations regarding the commitment of Consumers Power Company's management to a responsible construction program arise from certain contentions of intervenor Stamiris. These contentions are attached as an appendix to the ASLB's prehearing conference order in this matter, dated October 24, 1980.

Contention 1 and Contention 2, Parts a, b, c and d, all relate to activities that occurred prior to my participation on the project and as such have been addressed in the testimony of others. Contention 2e asserts that "Consumers Power Company's financial and time schedule pressures have directly and adversely affected resolution of soils issues...by failing to freely comply with NRC testing requests to further evaluate soils settlements remediation inasmuch as such programs are not allowed time for in the new completion schedule presented July 29, 1980."

First, as noted previously Consumers Power has accommodated the NRC's request for additional borings and test data. The borings are essentially complete and the testing is well underway. These activities are reflected on current soils schedules which have been provided to both the NRC and the intervenor.

Further, I disagree with this contention both as a matter of fact and of logic. By matter of fact, it is the Company's right to appeal any NRC staff decision to staff management at several levels and to the NRC

Commissioners if the Company so desires. If there were no appeals process in the nuclear regulatory arena, I am sure there would be a race to the nearest court or Congressional Committee between both licensees and intervenors to rectify that situation. Therefore, I find it difficult to understand how the Company's wish to avail itself of that right would be questioned in terms of bad management attitude. To set the record straight, Consumers Power Company has utilized the finest consulting talent available in this field; in fact, these are consultants who have done considerable work in the past for the NRC. Dr Ralph Peck, one of the consultants and a world reknown authority in soils engineering, expressed his conviction that these borings would not add any further data with respect to his conclusions regarding the status of the soils under the Diesel Generator Building. Therefore, it should not be surprising that the Company chose to follow the advice of the consultants and tried to convince the NRC staff that additional borings were unnecessary.

With regard to logic, the contention seems backwards. The NRC staff was under no obligation to reverse its original position based on our utilization of the appeal process. This is in fact what has happened. Subsequently, the Company in order to move this issue forward felt obliged to accommodate the staff request. My own personal involvement in this matter was outlined earlier in this testimony. It could therefore be argued that having failed to convince the staff to change their mind, I have in fact adversely impacted the financial and time schedule of this aspect of the project by utilizing the appeal.

Thus, both in fact and in logic, I conclude that the Contention 2e is without merit.

IV. CONCLUSION

In this testimony, I have attempted no more than to cover some of the more salient indicators of Consumers Power Company's management commitment to construct the Midland Plant in a responsible way. We are first and foremost mindful of our obligation as an NRC licensee to protect the public health and safety. In addition, the very factor asserted to foster a "poor" management attitude - time and schedule considerations - have just the opposite effect. We now estimate that the Midland Plant when completed will have cost approximately 3.1 billion dollars. This enormous sum is approximately equal to the total value (at original acquisition cost) of all Consumers Power Company's other electric assets put together. No rational person and no responsible corporate management could possibly be indifferent to design and construction quality when so enormous a sum of money is at stake. Contrary to popular belief, cost and schedule are important incentives to achieving quality. Anyone who has any experience in nuclear plant project management or any other business for that matter, soon becomes aware that the best guarantee of achieving project budgets or schedules is to "Do it right the first time." Also, in the electric power industry today, the result corporate management is striving for is to design and operate all their facilities at high capacity factors; ie, high reliability. Thus, the laws of practical economics directly reinforce the need to achieve a quality product.

EXHIBIT 1

MIDLAND PROJECT ORGANIZATION

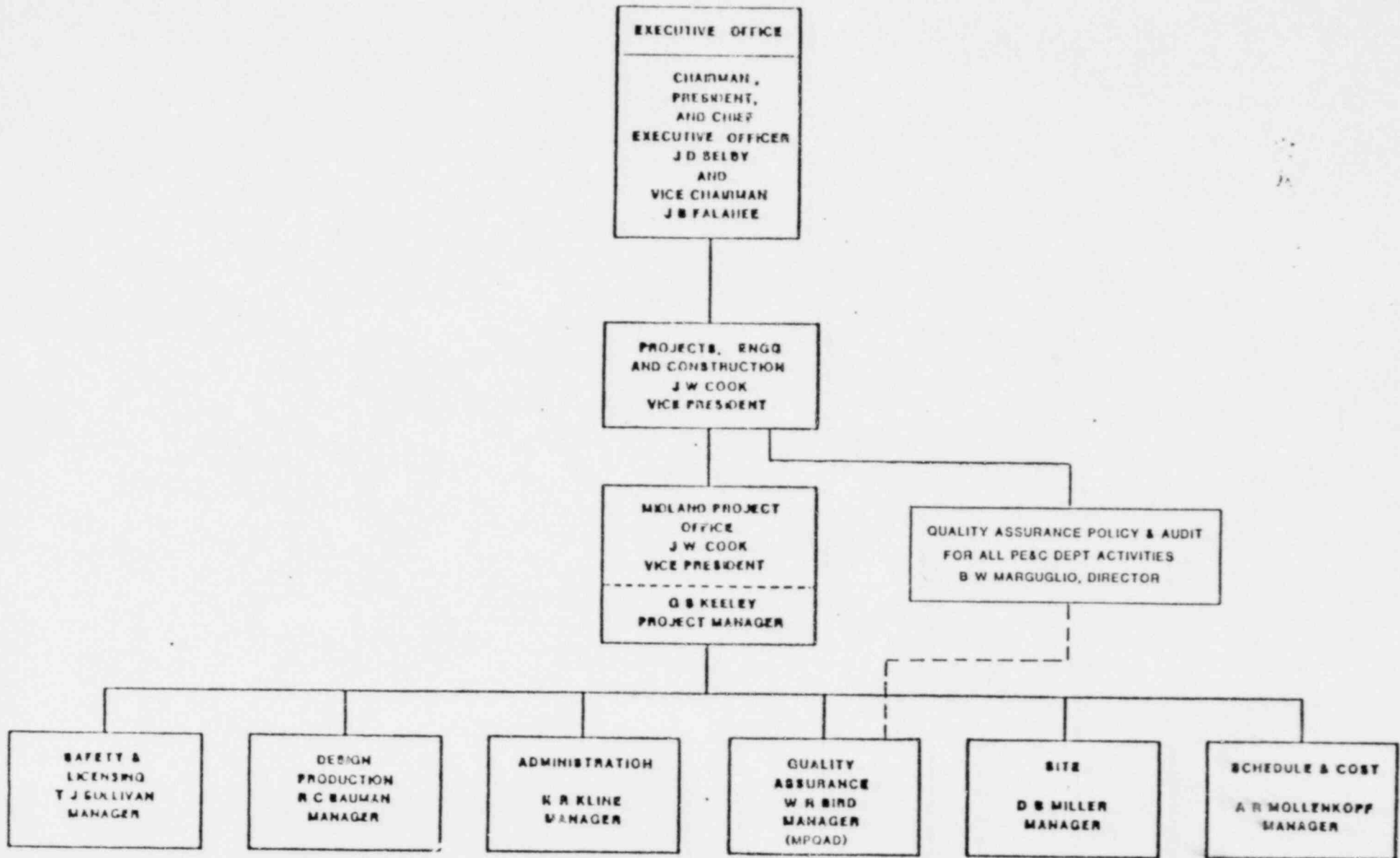


EXHIBIT 2

J W Cook Participation in Meetings
with NRC on Midland Nuclear Plant

<u>Meeting Date</u>	<u>Location</u>	<u>NRC Part icipation</u>	<u>Subject</u>
1. 5/ 2/80	Glen Ellyn, IL	J Keppler, G Fiorelli et al	RV Holddown Bolts and HVAC Audit Findings; Project Reorganization
2. 5/23/80	Bethesda, MD	D Hood et al	RV Support Modifications
3. 5/28/80	Washington, DC	D Eisenhut, H Thornburg et al	Licensing and Soils Issues
4. 6/13/80	Bethesda, MD	R Purple, R Tedesco et al	Licensing and Construction Status; Project Reorganization
5. 8/25/80	Besthesda, MD	H Denton, D Eisenhut et al	Licensing Review Plan
6. 8/29/80	Midland, MI	R Vollmer, J Knight et al	Appeals Meeting on Additional Borings
7. 11/24/80	Jackson, MI	J Keppler et al	SALP Program
8. 12/ 2/80	Glen Ellyn, IL	G Fiorelli, R Knop et al	SALP Follow-Up and QA Organization
9. 12/ 5/80	Bethesda, MD	R Jackson, D Hood et al	Site Specific Seismic Response Spectra
10. 12/ 5/80	Bethesda, MD	R Vollmer	Issues in Soils Hearings
11. 12/11/80	Ann Arbor, MI	J Gilray, E Gallagher	Exit Meeting - Follow-Up to 50.54(f) Question Responses
12. 12/17/80	Glen Ellyn, IL	J Keppler et al	SALP Follow-Up and QA Organization
13. 3/13/81	Glen Ellyn, IL	J Keppler et al	Project Organization and QA Program Update

EXHIBIT 2J W Cook Participation in Meetings with
NRC on Midland Nuclear Plant (contd)

<u>Meeting Date</u>	<u>Location</u>	<u>NRC Participation</u>	<u>Subject</u>
14. 4/16/81	Bethesda, MD	R Jackson, D Hood et al	Site Specific Seismic Response Spectra
15. 4/16/81	Bethesda, MD	R Vollmer, J Knight et al	Seismic Requirements for Soils Hearings and Operating License
16. 5/ 1/81	Midland, MI	C Williams et al	Exit Meeting - Electrical Inspection
17. 5/ 8/81	Bethesda, MD	J Knight, D Hood et al	Soils Issues Summary
18. 5/18, 20 21/81	Midland, MI	C Williams et al	General Midland QA Audit
19. 5/21/81	Midland, MI	J Keppler	Presentation on Midland Project Organization and Operation
20. 5/22/81	Midland, MI	J Keppler, C Williams et al	Exit Meeting - QA Program Inspection and Site Visit

NOTE: Meeting List does not include telephone contacts.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

CONSUMERS POWER COMPANY

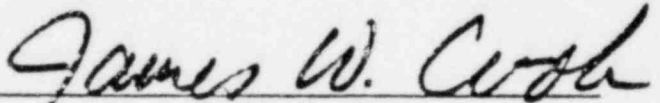
(Midland Nuclear Power Plant,
Units 1 and 2)

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

County of Jackson)
)ss
State of Michigan)

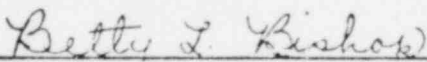
AFFIDAVIT OF JAMES W. COOK

I am James W. Cook. I am presently employed by Consumers Power Company as Vice President, Projects, Engineering and Construction. Based upon knowledge, information and belief my testimony in the Midland Soils Hearing, which is attached hereto, is true and correct.



James W. Cook

Subscribed and sworn to before me this 5th day of June, 1981.



Notary Public, Jackson County, Michigan
My Commission Expires: September 21, 1982

Engineering Department in New York, I held a number of positions in the mechanical and nuclear engineering areas. The majority of my experience at AEPSC related to various activities associated with the design of the D C Cook Nuclear Plant located in Bridgeman, Michigan. I directly participated in and was responsible for the initial cost estimates and design studies, the safety analyses and technical licensing activities leading to the construction permit, and the initial formulation of the analytical methods and staffing of the fuel management program for the D C Cook Plant. My final position at AEP was Section Head, Physics and Fuel Management. In 1972, I joined the Stone and Webster Engineering Corporation in Boston. At Stone and Webster, I undertook a number of assignments, first, as an Assistant Project Engineer and then as a Project Engineer with responsibility for the engineering of several nuclear power plants being designed by Stone and Webster. My final assignment at Stone and Webster was as Project Engineer for Millstone Unit 3 currently under construction near Waterford, Connecticut. In 1977, I joined Consumers Power Company as Vice President Energy Planning, a staff position coordinating the Company's overall corporate planning activities and reporting directly to the Company's top management. I held this position until March 1980.

I hold membership in various professional societies and industry committees related to my work. I have been a member of the American Nuclear Society since my graduation from Penn State either through individual or corporate membership. Among my more recent industry committee activities are the following: I am a member of the Executive

E17L13

1 MR. MILLER: Mr. Cook is available for cross
2 examination.

3 CHAIRMAN BECHHOEFER: Do you wish to begin?

4 MS. STAMIRIS: I will. If I had the choice, I
5 would go second.

6 CHAIRMAN BECHHOEFER: Well, Mr. Marshall, would
7 you like to start?

8 MR. MARSHALL: No, I would rather that she did
9 because I am always courteous. I am sure you have been
10 noticing that.

11 MS. STAMIRIS: I thought you were going to ask
12 Mr. Paton.

13 First of all, I would like to object to--
14 or I would like to go on the record that Consumers Power
15 Company does not wish to litigate or discuss any events
16 prior to December 5th, 1979, except for certain ones that I--
17 well, for whatever their reasons--I won't speculate on their
18 reasons, but I find it interesting to know that they are
19 anxious to include this one portion of the soils settlement
20 five-year period into the record, while the rest of it has
21 been deleted by means of the QA stipulation.

22 MR. MILLER: Excuse me. Just for the record,
23 if you are referring to the subsequent borings, all that took
24 place after December 6th, 1979.

25 MS. STAMIRIS: Oh, that's right.

E17L14

1 CHAIRMAN BECHHOEFER: I don't understand.

2 MS. STAMIRIS: Okay. That's right.

3 CROSS EXAMINATION

4 BY MS. STAMIRIS:

5 Q Mr. Cook, I would like to have just some brief
6 background information. Could you tell me roughly what
7 percentent of the plant is yet to be completed?

8 A In overall construction, we are approximately
9 70 percent complete.

10 Q Then of that roughly 30 percent which is
11 remaining, could you briefly summarize to me what construction
12 remains to be done, aside from the remedial fixes that
13 are pending?

14 A It is mostly small pipe and small pipe
15 hangers, cable spooling, terminations, and completion of
16 design changes that have resulted from recent events, such as
17 requirements coming out of Three Mile Island.

18 Q In that 30 percent that remains to be done,
19 is the amount of testing that has to be done, prior to start-
20 up of the plant, included?

21 A No, it is not. That's a whole separate
22 category. I was speaking of construction work.

23 Q Okay. I will be getting into some questions
24 about your testimony, and--

25 MS. STAMIRIS: I'm sorry. This is a preliminary

E17L15

1 matter that I wanted to ask the Board about that came to my
2 mind when I was reading Page 3 of Mr. Cook's testimony.

3 In that paragraph near the bottom of the page
4 that is inset, there is a notation as to how contentions
5 are to be understood.

6 Q (By Ms. Stamiris) Perhaps I can ask it as a
7 question to you, Mr. Cook. How do you believe this Board
8 should base its judgment on whether reasonable assurance
9 exists that QA will be implemented in the future?

10 MR. MILLER: I am going to object.

11 A I would leave that to the Board.

12 Q I just wondered--

13 MR. MILLER: Mr. Cook, when I object, please
14 don't answer until the Board has ruled.

15 THE WITNESS: Excuse me.

16 MR. MILLER: I really do object to going into
17 the question of how the Board is going to decide this matter.
18 It is totally inappropriate for examination of a witness.

19 CHAIRMAN BECHHOEFER: I think I will have to
20 agree. That's sustained, even though I think it is answered
21 already.

22 MS. STAMIRIS: Then I will try and--

23 MR. PATON: He just answered it, and it was an
24 excellent answer.

25 MS. STAMIRIS: I have to ask this now because

E17L16

1 it is a basic question, and it may be a procedural question,
2 so I will attempt to address it to the Board and see what
3 happens.

4 I would like to ask that the Board not accept
5 this condition that Mr. Cook has set forth in that paragraph
6 because it has not accepted that condition with regard to
7 the rest of the procedure that is to be followed in this
8 hearing.

9 Would you like for me to give an example?

10 CHAIRMAN BECHHOEFER: That might be helpful.
11 I don't really understand.

12 MS. STAMIRIS: Okay. Maybe if I give you an
13 example, it will help.

14 By accepting the quality assurance stipulation,
15 a great deal of the focus of this proceeding has been shifted
16 to quality assurance implementation in 1980 and even 1981,
17 and there has been testimony, and my understanding is that it
18 will be based on--in fact, my understanding of the bases
19 for Part III of the quality assurance stipulation, in which
20 the NRC has already offered their reasonable assurance,
21 that that was based on things other than the narrowest interpre-
22 tation of soils, and since the scope and the bases of this
23 proceeding have been expanded in that way, I don't believe
24 it would be fair to limit me in exploring things like managerial
25 attitude as it relates to quality assurance, if I was to

E17L17

1 be narrowing limited to the soils questions that he speaks
2 of.

3 I'm sorry. My inexperience makes it awkward,
4 but maybe it would be better-- Would it be better if I
5 just go through with my questions? Then if a problem
6 arises, maybe we can deal with it at that time. Maybe a
7 problem won't arise. Maybe I should withdraw this question.

8 CHAIRMAN BECHHOEFER: I think you probably
9 should. We haven't accepted that portion of the stipulation
10 yet, not until we secure the evidence, but I am going to see--
11 I guess I can't do it in a short time--whether the testimony
12 in support of it was limited to soils matters or in general.
13 It was my impression that no matter what happens, we aren't
14 approving the general QA/QC program at this stage of the
15 proceedings, at least.

16 MR. MILLER: In fact, Mr. Marguglio testified
17 at some length, both in his prepared and certainly on cross
18 examination, to events that are far removed from this soils
19 area.

20 CHAIRMAN BECHHOEFER: Yes, but our decision
21 at this time will be just on the soils area.

22 MR. MILLER: Yes, that's my understanding as
23 well, and really to the extent that Ms. Stamiris' request
24 is really a request for reconsideration of the Board's
25 ruling of October 24th, 1980, it is really--to do this after

E17L18

1 all the prepared testimony is in, and so on--

2 MS. STAMIRIS: But the QA stipulation was not
3 formally accepted, so therefore I am basing this on my
4 interpretation of that stipulation's effect on this proceeding,
5 and that's why I feel that it could not have been addressed
6 sooner because at an earlier time, I had a different idea
7 of what the hearing was going to be like.

8 CHAIRMAN BECHHOEFER: Well, the first sentence
9 of Paragraph 3 of the stipulation, which we have not accepted
10 yet and is somewhat broader than that, but it will-- We will
11 have to wait and see. We may well not accept that. We may
12 not rule in that broad language at the initial part of the
13 proceeding, in any event, so that does not-- We haven't
14 accepted anything along that line.

15 MS. BROWN: Chairman Bechhoefer, can we get a
16 clarification of exactly what Ms. Stamiris' point is or if
17 she is trying to make a motion to preclude evidence? The
18 Staff isn't clear as to just what she is requesting.

19 CHAIRMAN BECHHOEFER: Well, I think she may
20 wish to ask-- We better wait until the questions are asked.

21 MR. MILLER: Let's get on with the examination.

22 CHAIRMAN BECHHOEFER: She may wish to ask
23 questions that go to QA, but somewhat farther than the soils
24 area.

25 MS. STAMIRIS: I think it would be best if I

E17L19

1 go ahead and ask my questions, and then we will see how it
2 goes.

3 Q (By Ms. Stamiris) Mr. Cook, I informed the
4 attorneys that I wanted to ask you about the answer to the
5 notice of hearing that was given by Consumers Power Company
6 in April of 1980. Did you have a chance to review that,
7 or are you familiar with that?

8 A I was told that when I came down this afternoon;
9 but, no, I am not familiar with it.

10 Q Can you tell me if you are not familiar with
11 it, your impression of who this quality assurance stipulation
12 is made by and represents besides the lawyers?

13 A I'm sorry. The question was, was I familiar
14 with the response to the notice of hearing, or with the
15 quality assurance stipulation?

16 Q Oh, Well, first I will ask regarding the
17 notice of hearing, the answer to the notice of hearing.

18 A No, I was not familiar with the response to
19 the notice of hearing.

20 Q I understand that. I wondered--I mean I am
21 having difficulty with that because I believe this was a
22 position that was set forth in this document of Consumers
23 Power Company, and who would represent to me, in Consumers
24 Power Company, a statement of that position?

25 A Perhaps I can clarify. The decision by

E17L20

1 Consumers Power Company to request this hearing was made
2 prior to my joining the Midland project. I was not a party
3 to that decision.

4 I would believe that probably the thrust of
5 your question is why the request was made. I think that would
6 be an appropriate question for you to address to Mr. Howell.

7 Q To Mr. Howell?

8 A Yes.

9 Q Are you aware of the position that is taken
10 by Mr. Howell in this document?

11 MR. MILLER: Excuse me. In which document?

12 MS. STAMIRIS: I'm sorry. I am still on
13 Consumers' answer to the notice of hearing.

14 MR. MILLER: Well, may I just make a statement
15 for the record? The answer to the notice of hearing is a
16 document that was prepared by counsel, with the assistance
17 of Company personnel, and represents the position of the
18 Company in response to the December 6th, 1979 order.

19 To the extent that there are factual representa-
20 tions made in the answer that are within Mr. Cook's knowledge,
21 I certainly have no objection to asking him about that, but
22 if we are going to get into a question of the strategy
23 behind the answer, we may very well get into questions of
24 attorney-client privilege, to which I will have an objection,
25 and I am just trying to expedite this, if I can, really.

E17L21

1 MS. STAMIRIS: Well, I think we will have to
2 wait and see, you know, how that-- First, let me ask--

3 CHAIRMAN BECHHOEFER: If Mr. Cook can answer
4 the question on specific portions, that's okay.

5 MS. STAMIRIS: Okay. I will try that. First,
6 I want to ask, this answer to notice of hearing is evidence
7 in this proceeding, is it not? It was an attachment to Mr.
8 Gene Gallagher's testimony prior to December 6th, 1979.

9 CHAIRMAN BECHHOEFER: It is not evidence, as
10 such. An answer doesn't have to be introduced into evidence.

11 MS. STAMIRIS: I would like it to be introduced
12 as evidence.

13 MR. MILLER: It is a part of the record in
14 this proceeding.

15 CHAIRMAN BECHHOEFER: It is a part of the
16 record. It doesn't have to be entered as an exhibit in
17 these proceedings.

18 MR. MILLER: To the extent that there are
19 admissions in there, the Company is bound by it.

20 CHAIRMAN BECHHOEFER: It is not evidence. It is
21 not testimony of a witness at this stage. It can be used for
22 questioning purposes, and it is part of the record.

23 MS. STAMIRIS: Well, it is an attachment to--

24 CHAIRMAN BECHHOEFER: Correct, but that testimony
25 is not going to be used, I don't think. Am I correct? I will

E17L22

1 have to check that again. It is an attachment to the Staff
2 testimony, but I don't think that they are going to use
3 that.

4 MS. BROWN: The Staff has not committed one
5 way or the other. We do not think we will introduce it into
6 the record, but we are not tying our hands in that regard.

7 CHAIRMAN BECHHOEFER: I might say the answer
8 is part of the record, and you can make proposed findings
9 based on what's in the answer. You can do it for that period.
10 You don't formally have to have it introduced as evidence,
11 that particular document, at least.

12 Q (By Ms. Stamiris) Are you aware of the
13 reference in this document to the statement-- Wel', do you
14 have this document with you, as I asked?

15 MR. MILLER: I have just supplied it to him.

16 A Mr. Miller just gave me a copy.

17 Q On Page 3--and I don't mean to preclude all
18 of that that goes before it, if somebody wishes to introduce
19 it, but there is a statement that, "The licensee denies
20 that there was a breakdown in quality assurance." That's
21 only a part of the statement, but that's what I want to ask
22 you about.

23 Then a little farther down, under No. 3,
24 it says, "Licensee's responses to the specific factual
25 allegations as set forth in Appendix A"--and my understanding

E17L23

1 is that Appendix A--well, it doesn't say Appendix A--oh,
2 it does, but the Appendix is not listed as A. I believe
3 there is just one appendix, but this appendix has certain
4 factual information or-- No. I don't know.

5 Would you agree that this appendix and that
6 statement set forth the position that denies that there
7 was a quality assurance breakdown prior to December 6th,
8 1979?

9 MR. MILLER: I am going to object. There
10 are two questions; first of all, with respect to the sentence
11 in the answer that says, "The Licensee denies that there
12 was a breakdown in quality assurance".

13 MS. STAMIRIS: I didn't say that was the whole
14 sentence.

15 MR. MILLER: No, but the portion of the
16 sentence, that speaks for itself. If we are going to be
17 asking about the appendix, it might be helpful if Mr. Cook
18 were directed to specific portions of the appendix and could
19 then respond.

20 (Continued on next page.)
21
22
23
24
25

1 MS. STAMIRIS: I'd like to know if I can ask
2 the question in the general sense, whether Mr. Cook agrees that
3 this appendix sets forth a denial of a breakdown in quality
4 assurance. I know there are certain things in there--I know
5 there are specific statements in there, but I believe that you
6 could make one-- I would like to know if you could make one
7 general statement about the overall gist of this appendix.

8 THE WITNESS: Without reading it and studying
9 it in detail at this point in time, no, I could not. I believe
10 the Company's position on the quality assurance aspects of the
11 soil settlement was set forth in response to Question 23.

12 Q (By Ms. Stamiris) You were informed-- I mean
13 I don't want you to-- You were informed that I wanted to ask
14 you questions about this?

15 A Yes, ma'am.

16 Q Could you have read it?

17 MR. MILLER: I object to that question.

18 MS. STAMIRIS: I'm sorry.

19 Q (By Ms. Stamiris) Are you aware of a statement
20 made by Mr. Miller on the first day of this hearing that--he
21 said that the quality assurance stipulation, agreement, did
22 not represent a change in positions--and I'm paraphrasing, and
23 I would like to be corrected if I'm wrong--but I remember his
24 statement that there was not a change in position.

25 MR. MILLER: May we get the quote, if we're

1 going to be quoted here?

2 (Pause.)

3 MR. MILLER: Excuse me. I believe the quotation
4 at page 1046 of the record is as follows:

5 "I should point out that with respect to the
6 items that are set forth in paragraph 1 of the
7 proposed stipulation, they were foreshadowed by
8 the Company's answer to Notice of Hearing."

9 Then I went on to say that:

10 "There were admissions made in the response to
11 the Notice of Hearing by Consumers Power Company
12 that concede some of the same facts that are set
13 forth in paragraph 1 of the stipulation."

14 MS. STAMIRIS: That was not-- Perhaps I should
15 borrow a copy of the transcript so I could look at it tonight
16 and find the reference that I'm remembering, where I thought
17 the words were used that Consumers had not changed their
18 position. I can't remember anymore about it than that.

19 MS. BROWN: Your Honor, I object to the whole
20 line of questioning. I would like to understand what the
21 significance of the change in Consumers' position, if any, what
22 significance it has to this hearing?

23 MS. STAMIRIS: I'd be happy to explain. I'll
24 ask Mr. Cook some questions about-- Well, first, I'd have to
25 establish that there was a change in position, and I think

1 that that could be established. Then I want to know what
2 happened, what new factual information or what caused the
3 change in position, or which position, since they both refer
4 to factual information...

5 (Pause.)

6 CHAIRMAN BECHHOEFER: What relevance would it
7 be?

8 MS. STAMIRIS: The relevance is that I believe
9 that--and it's difficult to talk about these things, because,
10 of course, I realize that when we use the term "quality
11 assurance breakdown," that that's a broad term. But that can
12 be interpreted in lots of ways, and I think we have a
13 general understanding of what that means.

14 Well, either there was a quality assurance
15 breakdown prior to December 6, 1979 or there wasn't. And the
16 only way that it could actually be established is by an
17 examination of facts on the record, or facts covering that
18 period.

19 Now, aside from that kind of a factual consider-
20 ation, my feeling is that if there was a breakdown in quality
21 assurance, then there shouldn't be a stipulation-- Well, if
22 there was a breakdown in quality assurance, it should have been
23 admitted earlier on, if it was realized. If there was not
24 a breakdown in quality assurance, then it should not be--this
25 is over-simplifying--but it should not be admitted to just for

1 the sake of some other reason, if they don't really believe it.

2 CHAIRMAN BECHHOEFER: I'm still trying to
3 figure out what difference does it make to us? They have not
4 admitted it--not by the stipulation. They have agreed not
5 to contest it--which is different.

6 But I'm trying to figure out, what difference
7 does it make whether there are now, for some reason, which
8 they might even want to keep private, what difference does
9 it make what strategy they choose to use?

10 MS. STAMIRIS: Well, it makes a difference to
11 me, in that it affects my assessment of the way they handle
12 decisions, and the way they are doing things. And I believe
13 it has broader implications than just the agreement, or the
14 issues in their narrow sense.

15 Maybe if I could ask--

16 THE WITNESS: Might I make just one brief
17 response to that question? Perhaps it would help us proceed
18 a little bit.

19 I have to disagree with Ms. Stamiris about
20 knowing what the term "breakdown" means. I'm frankly not a
21 lawyer, I'm not a judge in this proceeding, and I can't tell
22 you from a precise definition what that word means. Whether
23 it's a problem, a deficiency, or a breakdown, I'm not trying
24 to differentiate that. My job is to try to get those--whatever
25 they are--fixed.

1 We are in this hearing essentially because we
2 felt, as a Company, it would be beneficial to resolving the
3 problem that we felt was not getting fixed, fixed. And that
4 was the reason we asked for it, essentially. And, hopefully,
5 those comments can help you gain some perspective about what
6 the overall approach and perspective that we have is.

7 Q. (By Ms. Stamiris) Do you believe that that
8 characterization you just gave to your approach to this
9 hearing was the original position of the Company's approach
10 to the hearing, or are you just stating that insofar as what
11 your position is now, since you have taken over?

12 A. I can't begin to speak for those who were in
13 my position at the time we asked for the hearing. But it's
14 certainly been the overriding consideration from the point of
15 view of myself and others that I've been dealing with since
16 my tenure began.

17 Q. On page 4 of your testimony you have described
18 some actions that will be organized according to the following
19 criteria--this is about in the middle of the page--which seem
20 appropriate with regard to management attitudes.

21 First of all, you list the existence of an
22 organizational structure to keep management informed of
23 construction and quality issues and management's willingness
24 to be informed on those subjects.

25 Could you give me some specific examples, aside

1 from program structure, of how you have demonstrated this
2 willingness?

3 A I'm sorry. Would you restate that? I thought
4 I was following, until the very end.

5 Q Okay. I asked if you could give me some
6 specific examples, aside from program structure, on paper,
7 of how you have demonstrated this willingness that you
8 referred to in No. 1.

9 A I suggest you look at my desk calendar, to
10 see what I do every day.

11 Q I--

12 A My whole--you know, 9:00 to 5:00, 7:00 to
13 8:00--day is spent trying to find out what's going on in this
14 project, and trying to make it move.

15 Q Since it is difficult to give specific examples
16 for something like this, would you concede that it is a
17 subjective statement, to a certain degree?

18 MR. MILLER: Object to the form of the question.
19 That what was a subjective statement?

20 MS. STAMIRIS: A statement of willingness.

21 CHAIRMAN BECHHOEFER: Which appears on page 4?

22 MS. STAMIRIS: In No. 1, the question I just
23 asked him about.

24 CHAIRMAN BECHHOEFER: Well--

25 THE WITNESS: I don't believe it's subjective.

1 I just believe it's totally disaggregated into a detailed
2 series of events, meetings, memoranda that we go through on
3 a routine basis, that demonstrates a willingness to be
4 involved and understand, to the best of my ability, what
5 happens.

6 Q (By Ms. Stamiris) So you believe that some
7 more specific objective examples could be given?

8 A Yes. Very, very detailed. I'd have a
9 difficult time to generalize for you.

10 Q I asked you not to generalize. I asked if you
11 could give me some specific examples.

12 A Specific examples might include the number of
13 days, you know, every month, that I spend at the site working
14 with the various groups and people on various matters regard-
15 ing the project; the amount of time I spend with the
16 regulatory agency people, trying to understand and respond
17 to their particular concerns; the amount of time I spend in
18 meetings when I'm in the home office with all of the
19 individuals on the project who have various matters they want
20 to bring to my attention; the amount of time I spend with the
21 various individuals on the Bechtel project team.

22 Q Okay. Thank you.

23 I would like to ask you some questions about
24 No. 3, but I would like to come back to that later.

25 In No. 4, where it says, "Expedited management

1 decision-making on programs and measures essential for the
2 successful completion of the project."

3 Could you define what you mean by "successful
4 completion"?

5 A. Finishing construction and receiving an operat-
6 ing license, and being certified by the NRC that we have met
7 all the requirements.

8 Q. I: No. 5 you list, as an example, "Management's
9 willingness to expend effort and resources to meet regulatory
10 requirements."

11 Do you believe that willingness to do something
12 can be characterized at all in terms of what caused that
13 willingness, or when it came about? I know that's a very poor
14 question.

15 Let me give you an example. For instance, if
16 you say you are willing to expend efforts and meet requirements,
17 do you believe that, hypothetically, a company would be as
18 willing, if they did that at the last minute after they had been
19 asked a lot of times before, and they felt that it was something
20 that had to be done, as opposed to a company that did it the
21 first time they were asked because they, themselves, agreed
22 that it was something that needed to be done?

23 MR. MILLER: I'm going to object to that
24 question. If there's a specific instance of that type of
25 behavior that the witness can be examined on, fine. But this

1 is totally hypothetical. There's no foundation laid for it.
2 I object.

3 MS. STAMIRIS: I'll try to think of some
4 specific example of management's willingness to expend
5 efforts and resources to meet regulatory requirements.

6 Q (By Ms. Stamiris) For instance, with the
7 service water intake structure, when was the most recent
8 remedial plan submitted for that structure?

9 A The concept was identified to the Staff in
10 late February.

11 Q Of 1981?

12 A Yes. We are currently readying ourselves to
13 make a detailed presentation of more substance to the Staff
14 on it.

15 Q Have you received any indication from the NRC
16 that they were not satisfied with your prior remedial
17 approach?

18 A I believe we knew there were some open issues.

19 Q How far back in time-- When did you first know
20 that the NRC was not satisfied with your first approach to
21 remediation of that structure?

22 A I'm not sure I can give you a good answer to
23 that question. Probably it became better defined to us
24 during the depositions. You know, prior to the commencement
25 of this hearing. At least that was my sense of it, personally.

1 Q When was the first plan of remediation for
2 the service water building submitted to the NRC?

3 A I'm not sure right now. I'd have to refer to
4 Mr. Keeley to answer that, specifically, for you.

5 Q Was there any plan-- Are you aware of any plan
6 for the structure in 1979?

7 A I believe the initial plan was with the piles
8 and corbels, attaching piles to the building, was formulated
9 in, roughly, that period of time.

10 Q And prior to this realization that you mentioned
11 that took place during the depositions for this hearing, you
12 were not aware of any NRC--I can't think of the exact word--but
13 their dissatisfaction with that?

14 A I knew it was under review, and as long as
15 something is under review, the Staff starts to think about the
16 proposals that are in front of them, and they may find it
17 perfectly acceptable, and they may have questions about it.
18 Until they get their questions resolved, they normally don't
19 take a formal position.

20 So it is an evolutionary process.

21 Q I want to briefly go through the same line of
22 reasoning on the auxiliary building.

23 I understand there is a fairly new remedial
24 plan for the auxiliary building.

25 A Yes.

1 Q. When was that submitted?

2 A. In the same time frame that we're talking about.

3 Q. What was the basis-- Why did you adopt a new
4 plan in 1981 for the auxiliary building?

5 A. The recognition that the seismic requirements
6 for the design of the remedial fixes were going to be
7 substantially in excess of what we had anticipated.

8 Q. Had you been aware of any-- Had the NRC
9 expressed lack of approval or disapproval of the earliest
10 plan for the auxiliary building?

11 A. In a manner similar to the service water pump
12 structure, there was an ongoing dialogue on open questions.

13 Q. On the question of the borings, did the Company
14 acquiesce to the NRC's request, despite their own reservations,
15 to do these borings?

16 MR. MILLER: I guess I am going to object.
17 Although I said that the testimony was there, and the contentions
18 were formally withdrawn and there's not much examination, I
19 have no objection to Mr. Cook answering; but this long history
20 with respect to the borings I think is irrelevant.

21 CHAIRMAN BECHHOEFER: Do you have a lot of
22 questions on this?

23 end 13

(Continued on following page.)

24

25

1 MS. STAMIRIS: No, I don't think I do, but if
2 I did, I think I would be justified in asking them since I
3 withdraw the contention, but they wanted to include it anyway.

4 I don't have any more questions on that.

5 CHAIRMAN BECHHOEFER: Well, has he answered that
6 question?

7 MS. STAMIRIS: Yes. I believe he said "yes".

8 THE WITNESS: I did.

9 CHAIRMAN BECHHOEFER: Okay. I didn't hear it.

10 Q (By Ms. Stamiris) Can you give me any other
11 examples of--I don't mean to say "other examples". I believe
12 I am aware of your basis for your decision on the borings,
13 so I don't mean to connect that, but can you give me any
14 examples of remedial plans or actions that your Company has
15 taken--I don't mean to say "remedial plans or actions". I
16 mean actions other than remedial actions that your Company
17 has taken, that you took to satisfy the NRC, even though
18 you didn't believe they were necessary?

19 A I can't give you specific examples, without
20 going back and researching, you know, the record, but I
21 think in general, one can describe the licensing process
22 of being an ongoing dialogue between the Applicant and the
23 Staff on the entire technical review of the Applicant's
24 SAR, to the point as the review gets further and further along,
25 the issues and differences between the Staff and the Applicant

E19L2

1 become fewer and fewer, and ultimately there is a point in
2 time where the Applicant and the Staff will sit down and
3 settle the outstanding issues, even though there may be
4 honest, technical disagreements between the two parties
5 on what was the appropriate course of action, but there
6 comes a time, normally, when one decides that he is not
7 going to try to convince the Staff to change their position.

8 Q On the next page of your testimony, on Page
9 5--again, I want to ask you a few brief background questions.
10 Can you tell me when the Dow steam contract deadline is?

11 A December 31st, 1984.

12 Q Could you just give a brief description of
13 what your contract is and what the deadline signifies?

14 MR. MILLER: I am going to object. I mean
15 the witness has agreed with Ms. Stamiris' characterization
16 that it is a deadline. I am not sure it is accurate, but
17 certainly that provides any necessary basis for the background
18 necessary to talk about the events that are chronicled
19 on Page 5.

20 Q (By Ms. Stamiris) Do you consider it a dead-
21 line?

22 A We have a contract to provide them steam by
23 that time.

24 Q The first sentence says, "The recognition
25 in the second half of 1979 that the Midland Nuclear Plant

E19L3

1 could not be completed on the then existing schedule led to a
2 reappraisal by many knowledgeable individuals in the Company,
3 including the chief executive officer, of how the entire
4 project could best be organized to successfully complete
5 the project."

6 I would like to ask, you, what led to that
7 recognition that you mention in the first part of the
8 sentence?

9 A That it could not be completed on the existing
10 schedule. Again, I was not in the project at that time,
11 so I can only give you second-hand information. I believe
12 it was because of the analysis by the Company of the events
13 that had transpired since the Three Mile Island accident
14 and the internal analyses by the project team between
15 Consumers Power Company and Bechtel on the status of the
16 project.

17 Q Are you aware of some new completion dates
18 that were offered by Bechtel in, roughly, March of 1979?

19 A No, not in March of 1979.

20 Q I said "roughly". Are you aware of any new
21 completion dates offered by Bechtel in 1979?

22 A Yes.

23 Q Would you please tell me what they are?

24 A I can't tell you exactly what they were because
25 it is not in my memory in its exactness, but they were an

E19L4

1 extrapolation to a projected completion date based on
2 estimating work that was going on in the project, which was
3 then one of the bases for the statement that I made that we
4 were not going to be able to meet our then current schedule.

5 Since that time, there has been extensive,
6 you know, replanning and rescheduling activities undertaken
7 that have been the basis for the current project schedule.

8 Q I understand. Do you remember that those new
9 completion dates offered by Bechtel extended beyond that 1984
10 Dow steam contract?

11 A Yes.

12 Q Would you say that in fact these new programs
13 and restructuring of the organization, which you just
14 spoke of, were indeed motivated by the fact that the Bechtel
15 completion deadline or schedule estimates went beyond the Dow
16 steam contract, and that there was a great desire to improve
17 on those?

18 A There was a great desire to improve on them,
19 but it was driven by far more than just the Dow steam contract,
20 I assure you.

21 Q You would not then care to characterize that
22 as the basic motivation?

23 A I certainly would not.

24 Q What were the new cost figures given by
25 Bechtel at approximately the same time for the plant?

E19L5

1 A Roughly \$3.1 billion.

2 Q Do you remember what they had been just prior
3 to that?

4 A Not precisely, although I think the number
5 \$1.67 billion sticks in my mind. Whether that was the
6 precise number the project was carrying at that time,
7 I am not sure.

8 Q Did Mr. Howell hold a press conference in
9 March of 1979, that you are aware of, on this subject?

10 A In March of 1979?

11 Q All right. I am not sure of March.

12 A On what subjects?

13 Q On the subject of the new schedules and cost
14 submissions by Bechtel. It was a big decision to go ahead
15 with the plant. There was, you know, a great deal of time
16 where there were some Company meetings, and then the news
17 came out that you had decided to go forward with the plant.
18 That's what I am talking about.

19 A Yes, he did hold a press conference in Midland,
20 I believe, in March of 1980--no. I'm sorry. Yes, '80.

21 Q When you, at the end of the sentence, say
22 that this led to a reappraisal of how the entire project
23 could best be organized to successfully complete the project,
24 again, I ask you, does this successful-- Well, do you remember
25 a statement by Mr. Howell at a press conference at this time

E19L6

1 that Consumers' goal was to beat Bechtel's completion dates
2 to honor the Dow contract?

3 A I wasn't at the press conference, so I don't
4 know.

5 Q You don't remember a statement like that?

6 A No.

7 Q I would like to read you some other statements
8 on this subject, and ask if you agree with them.

9 Obviously I am reading these from the newspaper.
10 I am not asking you to state that you know for a fact that
11 these are true, but I want to ask you if you agree with the
12 essence of the statement.

13 MR. MILLER: I guess I object to this line
14 of questioning. It seems to me that the witness can be
15 examined with respect to what the facts were that lie behind
16 or are related to his testimony without being asked to agree
17 or disagree with us accounts of statements made by other
18 Company officials or other individuals. It is a very
19 circuititous way of getting at basic facts, and the witness'
20 recollection of these events should be pretty good. I suggest
21 that that approach be tried.

22 CHAIRMAN BECHHOEFER: Could you do that? You
23 may want to do both, but you may want to ask Mr. Howell
24 about it. These are his statements.

25 MS. STAMIRIS: The reason I am going about it

E19L7

1 this way is because I did try once to get him to define
2 more clearly what he means by "successfully completing
3 the project", and I believe that this is a euphemism for
4 completion of the project on time, and I feel that it is
5 important to establish that, although I find it very difficult
6 to establish that, and I think that a great deal of his
7 testimony has to do with what I think is really successful
8 completion of the plant. If that actually means completion
9 on time or by the Dow steam contract deadline, it has a great
10 effect on this, and that's why I need to try to determine
11 it.

12

13 I don't know how else to do it but to ask him--

14 MR. MILLER: I think Mr. Cook has answered the
15 question directly as to what he meant by "successfully
16 completing the project".

17

18 THE WITNESS: I would be glad to restate that
19 for the record. On time, on budget, and meeting all regulatory
20 requirements.

21

22 Q (By Ms. Stamiris) You didn't include "on
23 time" the first time, I don't believe, or I would have been
24 satisfied. I think you specifically left that out. Maybe it
25 was just--

26

27 A I will be glad to expand the definition to
28 include it.

29

E19L8

1 Q (By Ms. Stamiris) Okay. Then I will be
2 satisfied. I would not have had to go into this.

3 I am going to ask you if you could help me
4 put some of your phrases in to simpler terms, and at the bottom
5 of Page 5, I will read the sentence, and I am going to ask
6 if you could put it into simpler or more basic words for me.

7 "In my view the Company was able
8 to benefit from industry's collective
9 experience and management's own perspective
10 of the specific internal environment that
11 the Company would face in proceeding
12 with the project."

13 MR. MILLER: I believe you misread it. It is not
14 "internal". It is "external".

15 MS. STAMIRIS: Oh, I'm sorry. Yes, "external
16 environment".

17 Q (By Ms. Stamiris) Beginning with the words
18 "management's own perspective", would you explain to me what
19 you mean by that phrase?

20 A Very simply, that we would have to expend a
21 great deal of our time for the duration of the project in
22 proceedings such as these.

23 Q Well, I had skipped over a question because
24 I didn't want to ask it, but I will go back to it now.

25 MILLER: Do you agree with a statement by Mr. Howell--

E19L9

1 and he stated his position. I just wanted to know if you
2 agree with his position:

3 "The bottom line, in my opinion,
4 is that if it hadn't been for the
5 Intervenor, this plant would have been
6 built and operating for a couple of years
7 now".

8 A I am certain that that is his belief. Since
9 I have not participated over the course of the project, I don't
10 believe I care to try to rephrase his position.

11 Q I just asked if you agreed with that position.
12 Are you saying you just don't care to state your position?

13 A No. As I was not a direct part of it, I have
14 not made that analysis. I know that he firmly believes
15 that, and he would give you, in his own words, his reasons why
16 when he testifies.

17 Q Have you ever publicly referred to "frivolous
18 intervention" by anti-nuclear activists?

19 A I don't have any recollection of what
20 specifically you are referring to.

21 Q Well, since it is a quote from you in a--
22 well, I shouldn't say--just that word is in quotes, but you
23 were interviewed in January of 1981, and I want to ask you
24 if you believe that-- Do you believe that intervention is
25 frivolous?

E19L10

1 MR. MILLER: I am going to object.

2 Q (By Ms. Stamiris) Do you believe that my
3 intervention is frivolous? I just wondered what is the basis
4 of that statement.

5 MR. MILLER: I object to this line of examina-
6 tion.

7 MS. STAMIRIS: Okay.

8 MR. MILLER: It is completely irrelevant.

9 MS. STAMIRIS: He did, like I said--

10 CHAIRMAN BECHHOEFER: Wait a minute. I think
11 we will overrule the objection. I would like to hear the
12 answer.

13 A I believe there are several kinds of interven-
14 tion, some of which are frivolous and some aren't. Those
15 which have the express objective of trying to just simply
16 delay a project as long as possible, I consider extremely
17 frivolous and detrimental and an abuse of the process.
18 I think there are noted practitioners of that art who have
19 publicly stated that as their goal, and I totally disagree
20 with that.

21 I think the right of citizens to take advantage
22 of the process and to ask questions, I have no complaint
23 with, and I think, frankly, sometimes it helps us to do a better
24 job, if we are questioned about why we are doing things the way
25 we are.

E19L11

1 Q Does-- Well, never mind.

2 On Page 6 of your testimony, you list some
3 general objectives that the reorganization sought to
4 achieve. Well, I will read the sentence, "The general
5 objectives that the reorganization sought to achieve can
6 be summarized as follows:"

7 I would like to ask you, the reorganization
8 that you speak of, was toward what goal? Toward what goal
9 was that reorganization directed?

10 A Completing the project.

11 Q Was it directed toward completing the-- Would
12 you go so far as to say that it was directed towards completing
13 the project on time for the Dow steam contract deadline?

14 A Completing the project, meeting all of its
15 requirements.

16 Q Was this not offered in your testimony as--
17 and I shouldn't-- Is this meant to represent examples of
18 what you believe is a good management attitude?

19 A Yes.

20 CHAIRMAN BECHHOEFER: Ms. Stamiris, I have
21 one question in terms of the cross examination you still have.
22 I am trying to figure out whether we should break or try to
23 finish up with this witness.

24 MS. STAMIRIS: I have quite a bit more.

25 CHAIRMAN BECHHOEFER: Well, what is Mr. Cook's

E19L12

1 availability schedule?

2 MR. MILLER: It is sometime next week, I
3 believe. Let me ask the witness.

4 THE WITNESS: Next week. I would have to go
5 back and, you know, reassess my schedule to see where I
6 have, you know, difficulties in being available, but I am
7 certainly available right now to the limits of endurance
8 of this group.

9 CHAIRMAN BECHHOEFER: What I was trying to
10 figure out is if we could finish around 7 o'clock. Do you have
11 more than that? I just want an estimate.

12 MS. STAMIRIS: Well, I didn't think the hearing
13 was going to go beyond 6 o'clock, and it would be very difficult
14 for me personally to--it would make it-- I mean I'm
15 sorry if I am the only one that has a difficulty in going
16 beyond 6 o'clock, but it does present personal difficulties
17 for me.

18 MR. MILLER: Mr. Cook has been staying on,
19 really, on the representation that a significant fraction
20 of his cross examination, at least, could be concluded today.
21 There are other personal inconveniences involved.

22 CHAIRMAN BECHHOEFER: I guess we will go
23 about 15 more minutes and then quit for the evening. If you
24 want, we can do that. I don't think we will be able to
25 finish.

E19L13

1 MS. STAMIRIS: I have a feeling that-- Well,
2 I'm sorry. No. Okay.

3 CHAIRMAN BECHHOEFER: We will quit around
4 6:30.

5 MS. STAMIRIS: Could I ask what time it is
6 now?

7 CHAIRMAN BECHHOEFER: I have about 6:15, but
8 I am not sure, exactly.

9 MS. STAMIRIS: I thought it was 5:30.

10 (Continued on next page.)
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 Q (By Ms. Stamiris) Looking at No. 1--I have
2 numbered these by paragraphs--the first paragraph, where you
3 list "Increasing participation by Consumers Powe Company in
4 all aspects of the project,"--I think I'm going to try to make
5 my questions shorter, and I'm going to skip some of the
6 questions I had planned. I'll skip that one.

7 MR. MILLER: It's really not necessary to read
8 the questions, but just direct everyone's attention to the
9 sentence, and we can all follow along.

10 MS. STAMIRIS: When I read through these, all
11 of these, just trying to do it all at once, instead of going
12 through it by example, perhaps you will object to it being
13 too general. But to me, all of these examples that you have
14 listed are directed toward an objective of speeding completion
15 of the plant.

16 Q (By Ms. Stamiris) I would like to ask you to
17 explain how making the project within Consumers Power Company
18 as self-contained as possible, and aligning the resources and
19 these other examples that you gave go towards a different goal
20 than that of speeding the project?

21 A Well, I think the second bullet directly speaks
22 to the question of quality of senior personnel.

23 Q What about the fourth paragraph, that starts
24 with "aligning the resources of all the participating organiza-
25 tions"?

1 A. I think the best way I can cite for you as to
2 how to make a mistake and to get into difficulties with
3 respect to the kinds of issues we're talking about here today,
4 is to have a project that doesn't communicate well with each
5 other, that the requirements are not transmitted, you know,
6 efficiently from one level of the project to another, so that
7 we have mis-communication gaps, and therefore make mistakes.

8 I think some of the things we're talking about
9 here are definitely aimed towards making the project work
10 better; not just faster.

11 Q. Can you answer this hypothetical question:

12 Do you believe that it's possible to go too
13 fast on a plant, to the point that it would, in fact, cause
14 safety problems to be overlooked?

15 MR. MILLER: Object. Really, there's nothing
16 in the record to suggest that's ever been the case.

17 MS. STAMIRIS: I asked it as a hypothetical
18 question.

19 CHAIRMAN BECHHOEFER: I think we'll overrule
20 the objection. I think he can answer that, as a hypothetical.

21 THE WITNESS: My answer would be yes, I can
22 conceive of a situation where things could be done willy-nilly,
23 and get out of control. But that's really the reason we have
24 the quality control and quality assurance program, which very
25 much defines the rules of how you can proceed. And as long as

1 you are meeting all of the requirements of the quality assur-
2 ance program, I don't believe you are going to be going too
3 fast.

4 On the other hand, I could also state that it's
5 possible to have things go wrong by going too slow, because
6 you lose continuity. You lose people who have a great deal
7 of experience and expertise, who get siphoned off and go
8 elsewhere. You lose your skilled tradesmen. You pick things
9 up that have been done by others, and, therefore, you have
10 a lack of continuity and the potential for having mistakes
11 on the other spectrum, also.

12 Q. (By Ms. Stamiris) When your position was--
13 when you assumed the position in 1980 that you hold today,
14 was this a new position that was more or less created for you,
15 or had this been held by someone else before?

16 A. No, this was a new position.

17 Q. Were there any goals that were stated by the
18 Company for you, as the holder of this position?

19 A. Not specifically. I think we've been discussing
20 the kinds of goals and expectations that the Company had.

21 Q. Do you believe that in this time frame that
22 we've been talking about that there has been an effort to
23 finish the plant at a greater rate, to get work done at a
24 greater rate than it was being done earlier, faster?

25 A. To improve the schedule, yes. But to get to do

1 that, to get work done in a more efficient manner As an
2 example, we actually held construction back almost all of
3 1980, because we felt the design was not advanced enough to
4 really go at a full-throttle construction program. We held
5 construction back and spent most of 1980 working hard on
6 getting all of the detailed design in place, to be far enough
7 ahead of the construction to be able to efficiently support
8 it.

9 Then we turned construction loose with a
10 backlog of design.

11 Q Okay. I want to know if I'm understanding your
12 testimony correctly.

13 Would you agree to this paraphrasing of your
14 testimony: That you have, in 1980, instituted a speeding-up
15 program of the work on the project, and that speeding up is
16 to meet the goal of efficiency?

17 MR. MILLER: Objection. It's backwards to
18 what the witness testified to not thirty seconds before.

19 MS. STAMIRIS: I'm sorry.

20 THE WITNESS: I think the objective was to
21 work better and work smarter.

22 MR. MILLER: Please, you must give the Judge
23 a chance to rule on the objection.

24 THE WITNESS: I missed the objection. Excuse
25 me.

1 MR. MILLER: I'll raise my hand. How's that?

2 CHAIRMAN BECHHOEFER: You've got about three
3 minutes, Ms. Stamiris.

4 MR. MILLER: There is an objection pending,
5 I think.

6 CHAIRMAN BECHHOEFER: Oh, is there?

7 THE WITNESS: I missed it, too. I'm sorry.

8 MR. MILLER: I'm sorry. Perhaps I didn't speak
9 up. I said I objected to the characterization of the witness'
10 testimony. I said it was directly contrary to what he'd
11 testified to not 30 seconds before.

12 MS. STAMIRIS: I didn't characterize it; I
13 just asked him if I was understanding him correctly that way.
14 I would like him to clarify his testimony.

15 CHAIRMAN BECHHOEFER: I think he did.

16 Q (By Ms. Stamiris) I want to know, do you agree
17 that, for whatever the reason, that work has been done at a
18 faster rate since 1980; that there has been a program, a
19 change in program; and since that change in program, work has
20 been done at a faster rate?

21 A. Yes, there has been more completed.

22 Q Well, you understand what I mean by the term
23 "rate." Is there more work being done over a certain period
24 of time?

25 A. There are more people working simultaneously at

1 the same kind of jobs.

2 Q Right. Then you would agree that there is an
3 effort to-- All right. I don't need to ask that.

4 I want to know, in view of what you just stated,
5 do you believe that if work is being done at a faster rate,
6 that quality assurance programs also need to be stepped up,
7 to keep up with that?

8 A Let me clarify the term "faster." I don't think
9 the unit rate per work per man is going any faster. I think
10 since there are more people working simultaneously, and we
11 have stepped up the inspection activities have kept pace with
12 the amount of work.

13 I don't think it has to be. It already has been
14 stepped up.

15 CHAIRMAN BECHHOEFER: Is this a good breaking
16 point for you now?

17 MS. STAMIRIS: Yes.

18 CHAIRMAN BECHHOEFER: All right, let's break for
19 the evening.

20 (Whereupon, at 6:30 p.m., the hearing was
21 adjourned, to reconvene at 9:00 a.m., Saturday, July 11, 1981.)

22

23

24

25

This is to certify that the attached proceedings before the
Nuclear Regulatory Commission, Atomic Safety and Licensing Board
in the matter of: Consumers Power Company, Midland Units 1 and 2

Date of Proceeding: July 10, 1981

Docket Number: 50-329 OL&OM, 50-330 OL&OM

Place of Proceeding: Midland, Michigan

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Eddie Spriggs Daniels

William E. Landon

Official Reporter (Typed)

Eddie Spriggs Daniels

W. E. Landon

Official Reporter (Signature)