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UNITED STATES ATOMIC ENERGY COMMISSION

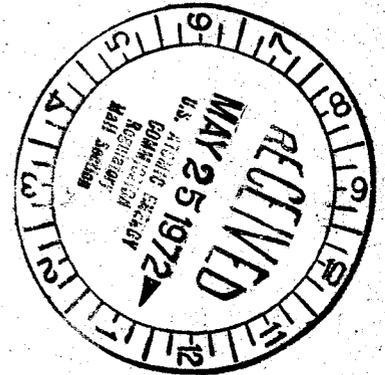
**RETURN TO REGULATORY CENTRAL FILES
ROOM 016**

50-247

IN THE MATTER OF:

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

(Indian Point Station, Unit No. 2)



Place Croton-on-Hudson, New York

Date May 18, 1972

Pages 5288-5576

Regulatory Docket File

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UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

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In the Matter of:
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CONSOLIDATED EDISON COMPANY OF
NEW YORK, INC. :
(Indian Point Station, Unit No. 2) :
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DOCKET NO. 50-247

Springvale Inn
Croton-on-Hudson, New York

Thursday, May 18, 1972

BEFORE:

SAMUEL W. JENSCH, Esq., Chairman, Atomic Safety
and Licensing Board.

DR. JOHN C. GEYER, Member.

MR. R. B. BRIGGS, Member.

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ABt1

M O R N I N G S E S S I O N

CHAIRMAN JENSCH: Please come to order.

The Board has been giving consideration to some of the pending matters. The Board contemplates resuming the evidentiary hearings on June 19, 1972, at 1:30 p.m., at which time we will consider those matters which will not be repetitive in character in reference to the final environmental impact statement, and regarding which the Board will expect the attorneys to proceed to achieve all stipulations possible, as well as develop the agenda for the session beginning on June 19, 1972.

It is contemplated that we would run through Thursday night of that week. The Board believes that the considerations of environmental matters should be related to the request made by Applicant for 100 per cent power level of the facility.

At the conclusion of this session of the evidentiary hearing tomorrow night at about four o'clock in the afternoon, or rather prior to the conclusion of this session, the Board requests a brief oral summary from each of the attorneys respecting their positions in reference to the motion made by the Applicant for testing authority up to a limit of 50 per cent of power. We understand that there are stipulations executed, some particulars in reference to that motion. There may be other outstanding matters that should be

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considered. We are contemplating thirty-minute presentations from each of the attorneys.

1 One final matter. We do not request the Applicant
2 at this time for a review of the site, at least today. Whether
3 that will come about at a later time, we will ascertain the
4 convenience of the Applicant at a later session or a later
5 time than this session. In any event, we thank the Applicant
6 for the opportunity of visiting the site. We do not feel,
7 however, that we should utilize hearing time for that purpose.

8 Are we ready to proceed with further cross-examination?

9 MR. TROSTEN: Mr. Chairman, I have some comments
10 to make with regard to the Chairman's opening statement.

11 MR. ROISMAN: Excuse me. I think if you would give
12 me five minutes, I may be able to forestall the need for you
13 to make those comments.

14 MR. TROSTEN: I'd rather make my comments.

15 Mr. Chairman, I understand the Chairman's remarks
16 to indicate that the Board is not going to continue the hearing
17 after Friday of this week until June 19th.

18 CHAIRMAN JENSCH: That's correct.

19 MR. TROSTEN: As I stated in my telegram to you,
20 Mr. Chairman, we regard a postponement of the hearing until
21 June 19th as being unwarranted, unjustified and contrary to
22 the public interest. We can see no reason why this hearing
23 should not be continued so that we are able to complete the
24 consideration of the Applicant's motion for a ninety percent
25 testing license. We have had this motion on file for months.

1 We have asked for authority to operate this plant at up to
2 ninety percent of power.

3 The Chairman's statement indicates that the
4 presentation should be related to 100 percent authority. Our
5 motion has been filed pursuant to Appendix D, Section D.2,
6 which authorizes a request for interim operating authority
7 at less than full power.

8 We ask the Board to consider our motion, to hear
9 the evidence on this motion, and to balance the evidence on
10 the record as we have requested. I understand that the
11 Chairman's remarks indicate that the Board is not going to
12 consider that motion, but rather move to consideration of
13 100 percent power operation. We protest that. We ask the
14 Board to consider our motion.

15 In the event that the Chairman adheres to this
16 ruling, we ask that the matter be certified.

17 CHAIRMAN JENSCH: The consideration of any partial
18 power consideration is discretionary with the Board under
19 the rules to which Applicant's counsel has adverted. The
20 Commission permits the Board to give consideration to such
21 matters, but under the situation pertaining to this
22 proceeding, there have been so many slippages in time
23 schedules by the Applicant that we are not persuaded that
24 there is a compelling requirement to take up the ninety percent
25 power with the 100 percent environmental impact statement

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likely to be available within a reasonably short period of time.

We had a somewhat similar situation last summer when the Applicant requested a certain authority. There was a great endeavor to have prompt action taken by the Board, and the Board did do that. This was in July of 1971.

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1 CHAIRMAN JENSCH: There was great claim and con-
2 tention that there would be a power shortage and dire
3 results would follow from failure to comply with the request
4 of the Applicants. The authority which was requested by
5 the Applicant was issued in July, but meantime the Applicant
6 continued to peddle the claims of great disaster to the
7 Applicant by delay on the part of the Board.

8 The ultimate result was that the authority which was
9 requested in May and June of 1971 and also in July, which was
10 issued in July, was not utilizable by the Applicant until
11 October because there were many slippages in the construction
12 program of the Applicant.

13 And we are not persuaded the situation is much
14 different today. It is anticipated that this plant will be
15 ready for initial criticality in June of 1972. It may be that
16 the Board will be able to give consideration to the motion
17 for low power testing prior to that time. The Board expect
18 to utilize the time in that regard between now and June in
19 order to accommodate, which appears to be the first order of
20 business, to see if they can get the criticality established.

21 Now that is more important, in the opinion of the
22 Board, and in view of the fact that the final environmental
23 impact statement is not available, than rushing through with
24 some matters that may be subject to a great deal of repetitive
25 interrogation.

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1 It is the Board's judgment, based upon the experience
2 in this case and the delays by the Applicant in meeting its
3 projected schedules, that the Board decides that we will
4 proceed to a consideration of the request that's still pending
5 for a hundred per cent of power.

6 Now Appendix D.2 of the Commission's Regulations says,
7 "The Board may give consideration to this matter. The Board
8 in its considered judgment decides that it's not worth the
9 repetitive action of going through a 90 per cent request and
10 then having to come back for another 10 per cent for a hundred
11 per cent power consideration.

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1 I appreciate the Applicant protests, feels it is
2 unwarranted. The Board feels otherwise. We feel it's in
3 the public interest to save the hearing time, and more
4 importantly for the development of a better record for
5 consideration of the issues that are involved in this
6 proceeding to adopt the procedure of proceeding as we have
7 indicated.

8 MR. TROSTEN: Mr. Chairman, I cannot let the record
9 stand with some of the remarks that the Chairman has made
10 about delays being the fault of the Applicant. The Applicant
11 has been proceeding dilligently. There have been delays
12 caused with regard to the completion of this plant which are
13 due to changing regulatory requirements, to events over which
14 the Applicant has had no control. It is simply not the case
15 that the Applicant has not been proceeding rapidly to get
16 this plant constructed.

17 I reject the concept that the Board has the
18 authority to determine without hearing any evidence that there
19 is no basis for granting the ninety percent operating license.

20 We --

21 CHAIRMAN JENSCH: That isn't the position of the
22 Board at all.

23 MR. TROSTEN: Well, Mr. Chairman, you said --

24 CHAIRMAN JENSCH: We have heard evidence and there
25 is no criticism of the Applicant's endeavors to proceed with

1 construction. The position of the Board is that there have
2 been slippages in the projected time schedules. Whose fault
3 it is we are not giving it concern, but we are saying a
4 realistic appraisal of this record does not indicate to the
5 Board that there is a compelling requirement to take up the
6 motions that the Applicant wants taken up.

7 We have looked at the several motions which are
8 pending here and are selecting those which appear more
9 realistic to reasonable attainment than taking up this
10 piecemeal approach, which we think the Applicant has
11 prescribed and hopes to have followed. The Board is going to
12 reject that position. We think we will get a better record
13 by first taking up the low power testing motion, which has
14 been pending, as you say, for some time, but there has been
15 no immediacy requirement about it since the plant is not
16 ready for it anyway, and it may be that the Board will get
17 this order one way or the other about this motion for low
18 power testing in time for criticality, and it may be that you
19 will have some slippages on the testing schedule in that
20 regard. Those are things that we anticipate will follow,
21 because you have had slippages so far.

22 The fire wasn't something that you could control
23 There has been a charge made of safety about the pieces and
24 parts that are used for these ring support structures and
25 that sort of thing. These are factors of consideration of

1 safety which, in the opinion of the Board, warrant
2 consideration, and in our judgment this will provide a better
3 record for the consideration of the issues prescribed for
4 determination and proceeding as requested by the Applicant.

5 MR. TROSTEN: Well, Mr. Chairman, again I say that
6 I do not believe that the Board has the authority to make a
7 determination not on the basis of the evidentiary record
8 that it will not consider our ninety percent operating motions.
9 The Board has not received into evidence the testimony that
10 we wish to offer on this matter. There has been no cross-
11 examination on these matters. There has been no interrogation
12 by the Board. We submit that the determination by the
13 Board whether or not a ninety percent operating license can
14 be granted can be made only on the basis of an evidentiary
15 presentation and on the basis of a written decision on our
16 motion.

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1 CHAIRMAN JENSCH: Excuse me for interrupting. Will
2 you submit the balance on your presentation in that regard in
3 written form, please, so we may proceed to utilize the hearing
4 time for the presentation of evidence.

5 MR. TROSTEN: We will, Mr. Chairman.

6 CHAIRMAN JENSCH: Thank you very much.

7 MR. TROSTEN: And we wish to have the matter
8 certified.

9 CHAIRMAN JENSCH: Very well. Are we ready to proceed
10 with further cross-examination?

11 MR. VOIGT: Mr. Chairman, could I take a moment or
12 two to give the Board a brief report on the matter of the
13 production of documents?

14 CHAIRMAN JENSCH: Yes.

15 MR. VOIGT: Will that be in order, sir?

16 CHAIRMAN JENSCH: Yes, please.

17 MR. VOIGT: And could I be seated while I do it?

18 CHAIRMAN JENSCH: Yes, indeed.

19 MR. VOIGT: In accordance with the statement of the
20 Chairman yesterday afternoon pursuant to Mr. Roisman's motion
21 for the production of documents, we have endeavored to churn
22 our files and ascertain whether these documents are available.

23 The first class of documents which the Chairman
24 directed to be produced were the final design drawings and
25 specifications for these two components produced by PECOR.

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1 The final design drawing for the reactor vessel
2 support ring was UE&C 9321-S-1284, Revision 7. That was
3 transmitted to Mr. Roisman and copies to the members of the
4 Board with Mr. Trosten's letter of May 6th, 1972.

5 The final drawings for the steam generator shoes was
6 UE&C 9321-F-1287, Revision 5, sheet number 2. That likewise
7 was transmitted to Mr. Roisman and the members of the Board
8 with the May 6th letter.

9 In addition, there is a sheet showing the proposed
10 modification to the steam generator shoes. That was produced
11 by Mr. Brill and marked as Exhibit 8 to his deposition.

12 There are also a series of PB&I drawings. With
13 respect to the shoes, PB&I Drawing Number 115. The later
14 revision is 5. That was produced by Mr. Brill as a part of
15 Exhibit 7 to his deposition.

16 With respect to the reactor vessel ring, the latest
17 drawings are PB&I 201, revision 2. I omitted PB&I 200.
18 PB&I 201, Revision 2; PB&I 202A, Revision 5; 202B, also
19 Revision 5; and 203, no revision.

20 All of those drawings were produced by Mr. Brill
21 during his deposition, and they are part of Exhibit 6 to his
22 deposition.

23 Finally with respect to specifications, the
24 specifications are the original document, 9321-01-12-3, dated
25 December 12, 1966, produced by Mr. Brill and marked as part of

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1 Exhibit 1 to his deposition.

2 The second classification of documents that we were
3 requested to produce were the original design vessel analyses
4 and any installed or modified stress analyses. We have re-
5 quested that the original design stress analysis be sent up.
6 I believe they are physically located in Philadelphia. We
7 will make them available to Mr. Roisman and the Board as
8 quickly as possible.

9 With respect to the stress analysis of modifications,
10 we have previously produced copies of the stress analyses
11 that were made concerning the modification of the steam
12 generator shoes. With respect to the modifications to the
13 ring, there were no stress analyses concerning the
14 modifications, and the original stress analyses which will
15 be produced are still determinative since the modifications
16 that were made to the ring did not necessitate the computa-
17 tion of revised stress analyses.

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1 The third class of documents which the Chairman
2 directed to be produced is memoranda or the reportings of
3 the modifications or adjustments that were made after the
4 PECOR components were delivered. We are reviewing our files
5 on that matter. Thus far we have come up with only two
6 documents in that category. Those are the job site minutes
7 of July 9 and July 10, 1968. The July 9 minutes were supplied
8 to Mr. Roisman, copies to the Board, as an enclosure to
9 Mr. Trosten's letter of May 6th.

10 Mr. Branting has very kindly supplied me with a
11 copy of the July 10 minutes. I have not had the opportunity
12 to have it duplicated. It is an original. I will hand it
13 to Mr. Roisman at this time and ask that he return it to me
14 at the recess so that I can have it run off so that we can
15 all have copies.

16 MR. ROISMAN: Why don't you run it while we are
17 cross-examining.

18 MR. VOIGT: If you prefer to have me run it off
19 first, we will do that as quickly as we can.

20 MR. ROISMAN: Thank you.

21 MR. VOIGT: In addition, Mr. Chairman, there were
22 specific requests for information in connection with the
23 cross-examination. Aside from the matters I have already
24 covered, I believe there were two separate requests. The
25 first was for the design criteria for the allowable stresses

1 on the steam generator shoes. I'm sorry that I haven't had
2 a chance to review the transcript. So I cannot give you a
3 precise reference to that request. But if I understood it
4 correctly, I'm informed that those numbers are contained in
5 Table A.3-1, which appears in Appendix A of the Final Safety
6 Analysis Report.

7 The second request for additional information
8 relates to the radial measurements from the pin to various
9 points along the beveled surface at the front of the steam
10 generator shoe. Mr. Slotterback is trying to collect that
11 information right now and we will give it to Mr. Roisman as
12 soon as we have it.

13 Mr. Chairman, that completes my report.

14 CHAIRMAN JENSCH: Thank you.

15 MR. ROISMAN: Mr. Chairman, on the last thing that
16 Mr. Voigt was talking about, the measurement, I believe that
17 the Parameter, Inc. study includes that measurement which I
18 had not had a chance to look at yesterday. If Mr. Slotterback
19 would simply check and confirm it my understanding of that
20 is correct, it would be in the first appendix to that --
21 Well, attachment to the Parameter study on page --

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1 MR. VOIGT: Four and five I believe, Mr. Roisman.

2 MR. ROISMAN: It's number five, and the measurement
3 would be line EFF. You will just confirm that that is the
4 short line distance.

5 MR. VOIGT: Mr. Roisman, Mr. Slotterback is making
6 his own independent determination. If it happens to be the
7 same as Parameter's, we will so advise you. If he comes up
8 with something a little different, why we will furnish the
9 information to you.

10 MR. ROISMAN: Fine.

11 Mr. Chairman, on the matter of documents in the
12 course of the reviewing of the Parameter, Inc., examination,
13 they have on page 13 of the main document from which
14 Mr. Voigt was just looking through page 16 listed the
15 references that they used in the course of the preparation.
16 Some of those are references that Mr. Voigt referred to.
17 Others, for instance a list of drawings provided from
18 Westinghouse Corporation, he did not refer to.

19 Those are all very specific references, no unusual
20 search would be required since they had already been made
21 available to Parameter, Inc. A number of them at least
22 justify the references here, would appear to be pertinent,
23 and if those documents were made available that might, with
24 the exception of the text and codes which are listed on page
25 16, that might substantially improve our document status and

1 perhaps focus down on the main documents.

2 It's a substantially longer list than the one that
3 the Applicant relied upon, and I note, for instance, under
4 miscellaneous it lists "inter-office note between UEC and
5 Mr. Slotterback, dated December 4, 1968." The Item D1 listed
6 under miscellaneous has already been covered. There are some
7 sketches listed under Item C, and these drawings under
8 Item B, all of which would be pertinent. I just merely bring
9 that to the Applicant's attention, that those seem to be
10 fairly extensive, with the exception of any additional
11 memoranda that might exist.

12 MR. VOIGT: Mr. Chairman, we have endeavored in our
13 review to isolate those documents in accordance with your
14 directions, sir, and in accordance with the components that
15 are here in dispute. I might point out, just as a general
16 observation, that some of the references in the Staff
17 consultant's report pertain to the posts, the structure
18 beneath the steam generator shoes. It has been my understanding
19 that that is not a matter in issue here.

20 However, we will review all of these references as
21 best we can, and if any of the additional materials that are
22 listed by Parameter, Inc. pertain to the steam generator shoes
23 and the reactor support vessel ring, we will certainly endeavor
24 to furnish copies to Mr. Roisman. It may be that Mr. Roisman
25 could obtain that information more directly from the Staff,

1 since this is the Staff's study. We will be happy to
2 cooperate.

3 CHAIRMAN JENSCH: Will you proceed.

4 MR. TROSTEN: Excuse me. May I make one observation,
5 Mr. Roisman.

6 Mr. Chairman, we have Mr. Schwartz here today and
7 we have three environmental witnesses who are scheduled to
8 get on a plane at ten o'clock in order to be here tomorrow.
9 We wish to offer in support of our ninety percent operating
10 license motion the testimony of Mr. Schwartz, and we are
11 prepared to stand cross-examination as far as Dr. Rainey,
12 Dr. Lauer and Dr. MacFadden are concerned, also in support
13 of our ninety percent operating license.

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1 CHAIRMAN JENSCH: May I interrupt. The evidence
2 from Messrs. Raney, MacFadden and Lauer has been received.

3 MR. TROSTEN: Yes.

4 CHAIRMAN JENSCH: Proceed.

5 MR. TROSTEN: I have two questions. One, shall we
6 proceed this morning with cross-examination by Mr. Macbeth of
7 Mr. Schwartz, and is the Board willing that cross-examination
8 of the panel proceed tomorrow?

9 MR. MACBETH: Mr. Chairman, it's my understanding that
10 the Board has denied the 90 per cent motion, and this evidence
11 is submitted in support of that motion. I would object to the
12 admission of Mr. Schwartz' evidence, I believe, because the
13 motion has been disposed of, and I see really no point in
14 having a cross-examination of the other witnesses tomorrow,
15 since also their evidence is in support of a motion which has
16 been denied.

17 MR. KARMAN: Mr. Chairman, may I have some clarifica-
18 tion. Has the Board denied the motion or denied to entertain
19 the motion?

20 CHAIRMAN JENSCH: Al Smith had a good one for that.

21 MR. MAC FADDEN: In either case, I see no need for
22 cross-examination on the topic.

23 CHAIRMAN JENSCH: Well, we made arrangements last
24 evening for Mr. Schwartz to be present, and we of the Board
25 believe that we should proceed to a consideration of the

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1 request that is pending by the Applicant for authority for
2 100 per cent operating license. There is a great deal of
3 flexibility in these proceedings. My thought was we'd go
4 ahead and cross-examine on these reports of the analyses.
5 It is our present intention not to take up the 90 per cent
6 license. We might be persuaded otherwise after we get done
7 with these analyses of the Brill situation.

8 The power need situation is something that would be
9 of importance for any change in the view of the Board. The
10 Board does not contemplate desiring, nor does it see an
11 opportunity in view of the length of time that this pro-
12 ceeding will be hearing, that we will reach Messrs. Raney
13 and Lauer, in any event, and we do not request, and suggest
14 that they not be present tomorrow.

15 It is our present plan to proceed solely with
16 reference to the 100 per cent operating license. We could
17 be persuaded otherwise. We do not believe it will provide
18 the kind of record that will realistically deal with the
19 issues that are subject to determination in this proceeding.

20 MR. TROSTEN: Well, Mr. Chairman, I renew the
21 offer of proof as far as Mr. Schwartz' testimony is con-
22 cerned. We have had the testimony submitted yesterday to
23 the parties at the Board. Mr. Schwartz is here to sponsor
24 the testimony.

25 CHAIRMAN JENSCH: If you want to put it in in the

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1 same way that we have Messrs. Raney and Lauer and MacFadden's
2 evidence in there and just hold the cross-examination.

3 MR. TROSTEN: It's up to the Board. We are
4 prepared.

5 CHAIRMAN JENSCH: Do you want to complete the record
6 by having him establish the veracity and the authenticity of
7 his preparation?

8 MR. TROSTEN: We will do that.

9 CHAIRMAN JENSCH: Will you proceed.

10 MR. TROSTEN: Mr. Schwartz, was the document entitled
11 Effects of Delay in Operation of Indian Point Unit Number 2
12 dated May 18, 1972, prepared by you or under your supervision
13 and direction?

14 MR. SCHWARTZ: Yes, sir, it was.

15 MR. TROSTEN: Mr. Schwartz, do you desire that this
16 testimony be included in the transcript as if read and received
17 in evidence in this proceeding in support of Applicant's
18 motion for authority to operate Indian Point 2 at 90 per cent
19 of power?

20 MR. SCHWARTZ: Yes, sir, I do.

21 MR. TROSTEN: Mr. Chairman, I now offer in evidence
22 in support of Applicant's pending motion for 90 per cent
23 operating authority the testimony of Bertram Schwartz, Vice-
24 president, Consolidated Edison Company of New York, Inc., on
25 Effects of Delay in Operation of Indian Point 2, dated May 18,

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1 1972.

2 CHAIRMAN JENSCH: Is there any objection?

3 MR. KARMAN: No objection, Mr. Chairman.

4 MR. MACBETH: No objection, Mr. Chairman.

5 Of course, I reserve the right to cross-examine
6 should the Board entertain this motion at a later day.

7 CHAIRMAN JENSCH: Any other statement?

8 MR. TROSTEN: Mr. Chairman, as I say --

9 CHAIRMAN JENSCH: Excuse me just a minute.

10 Any objection by the Citizen's Committee?

11 MR. ROISMAN: No, Mr. Chairman.

12 CHAIRMAN JENSCH: State of New York?

13 MR. MARTIN: No objection.

14 CHAIRMAN JENSCH: The request of Applicant is
15 granted and the previously prepared statement by Witness
16 Schwartz may be physically incorporated into the transcript
17 as if orally given. It will constitute the evidence on
18 behalf of the Applicant.

19 (Document follows)

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BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of)
)
Consolidated Edison Company of) Docket No. 50-247
New York, Inc.)
(Indian Point Station, Unit No. 2))

Testimony of
Bertram Schwartz, Vice President
of Consolidated Edison Company of New York, Inc.
on
Effects of Delay in Operation
of Indian Point Unit No. 2

May 18, 1972

It is now apparent that Indian Point 2 cannot be available for service for most of the Summer of 1972. Consequently, Con Edison increased its purchases from other utilities for this summer and will also delay various planned retirements. Notwithstanding these short term measures, the anticipated reserve levels are not adequate and there remains an urgent need to have this plant in operation at the earliest date possible. The plant is now undergoing preliminary testing and could be available for service in the latter part of August. If so, Indian Point 2 will provide needed capacity resources and, despite the delay, will contribute to the reliability of power supply in the New York area this summer. Furthermore, Indian Point 2 will represent a significant portion of the reserves required for the Winter of 1972-73 to assure reliable electric service to Con Edison's customers. *

To meet the estimated peak load of 8400 MW this summer, a total of 1621 MW of new generating capacity resources was planned for service by the peak load period. This consisted of 873 MW from Indian Point 2, 400 MW from Bowline Point 1 and 348 MW of barge-mounted gas turbines. Bowline Point 1 is a 600 MW unit in which Con Edison has two-third's ownership and Orange and Rockland Utilities one-third ownership.

With this capacity in service as scheduled, including Indian Point 2 in the Spring of 1972, Bowline Point 1 and one-half of the barged gas turbines by July 1st and the other half of the barged gas turbines by July 15th, retirements totalling 534 MW of old, inefficient generating units were planned. The Company's installed generating capability

* The Summer Capability Period extends from April 30 to October 30. The balance of the year is referred to as the Winter Capability Period.

for the summer would then have been 9996 MW. Additional firm purchases of 395 MW, including 270 MW from the Rochester Gas and Electric Ginna Nuclear Unit and 125 MW from Orange and Rockland's share of Bowline Point 1, would have provided by July 15th, total capacity resources of 10,391 MW, equivalent to a reserve of 1991 MW or 23.7%. This reserve margin would have been substantially the same as had been planned for the summer periods in recent years, during which periods the Company had been required to reduce voltage on many occasions.

When it became apparent that the service date of Indian Point 2 was slipping and that substantial additional sources of firm purchase capability were not then available on a non-contingent basis, efforts were made to provide partial replacement of capacity thru deferral of planned retirements. Initially, 208 MW of retirements were delayed until after the summer capability period. Subsequently, when the service date of Indian Point 2 was re-scheduled to the latter part of August, an additional 244 MW of retirements were also deferred, to bring to 452 MW the total reduction in retirements. The remaining 82 MW of generating capacity was retired in January, 1972. These delays were necessary to provide some measure of additional capacity despite the fact that the units affected are a much less reliable source of capacity than newer units and that they are unreliable, inefficient and environmentally undesirable. This capacity cannot be considered, by any reasonable measure, a replacement for 452 MW from Indian Point 2.

To further supplement capacity resources, and to replace the capacity unavailable due to the extended delay of Indian Point 2, arrangements were later made for additional capacity purchases. These include:

1. An additional purchase of 75 MW from the Orange and Rockland portion of Bowline Point 1. The purchase begins when the unit goes into commercial service-now scheduled for July 1, 1972.
2. A purchase of 300 MW from Ontario Hydro beginning May 1st and continuing thru September 3rd. The purchase can be extended by mutual agreement through October 28, 1972-the end of the summer capability period.
3. Up to 150 MW during daily peak load periods from the Power Authority of the State of New York beginning in May, pending approval of the Governor of New York State, and continuing thru September 29, 1972.

The 75 MW purchase from Orange and Rockland is dependent upon the availability of Bowline Point 1, as is also Con Edison's 400 MW share of the unit and the 125 MW purchased earlier from Orange and Rockland from its share of the unit. This purchase was made only after there was reasonable assurance that the Bowline Point 1 unit would be in service by July 1, 1972 as planned. Similarly, arrangements for the purchase of capacity from Ontario Hydro were not made until such time as there was assurance that the sale would not be affected by the availability of two new units on that system-Pickering 2 and Nanticote 2.

We are also purchasing, on a week to week basis, approximately 95 MW under a temporary export license granted by the National Energy Board of Canada to Long Sault, Inc. This license expires June 30, 1972. Previously, we had been advised that this capacity would not be available for sale.

In total, an additional 525 MW of firm purchases after July 1st has been arranged following the delay of Indian Point 2. This purchase alone is not sufficient to offset the loss of 873 MW from Indian Point 2 during the summer, and, notwithstanding the delay of retirement of 452 MW of capacity, which brings to 977 MW the total of all replacement capacity, the effectiveness of the reserves which will be available this summer will be less than previously planned with Indian Point 2 in service.

Based on the purchase and service dates detailed above, it is now projected that installed reserves will reach 24.9% (2095 MW) subsequent to July 15th, when the second of the two new gas turbine barges will be in service.

This is an unsatisfactory level of reserves considering the age and condition of many of the generating units now in service on the system, including those whose retirements were again deferred thru the Summer of 1972.

During the Summer of 1971, for example, Con Edison's experience with forced outages, daily unavailable capacity due to miscellaneous outages and deratings for steam sendout averaged approximately 2050 MW. Actual unavailable capacity ranged from 1245 MW to 3036 MW during the period June 1st to September 30, 1971.

On the basis of this experience, with adjustments made for the installation of new capacity resources, including Bowline Point 1 and the barged gas turbines, and considering the extensive maintenance program now being carried out, the average daily unavailability of capacity due to forced outages and miscellaneous equipment deratings, excluding

that required for steam sendout, is projected to increase from 1850 MW in June, to 2050 MW in July and August and 2150 MW in September. The gradual increase over the summer peak load period is due in part to the addition of new generating capacity and in part to deterioration of performance because of extended operation. Additional deratings, for steam sendout, may be as high as 300 MW in June and 325 MW in July, August and September. Therefore, total average daily unavailable may range from 2150 MW in June to 2475 MW in September.

Consequently, if we have a warm summer, there will be many days on which installed reserves will not be adequate to provide for forced outages and deratings. The unavailability of Indian Point 2 this summer will increase the likelihood that capacity shortages will again occur in the New York Metropolitan area.

Under the New York Power Pool agreement, each member company must maintain an operating reserve consisting of a spinning reserve, which is capacity that will be available within five minutes' time, and a ready reserve, which is capacity that will be available within thirty minutes' time. Con Edison will be required to maintain approximately 600-750 MW as operating reserves during the Summer of 1972 and the Winter of 1972-73.

Con Edison will be dependent during the Summer of 1972 on the timely start-up and reliable operation of Bowline Point 1 and the barged gas turbines, and in addition, to the continuous availability of purchased capacity. This is a

significantly different situation than would exist if Con Edison's reserves were made up largely of its own installed generating capacity, including Indian Point 2.

In the months following the 1972 summer high load period, system daily peak loads will be substantially lower. The secondary system peak, which generally occurs in December, is projected during the Winter of 1972-73 to be 6425 MW. During this same period, Con Edison plans to increase its installed generating capability by 480 MW in steps of 240 MW each, when two 600 MW oil-fired units at the Roseton Generating Station of the Central Hudson Gas and Electric Company are placed in service. Con Edison will have a 40% (240 MW) initial ownership in each of these units. The first is scheduled for service in the Fall of 1972 and the second in the Spring of 1973, so that only one of the two new units can be expected to be available for service during the Winter of 1972-3. Hence, as in the Summer of 1972, the level of reserves will be dependent upon timely completion of new generating facilities.

There will also be an increase in capability, approximately 663 MW, due to the increased thermal efficiency of Con Edison's generating units. This occurs each winter when air and water temperatures are lower.

If the first unit at Roseton is in service as scheduled, Con Edison's installed generating capability at the time of

the 1972-73 winter peak will be 10,478 MW. Additional capacity resources will be available thru firm purchases. Arrangements have been made to purchase Orange and Rockland's entitlement to Bowline Point 1, 200 MW, and 40 MW from the Maine Yankee nuclear unit if it is in service during the Winter 1972-73 capability period. Maine Yankee was to be in service for the Summer of 1972 and has already been delayed. Consequently, there can be no assurance of its availability for the winter period either. With the additional purchases available, total system capacity resources at the time of Winter peak of 1972-73 will be 10,718 MW. It is also planned that 608 MW of capacity, which has been included within the estimate of total capacity resources will be shutdown, in steps, for retirement on January 1, 1973. This consists of capacity at the older, inefficient generating stations; including capacity previously scheduled for retirement prior to the summer. As this capacity is shutdown and retired, system available reserves will be reduced.

During the period October through May, when additional reserves are available because of the diversity between summer and winter load levels, Con Edison schedules the maintenance of its generating units. This maintenance is necessary to repair or replace equipment which has been damaged or worn as a result of the operation of all units at or near their maximum capability to meet the high levels of customer demand during the summer peak load period. Failure to do so will likely result in a later forced outage of the same units, or, at the very least, equipment failures

which derate their capability at a time when their operation would be even more critical. The amount of capacity which must be scheduled out of service at any one time is a function of the number of units which must be maintained during the period and their size. For the Winter of 1972-73 the monthly maintenance schedule will vary from about 800 MW to 1800 MW.

In the Winter of 1972-73, the New York Power Pool will require Con Edison to schedule approximately 600 MW of operating reserves if Indian Point Unit 2 is not in service. Consequently, the available reserve from which Con Edison can schedule the maintenance of generating units will be 3300 MW, at the time of the winter peak load. This reserve must also cover the forced outages and deratings of generating equipment on a day-to-day basis.

The capacity shortages of the past three years, combined with the overlapping outages of two major generating units, Ravenswood 3 (1000 MW) and Indian Point 1, during the Summer of 1970 and the following winter of 1970-71, made necessary the deferral of much of the then planned maintenance program. At the present time, every effort is being made to provide maintenance to those units, but maintenance of many units will nevertheless have to be deferred until the Winter of 1972-73. Of course, many of those units which have received maintenance in the past two years will again require maintenance next winter. In consideration of the above, and projected levels of forced outages and daily unavailable capacity, a schedule of maintenance has been established for the period October 1972 through May 1973.

The actual maintenance scheduled will vary each month depending on the estimated load for that month. Thus, at the time of the winter peak load, Con Edison's planned reserve margin, assuming Indian Point 2 is unavailable, and after allowance for maintenance outages and operating reserve requirements, will be 1850 MW. The planned reserve margin will vary each month, but for the winter capability period will average 2035 MW.

Although the average planned reserve margin after maintenance during the Winter of 1972-73 is greater than that for the Summer of 1972, 2035 MW after coverage of operating reserves in the winter as compared to 2095 MW before coverage of operating reserves in the summer, the level of service reliability will be substantially the same in both periods because forced outages and average deratings will be higher in the winter than in the summer.

The older, non-reheat units will continue to experience outages and deratings which, because of their age and deteriorated condition, cannot be eliminated. In the winter, with many of the modern reheat units removed from service for maintenance, the non-reheat units represent a greater percentage of available capacity. Also, units which are forced out of service or derated will cause higher levels of unavailability than in the summer because of their higher ratings in the winter. There exists also in the winter high levels of derating of those units in common steam-electric stations where additional steam from the boilers must be channeled to street mains for send-out to steam customers (as a result of greater demand for steam in the winter) rather than utilized for electric generation. In addition, some of Con Edison's generating units, including both steam

and gas turbines, can burn only natural gas. In the winter, when customer demands for home gas heating are higher, these units may be partially derated.

During the past winter capability period, from November 1, 1971 through April 30, 1972, average daily unavailable capacity from all combined causes has been 2608 MW. Actual occurrences have been as high as 3743 MW on a single day. For the Winter of 1972-73, average daily unavailable is expected to range from 2600 MW to 3100 MW.

In the determination of the level of service reliability which might be expected for the Winter of 1972-73, consideration must also be given to the extended hours of operation that have already been required of Con Edison's nearly 2000 MW of gas turbines. These units, as presently designed, are essentially peaking units intended for limited hours of operation, perhaps 500-1000 each year. Con Edison's gas turbines, because of limited base load capacity resources, have already been required to operate, on the average, for the equivalent of 2000 hours per year since the Summer of 1971, and will be required to continue operation at this level in the Summer of 1972. As a result, their continued dependable operation through the Winter of 1972-73 cannot be assured.

The demand for capacity on a typical winter day, although attaining a high in the late afternoon, is not nearly as peaked as in the summer. Moreover, the day-to-day variation in peak load is also not nearly as marked as in the

summer.. Consequently, if the same capacity requirements were assigned to gas turbines in the winter as in the summer, the number of hours they would be required to operate would be substantially greater, and well beyond their design capability. Consequently, for the Winter of 1972-73, it would not be prudent to rely upon the total capability of Con Edison's installed gas turbine capacity to be available on a daily basis.

Consequently, if Indian Point 2 is not in service during the Winter of 1972-73, available reserve margins will be reduced to an undesirably low level and it will be necessary to reduce the program of scheduled maintenance. Failure to perform the entire maintenance program as now scheduled because of a delay in the operation of Indian Point 2, will cause increased hardships for the people of New York City at a later time when equipment deterioration ultimately leads to increased unit unavailability and lower levels of service reliability.

Firm purchases from other companies in the New York Power Pool, and from New England and Ontario are not expected to be available to replace the capacity of Indian Point 2, as these companies and regions experience annual peak loads in the winter.

Con Edison's experience in evaluating offers of capacity for sale for the Summer of 1972 is indicative of the reason why reliance on the purchase of capacity from other utilities with new units under construction is not prudent. Northeast Utilities had offered to sell an aggregate of 470 MW for the summer. Of this 220 MW would have been from the Northfield

Mountain Plant, 200 MW from gas turbines and 50 MW from the oil fired Montville 6 unit. Subsequent to receipt of this offer the Company was advised that the schedule for the Northfield Mountain Plant, which originally provided for all four turbines to be in service by the summer had slipped so that only two turbines were expected to be in service by the summer. Recently it was announced that various sections of the plant powerhouse have been inadvertently flooded and none of the units are expected to be in service for the summer. The availability of the remaining capacity offered for sale is uncertain. Had Con Edison chosen to rely on this capacity to provide additional capacity resources, the already critical shortage would be worse.

Another firm purchase, of Maine Public Service Company's entitlement (40 MW) in the Maine Yankee nuclear unit, was arranged by Con Edison. This unit, previously scheduled for service in May 1972, will not in fact be available for any part of this summer.

The delay of service of Indian Point 2 will not only affect the reliability of supply to the New York Metropolitan area, but will also have a substantial detrimental environmental impact. Without the unit Con Edison would be forced to make greater use of the remaining older fossil fueled generating plants. The Company has analyzed the dispatch of various units which would occur in the one year period commencing July 1, 1972 with and without Indian Point 2 in service. This analysis indicated that the additional emission of pollutants in New York City, were Indian Point 2 not in service, would be 8,475 tons of sulphur dioxide, 8,550 tons of nitrous oxides, and 439 tons of particulate matter.

In addition, the delay of Indian Point 2 will result in substantial costs to Con Edison and to its customers. During the one

year period commencing July 1, 1972 it is estimated that the cost to replace the capacity and energy which would otherwise have been produced by Indian Point 2 will be approximately \$67.7 million or slightly more than 5½ million dollars per month. Additionally, interest during construction would continue at a rate of more than \$1 million per month. The total cost of delaying the operation of Indian Point 2 will be about \$7 million per month-more than \$200,000 each day.

In summary, I would like to make the basic point that Con Edison's power supply problems are going to persist until modern, efficient units now under construction, such as Indian Point No. 2, come into commercial operation.

E2Bt5

1 MR. TROSTEN: Mr. Chairman, Mr. Schwartz is
2 prepared to be cross-examined.

3 CHAIRMAN JENSCH: Anybody desire to cross-examine
4 Mr. Schwartz at this time?

5 MR. MACBETH: Mr. Chairman, I am prepared to cross-
6 examine Mr. Schwartz, but as I understand it the Board is
7 not entertaining the motion, and that if the Board did
8 entertain the motion I'd be given an opportunity to cross-
9 examine him at that time.

10 CHAIRMAN JENSCH: Very well. That may be done.

11 MR. MACBETH: Thank you.

12 CHAIRMAN JENSCH: As I understand this evidence
13 on behalf of the Witness Schwartz is related to the 90 per
14 cent power situation, the motion entirely.

15 MR. TROSTEN: Yes, sir. It's in support of that
16 motion.

17 CHAIRMAN JENSCH: Very well. All cross-examination
18 may be deferred.

19 MR. TROSTEN: Mr. Chairman, I object to the Board's
20 ruling.

21 CHAIRMAN JENSCH: So noted.

22 Shall we proceed with cross-examination of the
23 Reports of Analysis of the Brill situation?
24
25

1 MR. MARTIN: In connection with the issue of the
2 power supply, the State of New York will have a witness who
3 will have the written testimony here later this morning.
4 The witness will be available tomorrow for cross-examination.
5 It bears on this matter of the need for power in connection
6 with the application for ninety percent license.

7 At this time, if there is not going to be cross-
8 examination on this issue, I would like to let the witness
9 know so he doesn't come. I would like to put in the written
10 testimony in any event on the basis that if he were here,
11 this would be his testimony.

12 CHAIRMAN JENSCH: You will have to develop that with
13 stipulation between the parties. We will take that matter
14 up in that regard later.

15 We believe that the ninety percent and the 100
16 percent are so close in the level of power and so near in time
17 that there is no practical reason to take up one motion for
18 ninety percent. If the Regulator Staff's indication of the
19 availability of the final impact statement is achieved, we
20 will be doing one and the same all at the same occasion. We
21 do not see any purpose in trying to separate a ninety percent
22 request from a 100 percent request, both of which are pending
23 by the Applicant.

24 MR. TROSTEN: Mr. Chairman, these matters are not
25 near in time and I do not see the basis for the Chairman's

1 statement. We are authorized under Appendix D, Section D.2,
2 to proceed with consideration of a request for interim
3 operating authority pending completion of the NEPA review.
4 The review of the 100 percent operating authority cannot be
5 completed until after the final detailed statement has been
6 published.

7 The Staff, under the Commission's recently published
8 rule, the Staff's position cannot even be officially
9 established until after that point. There will have to be
10 a hearing on that matter. There is going to be, I'm
11 convinced, a significant delay beyond the July 19 date in
12 the availability of the final detailed statement. The history
13 of these hearings has been such that they take longer than
14 is anticipated.

15 We have a situation here --

16 CHAIRMAN JENSCH: Construction has taken longer
17 than anticipated, too. One matches the other. The hearings
18 have kept up with the construction in every respect. This
19 hearing is ready to proceed as fast as this facility is going
20 to be ready for criticality. There has been no delay by the
21 Board in regard to the criticality situation at all. I don't
22 know what the reasons are for the delay. The fire, the
23 modification of the safety valve header and other matters,
24 none of which is related even to Brill's letter. Certainly
25 the Board hasn't affected your construction schedule, and

1 that has been a delay in this proceeding.

2 MR. TROSTEN: Mr. Chairman --

3 CHAIRMAN JENSCH: We would appreciate having your
4 further statement in writing. Will you do that, please?

5 MR. TROSTEN: Yes.

6 CHAIRMAN JENSCH: Thank you very much.

7 MR. TROSTEN: Subject to this one remark,
8 Mr. Chairman, and that is that there is nothing in the
9 Commission's regulations or the Atomic Energy Act that states
10 that a hearing must match the construction schedule of a
11 plant. If the plant is substantially completed, the Commission's
12 regulations authorize and direct the Board to make a finding
13 that this plant has been substantially completed and the
14 license may issue at that point.

15 There was no requirement that the hearing match
16 in time the construction, physical completion.

17 CHAIRMAN JENSCH: Very well. We will make a note
18 of your position.

19 MR. KARMAN: Mr. Chairman, may I say a word?

20 CHAIRMAN JENSCH: Yes.

21 MR. KARMAN: With respect to the Applicant's
22 motion for partial power which he indicates is for ninety
23 percent or some lesser amount as determined by the
24 Commission after findings by the Board, the Regulatory Staff
25 has submitted evidence on environmental matters for fifty

1 percent steady state power, and I am wondering whether this
2 Board will feel any different if the Applicant limited its
3 request to a fifty percent rather than ninety percent license,
4 or is the Board opposed at this time to any motion for any
5 partial power?

6 CHAIRMAN JENSCH: Well, we don't decide those
7 things in advance.

8 MR. KARMAN: You indicated that ninety percent is
9 so close to 100 percent. We already submitted for fifty
10 percent and we do not intend to tailor-make. I thought it,
11 the record, should be clear on it.

12 CHAIRMAN JENSCH: We understand. Thank you. Are
13 we ready to proceed with further cross-examination?

14 MR. ROISMAN: Yes, Mr. Chairman.

15 CHAIRMAN JENSCH: Will you proceed. Had you
16 concluded with the Applicant's panel?

17 MR. ROISMAN: Yes, except I would like to get
18 Mr. Slotterback back on the witness stand with respect to two
19 documents I would like to get into evidence.

20 I have completed with the Applicant's panel at this
21 point on the support shoes. I thought it would be preferable
22 to stick with the substantive issue and have the Staff go
23 ahead and put into evidence the Parameter, Inc. study and
24 then proceed to the cross-examination of the Staff people
25 on the support shoes, and move to the Staff also at the same

1 time.

2 CHAIRMAN JENSCH: Didn't you get that in at the
3 same time?

4 MR. ROISMAN: No. It was deferred for submittal
5 until this morning. None of the parties had an opportunity
6 to look at it.

7 MR. KARMAN: I renew my --

8 CHAIRMAN JENSCH: Is there any objection? Applicant?

9 MR. TROSTEN: No objection.

10 CHAIRMAN JENSCH: State of New York?

11 MR. MARTIN: No objection.

12 CHAIRMAN JENSCH: Hudson River Fishermen's?

13 MR. MACBETH: No objection.

14 CHAIRMAN JENSCH: Citizens' Committee?

15 MR. ROISMAN: No objection.

16 CHAIRMAN JENSCH: The request of Staff counsel is
17 granted. The analysis prepared by Parameter, Inc., heretofore
18 identified by Regulatory Staff counsel may be physically
19 incorporated into the record as if orally presented.

20 (Document follows.)

21

22

23

24

25

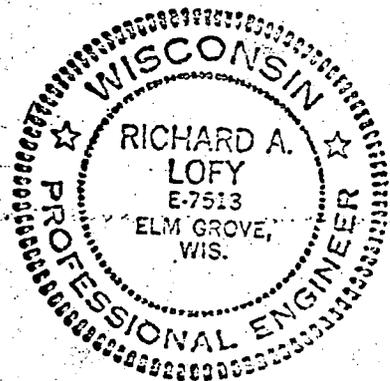
Evaluation of Modifications
to
Steam Generator Support Shoes
and
Reactor Vessel Support Ring
at
Indian Point Generating Station
Unit No. 2

Consolidated Edison Company
Buchanan, N. Y.

Report No. DC-96

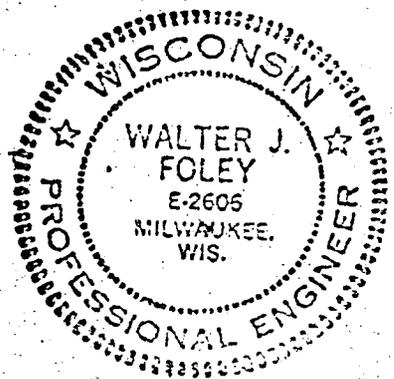
May 4, 1972

Prepared for: U.S. Atomic Energy Commission
Division of Compliance
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Attachment No. 1 - "Structural Effect of
Modifications to Steam
Generator Shoes"
May 5, 1972

Attachment No. 2 - "Structural Effect of
Modifications to Reactor
Vessel Support Ring"
May 5, 1972

I Introduction:

The Division of Compliance, Technical Support Branch has authorized PARAMETER, Inc. to review modifications made to certain shop fabricated components which support the reactor pressure vessel and steam generators at Indian Point Unit -2, and to evaluate any possible effect of the modifications on the structural integrity or serviceability of those components. Specifically, questions have been raised as to the condition of the reactor support ring and upper level steam generator support shoes on which modifications were made subsequent to delivery to the site. PARAMETER's review and evaluation is limited to these items and the individual modifications thereof described in the following text and attachments.

Mr. Richard A. Lofy, Consulting Engineer, PARAMETER, Inc., accompanied Mr. L. L. Beratan, Senior Structural Engineer, USAEC-CO Hq. and Mr. J. H. Tillou, Reactor Inspector, USAEC - Region -I, to the Indian Point site on April 24, 1972, where a meeting was arranged with the licensee and his agents' representatives. The objective of the meeting was to arrive at a detailed description of the modifications to the components in question and to obtain enough information to conduct an independent evaluation. The writer received such data and documentation as was deemed necessary for the performance of a meaningful analysis, supported by appropriate references, by the PARAMETER, Inc. staff. The meeting further served to open lines of communication with the contractor's (Westinghouse) and Architect Engineer's (United Engineers and Constructors) representatives so that technical data could be obtained, if necessary, by telephone while the evaluation was in progress.

The attendees at the meeting included:

Consolidated Edison Company

W. J. Cahill, Vice President
G. Beer, Director - Quality Assurance
S. B. Barnes, Plant Structures Engineer
C. W. Jackson, Engineer - Licensing
M. S. Silberstein, General Manager, Acting Project
Manager

i Introduction: - continued

Westinghouse Electric Company

L. Berkowitz, Program Manager
R. Devine, Project Engineering Manager
R. O. Tedeshi, Assistant Vice President - PWR

United Engineers and Constructors, Inc.

W. H. Reading, Structural Design Supervisor
J. R. Slotterback, Senior Engineer

United States Atomic Energy Commission -
Division of Compliance

J. H. Tillou, Reactor Inspector - Construction, CO-1
L. L. Beratan, Senior Structural Engineer, CO-Hq.
R. A. Lofy, Consulting Engineer, PARAMETER, Inc.

Information received at Indian Point and reviewed in connection with the evaluation reported herein is listed in Reference Section IV of this report. Also referenced are subsequent telephone communications, all of which serve to describe the scope and depth of background information which was surveyed. Such data and references as used directly in the analytical evaluation are identified by reference number in Attachments 1 and 2.

Note: Detailed notes and reference material assembled in connection with this investigation are maintained on file by PARAMETER, Inc. under Assignment No. DC-96 and available to the AEC.

II Description of Modifications:

As determined from an exhaustive discussion during the meeting at Indian Point and from supporting documents, the post fabrication modifications to the two items in question are itemized as follows:

A. Steam Generator Support Shoes (four supplied to each of four steam generators)

The modifications described below involved removal of metal and/or departure from the specified design of the shoes as-fabricated and delivered. The numbers (1) thru (3) correspond to the analytical treatment of each modification in Attachment -1.

(Modifications 1 and 2 are described on Ref. C.7)

1. The gussets, through which pins are fitted, on the shoe assembly weldment interfered with the outer surface of the steam generator lower head when assembly to the steam generator foot was required. The steam-generator head is of cast construction with apparent excess thickness in this area. The gussets were modified, cutting back on the beveled plate. This results in less edge distance available at the pin to resist vertical upward load from the steam generator foot under the steam pipe break condition. This modification in a load path requires an engineering disposition which was made by UEC (Ref. D.6). Of all the shoes modified, the analysis considered the case of maximum removal of material (minimum edge distance). This modification is re-evaluated by PARAMETER in Attachment -1.

II Description of Modifications: - continued

A. Steam Generator Support Shoes - continued

2. Interference with the foot of the steam generator also required removal of material along the leading edge of the shoe bottom plate. This relief for clearance took three forms:

- a. Cut-off of that portion of the plate extending beyond the gussets,
- b. Milling a 1-3/4" wide by 3/4" deep groove across the leading top edge in the area of the steam generator foot,

and c. Beveling outer corners of plate.

These modifications, as described for each worst case on the as-modified shoes in Ref. C.7 are evaluated in Attachment -1.

3. This modification consisted in machining the inside corner on either side of the pocket formed by the two gussets for the steam generator foot. It resulted in establishing the original design configuration. This machining was called for on original specification (Ref. C.4) and fabrication drawings (Ref. A.2) and apparently omitted at time of shop fabrication.

II Description of Modifications: - continued

B. Reactor Vessel Support Ring

The modifications described below involved either additional or rework on the as-fabricated reactor vessel support ring, or correction of dimensional variations by adjustment of other elements in the vessel support system.

Only those modifications initiated by the field for which the fabricator was not directly responsible for making have been identified for purposes of this evaluation. They are numbered below corresponding to the analytical disposition by PARAMETER in Attachment -2.

1. Anchor bolt holes in one support ring half were mislocated with respect to the anchor bolt setting. It was necessary to elongate the holes per Ref. A.8. The effect of the removal of material in the flange of the support ring due to this modification is evaluated in Attachment -2.

2. It was decided to radius the corners of the cutouts for bolt access on the inside diameter of the support ring after it was delivered to the site. Presumably the corners were typical of the intersection of two torch cut surfaces. A 1/2" diameter drill was used to round out the corner. Metal removal below the original flame cut surface results in a keyhole like undercut at each corner. See Attachment -2 for the assumed configuration and evaluation. Verification of exact as-built dimensions of the corner radius undercut is not possible as the ring girder is now cast in concrete.

II Description of Modifications: - continued

B. Reactor Vessel Support Ring - continued

3. The overall height of the cooling pads on vessel support ring was greater than drawing tolerance by 1/2" to 5/8" per Ref. C.2. This resulted in the base of the ring being set at a lower than nominal elevation with the thickness of grout being reduced. The condition is described in Attachment -2.
4. Shear keys on the underside of the support ring which are grouted into precast slots in the concrete foundation for the reactor vessel were too long. The field modification consisted of shortening the keys to the original drawing dimension.

III Summary of Findings:

The findings listed below are directed to the individual modifications described in Section II preceding. They result from an engineering review of information supplied in the references and the specific analytical evaluation contained in Attachments 1 and 2. The supporting analyses in these attachments are not intended to supplant the original design and analysis work performed by the Architect-Engineer (UEC) in qualifying the equipment for its application. Rather the calculations in the Attachments were performed to give the analyst a feel for the stress levels in the components in order to make a studied evaluation of the modifications and to document a specific basis for his conclusions.

A. Steam Generator Support Shoes (Refer to Attachment -1)

1. Pin edge distance affected by modification of the gussets is adequate in that stresses are well within allowable limits.
2. Removal of material at the leading edge of the shoe base plate does not limit the load carrying capability of the shoe.
3. Machining of inner surfaces brings shoe to dimensions specified on original drawing. This does not affect as-designed strength.

B. Reactor Vessel Support Ring (Refer to Attachment -1)

1. Elongation of the anchor bolt holes does **NOT** affect the load carrying capability of the support ring.
2. The radiused corners of the access openings do not affect the structural integrity of the support ring.

III Summary of Findings: - continued

B. Reactor Vessel Support Ring - continued

3. The effect of the excessive section depth of the support ring was remedied at installation without any change in function.
4. The shear keys were shortened to drawing dimension having no effect on the original design basis.

None of the modifications described under A and B above affect the structural adequacy of the components for the loads evaluated.

IV References:(A) Drawings
Pittsburgh Bridge & Iron Works
Contract Number L67-34

<u>Ref.</u>	<u>Sheet</u>	<u>Rev.</u>	<u>Description</u>
A.1	114	3	Support Shoe Posts, Steam Generator
A.2	115	5	Support Shoes, Steam Generator
A.3	201	2	Reactor Vessel Support Steel
A.4	202	3	" " " "
A.5	202A	5	" " " "
A.6	202B	5	" " " "
A.7	203	0	" " " "
A.8	--	-	Marked-over copy of Ref. A.5 Showing Elongated Holes

(B) Drawings
Westinghouse Electric Corporation

<u>Ref.</u>	<u>Drg.</u>	<u>Rev.</u>	<u>Description</u>
B.1	4417D18	3	Frame No. 1)
B.2	"	4	Frame No. 2) As-Built
✓ B.3	"	4	Frame No. 3) Comparison of
			Dimensions
			(Tube Bundle)
B.4	"	4	Frame No. 4)
✓ B.5	685J088	1	IPP Reactor Vessel Support Hardware
✓ B.6	882D832 Sheet 5	-	Orientation of Reactor Vessel Inlet and Outlet Nozzles, 8-1/2" x 11" Partial Print
✓ B.7	EDSK-323021	1	IPP-Maximum Forces acting on a Reactor Vessel Support

IV References: - continued(C) Drawings
United Engineers & Constructors, Inc.

<u>Ref.</u>	<u>Drawing No.</u>	<u>Rev.</u>	<u>Description</u>
C.1	9321-F-1284-6	7	Containment Reactor Vessel Support Steel
C.2	9321-F-1284-7	7	Containment Reactor Vessel Support Steel
C.3	9321-F-1286-5	5	Containment Building Steam Generator Supports, Sheet No. 1
C.4	9321-F-1287-5	5	Containment Building Steam Generator Supports, Sheet No. 2
C.5	9321-F-1327	0	Containment Reactor Support Anchor Bolt Details and Neutron Detector Details
C.6	9321-F-1330-1	1	Containment Building Metal Forms for Reactor Vessel, Sheet No. 3
✓ C.7	SK-9321-e-7733	-	Modification to Steam Generator Shoes

(D) Miscellaneous

- ✓ D.1 United Engineers & Constructors, Inc., Specification for Steam Generator, Reactor Coolant Pump, Pressurizer Supports & Reactor Vessel Ring Support, Spec. No. 9321-01-12-3, December 12, 1966
- ✓ D.2 Interoffice Note, UE&C, Reliability and Quality Assurance, from R. J. Vurpillat to J. R. Slotterback, September 4, 1968
- ✓ D.3 Isometric Sketch, Reactor Support Ring, 8-1/2" x 11"

IV References: - continued(D) Miscellaneous

- ✓ D.4 Isometric of Steam Generator Pipe Post, Cap Plate, Shoes, Shims & Pins, 8-1/2" x 11"
- ✓ D.5 United Engineers & Constructors, Inc., Revisions to Detail "P", Dwg. F-1287, Computation Sheet No. 97, J. O. No. 9321-01
- ✓ D.6 United Engineers & Constructors, Inc., Interference Check, Steam Generator Support Shoes, Computation Sheet, 1-914-737-6600, 7-22-68
- ✓ D.7 Photograph, IPII, Steam Generator #22 Southeast Upper Support, WP6929-28, 4-4-72
- ✓ D.8 Photograph, IPII, Steam Generator #23 Southwest Upper Support, WP6929-30, 4-4-72
- ✓ D.9 Photograph, IPII, Steam Generator #23 Southwest Support, Outside Support, WP6929-21, 4-4-72
- ✓ D.10 Photograph, IPII, Steam Generator #21, Northwest Upper Support, WP6929-29, 4-4-72
- ✓ D.11 15 sheets containing "Preliminary Draft", 4/22/72, description of Reactor Vessel Support Ring and Installation Inspection Data (all marked WEDCO Private Data)
- D.12 Vessel Setting Procedure, 3 sheets (marked WEDCO Private Data)
- ✓ D.13 5 pages of correspondence and inspection data relating to machining of ring girder splice plates.
- ✓ D.14 Telephone conference, 5/4/72, A. M., R. S. Dean and W. J. Foley, PARAMETER, Inc., to J. R. Slotterback, UE&C.

IV References: - continued(E) Texts and Codes

- E.1 American Institute of Steel Construction, Inc., Manual of Steel Construction, Seventh Edition, 1970
- E.2 Roark, R. J., Formulas for Stress and Strain, Fourth Edition, 1965, McGraw-Hill Book Company
- E.3 Timoshenko, S., Strength of Materials, Part I, Third Edition, 1955, D. Van Nostrand Company, Inc.
- E.4 Timoshenko, S., Strength of Materials, Part II, Third Edition, 1956, D. Van Nostrand Company, Inc.

V Attachments:

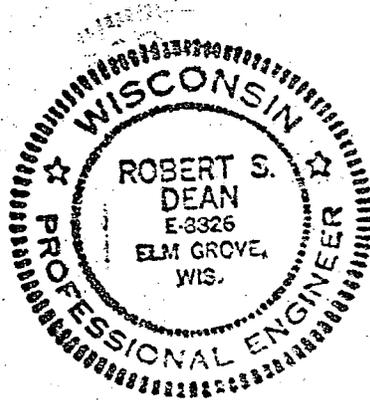
ATTACHMENT No. 1
to Report DC-96
May 5, 1972

STRUCTURAL EFFECT OF MODIFICATIONS
TO
STEAM GENERATOR SHOES

Indian Point Unit No. 2
Consolidated Edison Company
Buchanan, N. Y.

Prepared by: Robert S. Dean
Robert S. Dean, P. E.

Checked by: Walter J. Foley
Walter J. Foley, P. E.



PARAMETER, Inc.
Consulting Engineers
Elm Grove, Wisconsin

for: U.S. Atomic Energy Comm.
Division of Compliance
AEC Contract AT(11-1)-1658
Task "A"
PAR: 71-72 A

INTRODUCTION

THE MODIFICATIONS MADE TO THE STEAM GENERATOR BEARING SUPPORTS, HEREIN CALLED "SHOES", ARE INVESTIGATED FOR THEIR AFFECT ON STRENGTH OF THE SHOES.

THE ONLY MODIFICATION TO AFFECT SHOE STRENGTH APPRECIABLY IS MODIFICATION #1, CUTBACK OF THE ANKLED GUSSET PLATES. BREAK-OUT SHEAR STRESS FROM PIN HOLE TO GUSSET EDGE IS CALCULATED FOR THE SHOE WITH MOST SEVERE CUTBACK. THE MOST SEVERE LOAD, UPWARD DUE TO OVER-TURNING LOADS FROM STEAM PIPE BREAK, IS USED. THIS LOAD, 927K, IS FROM REF. [D.6], AND WAS VERIFIED BY REF. [D.14] AS CONSERVATIVE, SINCE THERE IS NOW A HOLD-DOWN GIRDLE OVER THE TOP OF THE STEAM GENERATORS WHICH ABSORBS SOME OF THIS LOAD.

MODIFICATION #2, CUTBACK OF THE BASE PLATE AT THE TOE OF THE SHOE, HAS THE EFFECT OF SHORTENING THE WELD BETWEEN GUSSET AND BASE PLATE. THE WELD AREA OF THE MOST CUTBACK SHOE IS SHOWN TO BE GREATER THAN THE MINIMUM CROSS-SECTION AREA OF THE GUSSET.

MATERIAL FOR THE GUSSET AND BASE PLATE IS T1 STEEL, WITH MINIMUM YIELD STRENGTH OF 90KSI, PER [D.6] AND [A.2], AND VERIFIED BY [D.14].

THE ARCHITECT-ENGINEER'S (U.E. & C) DESIGN CALCULATIONS, WITH THE EXCEPTION OF MODIFICATION CALCULATION REF. [D.6], WERE NOT AVAILABLE FOR USE OR REVIEW.

BY R. DEAN DATE 5-4-72

SUBJECT

SHEET NO. 3 OF

CHKD. BY DATE

ATTACHMENT NO. 1

JOB NO. AT (11-1)-1653

PARAMETER 71-72A

TO REPORT DC-96

CONCLUSIONS

MODIFICATION #1 (PAGES 4 & 5) GUSSET CUT-BACK

MAX. SHEAR BREAKOUT STRESS FROM PINHOLE TO EDGE OF GUSSET : $21863 \text{ PSI} < \tau_{\text{allow}} = 0.4F_y = 36000 \text{ PSI}$

MODIFICATION #2 (PAGES 6 & 7) BASE PLATE CUTBACK

WELD AREA, AS CUT-BACK, EXCEEDS MIN. GUSSET CROSS-SECTIONAL AREA THROUGH PINHOLE, AND SO IS NOT LIMITING. CONSERVATIVELY CALCULATED STRESS AT MIN. AREA TRU PINHOLE IS $33297 \text{ PSI} < S_{\text{allow}} = 0.45F_y = 40000 \text{ PSI}$.

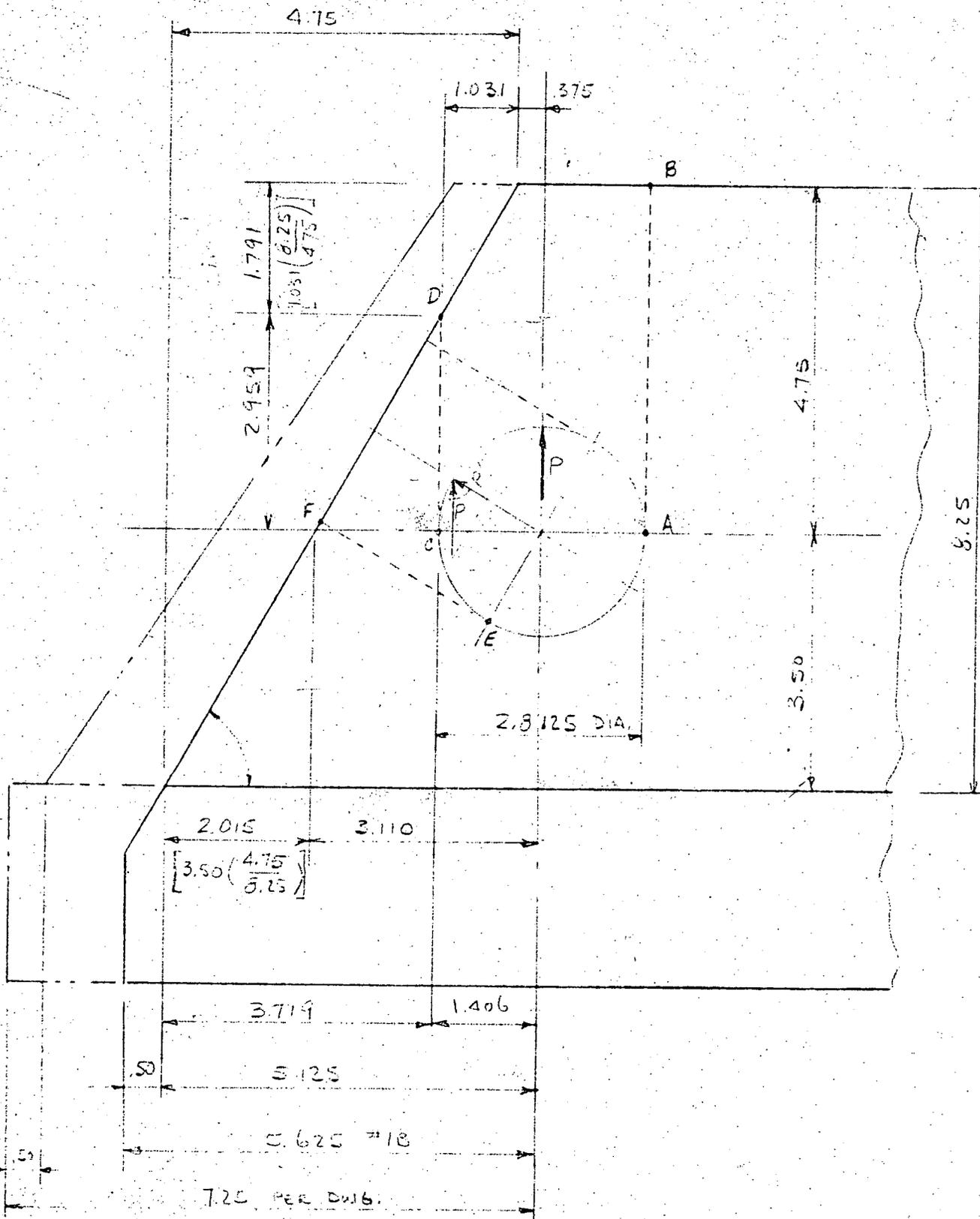
OTHER BASE PLATE CUT-BACKS ARE CORNER & EDGE MITRES OF NON-LOAD-CARRYING MATERIAL.

MODIFICATION #3 (PAGE 8), MACHINING OF INNER SURFACES BRINGS SHOE TO DIMENSIONS SPECIFIED ON ORIGINAL DRAWING. THIS DOES NOT AFFECT AS-DESIGNED STRENGTH.

MODIFICATIONS DO NOT CAUSE INCREASES IN CONSERVATIVE MAXIMUM DESIGN LOAD STRESSES TO LEVELS EXCEEDING SAFE LIMITS.

MODIFICATION #1 - CUTBACK ON GUSSET

REFERENCES [C.7], [A.2], [D.14]



MODIFICATION #1 ~ SEE SKETCH, PAGE 4

TOTAL BREAK-OUT SHEAR AREA IN VERTICAL DIRECTION (LINES AB AND CD)

$$\overline{AB} = 4.75$$

$$\overline{CD} = 2.959$$

$$\text{PLATE THICKNESS} = 2.75$$

$$\text{SHEAR AREA} = A_s = 2(2.75)(2.959 + 4.75) = 42.40 \text{ IN}^2$$

SHEAR STRESS

$$\tau_{\text{ABCD}} = \frac{P}{A_s} = \frac{927,000}{42.40} = 21,863 \text{ PSI} < \tau_{\text{ALLOW.}} = 0.4 F_y = 0.4(90 \text{ ksi}) = 36 \text{ ksi}$$

[E.1], PAGE 5-16.

USING THE MINIMUM EDGE DISTANCE \overline{EF} AND COMPONENT OF LOAD IN THAT DIRECTION, P' :

$$P' = \frac{4.75}{\left[(4.75)^2 + (3.25)^2 \right]^{1/2}} P = \frac{4.75}{9.520} P = .50 P = 463.5 \text{ K}$$

$$\overline{EF} = 3.110 \frac{3.25}{9.520} = 2.695$$

$$\tau_{\text{EF}} = \frac{463500}{4(2.695)(2.75)} = 15,635 \text{ PSI} < \tau_{\text{ALLOW.}}$$

BY R. DEAN DATE 5-4-72

SUBJECT

SHEET NO. 7 OF

CHKD. BY W.J.F. DATE 5-5-72

ATTACHMENT NO. 1

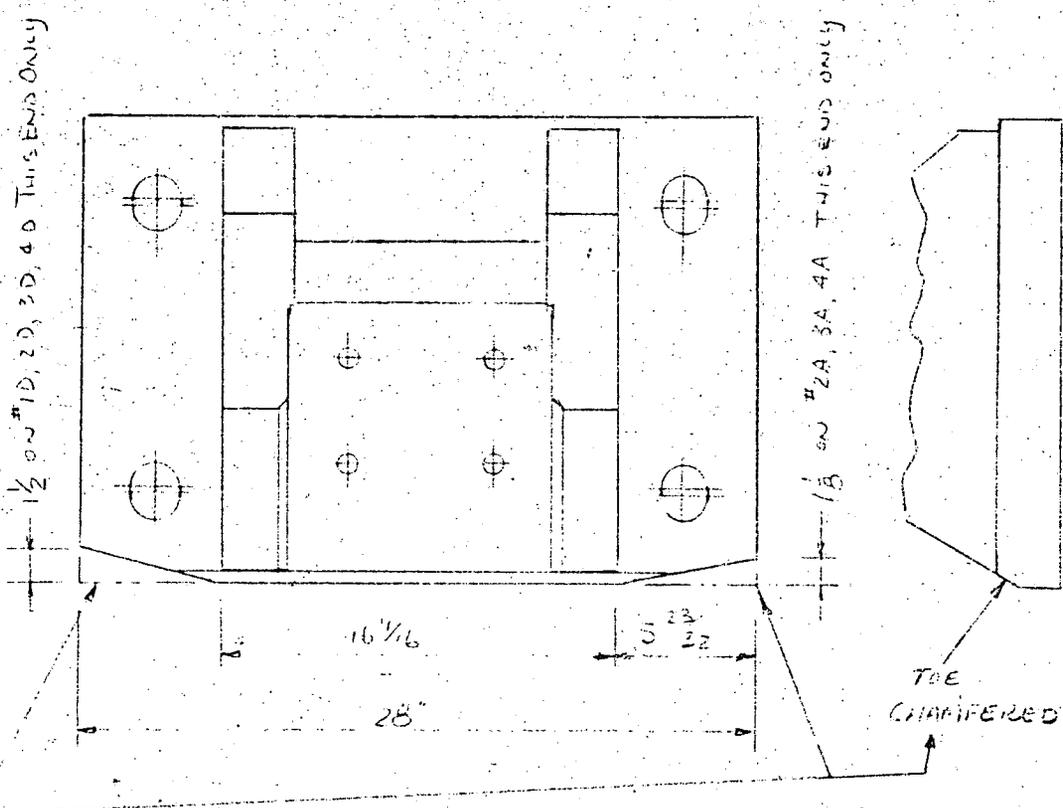
JOB NO AT (11-1)-1653

PARAMETER: 7172A

TO REPORT DC-96

MODIFICATION #2 - CORNER BEVELS ON BASE PLATE

REFS. [C.7] & [A.2]

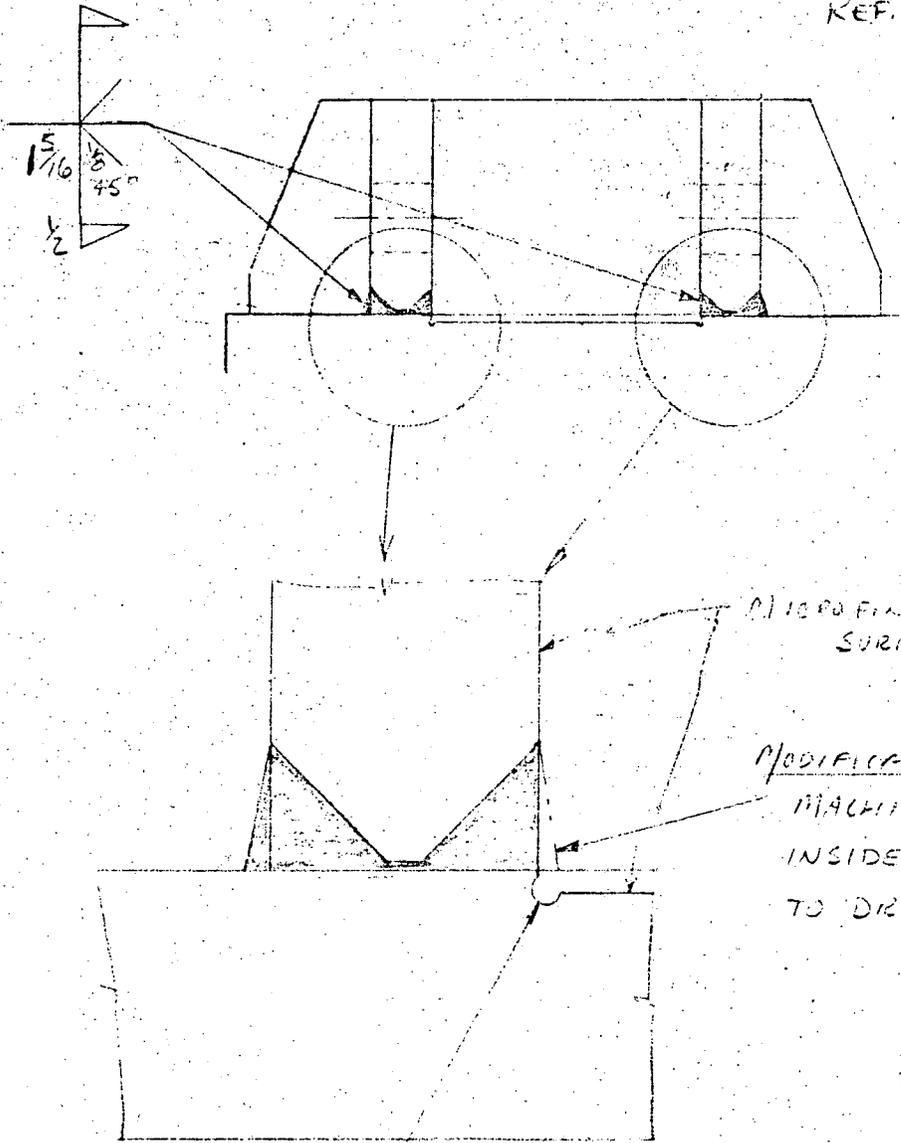


MATERIAL REMOVED HERE AT THE CORNERS IS NON-LOAD CARRYING MATERIAL. STRENGTH OF SHEET IS UN-AFFECTED.

MODIFICATION #3

THIS MODIFICATION BRINGS THE PART TO DRAWING,
AND THEREFORE HAD NO EFFECT ON THE AS-DESIGNED
SHOE STRENGTH.

REF. [A.2]



MODIFICATION #3
MACHINED TO BRING
INSIDE SURFACES
TO DRAWING.

$\frac{5}{16}$ MIN. DIA. RELIEF
GROOVE

ATTACHMENT No. 2
to Report DC-96
May 5, 1972

STRUCTURAL EFFECT OF MODIFICATIONS
TO
REACTOR VESSEL SUPPORT RING

Indian Point Unit No. 2
Consolidated Edison Company
Buchanan, N. Y.



Prepared by: Walter J. Foley.
Walter J. Foley, P. E.

Checked by: Robert S. Dean
Robert S. Dean, P. E.

PARAMETER, Inc.
Consulting Engineers
Elm Grove, Wisconsin

for: U.S. Atomic Energy Comm.
Division of Compliance
AEC Contract AT(11-1)-1658
Task "A"
PAR: 71-72 A

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INTRODUCTION

THE PURPOSE OF THIS ATTACHMENT IS TO EVALUATE THE STRUCTURAL EFFECT OF FOUR (4) MODIFICATIONS TO THE REACTOR VESSEL SUPPORT RING FOR INDIAN POINT UNIT 2 OF CONSOLIDATED EDISON COMPANY.

THE MODIFICATIONS ARE DESCRIBED IN THE MAIN BODY OF REPORT DC-96 AND ALSO ON PAGES 4, 5, 6, 20 AND 22 OF THIS ATTACHMENT.

IN ORDER TO PROVIDE A RATIONAL BASIS FOR EVALUATING THE MODIFICATIONS, FOUR (4) SIMPLE, CONSERVATIVE ANALYTICAL MODELS ARE USED. THESE MODELS ARE IDENTIFIED AS CASES 1 THROUGH 4 AND ARE DESCRIBED ON PAGES 11, 13, 15 AND 20 IN RELATION TO LOADING CONDITIONS.

THE ARCHITECT-ENGINEER'S (UE&G) DESIGN CALCULATIONS WERE NOT AVAILABLE FOR USE OR REVIEW.

REFERENCES ARE LISTED IN THE MAIN BODY OF REPORT DC-96.

*
LOAD CONDITION A+D [B.7], WHICH IS THE MOST SEVERE, IS THE ONLY ONE ANALYZED.

* [B.7] INDICATES "REFERENCE NUMBER B.7."

CONCLUSIONS1. ELONGATED ANCHOR BOLT HOLES

THE STRUCTURAL EFFECT OF MODIFICATION NO. 1 IS ANALYZED ON PAGE 22.

THE SCALE SKETCH SHOWS THAT THE BOTTOM FLANGE WITH ELONGATED HOLES IS STILL FAVORED BY THE CENTER OF GRAVITY LOCATION.

IN OTHER WORDS, THE TOP FLANGE STILL IS STRESSED CONSIDERABLY HIGHER THAN THE BOTTOM FLANGE. A FURTHER CONSIDERATION IS THAT THE ANCHOR BOLTS CARRY NO SHEAR LOADS AND NEED NOT HAVE A CLOSE FIT IN THE BOTTOM FLANGE.

A GENERAL CONCLUSION IS THAT STRESS LEVELS OF THE RING ARE SHOWN TO BE MODERATE DESPITE A VERY HARSH ANALYSIS.

FROM THE CONSIDERATIONS PRESENTED, IT IS SAFE TO CONCLUDE THAT STRUCTURAL INTEGRITY OF THE SUPPORT RING IS NOT AFFECTED BY THE ELONGATED ANCHOR BOLT HOLES.

CONCLUSIONS , CONT'D2. ANCHOR BOLT ACCESS OPENINGS WITH KEYHOLE-LIKE ROUNDED CORNERS

AS SHOWN BY THE SCALE SKETCH ON PAGE 20, THE ROUNDED CORNERS OF THE ACCESS OPENINGS ARE ONLY 0.56 INCH FROM THE CENTER OF GRAVITY AXIS OF THE SUPPORT RING. EVEN ON THE BASIS OF A HARSH ANALYSIS, TANGENTIAL BENDING STRESS IN THE SOLID WEB AT THIS LEVEL IS ONLY 2565 PSI (PAGE 21). STRUCTURAL INTEGRITY OF THE SUPPORT RING IS NOT AFFECTED BY MODIFICATION NO. 2.

3. OVERALL HEIGHT OF COOLING PADS

THE EFFECT OF $\frac{1}{2}$ " TO $\frac{5}{8}$ " EXCESSIVE SECTION DEPTH OF THE SUPPORT RING HAS BEEN REMEDIED BY SETTING THE BOTTOM FLANGE LOWER THAN NOMINAL. BENEFICIALLY, BEARING AREA OF THE SHEAR KEYS IN REINFORCED CONCRETE HAS BEEN INCREASED. ANOTHER ADVANTAGE IS THAT SUPPORT RING STRENGTH IS IMPROVED BY OVERSIZE DEPTH OF SECTION. IT IS CLEAR THAT STRUCTURAL INTEGRITY OF THE SUPPORT RING HAS NOT BEEN AFFECTED ADVERSELY BY MODIFICATION NO. 3.

BY W. FOLEY DATE 5-5-72 SUBJECT

SHEET NO. 6 OF

CHKD. BY R.D. DATE 5-5-72 ATTACHMENT NO. 2

JOB NO. AT (11-1)-165

PARAMETER 71-72A TO REPORT DC-96

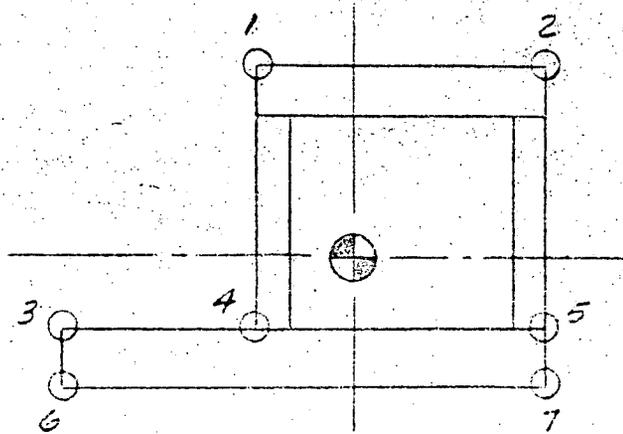
CONCLUSIONS , CONT'D

4. SHORTENED SHEAR KEYS

MODIFICATION NO. 4 CONSISTED OF SHORTENING SHEAR KEYS TO THE DRAWING DIMENSION. BEARING AREA AND STRENGTH OF THE SHEAR KEYS HAS NOT BEEN AFFECTED.

SUMMARY

1. STRESSES CAUSED BY RADIAL LOAD R AND TANGENTIAL LOAD T



$F_b = 22000$ PSI
 ALLOWABLE
 FOR SA-36
 [E.1]

$$\begin{aligned} \sigma_1 &= 2077 + 12200 + 20598 \\ &= \underline{34875 \text{ PSI}} > 1.33 F_b = 29260 \end{aligned}$$

$$\begin{aligned} \sigma_2 &= -4154 + 12200 + 20598 \\ &= \underline{28644 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_3 &= 6231 - 4686 - 4274 \\ &= \underline{-2729 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_4 &= 2077 - 4686 - 4274 \\ &= \underline{-6883 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_5 &= -4154 - 4686 - 4274 \\ &= \underline{-13114 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_6 &= 6231 - 8380 - 9715 \\ &= \underline{-11864 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_7 &= -4154 - 8380 - 9715 \\ &= \underline{-22249 \text{ PSI}} \end{aligned}$$

SUMMARY, CONT'D

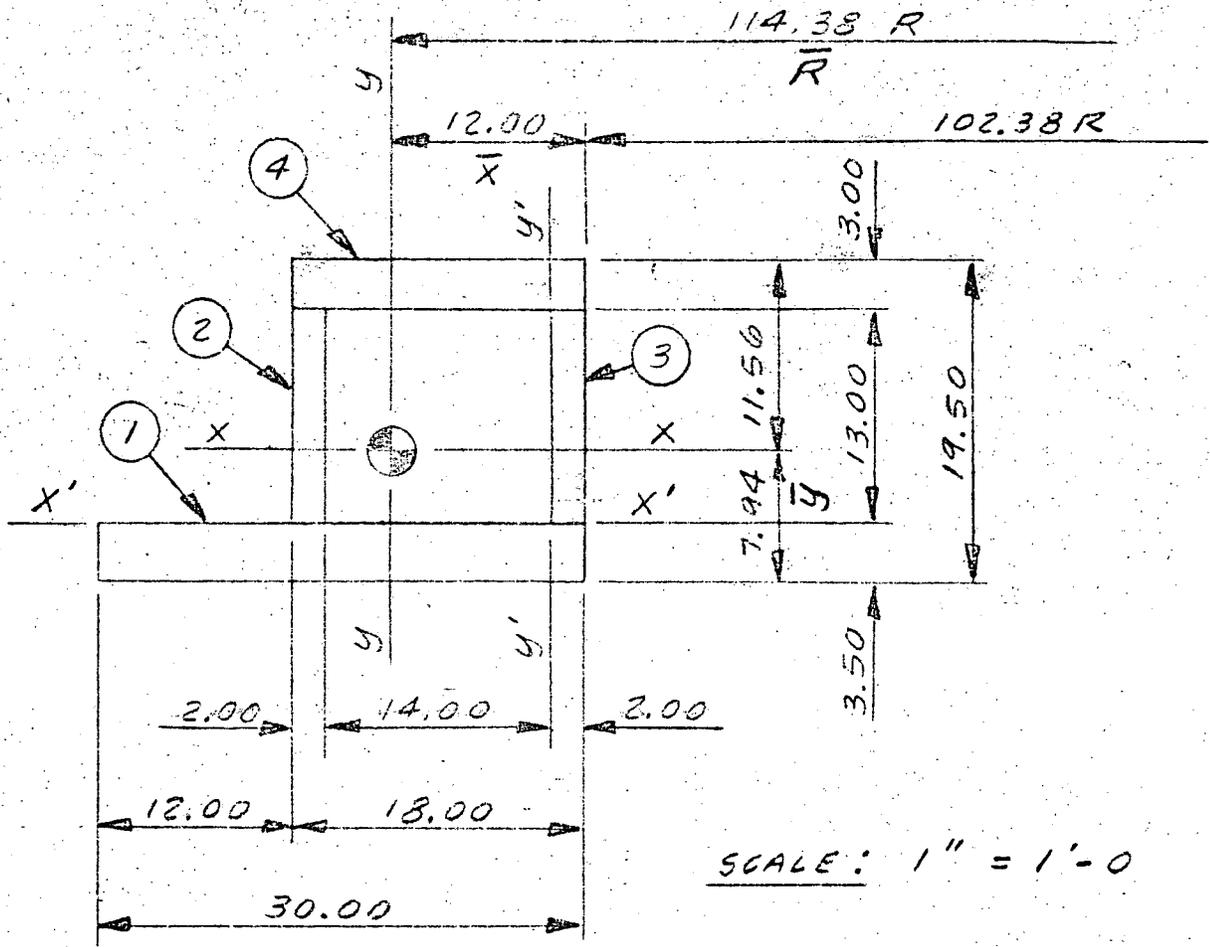
2. STRESSES CAUSED BY VERTICAL LOAD P

ON THE BASIS OF THE CONSERVATIVE ASSUMPTION THAT ONLY THE WEB AND STIFFENER PLATES DIRECTLY UNDER THE COOLING PLATE CARRY THE VERTICAL LOAD, IT IS FOUND THAT AVERAGE DIRECT COMPRESSIVE IS ONLY 6515 PSI.

THE DIRECT STRESS CAUSED BY THE VERTICAL LOAD IS AT RIGHT ANGLES THE BENDING STRESSES CAUSED BY THE RADIAL AND TANGENTIAL LOADS.

MOMENT OF INERTIA OF RING

REF DRG [C.2]



SCALE: 1" = 1'-0

$$A_1 = 3.50 \times 30.00 = 105.00 \text{ IN.}^2$$

$$A_2 = 2.00 \times 13.00 = 26.00$$

$$A_3 = 2.00 \times 13.00 = 26.00$$

$$A_4 = 3.00 \times 18.00 = \underline{54.00}$$

$$A = 211.00 \text{ IN.}^2$$

$$\bar{X} = \frac{15.00 A_1 + 17.00 A_2 + 1.00 A_3 + 9.00 A_4}{A}$$

$$= \underline{11.996 \text{ IN.}}$$

MOMENT OF INERTIA OF RING, CONT'D

$$\bar{y} = \frac{1.75 A_1 + 10.00 A_2 + 10.00 A_3 + 18.00 A_4}{A}$$

$$= \underline{7.942 \text{ IN.}}$$

$$I_{x'x'} = \frac{1}{3} \left[(30.00 \times \overline{3.50}^3) + (18.00 \times \overline{16.00}^3) \right. \\ \left. - (14.00 \times \overline{13.00}^3) \right]$$

$$= 14752 \text{ IN.}^4$$

$$I_{xx} = I_{x'x'} - (A)(\bar{y} - 3.50)^2$$

$$= 14752 - (211.00)(7.942 - 3.50)^2$$

$$= \underline{10589 \text{ IN.}^4}$$

$$I_{y'y'} = \frac{1}{3} \left[(19.50 \times \overline{2.00}^3) + (3.50 \times \overline{23.00}^3) \right. \\ \left. + (3.00 \times \overline{16.00}^3) + (13.00 \times \overline{16.00}^3) \right. \\ \left. - (13.00 \times \overline{14.00}^3) \right]$$

$$= 35617 \text{ IN.}^4$$

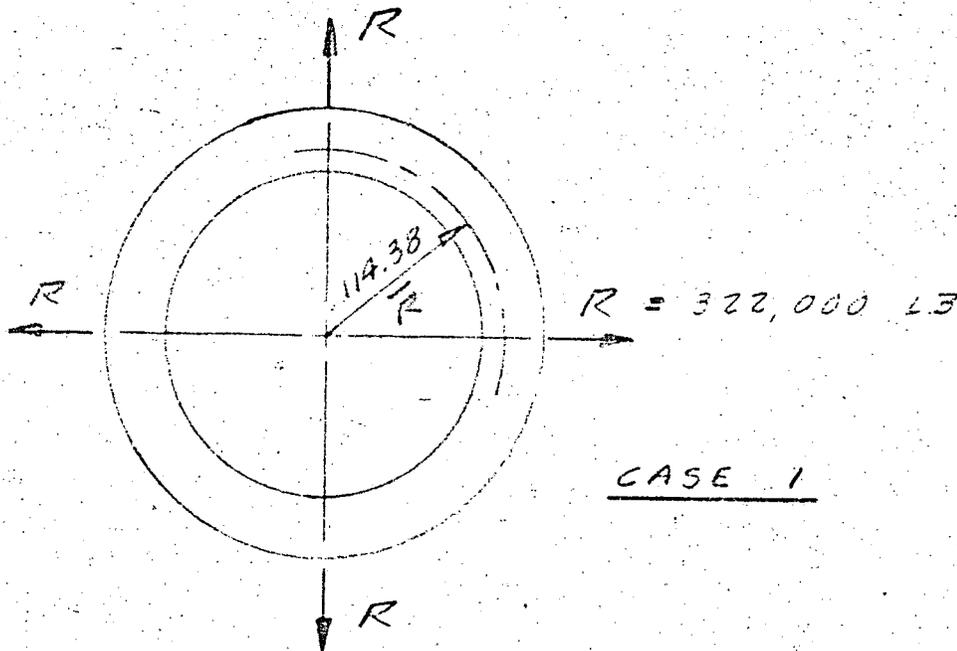
$$I_{yy} = I_{y'y'} - (A)(\bar{x} - 2.00)^2$$

$$= 35617 - (211.00)(11.996 - 2.00)^2$$

$$= \underline{14534 \text{ IN.}^4}$$

STRESSES CAUSED BY RADIAL FORCE R

AS DESCRIBED BY REFERENCE [B.7] AND CLARIFIED BY REFERENCE [D.14], RADIAL FORCE R IS A FRICTIONAL LOAD APPLIED EQUALLY AND SYMMETRICALLY AT THE FOUR SUPPORT SHOE SHIM PLATES BY DIFFERENTIAL THERMAL EXPANSION.



CONSERVATIVELY, ASSUME THAT THE RING IS FREE TO MOVE RADIALY.

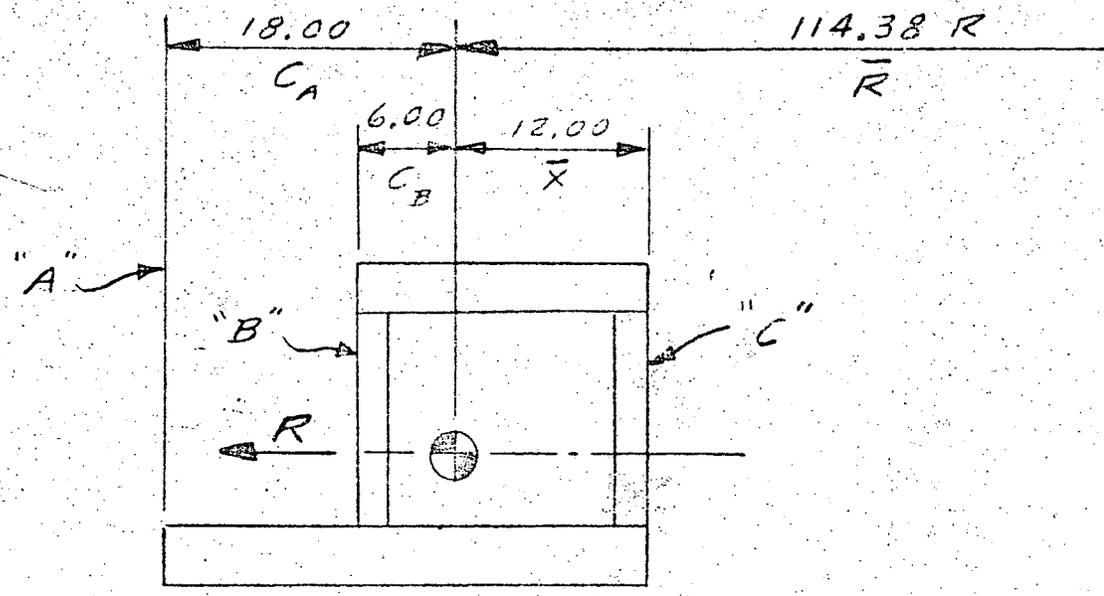
RADIAL FORCE R IS APPLIED IN THE HORIZONTAL PLANE WHICH CONTAINS THE CENTER OF GRAVITY OF THE RING.

AT EACH SUPPORT, [E.2] PAGE 172 CASE 1

$$M = (0.3183 - 0.1817) R \bar{r} = 5,031,027$$

$$\sigma = \frac{Mc}{I_{yy}} = \frac{5,031,027 c}{14534} = 346.156 c$$

STRESSES CAUSED BY RADIAL FORCE R, CONT'D



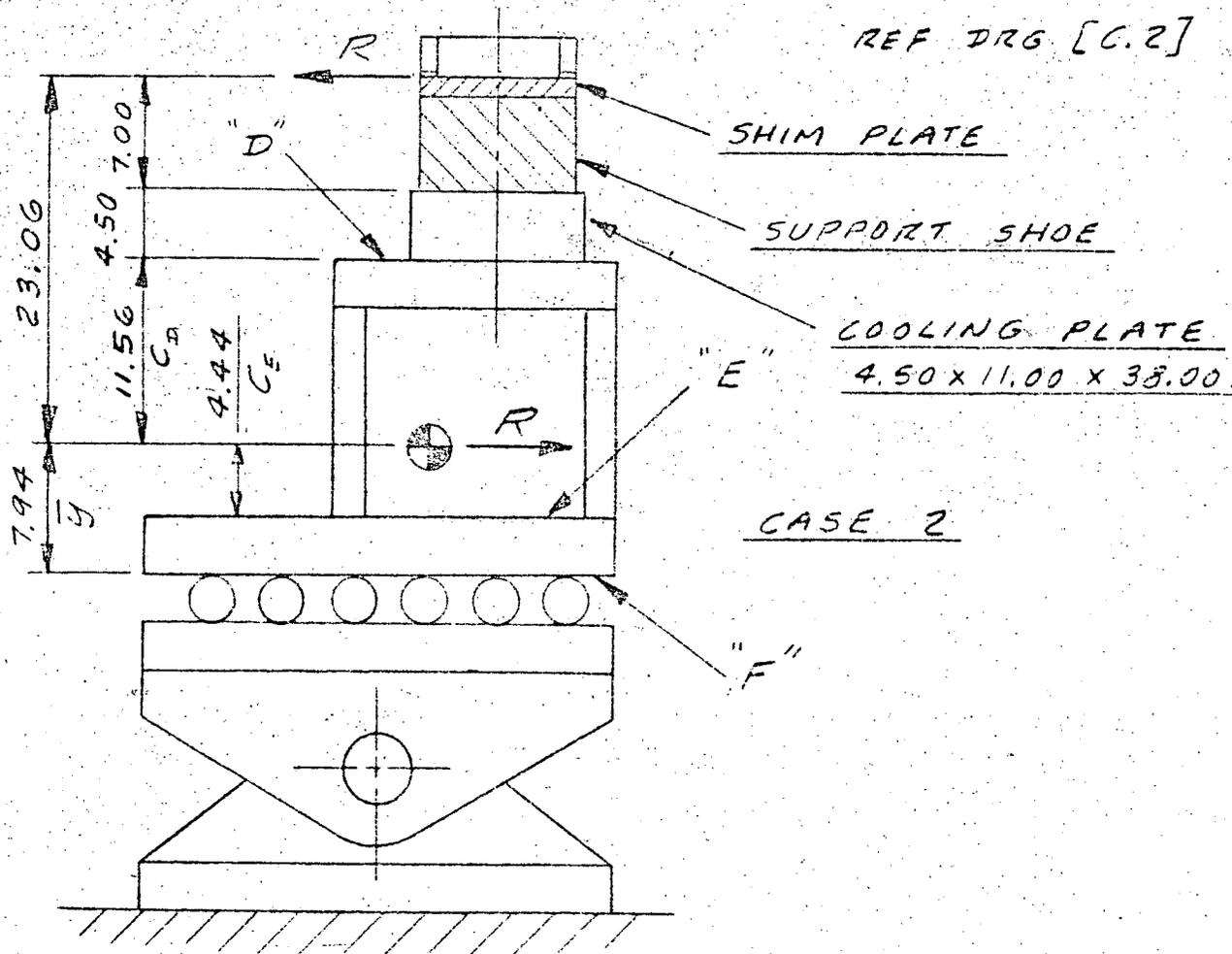
$$\begin{aligned} \sigma_A &= 346.156 C_A \\ &= \underline{+ 6231 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_B &= 346.156 C_B \\ &= \underline{+ 2077 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma_C &= 346.156 \bar{X} \\ &= \underline{- 4154 \text{ PSI}} \end{aligned}$$

CASE 1

STRESSES CAUSED BY RADIAL FORCE R; CONT'D



CONSERVATIVELY, ASSUME THAT THE RING IS FREE TO ROTATE ABOUT ITS CENTER OF GRAVITY, AS SHOWN.

FURTHER, ASSUME THAT FORCE R IS DISTRIBUTED UNIFORMLY OVER AN ARC EQUAL TO TWICE THE LENGTH OF THE COOLING PLATE AND THAT THE RESULTING UNIT FORCE IS APPLIED ABOUT THE ENTIRE CIRCUMFERENCE OF THE RING.

$$R' = \frac{R}{2 \times 38.00} = \frac{322,000}{76.00}$$

$$= 4237 \text{ LB/IN.}$$

STRESSES CAUSED BY RADIAL FORCE R, CONT'D

$$M' = 23.06 R' = 23.06 \times 4237$$

$$= 97705 \text{ IN.-LB / IN.}$$

$$\sigma = \frac{M' \bar{r} c}{I_{xx}} = \frac{97705 \times 114.38 \times c}{10589}$$

$$= 1055.39 c$$

[E.2] P.255

$$\sigma_D = 1055.39 c_D = 1055.39 \times 11.56$$

$$= \underline{12200 \text{ PSI}}$$

$$\sigma_E = -1055.39 c_E = -1055.39 \times 4.44$$

$$= \underline{-4686 \text{ PSI}}$$

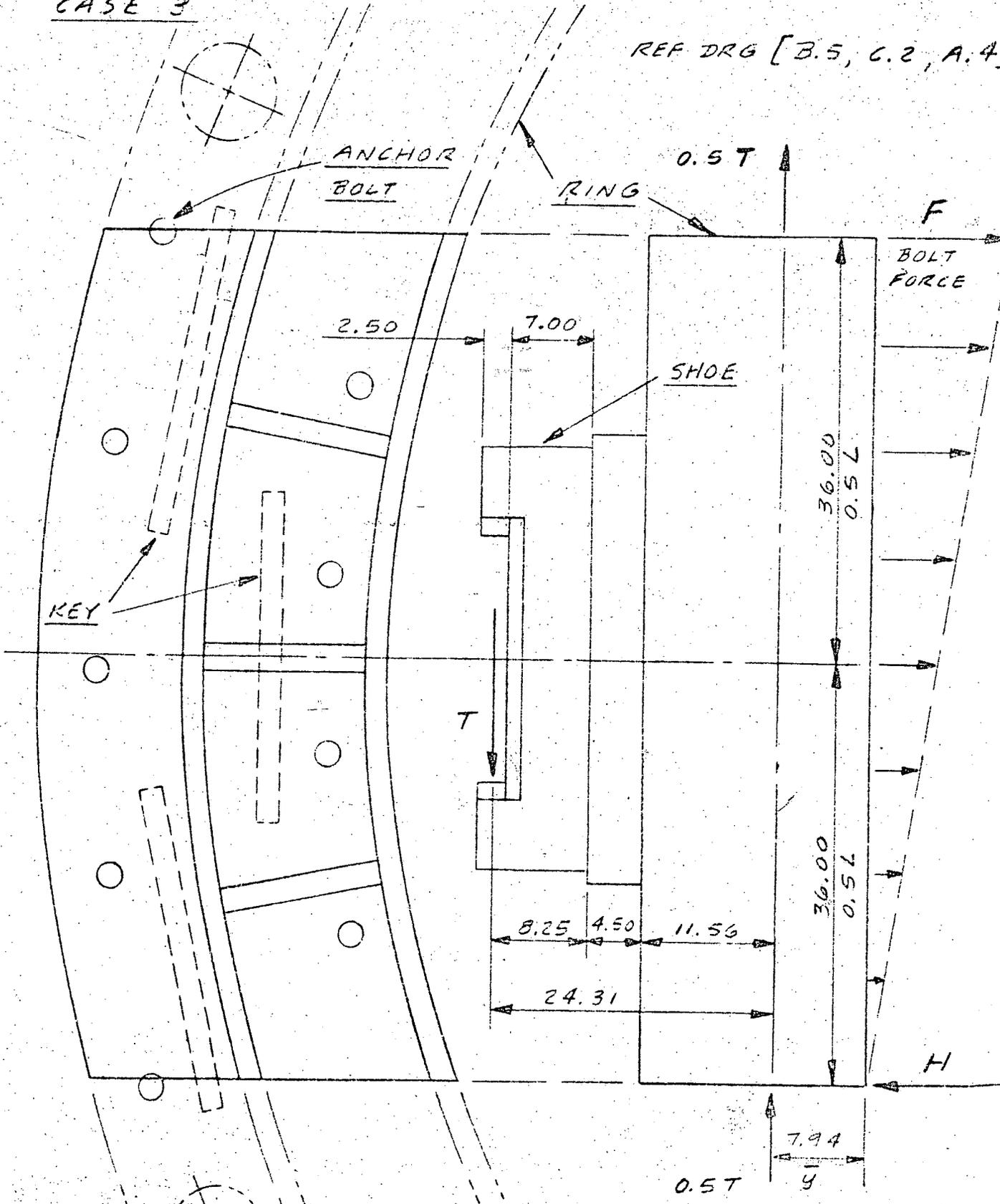
$$\sigma_F = -1055.39 \bar{y} = -1055.39 \times 7.94$$

$$= \underline{-8380 \text{ PSI}}$$

CASE 2

STRESSES CAUSED BY TANGENTIAL FORCE T
CASE 3

REF DRG [B.5, C.2, A.4]



SCALE: 1" = 1'-0"

STRESSES CAUSED BY
TANGENTIAL FORCE T, CONT'D

FOR SIMPLICITY AND CONSERVATISM, RESISTING MOMENTS AND SHEARS APPLIED BY BOTH SECTIONS OF RING ADJOINING THE ARBITRARILY CHOSEN SECTION ARE ASSUMED TO BE NEGLIGIBLE. FURTHER, SHEAR FORCES TAKEN BY THE THREE KEYS ALSO ARE ASSUMED TO BE NEGLIGIBLE.

AS THE FIRST STEP IN DETERMINING WHETHER THE ANALYTICAL MODEL SHOWN ON THE PRECEDING PAGE IS REASONABLE, LET US CALCULATE MAXIMUM BOLT STRESS. FOR SIMPLICITY, LET US MAKE THE REASONABLE ASSUMPTION THAT THE BOLTS ARE SPACED EVENLY ABOUT THE CIRCUMFERENCE OF THE RING.

$$\text{THEN } M_0 = 24.31 T$$

$$= FL \left[(1)^2 + \left(\frac{7}{8}\right)^2 + \left(\frac{3}{4}\right)^2 + \left(\frac{5}{8}\right)^2 + \left(\frac{1}{2}\right)^2 + \left(\frac{3}{8}\right)^2 + \left(\frac{1}{4}\right)^2 + \left(\frac{1}{8}\right)^2 \right]$$

$$= F \times 72.00 \times 3.1874$$

$$= 229.49 F$$

SOLVING FOR F,

$$F = 24.31 T / 229.49$$

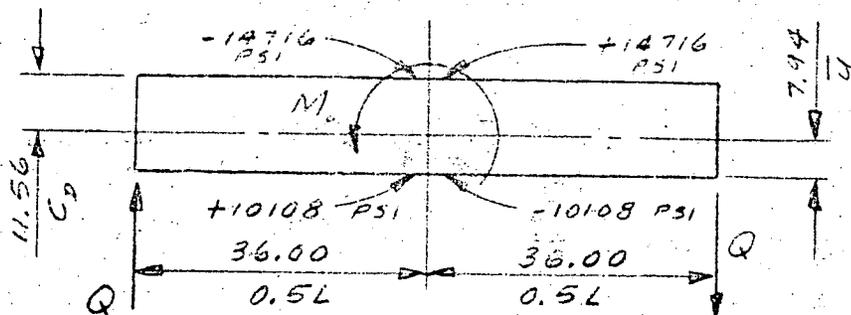
$$= \underline{117,477 \text{ LB/BOLT}} \quad (\text{FOR } T = 1,109,000)$$

STRESSES CAUSED BY
TANGENTIAL FORCE T, CONT'D

BASED ON SHANK AREA OF 2-INCH DIAMETER
ANCHOR BOLT MADE OF A325 STEEL,

$$\begin{aligned} \tau_{\text{BOLT}} &= F/A = 117,477/3.1416 \\ &= \underline{37,394 \text{ PSI}} < F_u = 40,000 \text{ OK} \\ &\quad \text{[E.1] PAGE 4-3} \end{aligned}$$

CALCULATING BEAM STRESS CAUSED
BY CENTRAL MOMENT,



[E.2] PAGE 103
CASE 20

$$\begin{aligned} Q &= M/L = 24.51 \times 1,109,000 / 72.00 \\ &= 374,442 \text{ LB} \end{aligned}$$

$$\begin{aligned} M &= 0.5 QL = 0.5 \times 374,442 \times 72.00 \\ &= 13,479,894 \text{ IN.-LB} \end{aligned}$$

$$\begin{aligned} \sigma' &= \frac{M C}{I_{xx}} = \frac{13,479,894 \times C}{10589} \\ &= 1273.01 C \end{aligned}$$

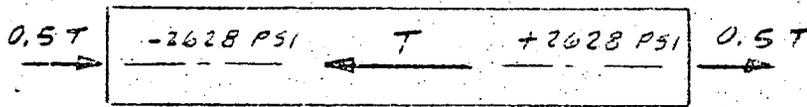
$$\begin{aligned} \sigma'_D &= \pm 1273.01 \times 11.56 \\ &= \underline{\pm 14716 \text{ PSI}} \end{aligned}$$

$$\begin{aligned} \sigma'_E &= \pm 1273.01 \times 7.44 \\ &= \underline{\pm 5652 \text{ PSI}} \text{ ; AT UPPER SURFACE} \\ &\quad \text{OF BOTTOM FLANGE} \end{aligned}$$

STRESSES CAUSED BY
TANGENTIAL FORCE T, CONT'D

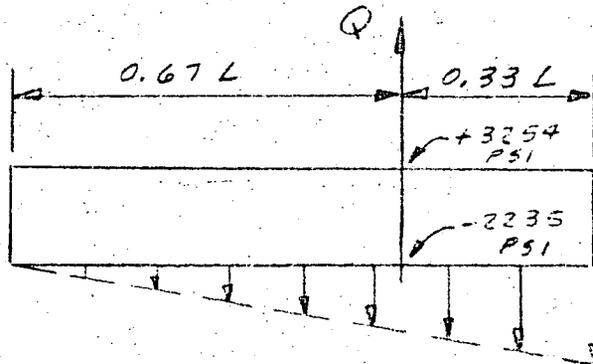
$$\begin{aligned} \sigma'_F &= \pm 1273.01 \times 7.94 \\ &= \pm 10,108 \text{ PSI} \end{aligned}$$

CALCULATING DIRECT STRESS,



$$\begin{aligned} \sigma'' &= \pm \frac{0.5 T}{A} = \pm \frac{0.5 \times 1,109,000}{211.00} \\ &= \pm 2628 \text{ PSI} \end{aligned}$$

ANALYZING THE REMAINING LOADS,



NOTE THAT CONCENTRATED LOAD Q CAUSES AT LEAST APPROXIMATELY TWICE AS MUCH STRESS (OF OPPOSITE SIGN) AS THE LINEARLY APPLIED BOLT LOADS.

$$\text{THUS } \sigma''' = \frac{Q \times 0.33L \times 0.67L \times C}{L I_{xx}} \times \frac{1}{2}$$

SUBSTITUTING: $Q = 374,442$, $L = 72.00$
 AND $I_{xx} = 10589$;

$$\sigma''' = 281.463 \text{ C}$$

STRESSES CAUSED BY
TANGENTIAL FORCE T, CONT'D

$$\begin{aligned}\sigma_D''' &= 281.463 \times 11.56 \\ &= \underline{3254 \text{ PSI}}\end{aligned}$$

$$\begin{aligned}\sigma_E''' &= 281.463 \times 4.44 \\ &= \underline{-1250 \text{ PSI}}\end{aligned}$$

$$\begin{aligned}\sigma_F''' &= 281.463 \times 7.94 \\ &= \underline{-2235 \text{ PSI}}\end{aligned}$$

TOTALING CASE 3 STRESSES,

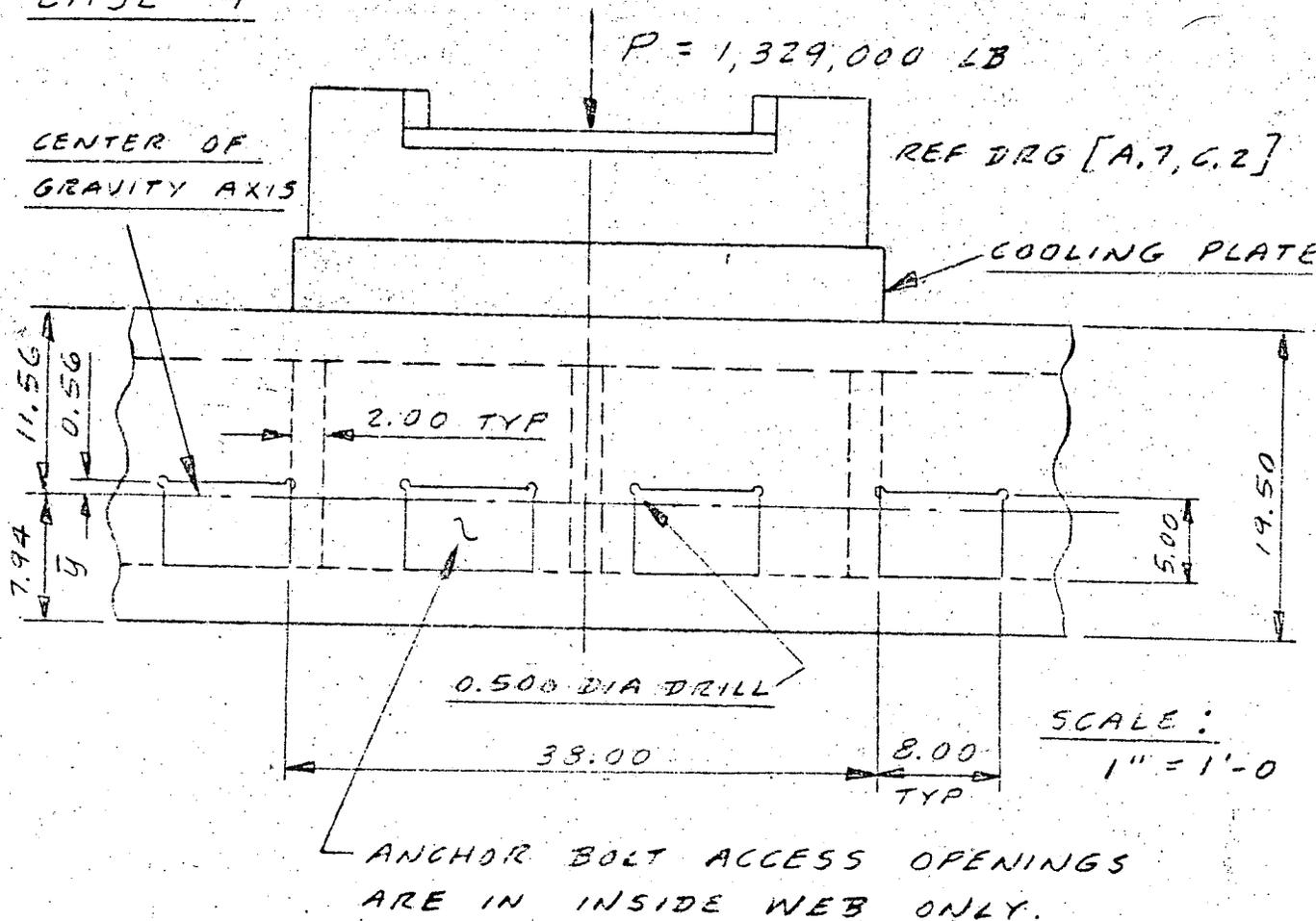
$$\begin{aligned}\sigma_D &= \sigma_D' + \sigma_D'' + \sigma_D''' \\ &= 414716 + 2628 + 3254 \\ &= \underline{20598 \text{ PSI}}\end{aligned}$$

$$\begin{aligned}\sigma_E &= \sigma_E' + \sigma_E'' + \sigma_E''' \\ &= -5652 + 2628 - 1250 \\ &= \underline{-4274 \text{ PSI}}\end{aligned}$$

$$\begin{aligned}\sigma_F &= \sigma_F' + \sigma_F'' + \sigma_F''' \\ &= -10108 + 2628 - 2235 \\ &= \underline{-9715 \text{ PSI}}\end{aligned}$$

CASE 3

STRESSES CAUSED BY VERTICAL FORCE "P"
CASE 4



$$\begin{aligned} \sigma_c &= \text{BEARING STRESS OF CONCRETE} \\ &= \frac{1,329,000}{38.00 \times 18.00} = \underline{1943 \text{ PSI}} < 3000 \\ &\text{OK} \end{aligned}$$

$$\begin{aligned} \sigma_s &= \text{COMPRESSIVE STRESS OF STEEL} \\ &= \frac{1,329,000}{(2.00)[(14.00 \times 3) + (38.00) + (38.00 - 16.00)]} \\ &= \underline{6515 \text{ PSI}} \end{aligned}$$

NOTE : THE FLAME CUT OPENINGS WERE MODIFIED BY DRILLING AS SHOWN.

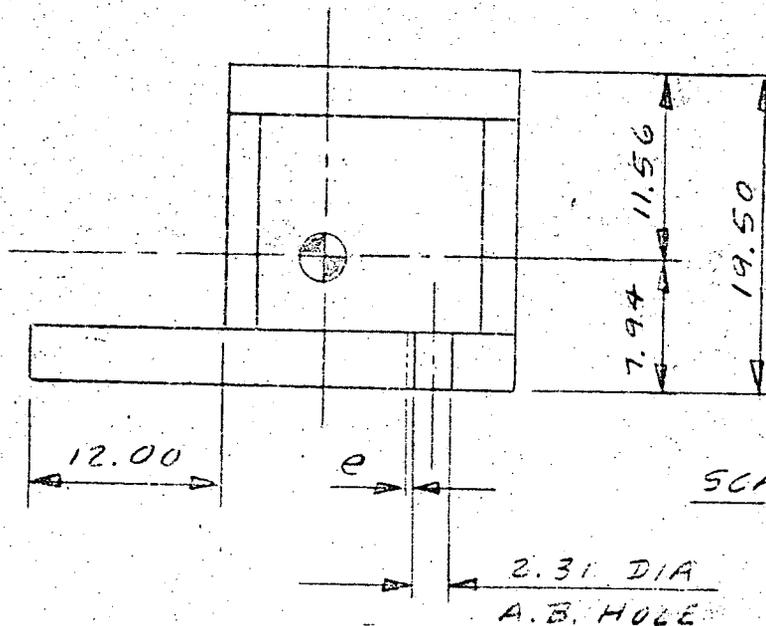
STRESS CAUSED AT TOP OF ANCHOR BOLT
ACCESS OPENINGS BY RADIAL FORCE R
AND TANGENTIAL FORCE T.

REFER TO SKETCH ON PRECEDING PAGE
 AND TO STRESS RESULTS ON PAGES
 12, 14 AND 19.

$$\begin{aligned}
 \sigma &= \sigma_1^R + \sigma_2^R + \sigma_3^T \\
 &= -4154 + \left(12200 \times \frac{0.56}{11.56}\right) \\
 &\quad + \left(20598 \times \frac{0.56}{11.56}\right) \\
 &= \underline{-2565 \text{ PSI}}
 \end{aligned}$$

EFFECT OF ELONGATED
ANCHOR BOLT HOLES

REF [A.8]



THE 2.31 DIA HOLE IS SPECIFIED BY THE DRAWING. ELONGATION e , WHICH IS DRAWN TO SCALE, PICTORIALIZES THE WORST CONDITION.

REDUCING CROSS-SECTIONAL AREA OF THE BOTTOM FLANGE WITHIN REASON HAS THE BENEFICIAL EFFECT OF TENDING TO EQUALIZE STRESSES AT TOP AND BOTTOM SURFACES. IT IS QUITE OBVIOUS FROM THE SCALE SKETCH THAT THE BOTTOM FLANGE WITH ELONGATED HOLES WOULD STILL BE FAVORED BY THE CENTER OF GRAVITY LOCATION.

BECAUSE THE 2-INCH DIAMETER ANCHOR BOLTS DO NOT CARRY SHEAR LOADS, CLOSE FIT IN THE HOLES IS NOT NECESSARY.

F2Wt1

1 MR. ROISMAN: If Mr. Slotterback --

2 CHAIRMAN JENSCH: Would you resume the stand, please,
3 Mr. Slotterback.

4 MR. ROISMAN: Mr. Slotterback, yesterday we were
5 discussing two documents prepared by United Engineering &
6 Constructors, which had been provided by the Applicant, and
7 which for purposes of numbering, will be numbered 14 and 17
8 which were, as I understood it, the complete record of the
9 stress analyses that were done, one on July 22, 1968, and
10 the other on May 10, 1972.

11 I am going to show these to you and ask you to
12 verify that what I have here are true and correct copies of
13 those.

14 MR. TROSTEN: Mr. Roisman, this appears to be a
15 correct copy of Document Number 17. It has numbers on it
16 which are written in ink which I presume are your calculations.

17 MR. ROISMAN: That's correct. Everything in ink
18 was my marking. The number 17 is on there and I think also
19 the indication that it was done under Mr. Slotterback's
20 direction I penned in for my own reference.

21 MR. TROSTEN: Subject to that, these are correct
22 copies.

23 MR. ROISMAN: Were those two documents, numbered
24 14 and 17, prepared by you or under your direction and control,
25 Mr. Slotterback?

F2Wt2

1 MR. SLOTTERBACK: Under my direction.

2 MR. ROISMAN: Mr. Chairman, I would like to have
3 those two documents marked as Citizen's Committee Exhibits
4 FF and GG, and received in evidence at this time. I do not
5 have the requisite number, but we will have copies made and
6 ask the reporter to mark them as FF and GG.

7 CHAIRMAN JENSCH: Which one gets FF?

8 MR. ROISMAN: 14 will be FF and 17 will be GG.

9 CHAIRMAN JENSCH: Can you give us a little more
10 clarity? What is 14? Is there a title on it?

11 MR. ROISMAN: It is difficult to read here.
12 "Interference Check dated 7/22/68," and completed by -- the
13 initials are WH -- I can't read the last initial. It looks
14 like a Z.

15 CHAIRMAN JENSCH: Very well. The document which
16 Citizen's counsel referred to will be marked for identification
17 as Citizen's Committee FF.

18 MR. ROISMAN: And Exhibit Number GG for identifica-
19 tion is dated 5/10/72. It has a job number, 952i-01. It has
20 also the initials, "Completed by MHR." It is subject to
21 Steam Generator Shoe Modifications. It was also prepared by
22 United Engineers and Constructors.

23 CHAIRMAN JENSCH: The document to which Citizens'
24 counsel has referred may be marked for identification as
25 Citizen's Committee Number GG.

F2Wt3

1 MR. TROSTEN: By way of further identification,
2 Citizen's Committee GG was furnished to Mr. Roisman by my
3 letter of May 13, 1972.

4 CHAIRMAN JENSCH: Does that appear on the document?

5 MR. ROISMAN: No, sir.

6 CHAIRMAN JENSCH: I was referring to just the
7 document. Having been thus identified and having previously
8 been offered, is there any objection to Citizen's Committee
9 FF and GG?

10 MR. KARMAN: No objection.

11 CHAIRMAN JENSCH: State of New York.

12 MR. MARTIN: No objection.

13 CHAIRMAN JENSCH: Hudson River Fishermen's
14 Association?

15 MR. MACBETH: No objection.

16 CHAIRMAN JENSCH: Applicant.

17 MR. TROSTEN: No objection.

18 CHAIRMAN JENSCH: Exhibits FF and GG are received
19 in evidence.

20 Will you proceed.

21 (Documents follow)

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23
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F2wt4

1 MR. ROISMAN: Thank you.

2 Mr. Karman, how do you want your witnesses to be
3 cross-examined, through a common --

4 MR. KARMAN: If you would, please, Mr. Roisman,
5 direct your questions to Mr. Madsen and he will then determine
6 which of our witnesses will be best qualified to respond.

7 MR. ROISMAN: I'd like to start with Mr. Lofy and
8 get an idea on who did what on the Parameter, Inc., study.

9 MR. MADSEN: The question is related to the Lofy
10 report?

11 MR. ROISMAN: Yes.

12 MR. Lofy, the portion of this report that is shown
13 in the attachments has prepared and checked by signatures on
14 here. Both Attachment number 1 and Attachment number 2 were
15 prepared by Robert S. Dean. I'm sorry. Attachment number 1
16 was checked by Walter Foley. Attachment number 2 was
17 prepared by Walter Foley and checked by Dean. Can you tell me
18 what participation did you have in the preparation of
19 Attachments number 1 and 2?

20 MR. LOFY: I assigned the work and brought the
21 inclusions of the attachments together in the typed body of the
22 report.

23 MR. ROISMAN: Did you supervise the preparation of
24 Attachments number 1 and 2?

25 MR. LOFY: Yes.

F2wt5

1 MR. ROISMAN: Then you are able to testify that these
2 are accurate and would be able to discuss in detail the basis
3 for any figures or computations that are contained herein?

4 MR. LOFY: I believe so.

5 MR. ROISMAN: Very well.

6 Let's turn, if you would, to Attachment number 1 on
7 sheet number 2 of that attachment. In the second full para-
8 graph on that page, the third sentence says, "The most severe
9 load upward due to overturning loads from steam pipe break is
10 used."

11 First of all, can you tell me how did you know what
12 was the most severe load and what direction it would take?

13 MR. LOFY: Our reference was a page from UE&C
14 specification analysis that I received here at Indian Point.
15 The loading condition was described to us by Mr. Slotterback.

16 MR. ROISMAN: I am going to show you Exhibit number
17 FF received in evidence, and ask you if that is the same as
18 your reference number D.6, which is referred to on Attachment
19 number 1, sheet number 2. The reference is actually given on
20 Page 16 of your main presentation. The penned material on there
21 is mine and not part of the document.

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1 MR. LOFY: That is our reference, D6. Thank you.

2 MR. ROISMAN: Now in your conversations with
3 Mr. Slotterback did you attempt to ascertain whether or not
4 the figure 927-K -- What the basis was for that figure, or
5 did you accept it from Mr. Slotterback without an independent
6 investigation on your part?

7 MR. LOFY: We accepted it on the basis of the
8 calculation you just showed me, and I believe it appears in
9 another UEC calculation as one of the loads on the shoe,
10 the vertical upward loads.

11 MR. ROISMAN: Could you show me on Exhibit No. FF
12 where there is a computation which establishes that 927-K
13 is the proper figure? I see 927-K written on the document,
14 but my question is how do you know that that is the correct
15 figure that should be used?

16 MR. LOFY: We accepted this as design input.

17 MR. ROISMAN: Did you question Mr. Slotterback on
18 how the figure was determined to assure yourself that it was
19 accurate?

20 MR. LOFY: We did not evaluate the magnitude of
21 the figure. I believe we have an understanding of how the
22 load is applied to the shoe, that is the direction and the
23 overturning mode in which this load is applied to the shoe
24 through the pin.

25 MR. ROISMAN: Okay. But for a moment let's just

1 concentrate on the validity of the 927-K figure without
2 getting into the question of which way the load would be
3 applied to the shoe. Just on the question of that, it's
4 your testimony that you accepted without further questioning
5 the statement that appears on Exhibit No. FF, and the
6 statement from Mr. Slotterback that the load was 927-K in
7 the event of the worst case pipe break.

8 MR. LOFY: We accepted the load 927-K with the
9 additional understanding that it was a conservative load
10 because the reinforcing effect of the girdle at the top of
11 the steam generator was not considered in establishing that
12 load.

13 MR. ROISMAN: How did you know that the reinforcing
14 effect of the girdle would in any way improve the situation?
15 Did you do a comparison of what the load would be without the
16 girdle and with the girdle?

17 MR. LOFY: No.

18 MR. ROISMAN: In the statement you also indicate
19 that the most severe load is upward. Can you tell me by
20 upward do you mean directly vertical?

21 MR. LOFY: Yes.

22 MR. ROISMAN: And can you tell me how you are able
23 to ascertain the load was directly vertical?

24 MR. LOFY: It is our understanding the steam
25 generator stands on four lugs or feet, and the overturning

1 mode would cause it to want to tip up on two feet, lifting
2 the other two feet off the shoes, as you would overturn a
3 table. And the load on the pins would be essentially vertical,
4 because the generator would be tilting around the opposite
5 two feet.

6 MR. ROISMAN: Is essentially vertical meant to
7 be some qualification of directly ninety percent?

8 MR. LOFY: When it starts tipping it's exactly
9 vertical. It would tip through some minute distance, the
10 deflection in vertical would be minute. It's vertical.

11 MR. ROISMAN: Well, is it your understanding that
12 if the support shoe serves its function that there will never
13 be a sufficient amount of tilt to permit any load to go other
14 than directly upward?

15 MR. LOFY: Yes.

16 MR. ROISMAN: Now did you do an analysis of the
17 nature in which the worst pipe break could occur in order to
18 ascertain for yourself that the overturning mode was the
19 proper mode and that that's the direction the load would be
20 going and that you wouldn't expect the load to be coming in
21 any other way?

22 MR. LOFY: No, we did not do an evaluation of the
23 cause of the mode.

24 MR. ROISMAN: In this same sentence you indicate
25 that the severe load is upward due to overturning modes from

1 steam pipe break. During the testimony yesterday and
2 unfortunately I have not had the transcript long enough to
3 identify it, I believe that Mr. Slotterback testified that
4 the worst break that was considered was a pipe break other
5 than the steam pipe break, namely one of the primary pipes
6 of this system. Was it your understanding that this steam
7 pipe break meant one of the pipes in the primary system or
8 did it actually mean a pipe that delivered steam from the
9 generator or to the generator?

10 MR. LOFY: It was our understanding that it was a
11 steam pipe break. The testimony yesterday would indicate that
12 this was incorrect.

13 MR. ROISMAN: Would that make any difference in
14 whether or not your judgment that the direction of the load
15 or the maximum amount of it might be different, given that
16 the steam pipes are smaller than are the maximum size pipes
17 in the reactor?

18 MR. LOFY: No.

19 MR. ROISMAN: Is it then your understanding that
20 the amount of load is unrelated to size of the pipe that
21 breaks?

22 MR. LOFY: No.

23 MR. ROISMAN: Is the direction of the load
24 unrelated to the size of the pipe that breaks?

25 MR. LOFY: Yes.

1 MR. ROISMAN: Now when you referred to having
2 verified information with Mr. Slotterback are you referring
3 to your reference D.14 which appears on page 15 of your main
4 document, namely telephone conversation, conference 5/4/72,
5 a.m., R. S. Dean, W. J. Foley, Parameter, Inc., to
6 J. R. Slotterback, IU E & C?

7 MR. LOFY: Yes.

8 MR. ROISMAN: Was there on your behalf any
9 memorandum made of that telephone conference?

10 MR. LOFY: Yes.

11 MR. ROISMAN: Do you have a copy of that with you?

12 MR. LOFY: Yes.

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1 MR. ROISMAN: I wonder if I might see it, please.

2 MR. KARMAN: May I look at this for a minute?

3 MR. ROISMAN: I'm going to not try to look at it
4 at this instant, so if it's all right I will go ahead with
5 Mr. Lofy and when Mr. Karman gives it to me and we take a
6 recess I will look at it and we will come back to it
7 specifically.

8 MR. VOIGT: Mr. Chairman, the Applicant would
9 appreciate the opportunity to look at this document, also.

10 CHAIRMAN JENSCH: You will have the document.

11 MR. VOIGT: Thank you, sir.

12 MR. ROISMAN: Mr. Lofy, looking at the same page,
13 namely sheet number two of attachment one, down at the
14 bottom the statement is made, "The architect-engineer's
15 U E & C design calculations with the exception of modification
16 calculation reference D.6 were not available for use or review."

17 Did you attempt to obtain these design calculations
18 and were unsuccessful in getting them, or did you simply
19 conclude that you didn't want them and never asked for them?

20 MR. LOFY: In the meeting here at Indian Point
21 about three weeks ago we established the scope of our
22 investigation, and it was determined that in the time
23 available we could not do a complete qualifying analysis.
24 We would do an independent check, given the loading conditions
25 and input that we have referenced.

1 MR. ROISMAN: Now you say in the time available.
2 You indicated in the time available you could not do a
3 qualifying check. Would you describe to me what is a
4 qualifying check?

5 MR. LOFY: Well, it was not only a matter of time.
6 It was a matter of our role. Our analysis does not purport
7 to establish and qualify the design of the entire equipment
8 package, either the support shoes or the ring girdle. It
9 addresses itself only to the modifications.

10 MR. ROISMAN: You are telling me that you weren't
11 planning to look at the original design. There were lots of
12 other things that I take it you didn't look at also. You
13 didn't look at the size of the containment building or anything
14 like that. Why did you mention in here that the design
15 calculations were not available? Would your analysis have
16 been better or more thorough or more accurate if you had
17 seen those design calculations?

18 MR. LOFY: No, sir.

19 MR. ROISMAN: Would those design calculations have
20 provided you with the information necessary to evaluate the
21 validity of the 927-K figure or the conclusion that the most
22 severe load would produce an upward load?

23 MR. LOFY: If we went that deeply into the analysis.

24 MR. ROISMAN: If you went that deeply into the
25 analysis yes or no, yes it would permit you to have verified

1 the 927-K figure and to have verified the conclusion that
2 the load would go upward?

3 MR. LOFY: Yes.

4 MR. ROISMAN: Turning back to the second paragraph
5 on the same page, you made the statement that there is now
6 a hold-down girdle over the top of the steam generator which
7 absorbs some of the load. What do you mean when you use the
8 term now? Now as compared to when?

9 MR. LOFY: This does not imply we are aware that it
10 was added. When the analyst, Mr. Dean, started his analysis
11 on the basis of the 927 kips, he was not aware of the girdle.

12 MR. ROISMAN: How did you become aware of it?

13 MR. LOFY: Through reference D.14.

14 MR. ROISMAN: The telephone conversation?

15 MR. LOFY: Yes.

16 MR. ROISMAN: Has Parameters, Inc. actually seen
17 the girdle or made any attempt to analyze whether it serves
18 any useful purpose?

19 MR. LOFY: I have seen this type of restraint, but
20 we have not made any attempt to evaluate its purpose.

21 MR. ROISMAN: Mr. Chairman, at this time I would like
22 to move to strike from the record paragraph on page two of
23 attachment number one of the Parameter, Inc. study, the
24 statement, "As conservative, since there is now a hold-down
25 girdle over the top of the steam generators which absorbs some

1 of this load," on the ground that, one, there is no adequate
2 foundation for Parameter, Inc. to conclude that it was
3 conservative. The sole basis, if any, for their foundation
4 consists of a telephone conversation and the reporting of it
5 here at this point is hearsay. That if the hold-down girdle
6 does make any of the calculations conservative it would be
7 necessary to have a witness from UEC or someone else who
8 is personal and knowledgeable with the girdle and its function
9 and can testify that it in fact does serve its function and
10 therefore in some way makes the calculation conservative.

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G3Bt1

1 MR. KARMAN: Mr. Chairman, Mr. Lofy is present here,
2 has been sworn in as a witness and is prepared to respond to
3 any question with respect to the document which we have offered
4 and has been accepted into evidence, and I can't see where the
5 hearsay objection would be a valid one. If Mr. Roisman has
6 any questions, let him ask Mr. Lofy questions.

7 CHAIRMAN JENSCH: Do you desire to speak to that
8 matter?

9 MR. ROISMAN: Yes. I just asked Mr. Lofy the only
10 pertinent question, which was does he have any independent
11 knowledge of how the hold-down girdle works, this one, how
12 effective it is, what it looks like, will it do its job, is
13 it in the right place, and all he testified was that the only
14 reason he knows it's there is because he had a telephone
15 conversation with Mr. Slotterback and Mr. Slotterback told
16 him that it was there.

17 And my contention is that that's not an adequate
18 foundation for Mr. Lofy to have made the judgment that the
19 figure 927K is a conservative figure.

20 MR. KARMAN: Mr. Lofy has also indicated that he is
21 aware of hold-down girdles in other installations, and we can
22 assume from that that he is basing his figure of conservatism
23 on his experience with respect to that.

24 CHAIRMAN JENSCH: I don't quite understand the Staff
25 position that Mr. Lofy can be interrogated about this, because

G3Bt2

1 as I understand it he has based it upon some other data that
2 he has not analyzed. And I am sure you could ask him questions
3 and end up with the same thing, well, somebody told him.

4 So I think the real question is is there adequate
5 foundation for his conclusion that it s conservative.

6 MR. KARMAN: Well, he has indicated that from his
7 experience with hold-down girdles on other installations that
8 it is his opinion that it's conservative.

9 CHAIRMAN JENSCH: Are girdles kind of a standard
10 component --

11 MR. KARMAN: You will have to ask an engineer, Mr.
12 Chairman.

13 Mr. Lofy has indicated to me, Mr.
14 Chairman, that he really doesn't think that this is important
15 enough at this stage for us to really question this hearsay
16 thing, as far as he is concerned. It was on the basis of this
17 telephone conversation.

18 CHAIRMAN JENSCH: The Citizen's Committee motion
19 is granted, that such may be stricken from the record.

20 MR. ROISMAN: Now, Mr. Lofy, turning to Page 3 of
21 Attachment number 1, these conclusions that are contained
22 here referring to the effects of modification number 1 and
23 modification number 2, is the basis for those conclusions
24 shown on the pages 4 and 5, and there is no other basis, so
25 that if we want to talk about it we can focus our attention

G3Bt3
1 on pages 4 and 5, modification number 1, and 6 and 7 for
2 modification number 2?

3 MR. LOFY: That's correct.

4 MR. ROISMAN: If you would then, let's turn to
5 modification number 1 and sheet number 5. Three-quarters
6 of the way down the page a formula appears under the label
7 Shear Stress, and on the right-hand side it indicates that
8 the allowable is equal to 0.4 times F_y .

9 Can you tell me what this F_y represents?

10 MR. LOFY: That is the yield strength.

11 MR. ROISMAN: You then indicate that yield strength
12 is 90 ksi, is that correct?

13 MR. LOFY: Yes.

14 MR. ROISMAN: And where does that yield strength come
15 from, that is where did you get the 90 ksi figure?

16 MR. LOFY: We discussed this value with Mr. Slotterback,
17 UEC.

18 MR. ROISMAN: Would such figure be something that
19 would have to be computed for each individual piece of steel
20 that you wanted to do a stress analysis on, or is it some sort
21 of standard figure?

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1 MR. LOFY: This would be a quoted standard for the
2 material by the supplier, U. S. Steel. I believe U. S. Steel
3 makes D-1 steel.

4 MR. ROISMAN: Do you know in your own experience,
5 how does one go about verifying whether or not a quoted
6 value by a supplier is in fact a real value?

7 MR. LOFY: For an actual piece of hardware, I would
8 expect a material certifications.

9 MR. ROISMAN: These would be certifications that
10 showed that certain tests had been run on that piece of steel
11 to verify the figure? In other words, how is it verified
12 assuming that ninety is the figure that the manufacturer of
13 the steel wishes to achieve. How does it verify that they
14 do achieve it?

15 MR. LOFY: By mechanical tests.

16 MR. ROISMAN: And in your experience, if you were
17 trying to determine whether or not a given yield strength for
18 a particular piece of metal was in fact the yield strength
19 that was applicable to that metal, what would you do if you
20 were directed by Parameter, Inc. to investigate that question?
21 How would you verify that?

22 MR. LOFY: I would look for material test records
23 associated with the heat of material used in the component,
24 and I would establish the identification of the heat in the
25 component.

1 MR. ROISMAN: Do you know if that was done by
2 Mr. Slotterback?

3 MR. LOFY: No.

4 MR. ROISMAN: You didn't ask?

5 MR. LOFY: I do not know.

6 MR. ROISMAN: You have indicated here that the
7 appropriate figure by which you should multiply the strength
8 of the steel is figure 0.4. If I understand what is
9 below your small computation, it shows the allowable as
10 36 ksi. You have a bracket, E.1, close bracket, page E 5-16.

11 Looking back to that reference of page 16 of your
12 main report, it indicates that reference E.1 is the
13 American Institute of Steel Construction, Inc., manual of
14 steel construction, seventh edition, 1970.

15 Do I understand that that means that if we had
16 page 5-16 here in front of us of that document, it would show
17 that the proper way to compute it, this FY figure, to multiply-
18 I'm sorry. To compute T allowable, is to multiply FY times
19 0.4?

20 MR. LOFY: Yes.

21 MR. ROISMAN: Were you here yesterday during the
22 discussions which I had with Mr. Slotterback regarding what
23 the T allowable was as computed by United Engineers and
24 Constructors?

25 MR. LOFY: Yes.

1 MR. ROISMAN: Do you remember your reference D.6
2 and our Exhibit No. FF, which I am going to show you now,
3 and indicate in the upper right-hand side of the page that
4 the allowable shear was five-eighths times 90 ksi?

5 MR. LOFY: Yes.

6 MR. ROISMAN: When you examined reference D.6,
7 our Exhibit No. FF, did you note that or have any discussions
8 with Mr. Slotterback regarding the basis for the use of the
9 five-eighths figure?

10 MR. LOFY: Yes.

11 MR. ROISMAN: Could you tell me what did you
12 conclude after your discussions with Mr. Slotterback
13 regarding the use of the five-eighths figure?

14 MR. LOFY: We learned from him that their
15 specification, specifications they were working to, allowed
16 them to go to 1.0 yield as a design basis, and also that it
17 was UEC's practice to go to .9 yield. In our analysis we
18 used just everyday commercial allowable stresses out of
19 AISC, so we would have a more direct reference. Because the
20 stresses we calculated were below these everyday construction
21 allowable stresses, we went no further. We did not have to
22 take advantage of the .9 times yield or 1.0 times yield to
23 prove out the design. So the analysis stopped right there.

24 MR. ROISMAN: As I understand it, the .4 figure
25 is a more conservative analysis than the five-eighths figure;

1 is that correct? That is it sets the allowable at a lower
2 figure.

3 MR. LOFY: Yes.

4 MR. ROISMAN: Is it your understanding, then, that
5 UE&C uses a less conservative than would be used in, quote,
6 the general marketplace, unquote, if you simply went to the
7 standard reference text?

8 MR. LOFY: I understand that they are allowed to go
9 higher stresses for upset or emergency conditions, not for
10 normal loading conditions.

11 MR. ROISMAN: You mean allowed by some other portion
12 of the American Institute of Steel Construction's manual
13 of steel construction or allowed by somebody else?

14 MR. LOFY: Allowed by somebody else.

15 MR. ROISMAN: In other words, there is nothing to
16 your knowledge in that text that permits that variation?

17 MR. LOFY: No.

18 MR. ROISMAN: On the same sheet number five of
19 attachment number one, you have computed a P prime.

20 MR. LOFY: Yes.

21 MR. ROISMAN: As I understand it -- And you really
22 have to help me along on this. Looking back at sheet number
23 four, this is an attempt on your part to determine what
24 would be the load going in the direction in which you
25 conclude was the minimum edge distance between the pin and

1 the edge of the material; is that correct.

2 MR. LOFY: Not exactly.

3 MR. ROISMAN: Perhaps I should just ask you to
4 explain it to me.

5 MR. LOFY: We decided to check a loading condition
6 perpendicular to the plane inclined edge, because this edge
7 was obviously a minimum dimension. It was the one that was
8 subject to scrutiny here.

9 We did this by applying the load P, the 927-K in
10 a vertical direction, but off-centered as far as the pin
11 diameter is concerned. The load P primed is the component
12 of the vertical load P which would be essentially perpendicular
13 to the inclined edge. This loading condition might be
14 described in another way by assuming that the pin was off-
15 centered.

16 This pin has a fairly loose fit and it will either
17 be bearing against one side or another. So this condition
18 could occur momentarily if the pin were off-centered, and
19 were bearing first at the point where these arrows are located,
20 the primed, rather than at the top. In application of the
21 load, it would tend to center itself at the top.

22 The arrow P primed is not a load applied in that
23 direction. It is a component of a vertical load P applied
24 at that point of contact.

25

H2Wt1

1 MR. ROISMAN: By "component," you mean that when the
2 load goes up, it also tends to go out a little bit?

3 MR. LOFY: No.

4 MR. ROISMAN: Then will you explain what you mean by
5 the term "component."

6 MR. LOFY: I mean that as the steam generator load
7 tends to be applied vertically, that the pin contacts the hole
8 off centered at this point, and in contacting it there, if the
9 full vertical load P were applied at that point, it can be
10 resolved into two components: One normal to the edge of the
11 hole or along this radius, and that is P primed; one tangential,
12 which would tend to center the pin. So we checked edge
13 distance for the components that was normal to the inclined
14 edge of this gusset.

15 MR. ROISMAN: In making your measurement, the line
16 EF is the line from the center point of the pin to the edge.
17 Can you explain to me why you don't use the point, the distance
18 from where P primed arrows are shown on Page 4 to the edge,
19 which I assume would be shorter than EF?

20 MR. LOFY: Well, our calculation checks the pullout
21 of the pin in double shear. That's the area that would have
22 to shear out to allow the pin to break through the site of the
23 gusset.

24 MR. ROISMAN: In other words, it is your under-
25 standing that the way it is going to break it is going to have

H2wt2

1 to pull out this entire section as bounded by the line EF, and
2 its counterpart on the upper edge, rather than simply splitting
3 at a point directly opposite the tip of the arrow P primed?

4 Did I describe it correctly? In other words,
5 because of the mechanism that you are assuming as to how the
6 break will occur.

7 MR. LOFY: I was referring to the method of analysis,
8 not the mechanism failure that might occur. The method of
9 analysis is one of double shear.

10 MR. ROISMAN: Your conclusions here show then the
11 stress of line EF or the load there is 15,635 psi., which
12 is less than the stress which will occur at P going in the
13 directly vertical direction.

14 Therefore, you conclude that in effect, if the thing
15 were going to break, it would break first on the upward side
16 rather than on this side, and therefore you don't worry about
17 the side part any longer; is that correct?

18 MR. LOFY: Yes.

19 MR. ROISMAN: Let me direct your attention, please,
20 to sheet number 6, on Attachment number 1. First of all, in
21 your analysis of the analyses done by the Applicant and its
22 contractors and subcontractors, did you find any stress
23 analysis that they had done that were comparable to the
24 stress analysis that you have done here on sheet number 6 and
25 7 of Attachment 1?

H2Wt3

1 MR. LOFY: No.

2 MR. ROISMAN: Why did you make this analysis?

3 MR. LOFY: Well, there are two reasons: One is the
4 scope of our investigation addressed to the three or four
5 modifications which were identified as involving removal of
6 material from the shoes after they were delivered to the
7 field. The reason we did the analysis on Page 6, which
8 checks the injection and weld area, is because we did not have
9 the original design analysis available.

10 Let's assume we had been the designers of this piece
11 of equipment, we would have been able to go back to our
12 analysis and look at it to see what the effect of this removal
13 of material might have been, and possibly come to the same
14 conclusion without putting new numbers on the item.

15 MR. ROISMAN: Isn't that equally true for the
16 analyses that you did with regard to modification number 1?

17 MR. LOFY: I don't believe so. I don't believe one
18 would want to draw a conclusion on modification number 1
19 without putting some numbers on it.

20 MR. ROISMAN: Can you explain to me the basis for
21 that distinction? If I understand what you were saying about
22 modification number 2 analysis, it was that for some reason
23 or another in that case you could look at the original and
24 from that make a determination of the cuts that the cuts that
25 were made would not adversely affect the strength of the

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1 material, and you couldn't do that with regard to the first
2 one? Is there something unusual about the cuts or what, that
3 makes this distinction?

4 MR. LOFY: I think it is a matter of geometry.

5 MR. ROISMAN: Would you explain that, please.

6 MR. LOFY: I think if you look at sheet 6, by
7 inspection, you can see that the area along the top of the
8 base plate where the gusset joins the base plate is greater
9 because the greater the length, then the area at the pin
10 elevation. So I think you know the load is common.

11 You can, by visual inspection, come to the conclusion
12 that the stresses are lower and even though you removed the
13 material in that area, you did not have a minimum cross
14 section there. We put numbers on it to establish an indepen-
15 dent documentation of this fact.

16 MR. ROISMAN: I understand that. What I guess I
17 don't understand is that down here at the bottom of sheet
18 number 6 where you list the tensile strength, you actually show
19 that the psi that would be applied is a higher number. Not
20 only a higher number but it comes closer to the allowable
21 number than was the case of what you were getting in sheets
22 number 4 and 5.

23 That seems to suggest that, at least to myself as a
24 layman, that if we were talking about probabilities of some-
25 thing breaking during a loading, that there would be a higher

H2vt5

1 probability that there would be a separation in the kind of
2 areas examined on sheet 6 and 7 than there would be of a
3 separation or a break in the kind of areas examined on sheets
4 4 and 5.

5 Am I misreading or misunderstanding what you mean
6 down at the bottom when you refer to tensil stress?

7 MR. LOFY: I can't comment on the probability of
8 failure in one mode versus another. But the tensil stress
9 I checked at the bottom checked against the code allowable
10 for tensil stress, whereas in sheet 5 we are comparing the
11 allowable for shear stresses.

12 MR. ROISMAN: That is the nub of my question. How
13 would you be able to determine the tensil stresses were not
14 exceeded, that is that the allowable was not exceeded in
15 tensil stresses unless you did a new analysis such as you
16 have done on sheets number 6 and 7?

17 MR. LOFY: We would not have been able to.

18 MR. ROISMAN: How would anybody have been able to?
19 How would UE&C and people who had these initial design
20 drawings that you referred to have been able to?

21 MR. LOFY: By looking at their original analysis.

22 MR. ROISMAN: You mean their original analysis would
23 have simply showed these same figures that the psi would be
24 33,297 and the allowable would be 40,500?

25 MR. LOFY: I can't answer what their figures might

d2vt6
1 have shown.

2 MR. ROISMAN: Can you give us some idea of how the
3 allowable psi's figures are determined? That is, how the
4 criteria determined for picking -- assuming that the 90 ksi
5 represents a proper figure. How was the determination made
6 as to what the figure that F_y is multiplied by should be?
7 .45 is used here for the tensil stress. .4 was used for the
8 shear stress. What are the factors that go into that?

9 MR. LOFY: We rely on the code AISC. Taken
10 literally, I can't explain what went into establishing those
11 figures in the code.

12 MR. ROISMAN: Do you know what would be your con-
13 clusion if you had a situation? Let's take the tensil stress
14 referred to on sheet number 6. If the figure for tensil
15 stress had been 43,297 instead of 33,297, what would your
16 conclusion be based upon that figure?

17 MR. LOFY: We then would have had to compare the
18 actual calculated stress with the allowable stress for this
19 particular application for the condition under which this
20 stress occurred. Whether it is site upset, emergency, what-
21 ever. There would have been a factor applied which allows you
22 to go higher. We did not go that far because we established
23 it below the normal stress levels.

24 MR. ROISMAN: I am going to ask you to explain in
25 somewhat more detail what you mean when you say you go further.

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1 Let me explain what it is I am trying to find out.

2 Is this figuring here some sort of a, quote,
3 conservative -- I don't want to use the word "guess." I mean
4 a conservative estimate which then could be further verified,
5 if necessary, by more precise analyses to apply the calculational
6 methods to the specific P's of the specific loads and all of
7 those other things? Is that what you are telling me, and if
8 you exceeded the allowable, you would have then gone on to
9 those more severe analyses?

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1 a second, please. Are you able to explain to me the reason
2 why the Regulatory Staff sought out and obtained the services
3 of an outside consultant for the purpose of investigating
4 this allegation?

5 MR. KARMAN: I don't believe Mr. Madsen has to
6 refer to that question, Mr. Chairman. The Regulatory Staff,
7 if it desires to have consultants, will send in consultants.
8 I don't think Mr. Madsen is in any position or should be
9 required to answer that question. The Regulatory Staff
10 undertook an analysis of certain allegations made by
11 Mr. Brill in his letter. They used their own employees of
12 the Commission, and a consultant, and I don't think that's
13 even relevant in this proceeding.

14 MR. ROISMAN: Mr. Chairman, the reason I have asked
15 the question is that we have had some testimony from Mr. Lofy
16 indicating that some of the work they did was done relatively
17 reasonably and that time was a portion, if not the sole
18 reason, why further work was not done. It's indicated here
19 that there was a meeting held with representatives of
20 Parameter, Inc. and the AEC and some representatives of the
21 Applicant and its contractors on the 24th of April, which was
22 a month or so after this problem arose, and I am trying to
23 find out whether in the early stages of the Staff analysis
24 they ran across some problems that they thought warranted a
25 more thorough study, and if so I'd like to find out what those

1 problems were to see whether or not this study has in fact
2 satisfied those problems.

3 And the reason for the Staff going to Parameter, Inc.
4 at what appears, at least in this document, to have been
5 a relatively late date, seems worthy of consideration to
6 find out if they discovered something that made them want to
7 go outside of their own expertise. I don't know why Mr. Karman
8 should be ashamed to --

9 MR. KARMAN: Under no circumstances am I ashamed
10 of anything, Mr. Roisman. I just don't think it's relevant
11 to your inquiry, as we have the report, we have the evidence
12 which is in, we have our witnesses here who are prepared to
13 discuss the contents of that evidence. Why we selected
14 Mr. Lofy's firm as a consultant I certainly do not feel --

15 MR. ROISMAN: I didn't ask why you selected
16 Mr. Lofy's firm.

17 MR. KARMAN: Any consultant. I think you are
18 getting into the business of the Atomic Energy Commission,
19 which is not relevant to this proceeding.

20 CHAIRMAN JENSCH: I can't understand the materiality
21 of the inquiry. Objection sustained.

22 MR. ROISMAN: Mr. Madsen, when did you begin the
23 analysis of the Brill charges?

24 MR. MADSEN: When did we begin it? Are you talking
25 about the first contact we had with someone? The letter,

1 of course, was received by the Regulatory on approximately
2 the 20th.

3 MR. KARMAN: 20th of March.

4 MR. MADSEN: 20th of March. That was the initiation
5 of Regulatory's function.

6 MR. ROISMAN: When did Compliance begin conducting
7 an investigation of charges?

8 MR. MADSEN: You want the first contact we had with
9 Mr. Brill or the first contact at the site?

10 MR. ROISMAN: Well, the first portion that you would
11 call the commencement of your investigation. Perhaps you
12 began investigating it before you even talked to Mr. Brill
13 about doing something. If you had received a letter into
14 the Regulatory Staff that said, "There are little green men
15 that are pounding hammers against the inside of the reactor
16 and it will break in twenty-five years; please go and
17 investigate it," I assume you'd make an initial judgment
18 whether to investigate it or not.

19 At some point you made an initial judgment that this
20 was a little higher caliber charge than that one and decided
21 to investigate. When did you then begin that investigation?

22 MR. MADSEN: Very well. Our first contact with
23 Mr. Brill was on March the 23rd, 1972. Our first contact at
24 PECOR itself was on the 29th of March, 1972.

25 MR. ROISMAN: And did the Staff attempt on its own

1 to conduct the kind of analyses that are shown in the
2 attachments number one and two to the Parameter study? That
3 is, did you do stress analyses and these kinds of drawings
4 and so forth and so on?

5 MR. MADSEN: No.

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1 MR. ROISMAN: At what time did you determine that
2 those types of analyses should be done by someone other than
3 the Applicant and its contractors?

4 MR. MADSEN: This was after we performed our
5 verification relative to documentation, corrective actions,
6 evaluations that had been made, that existed in the files,
7 and after the deposition by Mr. Brill when he identified the
8 specific two safety items that he was concerned with.

9 MR. ROISMAN: You had not had, you had not received
10 satisfactory information from him previously to identify the
11 precise things with which he was concerned. It was only
12 at the deposition that you were able to get that information?

13 MR. MADSEN: The specific two items, that's correct.

14 MR. ROISMAN: Now can you tell me, was this the first
15 time that the Staff was aware that the support shoes or the
16 reactor support ring --

17 MR. KARMAN: When you say this, when do you mean this?

18 MR. ROISMAN: I am sorry. Excuse me. The letter
19 from Mr. Brill dated March 14, 1972, did that letter represent
20 the first time that the Staff of the Atomic Energy Commission
21 was aware that there had been any modifications of the
22 support shoes or any modifications of the reactor support
23 ring?

24 MR. MADSEN: I can't say that there was no one
25 within the Commission that was aware of the modification.

1 CHAIRMAN JENSCH: What is your knowledge about it?

2 MR. MADSEN: I was not aware of the specific
3 modification to the steam generator shoes.

4 MR. ROISMAN: Were you aware that there had been
5 some modifications to the steam generator shoes?

6 MR. MADSEN: I knew there was fit-up, but I didn't
7 know that it was a specific problem.

8 MR. ROISMAN: By fit-up you mean you knew that they
9 had to do something to make it fit or you knew that they had
10 it fit but you didn't know --

11 MR. MADSEN: I knew they had them fit.

12 MR. ROISMAN: But that didn't tell you they had to
13 cut anything away from the support shoe in order to make it
14 fit?

15 MR. MADSEN: That is correct.

16 MR. ROISMAN: What about the reactor support ring?
17 Were you previously aware that it was shipped from the PECOR
18 Division with the warped ring that Mr. Brill indicated
19 yesterday?

20 MR. TROSTEN: I object to this line of inquiry.
21 The question of the nature of the Staff review of this matter
22 is not in issue in this proceeding and it's not in issue
23 with respect to the charges that Mr. Brill has made. I see
24 no relevance or materiality to this line of inquiry. What
25 was the knowledge of the Staff in the past with respect to this

1 is not at question here, Mr. Chairman.

2 CHAIRMAN JENSCH: Do you care to that matter?

3 MR. ROISMAN: Yes, Mr. Chairman.

4 We have, as the Chair is aware, briefed extensively
5 in our proposed findings of fact and conclusions of law
6 the issue that one reason why this license should not be issued
7 is because the Staff review was inadequate. We have said
8 at the same time in the course of that brief why we believe
9 the Staff's review analysis is a relevant issue. We are not
10 aware that the Board has ruled adversely on that contention
11 of our and that until they have done so we are entitled to
12 make a record on that issue.

13 I assume that if the Applicant had felt that the
14 issue should be resolved earlier than when the Board resolved
15 the licensing question it could have moved for summary judgment
16 on that question and have the Board resolve it before. We
17 would rest on what we said there. If the Board likes I would
18 be glad to summarize that point briefly here.

19 CHAIRMAN JENSCH: Objection overruled.

20 MR. MADSEN: I'd like to know what the question was.

21 MR. ROISMAN: My question has to do with whether you
22 were aware, or by you I mean the Regulatory Staff was aware
23 at any time prior to the March 14th, 1972 letter that the
24 reactor support ring was shipped from the Pennsylvania
25 Engineering Corporation to the Applicant and warped to the

1 extent that Mr. Brill indicated yesterday.

2 MR. MADSEN: I was not aware of it.

3 MR. ROISMAN: You are not aware that anyone in
4 the Regulatory Staff was aware of it?

5 MR. MADSEN: I can only give you belief.

6 MR. ROISMAN: What is your belief?

7 MR. MADSEN: I don't think so.

8 MR. ROISMAN: Now after the support ring reached
9 the site, so we are led to believe in testimony of the
10 Applicant, modifications were made in it in order to attempt
11 to correct the warping problem. The grout was put in at a
12 different level and there was some grinding and some
13 machining and so forth that was done. Was the Regulatory
14 Staff to your knowledge aware of that work having been done
15 at the site at any time prior to March 14th of 1972?

16 MR. MADSEN: We did not follow the step-by-step,
17 minute-by-minute setting of the ring girdle.

18 MR. ROISMAN: That was not precisely the question.
19 Did you know that modifications were made at the plant site
20 to the support ring, such as changing the thickness of the
21 originally intended grout, grinding on the top of it, doing
22 certain machining alongside pieces in order to make it fit
23 more properly?

24 MR. MADSEN: The machining wasn't necessarily done
25 at the site.

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First of all, in answer to your total question,
the answer is no with that correction.

MR. ROISMAN: You were not aware of machining done
anywhere else either until after March 14th of 1972?

MR. MADSEN: Yes.

13Bt1

1 MR. ROISMAN: Now looking, if you would please, at
2 Page 13 of the Parameter study and also Page 14, on those two
3 pages the drawings that represent the reactor support ring and
4 the generator support shoes are listed. In the course of the
5 review of the plant prior to March 14th of 1972, did the
6 Staff have occasion to review those drawings, any of them?

7 MR. MADSEN: In answer to your question, when we
8 are talking Regulatory I cannot answer for Regulatory because
9 I do not know what DRL had available to them. But as far as
10 did we of Compliance specifically review these drawings in
11 detail, the answer is no.

12 MR. ROISMAN: If in the course of the ring work that
13 you do as part of your normal compliance you had discovered
14 by looking at drawings or it had been brought to your attention
15 that the precise modifications that have in fact been made to
16 the support ring and the support shoes, which are now the
17 subject of investigation, had been made, say if you had found
18 out about it in 1970 or 1971, would you have in your judgment
19 conducted an analysis comparable to what you have done now
20 to determine whether the modifications raised any safety
21 questions?

22 MR. MADSEN: In answer to your question, it depends
23 on what the Regulatory involvement was in 1967, for instance,
24 versus what it might be today. Which are you asking for?

25 MR. ROISMAN: No. I premised it by assuming no

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1 earlier than say 1970. In other words, rather than having it
2 come to the attention of the Regulatory Staff through a letter,
3 or Compliance, or both, through a letter from Mr. Brill,
4 assume for a moment that it came to your attention simply
5 through one of the many series of meetings that you would have
6 had with the Applicant in which they'd say to you, "We want to
7 show you some modifications that have been made in the reactor
8 support ring and the reactor support shoes," and handed you
9 the drawings and papers and so forth that would have been
10 necessary for you to see the very modifications that are the
11 subject of this hearing.

12 If you had seen that would you then have independently
13 conducted an analysis of the type that you have in fact con-
14 ducted now?

15 MR. TROSTEN: Mr. Chairman, I don't see the relevancy
16 for this. What is the purpose of that question? What does
17 that have to do with anything that is in issue in the hearing
18 now, Mr. Chairman? I object to that.

19 MR. ROISHAN: Mr. Chairman, do you want to answer
20 that or do you want me to?

21 MR. CHAIRMAN: You have to.

22 MR. ROISHAN: Yes, of course.

23 The relevancy is this. We have already received in
24 evidence in this proceeding a letter which is written to
25 Consolidated Edison advising them in 1970 of the fact that

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1 Mr. Brill was concerned about these components. The Staff
2 has now testified that their first knowledge of the informa-
3 tion came in 1972 when Mr. Brill then communicated directly
4 to the Regulatory Staff about the problem.

5 We have also understood from Mr. Lofy that their
6 work was to some extent limited in time. They had only the
7 relatively few number of weeks from the end of the Brill
8 deposition until their report was filed, which I think is
9 dated May 4th, to conduct this work.

10 Now we have indicated and still believe that a
11 pertinent issue in this proceeding and in this particular
12 portion of this proceeding is the quality assurance program
13 of this applicant.

14 If the applicant had made all this information
15 available to the Staff at an earlier date we might have all
16 saved ourselves this hearing, because we would have had the
17 issue fully spelled out in the Staff safety evaluation.
18 Their conclusions would have been available and it would have
19 been discussed, if at all, in the course of our hearings on
20 radiological safety matters held during 1971.

21 I am trying to find out whether or not, if you will,
22 whether or not that assumption is correct, that the applicant's
23 failure to disclose these modifications to the Regulatory Staff
24 in effect forced this last-minute review to take place and
25 whether if the applicant had done otherwise we would have been

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1 able to dispose of it at an earlier time and more thoroughly.

2 If that conclusion is correct, then I think it raises
3 some doubts about the nature of the applicant's Quality
4 Assurance Program and their relationships with the Regulatory
5 Staff, and some questions about what will happen in the future
6 when the applicant, if they were to receive a license, if they
7 received some information from one of their subcontractors,
8 will it be necessary for several years to pass before the sub-
9 contractor finally in frustration has to write directly to the
10 Atomic Energy Commission in order to get resolution of a
11 possible safety problem?

12 So I think it's very pertinent to this overall ques-
13 tion of just how carefully we can assume the applicant is
14 going to go about its job of running this reactor, based upon
15 how carefully it went about doing its job of constructing the
16 reactor.

17 MR. KARMAN: Mr. Chairman, the Regulatory Staff is
18 charged with seeing to it that any nuclear power plant is built
19 in accordance with the design and is safe and cannot affect the
20 health and safety of the public. Our report and the evidence
21 which we have introduced here only proves that while this
22 allegation of a problem or a potential problem is made by Mr.
23 Brill our report would indicate that there was no substance to
24 any safety-related problem to this. I believe that we would be
25 certainly going far afield if we allowed the interrogation on

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1 the report of the analysis of the Regulatory Staff on the
2 particular allegations of Mr. Brill, which he seems to have
3 indicated is really no problem to him at this time, into a
4 wide and far-reaching investigation of both the Quality
5 Assurance Program of the applicant and the Regulatory Staff.

6 MR. TROSTEN: Mr. Chairman, I would like to re-
7 emphasize that the record, the evidence in this proceeding
8 shows that the applicant received no statement of the safety
9 concern in 1970, and that the evidence shows that there was
10 an adequate review of this matter at the time, and I see no
11 basis for ranging into this -- for going into this type of a
12 far-ranging inquiry that Mr. Roisman has attempted to open by
13 his question.

14 CHAIRMAN JENSCH: The objection is sustained.

end

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1 the report of the analysis of the Regulatory Staff on the
2 particular allegations of Mr. Brill, which he seems to have
3 indicated is really no problem to him at this time, into a
4 wide and far-reaching investigation of both the Quality
5 Assurance Program of the applicant and the Regulatory Staff.

6 MR. TROSTEN: Mr. Chairman, I would like to re-
7 emphasize that the record, the evidence in this proceeding
8 shows that the applicant received no statement of the safety
9 concern in 1970, and that the evidence shows that there was
10 an adequate review of this matter at the time, and I see no
11 basis for ranging into this -- for going into this type of a
12 far-ranging inquiry that Mr. Roisman has attempted to open by
13 his question.

14 CHAIRMAN JENSCH: The objection is sustained.

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1 MR. ROISMAN: Mr. Chairman, may I just argue once
2 more on this briefly.

3 The Applicant's statement, that is the one made
4 by Mr. Trosten just now, simply is not supported by the record.
5 Exhibit No. 12 attached to Mr. Brill's deposition is a letter
6 from Mr. Haagensen, a consultant to the Pennsylvania
7 Engineering Corporation, to Mr. Roddis, who I assume was the
8 President of Con Ed, and he says in the second paragraph,
9 "This letter is forwarded to you to discuss a 'most serious'
10 matter concerning the subject power plant."

11 And Mr. Brill testified in his deposition that he
12 understood that to mean that it was a safety problem.
13 That was March 11, 1970.

14 The Applicant made no attempt to advise the
15 Atomic Energy Commission's Regulatory Staff, at least
16 according to the testimony that we have just received, of
17 this matter, and the matter would have gone by without any
18 analysis whatsoever, but for the fact that Mr. Brill finally
19 stepped forward on March 14th of 1972 and brought the matter
20 into the public domain. I think that that is an extremely
21 pertinent inquiry to find out why and how this happened and
22 that is not in any way attempting to cast any aspersions on
23 the Staff or what the Staff did.

24 In fact, much to the contrary, the purpose of it
25 is to indicate that the Staff in performing its rightful

1 duty would have done just this kind of investigation if they
2 had only been allowed to learn of the matter at an early date.
3 Ideally at a date even prior to 1970, so that if corrections
4 needed to be made of the components, they would be made
5 without delay in the reactor.

6 I believe that couldn't be more pertinent to the
7 proceeding, and respectfully request that the Board reconsider.

8 CHAIRMAN JENSCH: The ruling will be adhered to.

9 MR. ROISMAN: Mr. Madsen, in the testimony of the
10 Staff itself, turning now to the summary of investigation
11 into allegations to that particular document, the document's
12 dated May 8, 1972, subject Structural Components Fabricated
13 by Pennsylvania Engineering Corporation, PECOR Division,
14 Newcastle, Pennsylvania.

15 Now was this document prepared by you or under your
16 supervision and control, or should I be directing questions
17 about specific language in here to some other person?

18 MR. MADSEN: The document that we are looking at,
19 I participated in, and as the principal reactor inspector
20 for Unit 2, had some direction, of course. But there are
21 other people that did have part in putting together this
22 document.

23 MR. ROISMAN: Let me ask you, on the bottom of
24 page one, the statement is made that the results of
25 Parameter's evaluations are that the as-installed components

1 are adequate to perform their design functions. Did the
2 Regulatory Staff independently examine what has been done
3 by Parameter, Inc., and reach an independent judgment on
4 this subject, or is the basis for your conclusion that there
5 is no safety problem as to reason A with regard to the
6 support shoes and the support ring, based solely upon the
7 Parameter, Inc. study?

8 MR. MADSEN: I think I have already answered that
9 question, that we have not performed our independent
10 calculation.

11 MR. ROISMAN: I understand that, but did you
12 independently study what Parameter, Inc. did to assure
13 yourselves that they had done a thorough and proper job,
14 or did you simply pick up the study, say, "Is this your study?"
15 and they said, "Yes, it is." And say, "Very well. What is
16 its conclusion?" and they say, "We conclude that the
17 as-installed components are adequate to perform their design
18 function." And you said, "Good."

19 MR. KARMAN: Mr. Roisman, the summary investigation
20 indicates and it states specifically the results of
21 Parameter's evaluation are that the as-installed components are
22 adequate to perform their design function. Parameter was
23 a consultant selected by the Regulatory Staff to make this
24 evaluation, and I think it's rather specific that this is
25 Parameter's evaluation which is adopted by the Regulatory Staff.

1 MR. ROISMAN: I'm just trying to find out whether
2 they adopted it without question or did they independently --
3 I mean going back to your hypothetical green man, what if you
4 had simply received in a piece of pink paper that had written
5 on it, "Looks okay to us," signed Parameter, Inc. I assume
6 that would have been something different than what they
7 provided, and I am trying to find out did you adopt it without
8 question or did you independently determine by looking at
9 what they did that this was a proper analysis and you could
10 rely upon it?

11 MR. MADSEN: In answer to your question we of the
12 Regulatory Staff did review this, but here not being experts
13 at this type of design analysis, but looking at it from a
14 general engineering viewpoint, and on that basis we have
15 adopted it.

16 MR. ROISMAN: On page two of the testimony, and
17 I will take it, Mr. Madsen, it would be one of the Region I
18 people to answer it, the next to the last sentence says,
19 "An evaluation and stress analysis of the as-installed steam
20 generator support shoes by Region I and its consultants
21 confirms that the items are adequate." Could the gentleman
22 from Region I tell me what evaluation and stress analysis
23 Region I did?

24 MR. MADSEN: The consultant was doing this work
25 for Region I.

1 MR. ROISMAN: Would you consider, since there isn't
2 any way to strike to make the sentence read properly, would
3 you consider modifying the testimony to say that then "an
4 evaluation of and stress analysis of the as-installed steam
5 generator support shoes by Region I's consultant confirms
6 that the items are adequate," and remove from there the
7 indication that there were two evaluations and stress analyses,
8 one done by Region I and another done by its consultants?

9 MR. MADSEN: I wouldn't have any problem with that,
10 but we are going back to the earlier testimony that the
11 consultant did the analysis and we did review, Region I did
12 review the analysis on a general engineering viewpoint to come
13 up with our position on that.

14 MR. ROISMAN: But I guess my problem is just that
15 this leaves the, what I gather was a somewhat erroneous
16 indication that there were two sets of evaluations and stress
17 analyses done and what there really was was one that was done
18 and another that was reviewed, is that correct?

19 MR. MADSEN: That is correct.

20 MR. ROISMAN: And that that would be a more
21 accurate statement of what is here on page two?

22 MR. MADSEN: The only thing I'd add is that the
23 review was of the Parameter analysis.

24 MR. ROISMAN: Okay. I think that will keep it
25 clear.

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1 MR. LOFY: Yes.

2 MR. ROISMAN: Turning to Page 3 of your testimony
3 dealing with the question of dimensioning and tolerancing.
4 Am I correct in assuming that that general question was not
5 the subject of the Parameter, Inc., study but was a question
6 which was investigated exclusively by the Regulatory Staff?

7 MR. MADSEN: This was as the result of the Brill
8 letter of March 14th. We took this as a Region I type of
9 investigation rather than the Parameter.

10 MR. ROISMAN: If you could direct your attention --
11 this is to the specification that we talked about yesterday.
12 These are number 9321-01-12-3, which are a part of Exhibit 1
13 to the Brill deposition that has been received in evidence.
14 I will give you a moment.

15 MR. MADSEN: Just hold on, please.

16 CHAIRMAN JENSCH: Are you going to be reviewing
17 documents? Is this a convenient place to recess or interrupt
18 your examination?

19 MR. ROISMAN: Mr. Karman, are those memoranda here
20 for me to look at now?

21 MR. KARMAN: Yes.

22 MR. ROISMAN: Yes, it will be fine.

23 CHAIRMAN JENSCH: At this time let us recess to
24 reconvene in this room at 11:15.

25 MR. ROISMAN: How long is that?

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1 CHAIRMAN JENSCH: Ten minutes. Is that enough?

2 MR. ROISMAN: Is it possible to take twenty?

3 CHAIRMAN JENSCH: At this time let us recess to
4 reconvene in this room at 11:25.

5 (A short recess is taken.)

6 CHAIRMAN JENSCH: Please come to order. Are you
7 ready to proceed with your cross-examination?

8 MR. VOIGT: Mr. Chairman, may I take a moment again
9 with respect to the matter of the production of documents?

10 CHAIRMAN JENSCH: Yes, please.

11 MR. VOIGT: I have at this time copies of the July
12 10 job site minute meetings. I will hand a copy of those
13 to each member of the Board and to Mr. Roisman. We have
14 additional copies for the other parties.

15 Secondly, I have the information which was requested
16 of Mr. Slotterback. These are copies of a handwritten sheet
17 bearing date 5/18/72, in the lower right-hand corner. It is
18 a drawing to actual scale of the bevel on the shoes, and Mr.
19 Slotterback's computation based on those measurements up at
20 the top.

21 Thirdly, Mr. Slotterback has located in his file a
22 copy of the computation sheet which was previously produced,
23 originally translated with Mr. Trosten's letter. This copy
24 has two additional calculations on it. I thought that in
25 order to complete the record, we should supply Mr. Roisman

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1 with these additional calculations.

2 Again, I will give copies of that also to the Board.

3 CHAIRMAN JENSCH: Thank you very much.

4 Please proceed.

5 MR. ROISMAN: At the break, Mr. Madsen, I was just
6 getting ready to ask you some questions regarding the Staff's
7 analysis of the dimensioning and tolerancing question. I had
8 asked you to look at specification number 9321-01-12-3.

9 Do you have that now in front of you?

10 MR. MADSEN: Yes.

11 MR. ROISMAN: The item I'd like you to give me some
12 assistance on refers to something that appears on Page 3 of
13 that document.

14 In the middle of the page there is the following
15 paragraph, and I quote:

16 "All field welding shall conform to the latest
17 revision of the American Welding Society code. Welders shall
18 be qualified in accordance with the standard qualification
19 procedure of the American Welding Society code."

20 Do you see that reference?

21 MR. MADSEN: Yes.

22 MR. ROISMAN: In Mr. Brill's letter of March 14,
23 1972, on Page 2, he says in the third paragraph on that page,
24 the second sentence:

25 "Dimensioning and tolerancing of the features of the

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1 parts were not in accordance with nationally accepted
2 engineering standards, e.g., the ASA standards."

3 It was that charge that you were investigating, and
4 the conclusions of yours are contained here on Page 3.

5 My question is, as I read the specification, it
6 appears that Mr. Brill was required -- that is PECOR was
7 required to use the American Welding Society code, and that
8 that is disclosed in the specification.

9 I guess I am trying to find out, is the ASA standard
10 used for some things, and the American Welding Society used
11 for something else, or was Mr. Brill confused and was that
12 the conclusion of your investigation with regard to this
13 charge?

14 MR. MADSEN: I would like to have Mr. Tillou answer
15 that.

16 MR. ROISMAN: Fine. Thank you.

17 MR. TILLOU: I'd like to refer you, Mr. Roisman, to
18 Page 6 of that exhibit covering the specification. In the
19 middle of the page it states: "Unless specifically exempted
20 by the specification, all design and manufacture shall be in
21 accordance with the applicable portions of the current editions
22 of the codes and standards."

23 Mr. Brill read these yesterday. Our investigation
24 revealed that there is no requirement anywhere in the purchase
25 order or this specification for any drawings to be made in

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1 accordance with any particular code or specification.

2 However, during our review of these drawings and
3 a comparison to the ASA drafting room standards, which is what
4 he referred to specifically, we find these drawings do indeed
5 meet the ASA requirements with the one exception that because
6 of the previous requirement in the specification, they do
7 include the American Welding Society's standard, symbols and
8 requirements for the welding to be done on this job.

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1 MR. ROISMAN: You mean that the drawings actually
2 met both standards, both American Welding Society standards
3 and ASA standards?

4 MR. TILLOU: They met the ASA standards but
5 included the American Welding Society requirements as
6 specified in the specification.

7 MR. ROISMAN: Thank you for clarifying that.

8 In this same testimony you indicate and use the
9 statement: "The welding information provided was adequate to
10 perform the required work."

11 MR. MADSEN: Which testimony?

12 MR. ROISMAN: Still on page three, still in paragraph
13 II, subparagraph B of the Staff's testimony: "The welding
14 information provided was adequate to perform the required
15 work."

16 Did the term "adequate" mean that it conformed to
17 the standards or that even though it might not have conformed
18 to the standards, it was still in your judgment okay?
19 I didn't understand that term.

20 MR. TILLOU: The requirements for welding in
21 accordance with the American Welding Society requirements
22 were indeed called for. Their adequacy I can't vouch for.
23 I did not make any inspection of whether or not this welding
24 did meet that. But the requirements were provided to Mr. Brill
25 in detail for the conduct of all welding.

1 MR. ROISMAN: In other words, it was your judgment
2 that Mr. Brill had enough information in order to be able
3 to construct and fabricate the component properly?

4 MR. TILLOU: In accordance with the requirements
5 of the specification, yes, sir.

6 MR. ROISMAN: That is in accordance with how they
7 were to be constructed?

8 MR. TILLOU: Yes.

9 MR. ROISMAN: Then my conclusion is that there are
10 also standards as to how the drawings are to be made? You
11 are not saying that those standards as to how drawings are to
12 be made were not thoroughly met? You are merely saying that
13 the drawings were good enough in order to guarantee that
14 the work would be done in the manner in which it should be
15 done; is that correct?

16 MR. TILLOU: Yes.

17 MR. ROISMAN: Thank you.

18 Going back to you a second, Mr. Madsen. In the
19 course of the work of all of the modification work that was
20 done, there was some machining on the support shoes and there
21 was some grinding and modifications in the support ring.

22 What standards were used for purposes of conducting
23 that work? In other words, in these specifications that we
24 have just been talking about, spec number 9321-01-12-3, there
25 are references to a variety of codes that are to be used,

1 types of steel that are to be used, procedures that are to be
2 followed, stress relieving operations that are required, and
3 the like. These various parts had work done after they left
4 the PECOR factor.

5 My question to you is, to what extent did the
6 Staff investigate to determine whether or not all of this
7 modification work met the standards of the specifications to
8 the extent that the standards of specifications covered the
9 work done?

10 MR. TILLOU: During the Staff's investigation of
11 this entire area, we found that there was available an
12 engineering prepared repair procedure based on the evaluations
13 made by UE&C and their staff. There was a detailed inspection
14 made by representatives of UE&C, and I believe the licensee,
15 although I'm not certain of that representation.

16 These verify that the work was done in accordance
17 with the engineering repair procedure, and they were
18 authorized to be shipped and installed from the repairing
19 agency.

20 MR. ROISMAN: Did you examine the repair procedures
21 and are you able to state of your own knowledge that those
22 repair procedures conformed to acceptable procedures for
23 purposes of conducting these kind of repairs?

24 MR. TILLOU: We did not evaluate them based on
25 their adequacy, only upon the fact that they were an acceptable

1 method of repair which would not create any further problem
2 in the reprocessing of the material through heat treat,
3 et cetera.

4 MR. ROISMAN: In the judgment of members of the panel
5 turning now to the support shoes particularly, are the
6 support shoes as strong as they would have been if the
7 modifications had been made to the generator rather than to
8 the generator support shoes, and if the support shoes had
9 merely been built according to their original design without
10 any additional modifications made to them?

11 MR. TILLOU: You are asking me to express an
12 opinion for which I have no basis.

13 MR. ROISMAN: I was asking whomever on the panel
14 would be in a position to state that, if anyone.

15 MR. MADSEN: We did not evaluate the effect of
16 machining upon the steam generator. We evaluated the
17 modification and the adequacy of the modification.

18 MR. ROISMAN: Is the support shoe as strong after
19 the modification as it would have been without the modification?

20 MR. LOFY: Not having established the entire load
21 path from the steam generator into the support structure,
22 I can't say that the modifications limit the total load
23 carrying capability. We only evaluated the actual modification
24 involving removal of material.

25 MR. ROISMAN: And with respect to that modification

1 and that particular stress or stresses that you examined,
2 is the shoe better able to withstand those stresses than
3 it would have been without the modification, less able to
4 withstand those stresses than it would have been without the
5 modification, or no change?

6 MR. LOFY: Can I answer that by making a comparison
7 or using the shoe as an assembly?

8 MR. ROISMAN: Yes.

9 MR. LOFY: Having been modified in the assembly
10 of the weldment plus the pin -- Having been modified, I
11 cannot tell you whether its load carrying capability is less
12 or greater than it was.

13 For example, the pin could be the limiting item in
14 the system. We did not look at the pin itself.

15 MR. ROISMAN: You mean that actually the pin might
16 break before the supports into which the pin is placed would
17 break?

18 MR. LOFY: I don't know if it might, but if it was
19 the weak link in the system, then it still is after
20 modification, and the modification would have no effect on
21 the total load carrying capability.

22 MR. ROISMAN: If we assume that the weak link in
23 the support shoe as a unit as the ability of the portion of
24 that support shoe that you analyzed, namely the vertical
25 gussets, I think you called them, then does the modification

1 weaken or strengthen the shoe's ability to withstand the
2 maximum possible stress?

3 MR. LOFY: Again, I'd have to modify my answer.

4 I can say that the stresses are higher. However, a projected
5 mode of failure might involve the pin pulling out entirely
6 vertically where the shear area on one side is essentially the
7 same as it was in the first place. So I guess unless you
8 did a test, you would really not know. I can only answer
9 your question to the extent that the stresses are higher using
10 the method of analysis that we did.

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1 MR. ROISMAN: Let's see if I understand that. Saying
2 the stresses are higher means they are closer to the yield
3 point of the material, is that correct?

4 MR. LOFY: Yes.

5 MR. ROISMAN: You would consider that to be then an
6 unfavorable direction to move, not necessarily reaching an
7 unfavorable point, but just talking about the direction in
8 which it's going. That's the unfavorable direction, is that
9 correct?

10 MR. LOFY: Yes.

11 MR. ROISMAN: But to really know whether or not
12 these shoes are stronger or weaker you'd actually have to run
13 tests that you did not run, real tests as opposed to calcula-
14 tions, to determine their strength compared to what they
15 used to be and as to what they are now, is that correct?

16 MR. LOFY: Yes.

17 MR. ROISMAN: Thank you.

18 Mr. Tillou, in the design modifications that took
19 place you had indicated that you had examined the procedures
20 for repair. Did those procedures include any stress relieving
21 to be done on the parts following any of the machining of
22 grinding that was done on them?

23 MR. TILLOU: They did not.

24 MR. ROISMAN: Would the machining and grinding result
25 in stresses at the point where the machining and grinding took

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1 place?

2 MR. TILLOU: There would be no reason for this.

3 MR. ROISMAN: I am sorry.

4 MR. TILLOU: There would be no reason for stresses
5 of this magnitude to be created in these areas.

6 MR. ROISMAN: Of which magnitude?

7 MR. TILLOU: Of a magnitude sufficient to require a
8 stress-relieving of the areas.

9 MR. ROISMAN: I am sorry. I just asked if there
10 were stresses at all created.

11 MR. TILLOU: Not to my knowledge.

12 MR. ROISMAN: Would you expect that there would be
13 stresses created by the machining and grinding?

14 MR. TILLOU: Not by machining or grinding.

15 MR. ROISMAN: Were you familiar with the particular
16 work that was done on the reactor support ring, I think it's
17 shown in the Applicant's testimony, figure 3? There's an A
18 and a B.

19 MR. KARMAN: Is this the one?

20 MR. ROISMAN: Yes, thank you.

21 Now as I understand that depicts -- Mr. Voigt, could
22 we get the large drawing that was up yesterday that showed
23 the reactor support ring back up on the blackboard?

24 MR. VOIGT: Surely.

25 MR. ROISMAN: I think it will be easier if we have

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1 the ring up there, then we can talk about particular parts
2 of it.

3 Thank you.

4 MR. VOIGT: Mr. Chairman, I have placed on the easel
5 once again the large copy of what is Figure 1 attached to the
6 Applicant's testimony concerning Mr. Brill's allegations.

7 CHAIRMAN JENSCH: Thank you.

8 MR. ROISHAN: Now then, Mr. Tillou, looking at this
9 large version of Figure Number 1, and also looking at Figure
10 Number 3, does Figure Number 3 purport to show an elevation
11 view of that point on Figure Number 1 which is marked splice
12 plate?

13 MR. TILLOU: Apparently, yes.

14 MR. ROISMAN: Now is it your understanding that the
15 support ring required a machining at that splice plate before
16 the splice plates would meet fully?

17 MR. TILLOU: That was not my understanding, Mr.
18 Roisman.

19 MR. ROISMAN: Would you tell me what your under-
20 standing was.

21 MR. TILLOU: I had understood that this drawing
22 indicated that this match did indeed occur. I guess I'd have
23 to correct myself and they did relieve this drawing for the
24 assembly at the top in order to provide the complete seating
25 of the joint. On the end, not as indicated there, but at

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1 that splice plate, the two halves of the ring were separated
2 and a relieving operation was done by either machining or
3 grinding at the upper elevation, upper surface of that, in
4 order to allow them to get a complete bearing for the splice.

5 MR. ROISMAN: By relieving operation you mean they
6 cut some of it off?

7 MR. TILLOU: It could have been relieved locally
8 by either grinding or by machining.

9 MR. ROISMAN: Well, you don't know which was done?

10 MR. TILLOU: I do not.

11 MR. ROISMAN: Did the Staff analysis, and this would
12 be to any member of the Staff panel, include an analysis of
13 the adequacy of the meeting of the splice plates and any
14 work that was done in order to make them meet properly?

15 MR. TILLOU: The inspection records indicate there
16 was a complete bearing after rework of this area and that the
17 material in this area was approximately a quarter of an inch
18 oversized in thickness and therefor this rework could be
19 accomplished with no detrimental effect on the structural
20 value of the splice.

21 MR. ROISMAN: This is something that you analyzed
22 since Mr. Brill's letter was received on March 14th of '72,
23 or this had been analyzed some time ago?

24 MR. TILLOU: This was analyzed during the investiga-
25 tion of Mr. Brill's allegation.

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1 MR. ROISMAN: Turning to Page 4 of the Staff
2 testimony which purports to be a summary of the investigation
3 of the Staff regarding Mr. Brill's allegations, I don't find
4 anything in there that indicates that the Staff an analysis
5 of the problem that we are talking about now, that is the
6 failure of the splice plates to meet, and that you concluded
7 on that basis of that analysis that the repair work was done
8 properly and the splice plates did in fact meet properly.

9 Could you direct me to the portion of the testimony
10 which discloses the existence of that analysis having been done?

11 MR. TILLOU: I think we are perhaps confusing the
12 word analysis. The word analysis as used by myself indicated
13 that we had conducted a selective review of the records
14 documenting the deviations on the ring as received at the
15 site. Also the evaluation of and recording of these devia-
16 tions by the UE&C Receiving and Inspection Staff, the
17 decision and repair procedure and instructions given to the
18 repairing agency for correction of these various deviations,
19 and the inspection of this material after the repair procedure
20 was accomplished.

21 This was the Staff analysis.

22 MR. ROISMAN: Did that analysis that you have just
23 described include an analysis of the modifications shown on
24 Figure 3 of the Applicant's testimony?

25 MR. TILLOU: This is documented, yes. This is

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1 documented in the inspection records of the repaired ring.

2 MR. ROISHAN: I am sorry. My question was you had
3 described to me a form of analysis that the Staff had done.
4 I was just asking did that form of analysis include analysis
5 of this modification in Figure 3?

6 Now you seem to be answering the question outside
7 the confines of it. I wish if you could you would answer
8 it within the confines.

9 MR. TILLOU: I still think that you and I are
10 using different connotations for the word analysis. By
11 analysis do you mean a structural analysis similiar to that
12 conducted by Mr. Lofy?

end

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1 MR. ROISMAN: At the moment I just mean that
2 dissertation that you gave us a few moments ago of what the
3 Staff review consisted of with regard to the Brill allegations,
4 and I am asking that the Staff review of the Brill allegations
5 as you described it include the review of this particular
6 modification that's shown on Figure 3.

7 MR. TILLOU: I did indeed review the inspection
8 records indicating what repair that was done and that it was
9 satisfactorily accomplished to provide a bearing.

10 MR. ROISMAN: Can you tell me when was that work
11 done? Was it done by Mr. Brill in his shop or was it done
12 after he had shipped it?

13 MR. TILLOU: This was done by a repairing agency
14 engaged by United Engineers and Constructors after arrival
15 on the site.

16 MR. ROISMAN: Were you here yesterday when Mr. Brill
17 indicated that prior to shipment from his plant of the reactor
18 support ring that some work was done to attempt to correct
19 what he described as the warping of the ring?

20 MR. TILLOU: I was here.

21 MR. ROISMAN: Did your analysis disclose what that
22 work was?

23 MR. TILLOU: It did not. Mr. Brill was able to
24 provide no records of any rework that was accomplished at
25 their plant.

1 MR. ROISMAN: In your work in the review of reactors
2 generally have you found that these "working problems of the
3 reactor support ring" that occurred are typical, to be
4 expected, or somewhat unusual?

5 MR. TILLOU: Any weldment is likely to provide some
6 warpage or distortion during the excessive heat which is
7 provided during stress relieving. The stress relieving
8 operation itself does this. The rapid cooling after excessive
9 heating.

10 MR. ROISMAN: It's my understanding that the stress
11 relieving that was done on the parts here in question --
12 correct me if I am mistaken on this-- consisted of raising
13 the part in question to a specified temperature, 1150 degrees
14 Fahrenheit, for a specified period of time, and then cooling
15 it slowly while it remained in a closed oven.

16 Now that doesn't seem to comport with your
17 description of quick cooling, which sounded almost like
18 quenching or throwing it into cold air immediately.

19 Are you saying that even this slow cooling is the
20 kind that would cause the warping?

21 MR. TILLOU: Yes.

22 MR. ROISMAN: Is it your understanding that the slow
23 cooling was in fact done on the support ring?

24 MR. TILLOU: Since there were no furnace charts
25 available to indicate the profile, nor the slope time, nor the

K2Bt3

1 decay heat time, I am unable to make that judgment.

2 MR. ROISMAN: Mr. Brill had testified yesterday that
3 he met all of the specifications that were required for pur-
4 poses of the construction of the support ring itself, that is
5 the materials and the techniques that were to be used, and the
6 heat treatment, so forth, and yet when he finished it it was
7 not possible for it to remain within the tolerances required.

8 Did your investigation confirm that that was the case,
9 that it was not possible to build this ring and meet the end
10 tolerances that were required and also follow all of the steps
11 that were required to be followed by the specifications?

12 MR. TILLOU: Our investigation did not reveal any
13 such condition.

14 MR. ROISMAN: Did it indicate definitely that it did
15 not exist or did it simply not indicate on the subject?

16 MR. TILLOU: I don't quite understand that question.

17 MR. ROISMAN: I had asked you if it confirmed what
18 Mr. Brill had said and you said no, your investigation had not
19 confirmed it. Then I asked you did it refute it or did it
20 simply not touch his allegation one way or the other.

21 MR. TILLOU: I think my first answer has to stand.
22 We could find no evidence that this item was not manufacturable.

23 MR. ROISMAN: But that could have been either because
24 you looked for it and there was none or you didn't look for it.
25 That's what I am trying to find out.

K2Bt4

1 In other words, did your investigation now lead you
2 to the conclusion that this item is manufacturable in the
3 manner in which it was intended to be manufactured and still
4 to meet the tolerances when it's all finished?

5 MR. TILLOU: Yes, it could have.

6 MR. ROISMAN: That's what I was trying to get at.
7 Thank you.

8 Now in terms of the reactor support ring modification
9 that's shown on Figure 3, do you know whether it as depicted
10 here and as in fact the problem existed was that the ring did
11 not meet at the bottom, or did meet at the top? In other
12 words, to your knowledge is that an accurate reflection of
13 the precise difficulty with the splice plates?

14 MR. TILLOU: I can only quote what was in the
15 records covering this item.

16 MR. ROISMAN: Yes. And what did they disclose?

17 MR. TILLOU: They do indeed disclose the condition
18 existed.

19 MR. ROISMAN: Looking now at the drawing that's up
20 here on the board, it indicates that the ring, that the bottom
21 part of the ring was not joined and the top part was.

22 Did your drawings indicate did the top part meet
23 evenly all the way along the top of the splice plate or was
24 there also some warping away from the top edge as well?

25 MR. TILLOU: There is no evidence to indicate that

K2Bt5

1 there is any mismatch on the top surface, Mr. Roisman.

2 MR. ROISMAN: Was there any tendency for the --
3 there was also testimony regarding the fact that the ring was
4 slightly oval. Can you tell me where did the slight ovalness
5 of the ring-- how does that show up in terms of the meeting
6 of the splice plates or did it not show up at all at the
7 splice plates?

8 MR. TILLOU: I can't answer that question.

9 MR. ROISMAN: Can anybody on the panel answer that
10 question?

11 MR. MADSEN: I think the answer to the question is
12 we are not aware exactly where the ovality is. We know it
13 exists. We then looked at the repairs that were performed
14 and the final status of the ring girder and made our
15 evaluation on that.

16 MR. ROISMAN: Looking still at the large drawing
17 of Figure 1, Mr. Tillou, can you tell me after the machining
18 was done or a grinding as the case may be, and a portion on
19 the splice plate was removed, did that leave a support ring
20 that was smaller in circumference than the ring was
21 originally intended to be?

22 MR. MADSEN: I can only state that after the
23 installation of the vessel there was no variation in the
24 support pads which would have had any bearing on the rings
25 other than the change in the size of the ring, I am trying to

K2St6

1 say, did not reduce the varying surfaces for the nozzles and
2 thereby increase the stresses on the rings.

3 MR. ROISMAN: But the ring may in fact have been
4 slightly different than the original?

5 MR. MADSEN: It may indeed have been slightly below
6 the original condition, although this was not specifically
7 measured and evaluated by the Staff.

end

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1 MR. ROISMAN: Can you explain to me, while we have
2 this drawing here, to see if I understand correctly, how the
3 support ring and the reactor join up? Correct me if I am wrong.
4 At the point where the cooling pads are located, the nozzles
5 of the reactor come in contact with the support ring; is that
6 correct?

7 MR. TILLOU: It is oversimplified, but yes.

8 MR. ROISMAN: If it is halfway clear and it is
9 oversimplified, we are a long way in the right direction.

10 Does anything else hold the reactor up other than
11 the support pads against the nozzle?

12 MR. MADSEN: The reactor vessel is supported by
13 that ring and the support pads are part of it. There are
14 some shim plates that fit in above the support pads which you
15 are looking at.

16 MR. ROISMAN: I was going to get to the shim plates
17 in just a second. Was that the reason for Mr. Tillou's
18 statement about the oversimplification, because technically
19 the nozzle rests on the shim pads and the shim pad rests --
20 And the green grass? All right, I got it.

21 MR. MADSEN: I believe the answer is yes.

22 MR. ROISMAN: Then is it correct to state that if
23 there were a deficiency in this ring's ability to perform
24 its function, the support pads or the rings which are
25 supporting this support pad, that the effect would be that the

1 reactor vessel itself could fall? In other words, this ring
2 is that critical to the vessel and its integrity, if you
3 will?

4 MR. MADSEN: For instance, if you just all of a
5 sudden took away the ring girder, that is possible.

6 MR. ROISMAN: And if the ring girder were to go
7 down just slightly on one side, collapse a little bit, you
8 would be setting up a new set of stresses that are not
9 intended to be, thereby tending to twist, or there would be
10 a tendency to break off a nozzle on the reactor vessel; is
11 that correct?

12 MR. MADSEN: There would be a change in position,
13 yes.

14 MR. ROISMAN: Would that change in position set up
15 stresses in the point where the nozzle and the vessel meet?
16 I realize the nozzle is part of the vessel in the sense that
17 it is all one unit.

18 MR. MADSEN: I would expect that additional stresses
19 would be imparted.

20 MR. ROISMAN: Is it correct to say that the levelness
21 of the ring is a very critical and important safety feature
22 of the reactor, and something which you as compliance would
23 want to make sure that levelness was maintained and installed
24 originally?

25 MR. MADSEN: The levelness of the reactor vessel

1 itself is important, yes.

2 MR. ROISMAN: The ring's levelness is only important
3 insofar as you can't correct its failure to be level in such
4 a way that you can make the reactor vessel level; is that
5 correct?

6 MR. MADSEN: That is correct. Now we are back to
7 the shims.

8 MR. ROISMAN: The shim plates?

9 MR. MADSEN: Yes.

10 MR. ROISMAN: Was this originally designed to have
11 shim plates between the pads and vessel nozzle?

12 MR. MADSEN: My understanding is yes.

13 MR. ROISMAN: Were those shim plates designed to
14 serve the function of correcting the failure of the ring to
15 whatever extent it did fail, to be level?

16 MR. MADSEN: The shim is normally used as a fit
17 mechanism. The answer is yes.

18 MR. ROISMAN: After this ring was shipped by
19 Mr. Brill -- I understand that he also had constructed shim
20 plates that were a part of the whole contract for the support
21 ring; is that correct?

22 MR. MADSEN: That's my understanding.

23 MR. ROISMAN: After they were shipped, was it
24 determined that further shim plates were required?

25 MR. TILLOU: Mr. Roisman, the shim support structures

1 under the nozzles are a part of the design of the vessel.
2 These are a form of material which is special material which
3 is machined to exactly fit the shoes in the support position.
4 These are part of the original design of the vessel. These
5 are tailored individually to fit in order to provide perfect
6 level and plumbness of the level. They are made this way
7 in order to accommodate minor variations in the elevation
8 of the support pads as you see them located on there.

9 MR. ROISMAN: And that is only done after the
10 support ring is delivered and an initial attempt to fit the
11 vessel and the ring together is made; is that correct? I
12 think this is in the Applicant's testimony they indicated
13 that they used --

14 MR. TILLOU: I was going to suggest, this has been
15 gone over rather thoroughly by the Applicant in their
16 testimony.

17 MR. ROISMAN: I am trying to make sure we are all
18 talking about the same set of shim plates. The only shim
19 plates involved here are the shim plates that were made that
20 is involved for purposes of these cooling pads.

21 Were the ones that were made after the ring was
22 delivered fit up, installed, the reactor vessel was put down
23 there, the plastic substance was used to get a mold for
24 purposes of getting the exact configuration of the shim
25 plate, and then somebody else constructed, fabricated those

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shim plates; they were brought in, put in and the reactor vessel was in place permanently; is that correct?

MR. TILLOU: Right.

1 MR. ROISMAN: The reason that I was confused is
2 that I thought that Mr. Brill had constructed shim plates
3 for this ring at the time he constructed the ring. Your
4 testimony is that at least the shim plates regarding these
5 cooling pads would only have been constructed after the vessel
6 and the ring had been brought together; is that correct?

7 MR. TILLOU: That's my understanding, yes, that's
8 correct.

9 MR. ROISMAN: In the Applicant's testimony they
10 indicated that beneath the ring there is a grout of some kind
11 by which the ring is attached to the concrete pad on which
12 it sits. Is that a correct oversimplification?

13 MR. TILLOU: Yes, Mr. Roisman.

14 MR. ROISMAN: They indicated that in order to get
15 the ring level, one of the adjustments that they made was to
16 change the depth of the amount of grout that was used.
17 Are you familiar with that part of their testimony?

18 MR. TILLOU: Yes, I am.

19 MR. ROISMAN: Did the Staff do an analysis to
20 determine whether or not changing in the amount of grout in
21 any way affected the stability of the ring or the contact
22 between the ring and the concrete below it, or the strength
23 of the ring or anything like that?

24 MR. TILLOU: Again, we have a semantics problem.
25 Grout is cement or concrete.

1 MR. ROISMAN: Yes.

2 MR. TILLOU: If we reduce an area of concrete by
3 a fraction of an inch, such as was done in this case, it has
4 no bearing whatsoever. Concrete is concrete provided it is
5 properly made. Whether you have three inches --

6 MR. ROISMAN: You have your finger on it there.

7 MR. TILLOU: Whether you have three inches or two
8 and a half inches, it has very little bearing on the
9 installation of the vessel or the ring.

10 MR. ROISMAN: I don't know if you have ever done
11 any bricklaying in your time, Mr. Tillou. As you know, when
12 you start with an already finished piece of concrete and
13 you attempt to bind other concrete to it, it is a somewhat
14 more complicated process than if you start originally and pour
15 all of your concrete and all set at the same time. My
16 question to you is, in making this grout, as I understand it,
17 we already had a concrete pad, and we are now filling in the
18 space between the bottom of the ring and the concrete pad
19 with a grout, namely more concrete, which was to bind with
20 the existing concrete, and some way or another was to be
21 attached to the bottom of the support ring.

22 There was an initial depth of that that was
23 required, and that depth was changed. My question to you is,
24 how does the Staff know that the change in that depth of
25 grout does not have any effect on the stability of the ring

1 or the bind between the ring and the support concrete below
2 it?

3 MR. TILLOU: We are not prepared to answer that.
4 I am not a civil engineer by profession. That gets into the
5 area of civil and structural engineering.

6 MR. ROISMAN: Mr. Tillou, if you wanted to say
7 something else, you may. Was there someone on the Staff with
8 that qualification who would have examined that question?

9 MR. MADSEN: Not in the specifics that you relate.

10 MR. ROISMAN: So that in the course of doing the
11 review of these charges that were made by Mr. Brill, the
12 Staff has not independently investigated or specifically
13 focused upon the grouting question as such; is that correct?

14 MR. MADSEN: Our review of the records on the
15 installation, we did carry through, and part of that was the
16 grouting.

17 MR. ROISMAN: You mean your review at the time
18 of the installation or you mean this most recent review?

19 MR. MADSEN: The most recent review.

20 MR. ROISMAN: So you did find the records that
21 showed that they did grout and that the grout thickness was
22 changed in various places to accommodate the ring?

23 MR. MADSEN: That is correct.

24 MR. ROISMAN: Did you go on to find out whether
25 that grout thickness difference made any practical difference?

1 MR. MADSEN: Our review was not the depth where I
2 can answer yes. So I will have to say no.

3 MR. ROISMAN: Mr. Tillou, can you help me with
4 one problem just with the drawing so I will be clear on
5 exactly how the drawing is made? Can you tell me what those
6 little holes are or what look like holes?

7 MR. TILLOU: Relief holes for the installation of
8 the nuts on the anchor bolts.

9 MR. ROISMAN: These were the holes that are referred
10 to in the Parameter, Inc. study when they said there were
11 certain notches that were made for anchor bolts? These
12 represent those notches; is that correct?

13 MR. TILLOU: I don't remember that quotation.

14 MR. ROISMAN: It wasn't a quotation.

15 MR. MADSEN: I think perhaps it is best that Mr. Lofy
16 answer that question.

17 MR. ROISMAN: Let me get the pertinent page.

18 Mr. Lofy, looking at page nine of your study, could
19 you identify for me if any of the modifications briefly
20 described there are the ones that I indicated up here on
21 Figure I which is these four little holes? We see them again
22 over here.

23 MR. LOFY: On page nine?

24 MR. ROISMAN: Yes. Page nine of the study, not the
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1 attachment. That is whatever you call the front part.

2 MR. LOFY: We have that described in a sketch in
3 attachment two.

4 MR. ROISMAN: What is the page in attachment two?

5 MR. LOFY: Page twenty.

6 MR. ROISMAN: Are the holes that are shown there
7 roughly these holes that I am now pointing to which are
8 beneath each of the four cooling pads?

9 MR. LOFY: Yes.

10 MR. ROISMAN: Is this a solid piece beneath this
11 plate all the way down, or is this just a vertical piece of
12 sheet steel that goes up from the bottom plate and attaches
13 to the top plate?

14 MR. LOFY: It is a vertical plate of two-inch
15 thickness, I believe.

16 MR. ROISMAN: Is the hole all the way through?

17 MR. LOFY: Yes.

18 MR. ROISMAN: Do I understand that your analysis
19 was made on the assumption that the weight that is placed here
20 on the cooling pad is being picked up by what is shown here
21 as internal stiffeners?

22 MR. LOFY: It is picked up by both the internal
23 stiffeners and the vertical plate.

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1 MR. ROISMAN: Was this vertical plate weakened by
2 having those notches cut in it?

3 MR. LOFFY: Well, cutting those notches is not a
4 modification. They were in the original design. The only
5 modification was rounding out the corners of the notches.

6 MR. ROISMAN: You are talking about these little --
7 which are not shown there but shown on your Figure 20, the
8 little tiny holes in the corners?

9 MR. LOFFY: Yes. These are access holes where wrench
10 clearance to get in and tighten up the nuts on the anchor
11 bolts. They were in the design all along.

12 MR. ROISMAN: What was not in the design all along
13 was the little notch hole up in the corner?

14 MR. LOFFY: Yes, the half-inch diameter drilled out
15 corner.

16 MR. ROISMAN: Did that weaken in any way, the support?

17 MR. LOFFY: No, it did not.

18 MR. ROISMAN: Mr. Madsen, one point I'd like to get
19 clarified, if possible, is that there seems to be on this
20 question of the reactor support ring some difference between
21 the analysis that has been done by Parameter and the analysis
22 to which the Applicant has directed its attention.

23 Parameter seems to be focusing on some modifications
24 that the Applicant didn't particularly focus on, and the
25 Applicant seems to be focusing on some modifications that

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1 Parameter didn't focus upon.

2 I wonder, can you tell me or can you explain what
3 the situation is. For instance, I don't see anything in the
4 Parameter study that deals with the modification of the
5 Applicant as shown in Figure 3 of its --

6 MR. KARMAN: Mr. Roisman, I would appreciate if
7 each of the so-called differences you would be specific as
8 to what you have in mind.

9 MR. ROISMAN: I was referring here to Figure 3 of
10 the Applicant's testimony. It is the one that Mr. Tillou and
11 I started talking about on the splice plates.

12 MR. MADSEN: That is correct.

13 Pardon me, I now have the item, Figure 3.

14 MR. ROISMAN: You just said as to that being correct,
15 the question was, was the reactor unsafe, and you said that
16 is correct?

17 MR. MADSEN: Did I do that? Can you read back that
18 answer?

19 MR. KARMAN: That goes back to Al Smith.

20 MR. ROISMAN: My question is, how did the Staff
21 make the determination that the more, if you will, thorough
22 or detailed kind of study which Parameter, Inc., represent
23 did not have to be done with regard to the splice plates?

24 Let me refer you particularly to the statement in
25 the Parameter, Inc., study which indicates on Page 5 of the

L3Wt3

1 Parameter, Inc., study in the introductory paragraph, that
2 they describe what is taking place. They say:

3 "The Division of Compliance Technical Support Branch
4 has authorized the Parameter, Inc., to review modifications
5 made in certain shop fabricated components which support the
6 reactor pressure vessel and steam generators at Indian Point
7 Unit - 2, and to evaluate any possible effect of the
8 modifications on the structural integrity or servicability
9 of those components. Specifically, questions have been raised
10 as to the condition of the reactor support ring and upper
11 level steam generator support shoes on which modifications
12 were made subsequent to delivery to the site."

13 Then suggested a delineation in the Parameter, Inc.
14 investigation based upon a period of time rather than any
15 particular safety judgment.

16 I wonder if you can explain to me, is this modifica-
17 tion of the Applicant depicted on Figure 3 one that didn't
18 fall within that time period, or why was it not included in
19 the detailed analysis?

20 MR. MADSEN: I think we will have Mr. Lofy answer
21 that question.

22 MR. ROISMAN: All right.

23 MR. LOFY: I'd like to say that we reviewed a great
24 deal of information here at Indian Point before deciding which
25 areas were modifications to the original design and warranted

L3wt4

1 an independent analysis. One of the areas we looked at was
2 the splice plate.

3 Reference D-13 describes some information that we
4 reviewed, and from it determined, number one, that the splice
5 plates were machined to have adequate bearing area both on
6 surfaces and under the bolts and nuts.

7 Secondly, that the thickness did not violate the
8 original design.

9 On that basis we did not consider the splice plate
10 machining where it was done, a modification to the original
11 design, and we did no additional stress analysis. It was
12 reviewed.

13 MR. ROISMAN: Let me see if I understand the term
14 "modification." Do you mean that any changes that were made
15 in these components which merely brought them into line with
16 their original design requirements as opposed to changing
17 the original design requirements were not ones that you went
18 into further investigation upon; is that correct?

19 MR. LOFY: That is correct. We were under the
20 understanding that this machining was performed under the
21 direction of PECOR. It was not by others. It was by PECOR,
22 to the best of my knowledge.

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MBt1

1 MR. ROISMAN: Now, Mr. Madsen, directing your
2 attention to Pages 8 and 9 of the Applicant's testimony, they
3 indicate there that in terms of the work that they did on the
4 shim plate with regard to the vessel, and I am quoting now
5 from Page 9, that, "blueing measurements indicate that surface
6 contact between each reactor vessel foot and its associated
7 shim was in excess of 67 per cent, thereby assuring uniform
8 transmission of the load to the foundation."

9 Do you see that on Page 9 at the very top? The
10 first full sentence at the top.

11 MR. MADSEN: Yes.

12 MR. ROISMAN: Now did your analysis include a fit-up
13 of the splice plates indicating that an attempt was made to
14 determine how much contact there was between the two pieces
15 of splice plates?

16 MR. MADSEN: Yes.

17 MR. ROISMAN: And what was the percentage of contact
18 as compared to 57 per cent that was found between the shim
19 plates and the vessel foot?

20 MR. MADSEN: When I said yes, we are going here again
21 on the basis of records.

22 MR. ROISMAN: I understand. Yes, and what do those
23 records disclose?

24 MR. MADSEN: I think in answer to this is that we did
25 review this specific thing, and I think Mr. Lofy can address

MIBt2

1 you as to our findings.

2 MR. ROISMAN: Good, fine.

3 Yes, that's right, contact between the splice plates.

4 MR. LOFY: I am not aware of a requirement for
5 blueing similar to that for the vessel shims. And the records
6 show that they were machined, I would expect machines surfaces
7 to meet within, and when they are bolted up, to meet within
8 such a tolerance that you couldn't put a feeler gauge in, and
9 you had metal-to-metal contact.

10 I don't know if a percentage of bearing surface was
11 established. I am talking about the splice plate.

12 MR. ROISMAN: Yes, that's right. Did you see anything
13 that indicated to you that any attempt was made to verify that
14 there was a substantial amount of metal-to-metal contact
15 between the splice plates?

16 MR. MADSEN: Just the information in reference D.13
17 of our report.

18 MR. ROISMAN: That's the five-page report.

19 Mr. Chairman, I would assume that that would be part
20 of what the Applicant would be producing in the way of documents.
21 If I am incorrect maybe Mr. Voigt, who is handling this, could
22 tell me that he was not intending to produce that particular
23 reference. It's on Page 15 of the Parameter study and it's
24 D-13.

25 It says "Five pages of correspondence and inspection

MBt3

1 data relating to machining of ring girder splice plates.

2 MR. VOIGT: Mr. Chairman, it's my understanding that
3 if Mr. Roisman wants a document pertaining to the Staff
4 testimony he will ask the Staff for it, at least in the first
5 instance.

6 Now if there is some difficulty, if the Staff counsel
7 hasn't been able to provide him with the information, we'd be
8 glad to talk to him about it. But I believe that orderly
9 procedure dictates that when he is cross-examining the Staff
10 and he is inquiring about the documents that the Staff witness
11 has referenced and relied upon, that he direct his request at
12 least in the first instance to the Staff witness or the Staff
13 counsel.

14 CHAIRMAN JENSCH: I think that is correct. This is
15 foundation evidence for the Staff.

16 MR. KARMAN: We have no problem with furnishing
17 Mr. Roisman with copies of these. We don't have sufficient
18 copies to distribute to everybody in the room.

19 MR. ROISHAN: Do you have them with you, all the
20 references?

21 MR. KARMAN: They were here and at the moment they
22 now are on the Applicant's table because they asked to look at
23 them just before this.

24 CHAIRMAN JENSCH: This is the second instance now,
25 Mr. Voigt. Would you, having gotten to step number 1, now go

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1 to number 3?

2 MR. VOIGT: I would point out for the benefit of
3 the record that the top item on this reference which is the
4 measurements of the so-called ovality of the ring, is also
5 one of the items that Mr. Trosten previously furnished to
6 Mr. Roisman. I haven't checked the correspondence that goes
7 with it.

8 CHAIRMAN JENSCH: It will be so noted.

9 MR. ROISMAN: Let me just clarify it.

10 MR. KARMAN: We would have no objection to the
11 Applicant making copies for you. We don't have the facilities.

12 MR. ROISMAN: I understand. I wonder if it would be
13 possible for me to have access to those references at lunch and
14 this evening when we break.

15 MR. KARMAN: Certainly.

16 CHAIRMAN JENSCH: You expect it to be available
17 sometime after the break this evening?

18 MR. ROISMAN: It's my hope.

19 CHAIRMAN JENSCH: To review it. Very well, proceed.

20 MR. ROISMAN: Mr. Lofy, just so that we are clear
21 on this, the items which you have identified in your analysis
22 attachment number 2, those represent the items in which the
23 reactor support ring differs from the ring as originally
24 designed, is that correct, to the best of your knowledge? And
25 they are summarized on Pages 9 and 10 of the main body of

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1 your report.

2 MR. LOFY: Yes.

3 end

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1 MR. ROISMAN: Mr. Lofy, in your analysis the
2 portion contained in attachment number two, at a number of
3 places in there you make reference to the stresses that are
4 expected on the reactor support ring, allowable stress figures
5 are also indicated. Now on these figures, like the figures
6 that we discussed with regard to the support shoes, based
7 upon data that you obtained from UE&C rather than upon an
8 independent analysis on your part to determine, for instance,
9 exactly how much stress is being applied to the reactor
10 support ring, given the weight of the reactor and how much
11 stress would be applied to it in any kind of a transient
12 condition?

13 MR. LOFY: Can you be specific? Can you break that
14 down?

15 MR. ROISMAN: Yes. For instance, looking up here
16 at Figure 1, and assume for a moment the cooling pad that's
17 shown on the right-hand side that has the words "cooling
18 pad" alongside of it, now you are trying to determine whether
19 or not the stress that bears on that cooling pad and on the
20 support ring under it as given by the reactor through the
21 nozzle will be greater than what the support pad, the ring,
22 can hold, and your analyses have included an attempt to make
23 that evaluation following the grinding and so forth that
24 was done with regard to the support pad. That is correct, is
25 it not?

1 MR. LOFY: Yes.

2 MR. ROISMAN: You had to know how much the stress
3 was in a static condition for the vessel, I assume. You also
4 had to know how much the load was going to be under an
5 appropriately conservative transient condition; is that correct?

6 MR. LOFY: We had to know the maximum stress.

7 MR. ROISMAN: That's right.

8 MR. LOFY: Maximum load, I should say.

9 MR. ROISMAN: Right.

10 MR. LOFY: Right.

11 MR. ROISMAN: And to get the maximum load how do
12 you get that figure?

13 MR. LOFY: We depended upon a reference that I
14 obtained during our initial meeting here at Indian Point.

15 MR. ROISMAN: By that you mean UE&C gave you that
16 information?

17 MR. LOFY: I am not sure whether it was a UE&C or a
18 Westinghouse reference. I'd have to check here.

19 MR. ROISMAN: Can we both get to the same page?
20 I am afraid this portion of the Staff study is a part I have
21 not been able to read as thoroughly as the first part, just
22 because of lack of time. So if you can direct me to the page
23 where the reference appears then we can both look at the
24 reference to talk about it.

25 MR. LOFY: The vertical load is shown applied on

1 page twenty. I will attempt to find the reference from which
2 that comes.

3 MR. ROISMAN: Is that load represented by the
4 figure P?

5 MR. LOFY: Yes.

6 MR. ROISMAN: If you are going to look at a drawing
7 maybe you can give me the drawing number and maybe it will
8 be one that I have also.

9 MR. LOFY: It is reference B.7 on page thirteen.

10 MR. ROISMAN: I don't have that reference.

11 Mr. Voigt, is that among the things that you had
12 on your desk that the Staff let you look at?

13 MR. VOIGT: Mr. Roisman, the only item I had from
14 the Staff, based on my specific request to the counsel, was
15 D.13.

16 MR. ROISMAN: Oh, fine. Thank you.

17 MR. VOIGT: The reason I asked for it was because
18 I didn't know what it was. I haven't asked for these
19 drawings and I suggest that you ask the Staff counsel for them.

20 MR. KARMAN: Where are we now?

21 MR. ROISMAN: I am still trying to find out where --
22 I want Mr. Lofy to have in front of him whatever he needs to
23 tell me how he knows that the proper P figure should be
24 1,329,000 lb., which I assume is pounds.

25 MR. LOFY: It's in this package.

1 MR. ROISMAN: You mean it came from a particular
2 drawing that was provided to you by Con Ed or one of its
3 subcontractors?

4 MR. LOFY: Yes.

5 MR. ROISMAN: You don't have to go and look for it
6 right now. And that was not independently verified by you,
7 is that correct?

8 MR. LOFY: That is correct.

9 MR. ROISMAN: Now was it your understanding that
10 the figure that you were given represented the maximum load
11 under the hypothetically worst possible kind of condition
12 that could occur, the break of the pipe or the earthquake or
13 whatever it was that produced the highest load?

14 MR. LOFY: Yes.

15 MR. ROISMAN: Did you attempt to determine what was
16 the criteria used for selecting what was the worst condition?

17 MR. LOFY: We did not.

18 MR. ROISMAN: Now about this sheet number 20 here
19 not possible for me to read, no fault of yours. Would you
20 just briefly tell me how you translated the P of pounds into
21 the bearing weight, the ability of the pad and the support
22 ring at that point to withstand the weight that it was being
23 subjected to? What is the figure that shows what its strength
24 is and what is the figure that translates the pounds into a
25 psi figure?

1 MR. LOFY: Well, the load P is taken by the
2 structure and cross-section in compression is that described
3 in the equation for compressive stress, the last one on
4 the page, and results in dividing load by the area in a
5 stress of 6515 psi.

6 MR. ROISMAN: That's how much stress is applied at
7 that point?

8 MR. LOFY: That is the compressive strength in a
9 cross-section that we have assumed here.

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1 MR. ROISMAN: Where do you show what is the strength,
2 that is how much stress this support shoe and ring can
3 withstand at these points?

4 MR. LOFY: How much can it withstand? We do not
5 calculate that.

6 MR. ROISMAN: Do you calculate what is allowable?

7 MR. LOFY: Well, the allowable stress per AISI
8 would be for a normal structure 22,000 without any extra
9 allowance for pipe that might break or any other abnormal
10 condition.

11 MR. ROISMAN: Does the point of the arrow P indicate
12 a point at which the entire 1,329,000 pounds is picked up,
13 or is that amount of weight spread over this U-shaped or
14 what I assume is a shim on top of the cooling plant?

15 MR. LOFY: It's spread over the shim.

16 MR. ROISMAN: So that it is the knowledge that the
17 shim meets not only the cooling pad but also that it meets
18 the nozzle surface firmly that would be the basis upon which
19 you would be able to conclude that the load had in fact been
20 spread?

21 MR. LOFY: Yes, sir.

22 MR. ROISMAN: And if it turned out that there was
23 a little high point there in the shim so that that little
24 high point was taking all the weight, the high point was only
25 one square inch, we'd come up with an entirely different set

1 of figures down here.

2 MR. LOFY: We'd come up with different figures at
3 the high point, but not in the gross section.

4 MR. ROISMAN: I understand.

5 Now do these figures demonstrate that there is no
6 give in the support ring when the stresses are increased as
7 the result of some transient condition taking place that
8 affects the reactor? Remember, we talked about the support,
9 the generator support shoes, and discovered that they actually
10 moved to some extent when stresses are applied. But as I
11 understand it this particular item is permanent, that is the
12 cooling pad is welded to the ring and ring is welded together
13 and it is in turn attached to the concrete below. Now what
14 happens? Is there enough strength in that cooling plate as
15 it's now installed in the plant so that there is no give,
16 or do we have a situation in which there will be some give
17 and for a period of time, no matter how brief, the reactor
18 vessel will be not level as the result of extra stresses on
19 one side as compared to the other?

20 MR. LOFY: You are selecting a vertical direction
21 when you say give.

22 MR. ROISMAN: Yes.

23 MR. LOFY: In the vertical direction stress levels
24 are quite low, and any give on one side more than another
25 would be a matter of microinches.

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MR. ROISMAN: Within .01?

MR. LOFY: No.

MR. ROISMAN: I am sorry?

MR. LOFY: No, not within ten-thousandths of an inch.

MR. ROISMAN: Now the other kinds of stresses that would be imposed on the cooling pad at this point are also the stresses that are discussed in this telephone communication which you gave me before, from the May 4th, is that correct? Those are radial forces, frictional load.

MR. LOFY: Up until now we have been looking at the case of a vertical load.

MR. ROISMAN: Yes.

MR. LOFY: Right. There is another load, which is radial.

MR. ROISMAN: Can you briefly just describe that?

MR. LOFY: Yes, sir.

MR. ROISMAN: Is it depicted here on sheet number, or could we use sheet number 20 to see it, or is there a better sheet?

MR. LOFY: I think we can go to sheet 13.

MR. ROISMAN: The R shown there sort of in the middle of the drawing represents the radial force?

MR. LOFY: Yes.

MR. ROISMAN: If the radial force were to exceed the strength of the support ring, what would happen? Would

1 the ring collapse on one side? I am unclear as to what the
2 consequences are of that kind of a force.

3 MR. LOFY: Well, first of all, the radial force is
4 due to friction.

5 MR. ROISMAN: Caused between the nozzle and the shim
6 plate?

7 MR. LOFY: That's correct.
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1 MR. ROISMAN: Yes.

2 MR. LOFY: As the vessel grows or contracts. If
3 it were to be exceeded it would increase the strength on the
4 ring. We did not calculate any case other than the radial
5 load that was specified in the same reference.

6 MR. ROISMAN: By the same reference you mean that
7 same drawing, C.2? There is a reference drawing there. Or
8 do you mean this reference that you referred to before,
9 B something, B.7?

10 MR. LOFY: Yes. B.7.

11 MR. ROISMAN: Mr. Chairman, I think at this time
12 from my standpoint I just need chance to look at some of these
13 documents that are coming in. I do not feel that this
14 cross-examination is as fruitful as it could be, and as I
15 have indicated when we initially asked for documents we were
16 fearful that that might happen. If it would be possible for
17 us to break for lunch I will look at as much of it as I can
18 during the lunch hour and try to focus the cross-examination
19 after lunch.

20 CHAIRMAN JENSCH: Let me inquire how much more
21 cross-examination do you envision that you have?

22 MR. ROISMAN: Well, that really depends on seeing
23 the documents. Some of them that I have seen dispelled
24 questions that I had. Others raised some. I just can't make
25 an accurate prediction of that.

1 CHAIRMAN JENSCH: Do you have any cross-examination
2 contemplated in reference to this safety valve header system
3 modification?

4 MR. ROISMAN: That I don't know because I have not
5 received a single shred of information on the subject. The
6 Staff has a witness who will testify orally, but there is no
7 written testimony. I would anticipate that I will have some
8 questions about it, but that's only a guess.

9 CHAIRMAN JENSCH: I wonder if we could provide some
10 time this afternoon for the oral presentation in that regard,
11 and you'd have the transcript available for review tonight.

12 MR. ROISMAN: That would be fine. I wouldn't object
13 if that were done right now, if the Staff wishes to have
14 someone present their testimony on that.

15 MR. TROSTEN: Mr. Chairman, we have an answer to a
16 question that was posed by Mr. Briggs which we are prepared
17 to offer in evidence.

18 CHAIRMAN JENSCH: That relates to the safety valve
19 header system. And that is all that you intended to adduce
20 in that regard?

21 MR. TROSTEN: We are prepared to respond to the
22 questions the Board may have on this.

23 MR. KARMAN: We have no direct evidence either,
24 Mr. Chairman. We are prepared to responde as best we can
25 with the people we have here, to respond to this.

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MR. ROISMAN: I am afraid I don't understand your letter to me, Mr. Karman, which I don't have in front of me, or I should say your response to our request for data which said that you were planning to present data.

NWtl
1 MR. KARMAN: Mr. Roisman, we discussed this on the
2 phone maybe a week and a half, ten days ago, in which you
3 requested permission to discuss with members of the Staff
4 most knowledgeable on the subject to find out exactly what the
5 problems were and possibly to enrich yourself in this matter.
6 At that time I indicated that the men who would be most
7 knowledgeable were about to leave the office, and that they
8 would be back the following week.

9 You indicated that you were quite busy and you would
10 get in touch with me and possibly speak to them on the phone
11 or try to make other arrangements to come and discuss it. I
12 am speaking primarily of either Mr. Maccary or Mr. Lange of
13 our office. I have not heard from you since that time.

14 MR. ROISHAN: Obviously there was some confusion in
15 our phone call because all I was waiting for was for you to
16 give me Mr. Lange's phone number and the location in which
17 he was traveling so I could call him.

18 MR. KARMAN: I had indicated he was going to be
19 away for a few days.

20 CHAIRMAN JENSCH: This is something you could take
21 up at the noon hour. This could be the first item after lunch.
22 We could have it established on the record and have it
23 available for consideration tomorrow. After the presentation
24 of the direct evidence, or whatever the data are with
25 reference to the safety valve system, we can return again to

1 the balance of your examination on this report by the Staff.

2 Is that agreeable to the parties?

3 MR. TROSTEN: Yes.

4 CHAIRMAN JENSCH: At this time let us recess to
5 reconvene in this room at two o'clock.

6 (The luncheon recess is taken.)
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A A T E R N O O N S E S S I O N

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2 CHAIRMAN JENSCH: Please come to order. Just before
3 the noon recess we were considering going ahead at the outset
4 of this afternoon's session with reference to the data on
5 the safety valve header system. I believe there was a
6 question propounded by Mr. Briggs in that regard. Can you
7 identify the portion of the record?

8 MR. TROSTEN: Yes. Mr. Chairman, we have prepared
9 a response to the question identified by Mr. Briggs. It is
10 in the transcript, page 4848, line 17 to 18. Transcript
11 page 4849, lines 1 to 3 and 15 to 12. We have prepared
12 the answer which Mr. Cohen is passing out to the Board and
13 the parties now, and we are prepared to offer this in evidence
14 under the sponsorship of Mr. Grob.

15 We also have some additional back-up witnesses in
16 case there are more detailed questions.

17 CHAIRMAN JENSCH: Mr. Grob, having been previously
18 sworn, need not be sworn again.

19 MR. TROSTEN: Mr. Grob, was the answer to Mr. Briggs'
20 question raised at the April 5th session which I show to you
21 now and bears the heading, "Question No. 1B, transcript 4848,
22 line 17, 18; transcript 4849, 1-3, 16-20 ASLB 4/5/72,
23 discussion of code requirements and heat treatment for
24 modifications to secondary plant main steam safety valves" --
25 Were they prepared under your supervision and direction?

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MR. GROB: Yes.

MR. TROSTEN: Do you desire to have this answer included in the transcript as if read and received in evidence in this proceeding?

MR. GROB: Yes.

PIBt1
1 MR. TROSTEN: Mr. Chairman, in response to the
2 Board's request for information we offer the two-page document
3 which I have just identified in evidence in this proceeding.

4 CHAIRMAN JENSCH: Is there any objection to having
5 this statement physically incorporated within the transcript
6 as if read?

7 Regulatory Staff?

8 MR. KARMAN: No objection.

9 CHAIRMAN JENSCH: State of New York?

10 MR. MARTIN: No objection.

11 CHAIRMAN JENSCH: Hudson River Fishermen's
12 Association?

13 MR. MACBETH: No objection.

14 CHAIRMAN JENSCH: Citizen's Committee?

15 MR. ROISMAN: Is this subject to cross-examination,
16 Mr. Chairman?

17 CHAIRMAN JENSCH: Oh, indeed.

18 MR. ROISMAN: No, no objection.

19 CHAIRMAN JENSCH: The statement identified by witness
20 Grob and to which Applicant's counsel has just referred may
21 be physically incorporated in the transcript as if read.

22 (Document follows.)
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P1Bt2

1 MR. TROSTEN: Mr. Chairman, I am sorry, I neglected
2 to ask a question of Mr. Grob which I intended prior to the
3 offer.

4 Mr. Grob, is there any correction in this proposed
5 testimony as originally submitted to the Board?

6 MR. GROB: Yes. What I have here now includes a
7 change in the next-to-last sentence where the post weld heat
8 treatment is described as being in accordance with the code
9 but does not include the precise method of heat treatment,
10 whereas the initial one sent to the Board indicated induction
11 heating.

12 CHAIRMAN JENSCH: What is the change you propose?

13 MR. TROSTEN: The change we propose, Mr. Chairman,
14 is that in the third line from the end, Mr. Chairman, of the
15 document that was originally submitted to you -- I don't know
16 whether you have it with you, Mr. Chairman.

17 CHAIRMAN JENSCH: No, I do not have that available
18 at the moment.

19 MR. TROSTEN: In any event the change is that the
20 phrase "Utilizing induction coil heating" reference to BS1.1
21 has been deleted. The document that's just been given to you
22 doesn't have those words.

23 CHAIRMAN JENSCH: Very well. Thank you.

24 Does the Staff have some evidence in this respect?

25 MR. KARMAN: No, we do not, Mr. Chairman. There was

Bt3
1 no question propounded by the Board or any of the Staff
2 witnesses with respect to this matter, and I might add that
3 with respect to this entire matter of the headers I would
4 like to distribute to the parties a copy of a letter which
5 was sent by the Regulatory Staff to the Applicant on May 12,
6 which indicates that the Regulatory Staff is aware of the fact
7 that as a result of a design interview conducted by the
8 Applicant a change in safety valve discharge tailpipe
9 orientation and additional reinforcement in the nozzle area
10 of the main steam piping is planned.

11 Then the Regulatory Staff goes on to request,
12 "Please provide for our review the design and installation
13 criteria and a summary of stresses and other pertinent
14 matters, so at the moment, Mr. Chairman, we have really no
15 direct testimony on this subject.

16 CHAIRMAN JENSCH: In response to your letter have
17 you had a design proposal?

18 MR. KARMAN: The letter was just sent on May 12,
19 Mr. Chairman. We have not to the best of my knowledge had
20 any response.

21 CHAIRMAN JENSCH: What is the status of this steam
22 safety valve situation? Are you proposing to make some change?
23 Is that it? Has it been done? Has it been designed? How far
24 along is it? Can you tell us something about that?

25 MR. TROSTEN: Yes, Mr. Grob can respond to that,

By4

1 Mr. Chairman.

2 MR. GROB: It has been designed, the work is currently
3 underway. Work has been done on the exhaust elbows from the
4 safety valves and weld metal is presently being deposited on
5 the main steam piping.

6 CHAIRMAN JENSCH: When do you expect this work will
7 be done?

8 MR. GROB: The exact schedule of this work I would --
9 The work is scheduled to be completed towards the
10 latter part of June.

11 CHAIRMAN JENSCH: Well, here is a letter of May 12,
12 1972, from the Regulatory Staff requesting opportunity for
13 the Staff to "review the design and installation criteria and
14 a summary of stresses applicable to the mounting of pressure -
15 relieving devices (safety valves and release valves) for the
16 over-pressure protection of systems with ASME Class 1 and 2
17 components for Indian Point 2.

18 "In particular, the design criteria and summary of
19 stresses used to account for full discharge loadings (i.e.,
20 thrust, bending, torsion) on valves and on connected piping
21 in the event all valves for a system are required to discharge
22 should be described including the provisions made to
23 accommodate these loads.

24 "State all significant assumptions used in the
25 analysis of stresses for safety valve discharge."

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This was stressed to Mr. Cahill. Have you received
this letter, Mr. Cahill?

MR. CAHILL: Yes.

1 CHAIRMAN JENSCH: If your design and installation
2 criteria have been formulated and written down and recorded
3 are you able to Xerox the thing and send it back to this
4 panel?

5 MR. CAHILL: Sir, the letter asks for information
6 on other valves besides the main steam safety valves. We
7 are endeavoring to respond in a prompt fashion, but we aren't
8 ready to Xerox the complete answer to that and send it off
9 this instant.

10 CHAIRMAN JENSCH: Well, tell me, have you formulated
11 your design and installation criteria?

12 MR. CAHILL: Yes, for the main steam safety valves,
13 yes.

14 CHAIRMAN JENSCH: Have you computed or made a
15 summary of the stresses applicable in mounting the pressure
16 release valves?

17 MR. CAHILL: Yes.

18 CHAIRMAN JENSCH: Those could be Xeroxed and sent
19 back to the Staff, is that correct?

20 MR. CAHILL: Yes.

21 CHAIRMAN JENSCH: If the Staff should suggest some
22 changes in what you are doing are you in a position in the
23 course of your construction to adjust to it and retrofit or
24 backfit?

25 MR. CAHILL: Sir, that would of course depend upon

1 the nature of the changes. We are correcting a deviation
2 from the plant design criteria as given in the FSAR. We are
3 bringing the safety valve installation into conformance with
4 the design as we have described it to the Staff, and do not
5 anticipate, therefore, that there would be changes, and we
6 are moving ahead to accomplish this because of the urgent need
7 to keep moving and if of course a change was required and
8 forced on us, the risk would be -- That would be at our risk.

9 CHAIRMAN JENSCH: Just so we may understand some
10 other matters, too, on which you are speaking, Mr. Cahill,
11 I wonder what other items do you have coming on for this
12 "latter part of June" so that everything will be directed to
13 criticality. Can you tell us what other systems and
14 components are under review or redesign or further construction
15 or completion of original construction?

16 MR. CAHILL: Well, on the subject of this letter
17 there is a review of the safety and release valves in the
18 ASME Class 1 and 2 categories. In addition to that we have
19 several matters which do not appear to us at this time to be
20 controlling on the start-up schedule. The controlling item,
21 we believe, is this safety valve modification, which is a
22 significant amount of work. There are twenty valves on large
23 piping and this is the controlling item. We have some
24 corrections to be made in a boiler feed pump, in a main
25 coolant pump motor. We have a control rod malfunction which

1 has been picked up under the precritical flow test control
2 rod exercising. That has to be corrected. There is still
3 some work which is not controlling on pipe restraints and
4 hangers. There is still some insulation work. There is an
5 electric heating tracing circuit that has to be completed as
6 part of the final repair, and well, that's all I can think of
7 right now. I think that is essentially it.

8 CHAIRMAN JENSCH: Does this control rod malfunction
9 require a retesting of the other control rods?

10 MR. CAHILL: Yes, it will.

11 CHAIRMAN JENSCH: And is this something that you
12 are working with the Compliance section on?

13 MR. CAHILL: We are.

14 CHAIRMAN JENSCH: Have they made any suggestion as
15 to the tests to be undertaken with reference to your other
16 control rods other than the one that's in malfunction?

17 MR. CAHILL: I'm not sure, sir. I know that they
18 are informed of the matter and following it and --

19 CHAIRMAN JENSCH: What is the malfunction?

20 MR. CAHILL: We are still investigating, but the
21 malfunction was on testing. During the precritical test a
22 control rod stuck. In fact three, I think three control rods
23 stuck. But one of them jammed and on investigation we found
24 that the -- If you are familiar with the configuration, the
25 control rod cluster arrangements of several rods that go inside

1 the fuel elements, held together in a structure called a
2 spider, which is then attached to the drive shaft, and one
3 of the projections of that spider broke apparently because it
4 was jammed by a piece of metal, which we are determining just
5 what that was.

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1 CHAIRMAN JENSCH: You don't know the source of this
2 piece of metal?

3 MR. CAHILL: It looks like a machine chip.

4 CHAIRMAN JENSCH: Are you going to have to replace
5 that control rod?

6 MR. CAHILL: That control rod will have to be
7 replaced, yes.

8 CHAIRMAN JENSCH: And the main coolant pump motor
9 will have to be replaced or repaired or calibrated?

10 MR. CAHILL: I believe that's repaired. The motor
11 was removed to replace a seal on the pump. So it is not a motor
12 repair.

13 CHAIRMAN JENSCH: And the boiler fuel pump?

14 MR. CAHILL: The boiler feed pump also has a seal
15 modification to be made.

16 CHAIRMAN JENSCH: And you have some vibration problems
17 on the pipes, is that your problem?

18 MR. CAHILL: It's not vibrations, sir. These pipes
19 are supported in a much more complex way than conventional
20 plant pipes are, in that they are restrained against seismic
21 motion. This requirement for seismic restraint was imposed
22 rather late in the plant design. So it is one of the last
23 items. It is very nearly complete now. But we have been
24 working on this for a long time.

25 CHAIRMAN JENSCH: You say you have some insulation

1 work to be done, too, in connection with the fire aftermath;
2 is that correct?

3 MR. CAHILL: Yes. We had to remove -- Some
4 insulation was damaged by the water. We had to remove it
5 and clean it. There is some very small amount of work to be
6 done in that area.

7 CHAIRMAN JENSCH: If there are any other items
8 will you send us a letter about what the additional items are?
9 You said these are as many as you can recall now.

10 MR. CAHILL: We certainly will let you know of those
11 items and any others.

12 CHAIRMAN JENSCH: These valves, for the safety valves
13 do you have all those valves presently on site and so forth?

14 MR. CAHILL: Yes.

15 CHAIRMAN JENSCH: In fact --

16 MR. CAHILL: Those valves were installed.

17 CHAIRMAN JENSCH: And you just changed the exhaust
18 structure; is that correct?

19 MR. CAHILL: We have changed the exhaust structure?

20 CHAIRMAN JENSCH: Yes, you have.

21 MR. CAHILL: The angle at which they discharge, that
22 has been accomplished. In addition, we are reinforcing the
23 area where the inlet of the safety valve joins the main
24 steam line.

25 CHAIRMAN JENSCH: How are you doing that?

1 MR. CAHILL: By building up a weld deposit metal
2 at the intersection of the safety valve inlet nozzle and
3 the main steam line.

4 CHAIRMAN JENSCH: And you are stress relieving that
5 process?

6 MR. CAHILL: Yes.

7 CHAIRMAN JENSCH: Perhaps I don't use the term
8 properly. You are post-heating the area so it is gradually
9 cooling; is that correct?

10 MR. CAHILL: I believe so, but I think Mr. Grob has
11 more detailed information.

12 MR. GROB: Well, yes. After the welding work is
13 complete there is a post-heat treatment where you soak the
14 weldment for two hours. In this case at a temperature of
15 1100 degrees minimum in order to relieve stresses which may
16 exist due to the weld depositing heat.

17 CHAIRMAN JENSCH: And that process is going on for
18 each of the valves?

19 MR. GROB: It will go on for each of the valves after
20 the weld deposit reinforcement is complete.

21 CHAIRMAN JENSCH: How many valves have you corrected
22 in that manner out of the twenty?

23 MR. GROB: We have only started on this. I would
24 have to verify that. All valves are in process. They are
25 about fifty percent of the way along.

1 CHAIRMAN JENSCH: None of them is complete; is
2 that correct?

3 MR. GROB: None of them are complete.

4 CHAIRMAN JENSCH: Perhaps we can see that phase of
5 it, too, when we view the site. All twenty valves?

6 MR. GROB: Yes.

7 MR. BRIGGS: Are you using reduction heating or some
8 other method?

9 MR. GROB: The recommended process is resistant
10 heating. That is surface heating using electricity resistance
11 heating.

12 CHAIRMAN JENSCH: Thank you, Mr. Grob. If anybody
13 has any questions, you may. Let me ask the Staff. Do you
14 have somebody here who is familiar with this type of work and
15 have you observed it? What is going on? Can you give us
16 some information in that regard, Mr. Madsen? Are you the
17 expert?

18 MR. KARMAN: Mr. Madsen is in the Compliance Division.

19 CHAIRMAN JENSCH: It is the same definition.

20 MR. KARMAN: I wanted to distinguish this question
21 of possibly what Mr. Madsen has seen as distinguished from
22 the request of the Regulatory Staff for this. Mr. Madsen
23 is not in a position to say whether he approves it or not.

24 CHAIRMAN JENSCH: I understand that. Have you
25 been down there and have you seen what they are doing? I

1 think we asked you once before about a time schedule. It
2 worked out pretty well on your last estimate. Would you give
3 us an estimate as to how long this will take?

4 MR. MADSEN: In answer to your question, Mr. Chairman,
5 I really don't know. I have not looked at the status in the
6 last week. It gives me a little bit of difficulty to say
7 where they are today.

8 CHAIRMAN JENSCH: Give us what you saw last week.
9 Has there been much change?

10 MR. MADSEN: I have no reason to say that it cannot
11 be accomplished before the end of June.

12 CHAIRMAN JENSCH: Let me ask it with a little more
13 positive thinking. Are you convinced it can be accomplished
14 at the rate of work that they are undertaking down there with
15 induction heating and resistance heating involved?

16 MR. MADSEN: I would say it is possible to do this
17 in that length of time.

18 CHAIRMAN JENSCH: Is it possible or is it probable?

19 MR. MADSEN: Gosh, I have no control of how many
20 people they put on the job, sir. I understand that as of
21 today, at least, they are working twenty-four hours a day on
22 this particular work. This is in the main steam safety
23 valve modification.

24 On the basis of this, if they put men on all twenty
25 valves and proceed that way, I don't see any reason why they
can't complete the work that I am aware they are going to do,
between now and the end of June

1 CHAIRMAN JENSCH: What about this control rod, how
2 long is that going to take? Do they have the parts? Do they
3 have the metal chip out of there yet?

4 MR. MADSEN: I cannot answer the question if they
5 have parts. I would imagine in Westinghouse they have a
6 spare rod some place. The matter came up. The 29th is when
7 I became aware, the 29th of April, of the rod problem. Since
8 then they have removed the head and are presently investigating
9 the problem.

10 CHAIRMAN JENSCH: As I understand Mr. Cahill, three
11 control rods are stuck but only one of which seems to be
12 affected by that chip of metal. Is that your understanding of
13 the situation?

14 MR. MADSEN: There is only one that I am aware of
15 that they are having a problem with with respect to a chip of
16 metal. There are two others where they had some difficulty
17 during the rod drop testing. The exact nature of the
18 problem I am not aware of.

19 CHAIRMAN JENSCH: Have you had an opportunity to
20 inspect the facility since you became aware of the situation
21 on April 29, 1972?

22 MR. MADSEN: I have no. The head was on the last
23 time I was here for inspection, Mr. Chairman.

24 CHAIRMAN JENSCH: My question wasn't quite that.
25 You haven't had a chance to go down, since the head is off, and

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1 take a look at the control rod?

2 MR. MADSEN: I have not seen it.

3 CHAIRMAN JENSCH: Are you planning to do it?

4 MR. MADSEN: Yes, sir.

5 CHAIRMAN JENSCH: Is it going to be your thought
6 that they have to examine all the other control rods, too?

7 MR. MADSEN: Examine all control rods?

8 CHAIRMAN JENSCH: Yes.

9 MR. MADSEN: I don't think I can answer that question
10 yes for the simple reason I must see the nature of the problem
11 before I can even formulate my own opinion.

12 CHAIRMAN JENSCH: What is it that you have seen, if
13 anything, that -- have you seen any reports on the control
14 rod being stuck situation?

15 MR. MADSEN: I have only had telephone conversation
16 since the time of the problem. I was here during the rod
17 drop testing and the hot flow, no flow. There was a problem
18 with one of the rods which happens to be the one that also
19 has the metal chip associated.

20 CHAIRMAN JENSCH: I believe that's all the questions
21 we have.

22 Would anybody like to interrogate with reference to
23 this matter or shall we let it stand and go ahead with the
24 analysis that have been made?

25 Dr. GEYER: How does the fact that they have to

1 have the head off and work on this problem of the control rod
2 sticking delay their -- what effect does it have on the
3 testing program? Will it delay it?

4 MR. MADSEN: Needless to say, after they get through
5 making the necessary changes with the head off, the head will
6 have to go back on and all the rods will have to be checked
7 out again before they go into operation.

8 DR. GEYER: But there are other testing operations
9 going on; is that correct?

10 MR. MADSEN: Most of the testing has been complete.
11 There are a few tests that have not been completed, and there
12 are a few tests which I have not verified. Here again, between
13 now and the end of June I have no reason to think that that
14 cannot be accomplished.

15 DR. GEYER: Having the head off and working on this
16 problem won't interfere with the completion of the other tests;
17 is that correct?

18 MR. MADSEN: Right offhand I can't think of a test
19 that interferes with it, except the test of the rods itself.

20 DR. GEYER: Thank you.

21 MR. MADSEN: There may be one but I can't think of
22 it right now.

23 CHAIRMAN JENSCH: What is the wish of the parties
24 with reference to cross-examination on this subject?

25 MR. ROISMAN: Mr. Chairman, before we do cross-

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1 examination, Mr. Cahill's testimony has focused on a problem
2 that we raised before here. I thought we had some resolution.
3 Apparently we haven't. I will ask the Board if we can get it
4 again.

5 As I understand it, once a reactor begins an AEC
6 approved testing program, any abnormal occurrence such as a
7 stuck control rod, becomes the subject of a written communica-
8 tion between the Applicant and the Compliance Division or
9 Regulatory Staff, and actually gets -- I think they call it
10 an AO number. Certain of these AO numbers represent reports
11 on abnormal occurrences, and they can become the subject of
12 investigation as required.

13 There has been no communication which we have
14 received, although it is our understanding that we are to
15 receive copies of communications between the Applicant and the
16 Atomic Energy Commission dealing with this reactor. This
17 problem has already once caused us to go through the expense
18 of filing a request to require the Applicant and the Staff
19 to submit data on several items which we filed on the 10th
20 of April, and finally, when we got a response from the Applicant
21 to that, which we received on the 26th of April for the first
22 time, they attached a letter dated February 2, 1972, that Mr.
23 Cahill had sent to Mr. DeYoung dealing with one of the matters,
24 and a letter dated February 25, 1972, that Mr. Cahill had sent
25 to Mr. DeYoung dealing with another one of the matters.

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1 It is not our understanding that it is expected for
2 us by happenstance to discover that control rods got stuck
3 due to a metal chip which was not to have been there at all,
4 getting into the control rod and jamming it, but rather in the
5 normal course of things, we are to receive these communications.
6 We have had this problem in another hearing in which the
7 Chairman was the Chairman, and at that time the Chairman
8 directed the Staff and the Applicant to provide the Intervenor
9 with this correspondence between Applicant and Staff as it is
10 served on the two of them.

11 I would request that the Chair direct that that be
12 done again now in this proceeding, and in addition, that the
13 communications which have already taken place which we have
14 not received be sent to us so that we can find out what is
15 going on.

16 It should not be surprising to the Applicant that
17 we are very much concerned about a control rod sticking due
18 to the existence of foreign matter in the reactor vessel. We
19 are delighted that they discovered the problem. We are troubled
20 as to why it was there in the first place, why there was metal
21 chipping there in the first place.

22 That is the first thing that we would like, to make
23 sure that we are kept up to date on what is going on except of
24 having it all sprung on us at the last minute only when the
25 Board, in its wisdom, asked Mr. Cahill to describe items of

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1 delay and he, and then he for the first time revealed to the
2 public the existence of this problem.

3 Insofar as cross-examination is concerned, we have a
4 rather large amount of cross-examination that we would like
5 to conduct on the safety valve question.

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1 CHAIRMAN JENSCH: Has this subject come up before
2 in this proceeding? It escapes me. I know we did consider
3 it in another proceeding when the Staff recognized the
4 oversight. They are not supplying documents of this kind.
5 I wonder, was this considered in this proceeding?

6 MR. TROSTEN: No, it has not, Mr. Chairman.

7 CHAIRMAN JENSCH: What is the view of the Staff on
8 this situation?

9 MR. KARMAN: Speaking on behalf of the Staff,
10 Mr. Chairman, to my knowledge, I have not seen any such
11 document with respect to the control valve problem and control
12 rod. I'd like the Chairman and the other members of the
13 Board and party to know that correspondence between the
14 Applicant and the Regulatory Staff which came to my knowledge
15 has been distributed as soon as I get my hands on it.

16 MR. ROISMAN: I have had no problem with the Staff,
17 although I think it is an unnecessary delay for that
18 Mr. DeYoung sends to Mr. Cahill to have to go to Mr. Karman
19 before it gets to me. Mr. DeYoung is perfectly capable of --

20 MR. KARMAN: I brought it with me because I did
21 not receive a copy of this until Monday. I thought it would
22 be faster to bring it than mail it.

23 MR. ROISMAN: I have no complaint with Mr. Karman.
24 I might ask Mr. Madsen if Compliance has received a report
25 on the abnormal occurrence of the stuck rod?

1 MR. MADSEN: No, but Con Ed is committed to issuance
2 of the report on this subject.

3 CHAIRMAN JENSCH: When?

4 MR. MADSEN: Needless to say, they can't give the
5 nature of the problem until they find out what it is.

6 CHAIRMAN JENSCH: That couldn't prevent them
7 reporting the incident, could it?

8 MR. MADSEN: The reporting of the incident on what
9 basis?

10 CHAIRMAN JENSCH: Do you not have a requirement for
11 a report of an abnormal situation arising in the course of
12 testing or operating?

13 MR. TROSTEN: Mr. Chairman, to the best of my
14 knowledge, there is not a requirement that this particular
15 incident be reported in the test specs. It is an incident
16 that has occurred in the testing program.

17 CHAIRMAN JENSCH: And incidents occurring in testing
18 programs are not reported, is that the interpretation?

19 MR. TROSTEN: I don't believe all instances in
20 testing programs are reported, Mr. Chairman. I would have to
21 go back and consult the technical specifications for the
22 exact language of it.

23 MR. ROISMAN: Maybe Mr. Madsen can tell us how he
24 found out about it. Was it just this morning or this
25 afternoon when Mr. Cahill just told us?

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MR. MADSEN: Found out what?

MR. ROISMAN: The control rod.

MR. MADSEN: I was here on site during the testing program witnessing it when the problem came about.

MR. ROISMAN: You actually saw it when it occurred rather than getting a communication from --

MR. MADSEN: That is correct.

MR. TROSTEN: There is, of course, a six-month reporting requirement that covers matters generally of this sort, Mr. Chairman. I didn't mean to imply that that isn't done.

CHAIRMAN JENSCH: Does Con Edison plan to submit a written report about this incident either before it is fully analyzed or after it is fully analyzed, separate and distinct from the six-month reporting requirement?

MR. TROSTEN: We have been asked to submit such a report, Mr. Chairman, and we intend to submit it.

CHAIRMAN JENSCH: Do you have an objection to making it available to the intervenors?

MR. TROSTEN: No, we do not.

CHAIRMAN JENSCH: Will you do that?

MR. TROSTEN: Yes.

CHAIRMAN JENSCH: Very well.

MR. ROISMAN: Mr. Chairman, could we get them directed to give us a copy of all the communications that they

1 make to the Staff and the Compliance Division people?

2 CHAIRMAN JENSCH: From now on?

3 MR. ROISMAN: Yes. I will make an attempt, now
4 that I am aware that much of the information Mr. Trosten never
5 thought was any obligation to provide, I will go through the
6 Public Document Room, and if I find others, I will note those
7 and send a letter to the Applicant with a copy to the Board
8 requesting that we receive copies of those other documents.

9 CHAIRMAN JENSCH: Do you have any objection to that
10 request?

11 MR. TROSTEN: Mr. Chairman, if the Board directs,
12 we will furnish Mr. Roisman with copies of all correspondence.
13 There is nothing in the AEC's regulations that requires us
14 to do this or requires the Staff to furnish Mr. Roisman copies
15 of this. If the Board believes that we should do this,
16 then certainly we will comply with the Board's request.

17 CHAIRMAN JENSCH: I don't think it should be on that
18 basis. I think we have a difficulty in many of these
19 proceedings bearing in mind that the Staff is a party to the
20 proceeding. As a party, and especially a representative
21 party from a federal agency, they do receive many documents
22 in the course and performance of their duties, some of which
23 may be directly related to proceedings then pending. I think
24 really it is an aid of expediting the proceeding. It seems
25 advisable for an Applicant to make general distribution of

1 those documents which will be placed ultimately in the
2 public record. I think it will help move the case along to
3 do that, do you not agree?

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1 MR. TROSTEN: Well, we will endeavor to keep Mr.
2 Roisman informed, Mr. Chairman.

3 CHAIRMAN JENSCH: Very well.

4 MR. MARTIN: Would this be for all the parties?

5 MR. TROSTEN: Mr. Chairman, really! I really think
6 this is sort of getting a little bit out of hand for a
7 requirement that all correspondence that's furnished to the
8 Regulatory Staff-- There is a requirement in the regulations
9 that every communication to and from the Regulatory Staff go
10 into the Public Document Room. That's what the AEC's
11 regulations require, and I really think that that's rather
12 stretching things that copies of all communications to and
13 from the Regulatory Staff, which is the responsible agency,
14 be given this type of widespread distribution. It's burdensome
15 and I just don't think it's really appropriate.

16 CHAIRMAN JENSCH: Well, I think that your point is
17 well taken. How many communications do you generally have in
18 number? One or two a month?

19 MR. TROSTEN: I don't know.

20 CHAIRMAN JENSCH: Do you Xerox those off and stick
21 them in an envelope? I don't think Con Edison should be
22 burdened with mailing expense of three or four letters if it's
23 too much of a chore, but I think that you should analyze your
24 position from the point of view of the number of documents
25 involved and the cost. If it's three or four or five letters,

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1 maybe Intervenor would send you some return, stamped
2 envelopes or something to cut down the expense for Con Edison,
3 which is know is a big concern.

4 Do you think it's much of a chore to send them
5 another letter in a pre-addressed envelope and have it sent
6 to a party?

7 MR. TROSTEN: Mr. Chairman, we will endeavor to
8 keep the other parties advised of this correspondence.

9 CHAIRMAN JENSCH: Very well. That will be helpful
10 I am sure. Thank you.

11 Are we ready to go back to the analyses of the
12 situation we considered this morning?

13 MR. ROISMAN: I'd like to go on with the safety
14 valves, Mr. Chairman, if I may, directing the Board's attention
15 to our motion on which the Board has not yet acted as to the
16 Staff's and in particular to the Staff's response to it.

17 The motion on April 10th was entitled Citizen's
18 Committee For the Protection of the Environment Motion to
19 Require Applicant and Staff to Submit Evidence and we said we
20 requested the Board to order the Applicant and the Staff to
21 introduce into evidence at the next hearing session, meaning
22 this one, all the data within their possession, including the
23 oral testimony of qualified witnesses which is relevant to the
24 following matters, and Item Number 1 was the reason for the
25 change being made in the steam safety valves, including a

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1 detailed description of deficiencies, the reason they were
2 undetected previously, and a detailed description of the
3 repairs and methods for verifying their accuracy.

4 And we referred to Mr. Trosten's letter of April 1,
5 1972, in which he revealed the existence of this difficulty.

6 Now the Staff responded to that motion by a one-page
7 response dated April 20, 1972, upon which we fully relied and
8 it's signed by Mr. Karman, and he said, "The Regulatory Staff
9 intends to furnish the Board and the parties prior to the next
10 hearing session its proposed evidence relative to the
11 enumerated items," meaning the items that I had enumerated in
12 this motion. We didn't get anything on these items from the
13 Staff prior to this. We did receive as attached to the
14 Applicant's response copies of letters from Mr. Cahill to Mr.
15 DeYoung, which satisfied our concerns with regard to Item
16 Number 2 and Item Number 5, and we have seen -- I am sorry.
17 We did get one thing from the Staff.

18 Mr. DeYoung indicated we received a copy of the
19 letter regarding Item Number 4, namely that the Staff had
20 completed its review of the proposed change on Item Number 4.
21 The hearing, of course, has been dealing with Item Number 6,
22 which is the allegations of Mr. Brill. We have not yet had
23 any further discussion on Item 3, and the one question which
24 the Applicant answered which was asked by Mr. Briggs relates
25 to Item Number 1 but does not in our opinion in any way

1 exhaust the subject.

2 We would still like to know where the Staff's
3 evidence is. Obviously it can't be provided to us prior to
4 this hearing session. We'd be delighted just to have it
5 during the hearing session. We are prepared, based upon only
6 a limited amount of information, because we have not had any
7 other information, because we have not had any other informa-
8 tion, to commence to conduct cross-examination of the
9 Applicant with regard to the subject as described in Paragraph
10 1 of our motion of April 10th.

11 CHAIRMAN JENSCH: Well, not having received it
12 before, there is a witness here in reference to the matter now
13 describing what they plan to do about heat treatment for
14 modification to secondary plant of main steam safety valves,
15 and the subject seems to be quite broad in scope.

16 Can you not proceed to make inquiry at this time?

17 MR. ROYMAN: Yes. I will, of the Applicant.

18 CHAIRMAN JENSCH: Proceed.

19 MR. TROSTEN: I take it for the Staff to have a
20 presentation is going to depend upon them receiving the
21 response to their May 12th letter, namely asking for the
22 information regarding this. But I would have some questions
23 to ask of whomever is the appropriate witness of the Applicant
24 on the subject. Mr. Grob sponsored this. Maybe he is the one
25 who can answer a question.

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1 CHAIRMAN JENSCH: Let's try it.

2 MR. ROISMAN: Mr. Grob, can you tell me how it
3 happened that this change was made by the Applicant in the
4 steam valve, steam release valves?

5 MR. GROB: Yes, Mr. Roisman.

6 In the course of review of the design of these steam
7 valve connections subsequent to some difficulty that occurred
8 at Turkey Point, we requested an analysis of these valve
9 connections from Westinghouse Corporation, who also at the
10 time had been conducting their own review, and the results
11 of this analysis showed that at the junction point between
12 nozzle connected to the main steam pipe, this nozzle then
13 having attached to it the safety valve which in turn then
14 goes into an exhaust pipe arrangement, we found that there was
15 a stress which exceeded the allowable stresses when reaction
16 forces from the valve exhausting are added to the normal
17 pressure of loads from inside the pipe.

18 This then led to a need for a reinforcement and
19 other corrective measures. Actually the total correction
20 consisted of cutting the exhaust elbow from the safety valve
21 in such a way that one did not have a reaction force parallel
22 to and perpendicular to the main steam pipe header, but rather
23 the reaction force from the exhausting of the safety valve was
24 pointed more towards the center line of the valve, thus
25 reducing the force that tended to cause overstraining at the

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1 junction of the nozzle with the main steam pipe.

2 In addition to this a reinforcement was done around
3 the fitting at the main steam pipe header so as to distribute
4 the load over a wider area and reduce the stress at that point.

5 MR. ROISMAN: Was the initial design of the main
6 steam safety relief valve and its connection to the main steam
7 header the subject of a stress analysis for purposes of
8 determining what the design criteria should be?

9 MR. GROB: The design criteria exists. I don't
10 understand the question in that form. You mean the design
11 criteria contained in the requirements of the code B31.1?
12 There are allowable stresses associated with the materials
13 that are used here, and these allowable stresses were found to
14 be exceeded under the combined loading of the reaction force
15 with the safety valve blowing and the pressure load inside the
16 main steam pipe, normal pressure load.

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1 MR. ROISMAN: Yes, I am sorry. What I meant was
2 in designing the manner in which the safety relief valves
3 should be connected to the main steam header, was there an
4 attempt made to determine what stresses would occur at that
5 point in order to make sure that the connection was designed
6 in a way that you would meet the design criteria?

7 MR. GROB: Yes. Mr. Crowley of UE&C can address
8 himself to that question.

9 MR. TROSTEN: Mr. Chairman, anticipating that the
10 Board might have some more detailed questions, we have asked
11 Mr. John H. Crowley, who is the manager of the Advanced Power
12 Engineering Department of United Engineers and Constructors,
13 Inc., to be present.

14 CHAIRMAN JENSCH: Has he been sworn?

15 MR. TROSTEN: No, he has not been sworn.

16 (JOHN H. CROWLEY, Sworn.)

17 MR. TROSTEN: Would the Reporter read back the last
18 question, please.

19 (The previous question is read by the Reporter.)

20 MR. CROWLEY: Stresses for the connection from the
21 valve through the stub were analyzed for these reaction forces
22 in the initial design, but the stress analysis of the route
23 connection, which is the point in issue here, we consider
24 were not initially adequately analyzed and a reevaluation of
25 these stresses, as we stated earlier, indicated that the

1 allowable stresses of the code were exceeded and that the
2 stress evaluation of the initial design did not have the
3 requirements.

4 MR. ROISMAN: Was the initiating cause of the
5 reevaluation the incident that Florida Power & Light which is
6 recorded in a document entitled Incident Report Turkey Point
7 Unit 3 Safety Valve Headers dated December 1971, and submitted
8 to the Atomic Energy Commission, Dr. Peter A. Morris on
9 February 15, 1972, a copy of which I am now handing you.

10 MR. CROWLEY: Well, becoming aware of that particular
11 accident in the Turkey Point plant we undertook shortly
12 thereafter to obtain a computer program based on the so-called
13 Bujliard method. It's an empirical analytical method to
14 explore more in detail the stresses of intersecting cylinders.

15 CHAIRMAN JENSCH: Maybe you could adopt a position
16 where you could talk more directly to the Reporter.

17 (Discussion held off the record.)

18 CHAIRMAN JENSCH: She is the one person who wants
19 to hear. The rest of the lawyers are secondary. Please proceed

20 MR. CROWLEY: Intersecting cylinders. This is a
21 more sophisticated analytical method than we employed on
22 earlier designs and have permitted a critical evaluation of
23 the stresses in this particular location. These stresses
24 were then evaluated in conjunction with the thrust loads
25 acting on the valve during blowdown, were considered also in

1 conjunction with pressure forces in the pipe at the maximum
2 pressure, seismic forces occurring coincidentally, and weight
3 forces in the pipe.

4 A combination of all of these stresses, additive,
5 were evaluated. The results of this evaluation showed the
6 stress to exceed the allowable limits.

7 MR. ROISMAN: Would it be a fair oversimplification
8 to say the initial analysis was made in such a way that at
9 least some stress or stresses were not adequately considered,
10 and therefore the evaluation showed a total loading below
11 the allowable limits when in fact the total loading, if all
12 stresses were considered, would be above the allowable limits?

13 MR. CROWLEY: I think that was my earlier comment,
14 that we considered them to be inadequately considered within
15 the framework of the total stresses.

16 CHAIRMAN JENSCH: Is the Bujliard method that you
17 referred to involving a more sophisticated method for
18 intersecting cylinders, is that the method that has now been
19 applied to reevaluate every plate in the Indian Point No. 2
20 reactor where intersecting cylinders exist and stresses are
21 possible?

22 MR. CROWLEY: Where there is a relief valve.

23 MR. ROISMAN: Related to thrust forces we would
24 apply this method in safety-related relief valves to make
25 a further examination of the stresses at this particular

1 location which are dominantly influenced by thrust loads.

2 MR. ROISMAN: Are the only valves for which the
3 thrust load is a problem the twenty main steam safety relief
4 valves?

5 MR. CROWLEY: These ones that we are discussing at
6 this point, I believe, especially an identification of the
7 other valves which may be located in the primary containment,
8 which for example, might include the pressurized relief valves,
9 accumulator relief valves, there are some of these valves that
10 have similarities and some differences. Some of these valves
11 are located on pressure vessels, for example, pressurizers,
12 although it is an attempt to analyze where this method applies,
13 intersection of a pipe with either a pipe or a cylinder to
14 explore the reaction forces by this method.

15 MR. ROISMAN: Has that been done by these other
16 valves for this plant?

17 MR. CROWLEY: This is currently underway, and the
18 results are essentially complete. I can't say they are
19 totally complete, but they are essentially complete.

20 MR. ROISMAN: Do you know of any further modifications
21 that are going to be required as the result of those analyses
22 on the other valves?

23 MR. CROWLEY: For the analysis that's been completed
24 to date we have not uncovered any overstressed situation
25 involving relief valves in the other applications.

1 MR. ROISMAN: Did you uncover any loadings that
2 were higher than what you had initially predicted they would
3 be?

4 MR. CROWLEY: I am not able to answer that question
5 at this point because I have not see the detailed results.

6 MR. ROISMAN: Do you know why the detailed --

7 MR. CROWLEY: I could qualify by saying the results
8 as I am aware of them are reliable within the code.

9 MR. ROISMAN: Is it your understanding that the
10 results of those analyses are going to be provided to the
11 Compliance Division?

12 MR. TROSTEN: Mr. Chairman, as Mr. Karman indicated
13 at the outset we have received a request from the Regulatory
14 Staff for an analysis of the safety and relief valves. We
15 are going to provide the information to the Regulatory Staff
16 as requested as soon as practicable.

17 MR. ROISMAN: Mr. Crowley, have you seen this letter
18 of May 12, 1962, that was addressed to Mr. Cahill by Mr. DeYoung?

19 MR. TROSTEN: No, he has not seen it, Mr. Roisman.

20 MR. ROISMAN: Wait a second. I want that answer
21 under oath.

22 MR. CROWLEY: I have not seen that letter.

23 MR. ROISMAN: I hand you a copy of it and ask you
24 to tell me if the description in the first sentence of the
25 second paragraph, namely safety valves and relief valves,

1 covers all the valves for which you are now redoing or just
2 completing the redoing of stress analyses using the Bujliard
3 method?

4 MR. TROSTEN: Mr. Chairman, at this point I am going
5 to object to Mr. Roisman's further line of questions, or
6 this line of questions. We have sponsored testimony in
7 response to Mr. Briggs' question dealing with the repair and
8 the redesign of the main steam safety valves. We have
9 received an inquiry from the Regulatory Staff to provide a
10 report on certain matters which go beyond the scope of the
11 main steam safety valves, and we are proceeding to provide
12 that information. This matter is one to be resolved by the
13 Regulatory Staff in accordance with the normal procedures
14 involving the Director of Licensing and the Director of
15 Operations. I object to this further line of questions on
16 the grounds that this is not a matter which an issue in the
17 hearing. Accordingly I object to the question to Mr. Crowley.

18 CHAIRMAN JENSCH: Does this matter have any safety
19 implications?

20 MR. TROSTEN: Does the matter raised by the Regulatory
21 Staff have any safety implications?

22 CHAIRMAN JENSCH: I think that is the way I said it.
23 Would you want the Reporter to read it?

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ASBt1 1 MR. TROSTEN: The letter from the Regulatory
2 Staff I would say, Mr. Chairman, does have safety implications.

3 CHAIRMAN JENSCH: And it's your understanding that
4 this proceeding involving the license to Consolidated Edison
5 Company of New York, Inc., concerns safety matters of the
6 proposed plant?

7 MR. TROSTEN: Yes, it certainly does, Mr. Chairman.

8 CHAIRMAN JENSCH: What is the basis then for excluding
9 inquiry in this regard?

10 MR. TROSTEN: My basis not for excluding inquiry,
11 Mr. Chairman, but simply to limit the cross-examination by
12 Mr. Roisman to the scope of the direct, and within the matters
13 that he himself has raised as specific intentions or as
14 contentions, at any rate, is simply that as far as this hearing
15 is concerned there is no issue in this proceeding with regard
16 to the matter of the relief valves and safety valves which
17 are discussed in the Staff's letter.

18 We have offered testimony with regard to the
19 modification of the main steam safety valves and we are ready
20 to stand cross-examination with regard to that. To carry
21 cross-examination beyond the scope of that direct testimony
22 into this additional matter is improper, and for that reason I
23 object.

24 CHAIRMAN JENSCH: Is it your thought that if you
25 prepare a limited statement about the safety valve that you

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1 can thereby curve the inquiry into the safety implications
2 of the components that are involved?

3 MR. TROSTEN: No, Mr. Chairman. I am simply taking
4 the position that the matters for inquiry in a contested
5 nuclear licensing hearing must be sharply defined, both by
6 specific contentions and also by the scope of the direct
7 testimony. It's a precedent which was established very
8 clearly, for example, in the Florida Power & Light hearing.
9 And the same principle applies to this proceeding as well.

10 CHAIRMAN JENSEN: Well, as I understand the situation
11 in this proceeding, some of these events have kind of happened
12 pretty rapidly and they haven't had an opportunity to have a
13 formal design and preparation, let me say, by way of a written
14 document which could be served on the parties and as to which
15 they could file some specific contentions.

16 As I recall it in the Florida Power & Light case the
17 applicant set forth certain aspects which were quite all-
18 inclusive and certain contentions were made in reference to those
19 written and prepared and studied matters and on the basis of a
20 consideration of the insertions made in reference to that
21 direct presentation the commission felt that one contention was
22 valid for an inquiry.

23 We haven't had the benefit of in this proceeding this
24 stuck control rod. For instance, you see, we couldn't get any
25 specific contentions made about that because we didn't hear

REPORTS
1 about it until today. And then this presentation you have
2 here of the page and a half, well, a page and a third, in
3 reference to main steam piping, may be somewhat more limited
4 than the subject should have been, and it seems to me that the
5 subject of safety is never limited in these proceedings.

6 Whenever an incident comes up or a situation develops somewhat
7 contrary to the original presentation of the applicant in his
8 final safety analysis report, we just have to do the best we
9 can with the information that's given to us, and it may be that
10 the information given is not as complete as it might be, and
11 I assume that this is an endeavor to perhaps develop more
12 data as to which then specific contentions would be made.

13 The objection is overruled.

14 Do you have the question in mind, Mr. Witness?

15 MR. TROSTEN: Would the reporter read the question
16 back?

17 MR. ROISMAN: It's a long way away. If you will give
18 me back the letter for a moment, Mr. Crowley, I will restate
19 the question.

20 The question was in the re-analysis of stress that's
21 being done according to the Bujliard method with regard to the
22 intersecting cylinders, does that re-analysis that's now being
23 done coincide with what the Staff has requested in this letter
24 from Mr. DeYoung to Mr. Cahill in the first sentence of the
25 second paragraph? In other words, in responding to that would

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1 you be reporting all of the stress analyses that you are now
2 doing?

3 MR. CROWLEY: Well, this method will be applied to
4 any reaction force as I mentioned involving intersecting
5 cylinders, the method will be applied to all of these valves,
6 and that is currently being done.

7 MR. ROISMAN: What I mean was are there any valves
8 not covered by that (safety valve and relief valve), any valves
9 not covered by that reference that you are doing this work on
10 now?

11 MR. CROWLEY: I don't have at this point in time a
12 complete extension between all the valves and the ones that
13 were analyzed. I feel that the ones that were analyzed
14 covered these, but we are going to have to have a further
15 review among ourselves to make sure that that is so.

16 MR. ROISMAN: Thank you.

17 Mr. Crowley, are you familiar with an incident which
18 was the subject of discussion in this proceeding at an earlier
19 date involving a pipe break at the E. S. Robinson plant? Is
20 that one with which you are familiar?

21 MR. CROWLEY: I am familiar with that event, yes.

22 MR. ROISMAN: Do you know if the reason for the pipe
23 break there was that the loading exceeded the allowable stress?

24 MR. CROWLEY: My review of the materials that have
25 been prepared relative to the Robinson event indicate to me

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1 there was a ducting failure in a transition pipe and not in
2 a nozzle pipe, which was a failure point different than the
3 one we have been discussing here.

4 MR. ROISMAN: I understand, but was the cause of it
5 in effect that it was overloaded?

6 MR. CROWLEY: This would appear to be the case.

7 MR. ROISMAN: Was the deficiency, if you will, that
8 caused the overloading the failure to detect all of the
9 possible stresses and to fail to take them into account in the
10 design of that portion of the pipe?

11 MR. CROWLEY: Well, I have had no opportunity to
12 review in detail the specific stress analysis applicable to
13 the Robinson plant, but a failure would indicate, a yielding
14 failure would indicate loads existed that weren't considered.

15 MR. ROISMAN: Was that also a plant that you UE&C
16 was involved in?

17 MR. CROWLEY: No, it was not, Mr. Roisman.

18 MR. ROISMAN: Do you know if with regard to other
19 plants that UE&C was involved in after the H. B. Robinson
20 event was any attempt made to re-analyze the stresses to which
21 various pipes might be subjected in order to make sure that
22 all possible stresses had been considered, and in particular
23 was that one on Indian Point Number 2?

24 MR. TROSTEN: I object to the form of the
25 question, and I also object to the reference to these other

1 facilities. I don't see any materiality with regard to that
2 inquiry.

3 MR. ROISMAN: For the moment he can answer just the
4 Indian Point 2. I think it's material but I don't want to
5 waste time.

6 CHAIRMAN JENSCH: Well, I think Applicant's objection
7 is well-taken in reference to asking that gentleman to give
8 us a re-analysis of every other plant. But if you want to
9 restate your question relative to Indian Point, proceed in
10 that regard. The objection is sustained.

11 MR. ROISMAN: Let me just say, so that it doesn't
12 block any further inquiry, that the competence of UE&C is very
13 much at issue, and if UE&C upon earlier warning didn't take
14 action with regard to all of its plants it certainly brings
15 up the suspect question of whether or not UE&C did a competent
16 job here.

17 But for the moment I will simply rephrase the
18 question and direct it to whether or not in Indian Point
19 Number 2 following the H. B. Robinson event UE&C undertook an
20 in-depth analysis of the pipes of the plant and all other
21 places in which stresses can occur in piping to determine if
22 they had actually considered all of the stresses.

23 In short, did you take some action to make sure that
24 the H. B. Robinson problem didn't arise here?

25 MR. CROWLEY: As soon as we became aware of the

1 H. B. Robinson problem, which again I would distinguish as a
2 different failure than the Turkey Point failure, we took
3 immediate action to investigate the stresses in the transition
4 pipe area from the main steam header to the valve to determine
5 the stresses as an additional check, and found them to be well
6 below the allowable stresses.

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1 MR. ROISMAN: Do I understand then that it has been
2 the NE&C posture with regard to Indian Point No. 2 both in
3 response to H. B. Robinson and now in response to the Florida
4 Power & Light incident to treat each pipe burst as isolated
5 only to that particular portion of the pipe in the Indian Point
6 plant which is comparable to the portion of the pipe in the
7 other plant and not to its generic problems that are the
8 failure to analyze all possible stresses in making designs
9 of pipes?

10 MR. CROWLEY: Is this limited to Indian Point or
11 is this a generic question?

12 MR. ROISMAN: Limited to Indian Point.

13 MR. CROWLEY: As I mentioned we have on the Turkey
14 Point failure, immediately set out to get a specific analytical
15 tool to discreetly look at the problem which is redefined
16 as a junction of a cylinder to a cylinder, and the stress
17 concentrations within that junction, and having obtained that
18 analytical method and the computer programs associated with
19 it, we are employing that on every similar application on
20 the Indian Point plant. Currently we are doing an analysis.

21 MR. ROISMAN: Mr. Crowley, the thrust of my question
22 and the thing that bothers me is that it appears from your
23 testimony that in H. B. Robinson and Florida Power & Light,
24 the nub of the problem was that in analyzing possible stresses
25 to which pipes or portions of pipes could be subjected, the

1 analysis ignored certain stresses. In short, the analyses
2 weren't detailed enough.

3 I am trying to find out why UE&G does not consider
4 that those events proved that they should go over every stress
5 point on every point regardless of its configuration similarity
6 to that of Florida Power & Light, and regardless of the
7 particular stress overlooked, to see whether or not your
8 whole stress analysis for this plan has not been made
9 inadequate because you haven't considered these stresses
10 and sufficient data.

11 MR. TROSTEN: Mr. Chairman, I object to the form of
12 the question and I also again object to the scope of the
13 question.

14 CHAIRMAN JENSCH: What is the basis of your
15 objection?

16 MR. TROSTEN: My objection is to the form of the
17 question and that it is a question that contains many individual
18 questions and should be broken down so that Mr. Roisman asks
19 the witness a specific individual question. As far as the
20 scope of the question is concerned, I object again on the
21 ground that this matter is not an issue in this proceeding.
22 We do not have a specific contention from Mr. Roisman, and the
23 nub of the hearing requirement in this particular proceeding
24 is the relationship of cross-examination and of testimony to
25 specific contentions which have not been made in this proceeding.

1 CHAIRMAN JENSCH: By the way, had you ever filed
2 anything prior to this statement that you brought in here
3 this morning about this redesign of the safety header valves?

4 MR. TROSTEN: Mr. Chairman, there was a letter which
5 was sent to the Board on April 1st advising the Board of the
6 fact that the change had been made. On April 5th there was
7 questioning by the Board. Mr. Briggs and I believe the
8 Chairman questioned to which Mr. Cahill responded. There has
9 been the additional answer to the question offered or raised
10 by Mr. Briggs.

11 That is what has been transpired in this proceeding
12 to date. In addition, we have had the motion by Mr. Roisman
13 to produce data. Our response thereto, which asserted this
14 is a matter for resolution by the Regulatory Staff in
15 accordance with the normal requirements of the Commission's
16 regulations.

17 Finally we have had the letter of Mr. DeYoung to
18 the Applicant, which the Applicant has just received, and
19 to which we will respond.

20 CHAIRMAN JENSCH: I think that was mentioned before
21 today. Let me go back and see. Have you filed anything like
22 an amendment to the FSAR with reference to the safety header
23 valves?

24 MR. TROSTEN: No, sir, we have not because what we
25 are doing --

1 CHAIRMAN JENSCH: I suppose that those are the
2 matters to which the contentions will be directed.

3 MR. TROSTEN: There is no need for us, in our
4 view, Mr. Chairman, to file an amendment of the FSAR. What we
5 are doing in regard to the main steam safety valve headers
6 is to make certain that we are complying with the FSAR. That
7 is the reason why we aren't filing any amendment. This is
8 a request that we have had from the Regulatory Staff for
9 analysis.

10 Over the course of this proceeding, there have been
11 many such requests which have been responded to, and we will
12 respond to this one. It is a matter which the Regulatory Staff
13 has asked us to look into. We are going to provide a report
14 to them. It will be reviewed with the Division of Compliance.

15 CHAIRMAN JENSCH: There is one matter that disturbed
16 me a little. You felt that you could work it out with the
17 Regulatory Staff. I take it you don't want anybody else to
18 interfere with your consideration in that regard.

19 MR. TROSTEN: No, sir, I didn't mean that.

20 MR. JENSCH: The Board in this proceeding will
21 consider all safety aspects related to the plant and submit
22 an initial decision to the Commission for its review. We
23 intend in this proceeding to cover all safety matters even
24 though you may also be having a separate participation with
25 the Regulatory Staff, which of course we do not want to

1 interfere with in any way.

2 But this involves a safety matter, as I understood
3 your statement about the safety header valve, and it seems
4 to be quite definitely related to possible radiological
5 releases if the situation is not constructed with a degree
6 of reasonable assurance, and there not being any undue risk
7 to the health and safety of the public.

8 Let me pose this question: Suppose they used a
9 plastic tubing for this header safety valve, and of course,
10 in time they discovered it wasn't working or wouldn't work
11 or would disintegrate. Do you think it would be improper to
12 say, by the way, do you have any more of that plastic pipe
13 on your main pipe coolant, or something such as that? Because
14 direct interest was to the safety header valve plastic pipe,
15 that no one should inquire that there is any more in the plant?

16 MR. TROSTEN: Mr. Chairman, we have undertaken a
17 review. The Staff has asked us this question, which is intended
18 to elicit the information. We will certainly provide it and
19 it will be provided as quickly as we can.

20 CHAIRMAN JENSCH: We would like to have it provided
21 in this hearing herein. If there is some data now, we would
22 like to have it now. The objection is overruled.
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1 MR. ROISMAN: I will restate the question,
2 Mr. Chairman.

3 Mr. Crowley, the question I am asking you is, why
4 did UE&C not reanalyze all of the pipes and valve connections
5 within the reactor following the H. B. Robinson and the
6 Florida Power & Light incidents in order to determine whether
7 at any point where stresses were important, whether they had
8 inadvertently excluded an important stress and therefore had
9 failed to detect a possible break point? c

10 MR. CROWLEY: The failure involved in the Robinson
11 plant was a failure of obvious overstress. Our analysis
12 programs for the piping systems used throughout the plant
13 comprised a very vigorous thermoflexibility analysis, weight
14 analysis, which includes all the effects on the pipe, seismic
15 earthquake events, and general, as a continuing check against
16 the code, calculated stress versus allowables.

17 These techniques are reviewed and they have been
18 double-checked for the Indian Point plant.

19 Secondly, the forces that we are considering on
20 the safety valve are reaction forces which are normally not
21 associated with the other parts of the piping system.

22 There has been stated earlier, as an additional
23 reaction force, which is unique to safety valve installations
24 which create this stress situation different from that in
25 other parts of the piping system, thereby leading to the

1 intense review of these reaction forces associated with
2 safety valves. We feel that our code reviews have been
3 complete.

4 MR. ROISMAN: In other words you weren't at all
5 bothered by the fact that H. B. Robinson and Florida Power
6 & Light demonstrate that people who believe they have made
7 thorough and adequate stress analyses could in fact ignore
8 an important stress in the case of Florida Power & Light,
9 this reaction force, that could ignore that and the consequences
10 could conceivably be catastrophic, and it did not persuade
11 you that you ought to make sure in all parts of the plant
12 that you were not ignoring stresses?

13 MR. TROSTEN: I object to the form of the question,
14 Mr. Chairman.

15 CHAIRMAN JENSCH: I think the question is argumentative.
16 The objection is sustained.

17 MR. ROISMAN: Mr. Crowley, at the time the safety
18 valve, safety relief valves to the main steam header were
19 originally analyzed, was an analysis made assuming there would
20 be a reaction force, but the analysis failed to consider its
21 strength, or was there no analysis of the reaction force at all?

22 MR. CROWLEY: There was an analysis of the reaction
23 force relative to the stub tool, but I am not aware of the
24 details of the analysis related to the joint of a weld to
25 the main steam header.

1 MR. ROISMAN: In other words, at that particular
2 point the effect of the reaction force was not considered?

3 MR. CROWLEY: I'm not aware of the details of what
4 was considered at that point in time.

5 MR. ROISMAN: Is the Bujliard method that you have
6 referred to something that has only recently been developed
7 or is it a method of analysis that has been available for
8 some time?

9 MR. CROWLEY: It is a method of analysis that has
10 been available for some years.

11 MR. ROISMAN: Do you know why it was not used in
12 the first instance in analyzing the safety relief valves
13 and the main steam header?

14 MR. CROWLEY: I don't know specifically because I
15 was not there at the time. I don't believe it was used on
16 the original design.

17 MR. ROISMAN: Is there an even more sophisticated
18 method for the analysis of the forces involved or conceivably
19 could be involved at that critical point on the safety relief
20 valves than the Bujliard method?

21 MR. CROWLEY: I'm not aware of such. There may be.

22 MR. ROISMAN: With regard to other portions of the
23 piping in the plant, are there more sophisticated stress
24 analysis methods than the ones that have been used for stress
25 analysis?

1 MR. CROWLEY: With respect to the method or the
2 stress analysis in general?

3 MR. ROISMAN: I take it the Bujliard method, as
4 you testified, is uniquely related to the intersecting
5 cylinders problem.

6 MR. ROISMAN: I was talking about other sophisticated,
7 more sophisticated methods not necessarily including just
8 the Bujliard method.

9 MR. CROWLEY: Related to the force or any other
10 stress calculation in the piping system.

11 MR. ROISMAN: To any other stress calculation in
12 the piping system?

13 MR. CROWLEY: We currently employ the Arthur D.
14 Little method of seismic dynamic weight load analysis, which
15 to my knowledge is one of the more, if not the most,
16 sophisticated methods available for piping systems analysis
17 today.

18 MR. ROISMAN: For instance, does the A. D. Little
19 method include the Bujliard method in it?

20 MR. CROWLEY: Not as such. This is an input that
21 would have to be applied by judgment using properly selecting
22 the Bujliard method. That's my understanding.

23 MR. ROISMAN: Then are there other methods that one
24 would have to add to the A. D. Little method in order to make
25 it the most sophisticated possible?

1 MR. CROWLEY: Considering this particular event,
2 I believe that's so.

3 MR. ROISMAN: Mr. Crowley, are you familiar with
4 the repairs that are being made to the safety valve headers,
5 to this particular intersection?

6 MR. CROWLEY: Relative to Indian Point?

7 MR. ROISMAN: Yes.

8 MR. CROWLEY: Yes.

9 MR. ROISMAN: Can you tell me, in terms of the work
10 that is being done there, is the new weld being subjected to
11 any sort of nondestructive testing once it is installed?

12 MR. CROWLEY: It is, although I'm not acquainted
13 with the total details of the quality control procedures with
14 the installation of it, although I know they exist.

15 MR. ROISMAN: Is there some witness here who can
16 testify with regard to that?

17 MR. TROSTEN: Mr. Chairman, we can provide a witness
18 who can testify as to the details of that. He is Mr. Fred
19 Burgess of Westinghouse Electric Corporation.

20 CHAIRMAN JENSCH: Mr. Burgess, will you come forward
21 and be sworn.

22 MR. ROISMAN: Thank you, Mr. Crowley. Don't go away.

23 (FREDERICK G. BURGESS, Sworn.)

24 CHAIRMAN JENSCH: While there is a pause, did you
25 desire to have a statement of Mr. Crowley's professional

1 qualifications included in the record?

2 MR. TROSTEN: I certainly can. I have a copy of
3 them here.

4 CHAIRMAN JENSCH: Do you have sufficient copies
5 for the Reporter?

6 MR. TROSTEN: Yes, we do.

7 CHAIRMAN JENSCH: And the gentleman now sworn is
8 Fred Bruggess; is that correct?

9 MR. TROSTEN: Yes. We can, for Mr. Burgess, as well.

10 CHAIRMAN JENSCH: Is there any objection to the
11 statement of professional qualifications of Burgess or Crowley
12 to be incorporated in the record?

13 MR. MACBETH: No objection.

14 MR. MARTIN: No objection.

15 MR. KARMAN: No objection.

16 MR. ROISMAN: No objection.

17 CHAIRMAN JENSCH: The request is granted and the
18 statement of professional qualifications of witnesses
19 John H. Crowley and Fred G. Bruggess can be physically
20 incorporated in the transcript as if read, and shall
21 constitute evidence from the Applicant.

22 (Documents follow.)
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1 PROFESSIONAL QUALIFICATIONS
2 JOHN H. CROWLEY
3 MANAGER
4 ADVANCED POWER ENGINEERING DEPARTMENT
5 UNITED ENGINEERS & CONSTRUCTORS, INC.

6 My name is John H. Crowley. My address is 7571
7 Wayland Road, Berwyn, Pennsylvania. I am the Manager of
8 the Advanced Power Engineering Department which is
9 responsible for environmental and safety analysis, includ-
10 ing piping system stress analysis. I have served in that
11 capacity since August 1967.

12 I was graduated from Purdue University in 1948,
13 with a Bachelor of Science Degree in Mechanical Engineering.
14 I graduated from the Oak Ridge School of Reactor Technology
15 in 1952.

16 Prior to joining United Engineers, I was in-
17 volved for 16 years in various design and analysis assign-
18 ments for nuclear power plants.

19 I was involved for four years, 1952-1956, in the
20 nuclear submarine program, six years in reactor design and
21 development, General Electric Company, and six years with
22 the Jackson & Moreland Division on safety aspects of nuclear
23 power plants.

PROFESSIONAL QUALIFICATIONS
FRED G. BURGESS
MANAGER, FIELD DESIGN ENGINEERING
INDIAN POINT PLANTS
NUCLEAR ENERGY SYSTEMS
WESTINGHOUSE ELECTRIC CORPORATION

My name is Fred G. Burgess. My residence address is 152 Teton Drive, Pittsburgh, Pennsylvania, 15239. I am employed by Westinghouse Electric Corporation as Manager, Field Design Engineering, Indian Point Plants, in the Pressurized Water Reactor Systems Division (PWRSD), Westinghouse Nuclear Energy Systems, Westinghouse Power Systems Company, and have served in this capacity since March, 1971. I am one of the individuals responsible for the preparation of engineering information and designs used in the construction of Indian Point Plants, and am responsible for engineering follow of construction activities.

I was graduated from the University of Wyoming in 1969 with a BS Degree in Mechanical Engineering. From 1963 to 1964 I attended a nuclear power plant operator training school at the Bettis Atomic Power Laboratories.

I joined Westinghouse Bettis Atomic Power Laboratories in 1963 and became a qualified nuclear power plant operator at the Naval Reactor Facilities in Idaho. In 1966 I was employed by Phillips Petroleum Company in Idaho Falls, Idaho as a mechanical design engineer on the Loss of Fluid Test (LOFT) project. I was given assignments in the design of component and systems associated with the nuclear steam supply system. From 1969 to present, I have been employed by Westinghouse Nuclear Energy Systems actively engaged in the engineering and design activities on Westinghouse Turnkey Plants. I was assigned as a project engineer for the H. B. Robinson Unit No. 2, with responsibility for the engineering associated with mechanical and fluid system design.

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1 MR. TROSTEN: Mr. Burgess, do you have any correc-
2 tions in your statement of professional qualifications?

3 MR. BURGESS: The proper graduation date is 1959.

4 CHAIRMAN JENSCH: Will you see that the copies
5 delivered to the reporter are corrected?

6 MR. TROSTEN: Yes.

7 MR. ROISMAN: I see by this that you worked on the
8 H. B. Robinson unit. You heard the questions asked of Mr.
9 Crowley regarding H. B. Robinson. Is there any information
10 that you can add and supplement what he said, or to the best
11 of your knowledge, was it correct with regard to the issues
12 asked?

13 MR. TROSTEN: You would have to state the questions
14 again, Mr. Roisman, for Mr. Burgess to respond to that.

15 MR. ROISMAN: I just thought I would give him a
16 chance if he wanted to add anything. I have no interest
17 other than that. As long as he does not, there is no problem.

18 Mr. Burgess, let us concentrate on, if you would,
19 the welding that is being done with regard to the nozzle and
20 connections of the main steam safety relief valves to the
21 main steam header.

22 Can you tell me, is there welding being done and
23 subjected to some sort of non-destructive testing?

24 MR. BURGESS: Yes.

25 MR. ROISMAN: Will you describe the testing to which

1 it is being subjected, please.

2 MR. BURGESS: The non-destructive testing program
3 principally consists of a magnetic particle inspection of
4 each layer of weld metal that is applied to the main steam
5 header around the nozzle connections.

6 MR. ROISMAN: Is this diagram up here related to
7 the safety valve headers, or is that related to something
8 else?

9 MR. TROSTEN: This model?

10 MR. ROISMAN: Yes, on top of the piano.

11 MR. TROSTEN: Yes, that is a model of the safety
12 valve.

13 MR. ROISMAN: Mr. Burgess, perhaps if you put it on
14 the table, you could show us where the weld material is going.

15 They keep saying "be careful" to each other. I hope
16 the plant is stronger.

17 MR. BURGESS: The welding being that is shown in blue
18 on the model here.

19 MR. ROISMAN: You pointed to welding at the base of
20 the connection of what looks like a steam generator to a large
21 piece of pipe. There is also blue on a piece of pipe that is
22 coming out of there. Is that also additional welding?

23 MR. BURGESS: The objective of pointing out or making
24 the blue is that --

25 MR. TROSTEN: Excuse me. Is this facing in the right

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1 direction for the Board to see?

2 MR. BURGESS: Let's turn it around.

3 MR. TROSTEN: I think that is the problem here. We
4 have it facing the wrong way.

5 CHAIRMAN JENSCH: If it will help any, we can put it
6 up on the table here and we can see both sides at once.

7 MR. BURGESS: The welding being done is the
8 addition of weld metal to the main steam pipe which is shown
9 here as the large piece. This addition of weld metal is about
10 four inches wide and about an inch thick. The inspections
11 I referred to was that when you apply the weld metal, you do
12 it in discreet layers, and when each layer is completed, it
13 is non destructively examined.

14 MR. ROISMAN: And the other blue is on the piece of
15 pipe that comes out halfway up that, is that a steam generator?

16 MR. BURGESS: The safety valve is this piece of
17 apparatus from here to here.

18 MR. ROISMAN: And that piece of pipe coming out of
19 the safety valve, what does the blue on that indicate?

20 MR. BURGESS: The blue here just depicts the fact
21 that this has been modified. The original installation looked
22 like this. It was modified to look like that.

23 MR. ROISMAN: As the result of making that change,
24 reducing the angle of the bend is such that it takes some of
25 the effect of the reaction load off of the pipe and deflects it

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1 further up the pipe; is that correct? That is in a very
2 simple sense.

3 MR. BURGESS: That is my understanding, yes.

4 MR. ROISMAN: When the weld is applied to the main
5 steam pipe, is there any possibility of it affecting the
6 quality of the steam pipe itself as that heat is applied
7 there, and if so, what is being done to determine that the
8 steam pipe is not in any way being adversely affected by the
9 welding operation?

10 MR. BURGESS: To my knowledge, this particular type
11 of operation did not affect the quality of the main steam
12 pipe.

13 MR. ROISMAN: Are there any radiographic or
14 ultrasonic tests being made of the weld to determine that there
15 are no holes in it?

16 MR. BURGESS: Could you rephrase your question,
17 please?

18 MR. ROISMAN: Are there any radiographic or ultra-
19 sonic tests being made of the weld to determine that there are
20 no holes or flaws in the weld after it has been completed?

21 MR. BURGESS: The non destructive testing that is
22 being performed will detect defects in the layers as they are
23 applied. That is the only way I know to answer that question.

24 MR. ROISMAN: The defects in the surface of the
25 layers?

S3Wt5

1 MR. BURGESS: No. Defects a fraction of an inch
2 deep -- the exact number I'm not familiar with.

3 MR. ROISMAN: I guess my question is, is it possible,
4 using the methods of non-destructive testing that are being
5 used, that there could be within the welds defects -- that is
6 air spaces or gaps. -- that appear below the surface of each
7 weld layer that are not visible from the surface at all that
8 would not have been detected by your metal particle tests?

9 MR. BURGESS: The inspection that we are going to
10 do provide a weld that is consistent with the code acceptance
11 requirements.

12 MR. ROISMAN: I'm afraid that's not responsive to the
13 question.

14 MR. BURGESS: Let me explain my answer.

15 MR. ROISMAN: All right.

16 MR. BURGESS: In most inspections of base material
17 or metal, for that matter, there are some degree of defects
18 permitted. So you cannot say that it will be 100 per cent
19 defect free.

20 MR. ROISMAN: Yes, I'm aware of that. But in earlier
21 testimony in this hearing we had determined that certain types
22 of defects are detectible with radiographic testing, that
23 are not detectible with ultrasonic testing, and vice versa,
24 and it would appear that on what the applicant considered to
25 be particularly important pieces of piping, that ultrasonic

S3wt6

1 and radiographic testing were done in order to assure that
2 there were no improper defects there, including testing
3 weld material that way.

4 I am trying to find out why those more sophisticated
5 methods are not being used here on this particular welding.

6 MR. TROSTEN: Mr. Roisman, the witness has answered
7 that it is being performed in accordance with code requirements.
8 That is the applicable code, and hence, that is the reason
9 why the particular method of testing is being used.

10 MR. ROISMAN: That is a nice answer, Mr. Trosten,
11 except that that code is not adopted by the Congress of the
12 United States, to my knowledge, and it has not become the law
13 of the land. It was adopted by a group of industry people
14 who sat down and decided what they could live with. I don't
15 care that it was complied with the code. I want to know why
16 ultrasonic and radiographic testing wouldn't have been a
17 better way to detect the existence of flaws or defects within
18 the weld material. I'd still like the witness to answer the
19 question.

20 MR. TROSTEN: The witness will answer the question
21 if he is able to answer the question, Mr. Roisman. If he
22 isn't, he will let you know.

23 CHAIRMAN JENSCH: I think we should understand
24 that's a premise for most of the questions.

25 MR. TROSTEN: Go ahead and read the question, please.
(The pending question is read by the reporter.)

End

1 MR. TROSTEN: Now I object to the form of the
2 question. I will ask Mr. Roisman to restate it, please.

3 CHAIRMAN JENSCH: On what ground?

4 MR. TROSTEN: Because it has too many premises
5 and qualifications in it, Mr. Chairman, for the witness to
6 understand.

7 MR. JENSCH: I understood he was laying a foundation
8 to understand the purpose of the question, to understand why
9 one form or other was accepted. I think certain technological
10 methods have to be set forth in the premise of the question.
11 I think, as you indicated, if the witness doesn't understand,
12 he may so say. The objection is overruled.

13 Are you able to answer, Mr. Witness, or are you
14 waiting for some statement?

15 MR. TROSTEN: Mr. Chairman, the witness has advised
16 me that he is really not qualified to answer the question.
17 You may so state.

18 CHAIRMAN JENSCH: I don't think you can tell him
19 too much to testify. He can give his own view of the matter
20 in the course of his presentation.

21 MR. BURGESS: I am not qualified to answer that
22 question in depth.

23 CHAIRMAN JENSCH: Give us the circumstances. Can
24 you give us any kind of an answer why you didn't do one kind
25 of testing more than the other. Do you know? Who selected

1 the method? You were project engineer at Robinson plant.
2 You are not the project engineer here; is that correct?

3 MR. BURGESS: Yes.

4 CHAIRMAN JENSCH: Do you know about the different
5 methods of testing?

6 MR. BURGESS: Yes, I do. I participated in
7 selection of a method. The experts in this area assisted us
8 in making the selection.

9 CHAIRMAN JENSCH: What did you select?

10 MR. BURGESS: A mag particle inspection of each
11 weld layer.

12 CHAIRMAN JENSCH: When you made that selection,
13 what did you reject? What method did you reject, ultrasonic?

14 MR. BURGESS: We reviewed the various alternatives
15 to us. One of them was ultrasonic.

16 CHAIRMAN JENSCH: Why did you reject that?

17 MR. BURGESS: We concluded that the mag particle
18 inspection would provide the quality of weld desired.

19 CHAIRMAN JENSCH: How would it do that better than
20 the ultrasonic, for instance?

21 MR. BURGESS: The ultrasonic examination was
22 determined that it would also determine the quality of weld
23 required. We elected to use the mag particle because it was
24 compatible with the installation.

25 CHAIRMAN JENSCH: Proceed.

1 MR. ROISMAN: Looking again at the diagram that you
2 have here, I notice to the right of the large section there
3 is a small piece with several safety valves on it. Is that
4 meant to depict the actual configuration of several safety
5 valves on one long stretch of steel pipe?

6 MR. BURGESS: Yes. This represents one header.

7 MR. ROISMAN: Those safety valves as shown do not
8 show the modification; is that correct? They show the
9 configuration before any modification has been made; is that
10 correct?

11 MR. BURGESS: Yes.

12 MR. ROISMAN: Looking at the modification, it appears
13 that the pipe is instead of coming almost at a right angle or
14 almost parallel to the safety valve, is going to come off at
15 an angle to the safety valve in such a way that if those
16 in your little diagram were done that way, it looks like the
17 pipes would run into each other. Can you explain to me what
18 goes on with that pipe after it continues such that that
19 doesn't occur?

20 MR. BURGESS: Could you explain the question again?
21 Could you point to the model?

22 MR. ROISMAN: Yes. If we assume that the modification
23 as shown in blue on the large safety valve had in fact been
24 made on each of the small safety valves, the two valves that
25 are at the right side of the steam pipe header, those two

1 would each have been bent outward. So it looks like they would
2 run into each other. I'm trying to find out what did you do
3 so it wouldn't happen.

4 MR. BURGESS: The answer to your question, as I
5 understand it, is the stack modification geometry basically
6 consists of the vent stack which protrudes or extends the
7 exhaust from the valve above the roofline of the building in
8 which these are housed. That vent stack is around the safety
9 valve discharge at an angle the same as you see here. This
10 is the stub pipe that comes out of the valve. Fitting around
11 here is a vent stack. A vent stack goes up and turns such
12 that it then proceeds in a vertical direction or almost
13 vertical in all cases.

14 MR. ROISMAN: In other words, there is another bend?
15 The pipe doesn't go just straight?

16 MR. BURGESS: There is another piece of pipe that
17 is not shown here.

18 MR. ROISMAN: With another bend in it?

19 MR. BURGESS: That's correct.

20 MR. ROISMAN: In the original configuration that
21 bend didn't exist; is that correct? That's a new bend; is
22 that correct?

23 MR. BURGESS: That bend did not exist in the original
24 bend in the bend stack in the original installation, that's
25 correct.

1 MR. ROISMAN: In doing the analysis of stresses on
2 that portion of the piping, has a new stress been done to
3 determine what the stresses will be at that second bend, the
4 brand new bend?

5 MR. TROSTEN: I think we should have Mr. Crowley
6 answer that question.

7 MR. CROWLEY: As I understand the question, this
8 new configuration and its vent stack, to the roof, has the
9 combined effects of flow as may relate to this reaction that
10 has been considered; is that correct?

11 MR. ROISMAN: As I understand it, in the old
12 configuration, to reach the vent stack, the steam from the
13 relief valve made one turn. That one turn was very sharp and
14 that is where the problem arose, because it was so sharp.
15 Now you have made two turns, each small, but you are still
16 having to end up getting the steam to move in a ninety-degree
17 angle from where it originally started.

18 Have you reanalyzed the stresses at the new, the
19 brand new bend that exists that Mr. Burgess just described on
20 the diagram here?

21 MR. CROWLEY: Yes.

22 MR. ROISMAN: Were those done according to the
23 Bujliard method?

24 MR. CROWLEY: Well, the Bujliard method doesn't
25 apply to this particular question. This is a question that

1 actually relates itself to what might be simplified as the
2 Newton second or third laws. It has to do with jet forces,
3 acceleration forces. These forces have been calculated for
4 this configuration to determine the total dynamic impact load
5 as communicated through this configuration. That is the
6 force load at so many pounds thrust. That has been taken
7 into account as it intersects with load intersection of these
8 intersecting cylinders which permits the application of that
9 load into the Bujliard method which permits the calculational
10 stresses here.

11 MR. ROISMAN: Do I understand correctly that the
12 problem that the modification is designed to eliminate is
13 that when the steam from the safety relief valve went out
14 the exhaust, it created a horizontal force which struck the
15 side of the vertical pipe, and in effect ripped or would tend
16 to rip the safety valve off of the main steam line; that i
17 was that horizontal force that was causing the problem; is
18 that correct?

19 MR. CROWLEY: This configuration produces a moment
20 where the force is tending to overturn in this direction.
21 This produces a force that tends to intersect into this
22 junction between the two cylinders, which tends to reduce
23 the load as relates to stresses in this area. So it is a
24 movement in the direction of reducing the stresses at this
25 point, when coupled with the weld overlay method produces the

1 stresses to well below allowables in this area. These two
2 are combined effects.

3 MR. ROISMAN: Mr. Crowley, are you familiar with
4 the stress relieving post-weld heat treatment that's intended
5 for this weld there, or should we have Mr. Burgess come back?

6 MR. CROWLEY: I believe Mr. Burgess is a more
7 appropriate spokesman for that subject.

8 MR. ROISMAN: All right.

9 CHAIRMAN JENSCH: Is he here?

10 MR. BURGESS: Right here.

11 CHAIRMAN JENSCH: You may sit where you are.

12 MR. ROISMAN: Mr. Burgess, does the post-weld heat
13 treatment get applied to each layer individually, and then
14 to the total weld, or does it get applied on to the total
15 weld and not each layer individually?

16 MR. BURGESS: It gets applied to the total weld
17 once it is completed.

18 MR. ROISMAN: Can you just describe how you go
19 about subjecting the welded area to this temperature and
20 holding it at that temperature for an hour? Do you have to
21 enclose the weld in some sort of a portable device?

22 MR. BURGESS: It will be jacketed in a heating
23 device.

24 MR. ROISMAN: And then when you have held it at
25 the required temperature, what will you do after that temperature

1 has been reached? Do you simply remove the jacket and walk
2 away or leave the jacket there and turn off the temperature?
3 What happens?

4 MR. BURGESS: We let it cool down at a control rate.

5 MR. ROISMAN: By control, do you mean that you will
6 lower the heat gradually or you will turn the heat off and
7 let the heat dissipate by normal forces gradually?

8 MR. BURGESS: We will turn the heat off and let it
9 dissipate slowly.

10 MR. ROISMAN: Can you give me any idea of how long?
11 First of all, will you do it valve by valve, or will you do
12 it for a whole series of valves on a single header?

13 MR. BURGESS: Our present plans are to do the whole
14 header at once, each header at one time.

15 MR. ROISMAN: You are not at that stage yet, am I
16 right? You have not begun the heat treatment?

17 MR. BURGESS: That is correct.

18 MR. ROISMAN: How long will you anticipate that
19 that takes from the time you finish the weld and finish the
20 last tests on the weld?

21 MR. BURGESS: Can I ask you to restate the question,
22 please?

23 MR. ROISMAN: After you finish the weld and the
24 last tests on the weld, how long does it take to do the post-
25 weld heat treatment?

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1 MR. BURGESS: I don't know the answer to that
2 question exactly.

3 MR. ROISMAN: Hours, days, months?

4 MR. BURGESS: It's on the order of days.

5 MR. ROISMAN: I have no further questions at this
6 time, Mr. Chairman, on this subject.

7 CHAIRMAN JENSCH: Mr. Briggs would like to ask a
8 question. Have a seat, Mr. Burgess.

9 MR. BRIGGS: What work has been done to qualify the
10 weld rod, the base metal, and the procedures for carrying out
11 this particular operation?

12 MR. BURGESS: We welders that we have working on
13 the job now are qualified in accordance with Section 9 of
14 the ASME code.

15 MR. BRIGGS: Have any special tests been run on the
16 base material in the weld rod itself?

17 MR. BURGESS: Nothing in addition to the normal
18 ASTM.

19 MR. BRIGGS: When you say nothing in addition to
20 the normal ASTM, what are the requirements for the normal
21 ASTM qualifications?

22 MR. BURGESS: I am not familiar with the details of
23 that particular ASTM.

24 MR. BRIGGS: Have any special tests of any kind been
25 made? In other words has base material and weld rod been welded

T1Bt2

1 together in a configuration like this and been tested with
2 reserve bend tests and things of that nature to check the
3 quality?

4 MR. BURGESS: The answer to that is no.

5 MR. BRIGGS: So you have the weld rod and some tests
6 have been run on that and you are not quite sure what those
7 are, and you have the installation in the plant and qualified
8 welders are doing the welding and they are doing particular
9 inspections, is that right?

10 MR. BURGESS: That is correct.

11 MR. BRIGGS: Could someone let me know what kinds of
12 tests are run on weld rods for this particular job to make
13 sure that they meet the requirements for the job?

14 MR. TROSTEN: Mr. Briggs, we have another back-up
15 witness whom I think we can have available to answer your
16 question in this detail. He is Mr. Monroe of Battelle.

17 MR. BRIGGS: Fine.

18 CHAIRMAN JENSCH: Mr. Monroe, have you been sworn
19 in this proceeding?

20 MR. MONROE: No, sir.

21 (ROBERT E. MONROE, Sworn.)

22 MR. BRIGGS: I didn't think that there was anyone
23 left who hadn't been sworn in this proceeding.

24 MR. ROISMAN: I was just trying to find out who was
25 down at the plant.

T.BTS

1 MR. BRIGGS: Possibly you heard the question that
2 had to do with the qualification of of the materials and the
3 procedures that are used for carrying out this operation.
4 Would you like me to ask questions or can you just give me
5 some information about all this?

6 MR. MONROE: I can comment, first of all, on that
7 particular question in part, while I think it's correct to
8 state there was no specific qualification conducted for this
9 particular procedure, that the base materials, the electrodes
10 which are being employed, all of the critical welding materials,
11 have been qualified as part of other welding operations required
12 for the construction of the plant, and in that regard I
13 believe anything important in this area probably has been
14 verified previously.

15 MR. BRIGGS: In the qualification of the weld rod
16 itself are tests run on batches of rods here or are tests
17 run by the manufacturer, or what kind of certification does
18 one get on the rod that's used in this operation?

19 MR. MONROE: I am not exactly certain here, but it
20 is the normal practice for welding materials to be supplied
21 to a specific specification. Most of these are specifications
22 designated by the American Welding Society and I believe also
23 incorporated into the specifications of other organizations.

24 MR. TOSTEN: Mr. Briggs, Mr. Burgess can further
25 respond to your question.

TLBt4

1 MR. BRIGGS: The particular weld material we are
2 using on this modification comes with certification papers
3 by lot from the manufacturer.

4 MR. BRIGGS: One of the reasons for asking the
5 questions was that I am told that there is some uncertainty
6 at Turkey Point as to whether the relief valves actually
7 opened and exerted forces on the joint, or whether there was
8 some problem with the welds that caused the fractures before
9 the relief valves opened, and if the relief valves opened
10 the forces existed, if the relief valves did not open, the
11 forces apparently did not exist, and there was a question of
12 the quality of the weld material itself, and this was the
13 reason for asking about how certain we are of the quality of
14 the joint that one finally gets here when he carries out this
15 operation.

end

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1 MR. TROSTEN: Excuse me just a minute, Mr. Briggs.

2 CHAIRMAN JENSCH: I don't know if there is any
3 question. As I understand Mr. Monroe examined the materials
4 after the incident at Turkey Point. Is that correct?

5 What is your relationship with this project, Mr.
6 Monroe?

7 MR. MONROE: I guess experience at Turkey Point, sir.

8 CHAIRMAN JENSCH: Let me ask Mr. Burgess a question
9 or two.

10 You were the project engineer at Robinson, and I
11 presume you followed the related incident down at Florida
12 Power & Light, Turkey Point, did you?

13 MR. BURGESS: I was a project engineer on Carolina
14 Power & Light plant, H. B. Robinson No. 2. I am not
15 familiar with the details of the Turkey Point incident.

16 CHAIRMAN JENSCH: Well you know about it, of course.

17 MR. BURGESS: Yes, I do.

18 CHAIRMAN JENSCH: Do you know of any evidence that
19 the valves opened at Turkey Point?

20 MR. BURGESS: No.

21 CHAIRMAN JENSCH: Let me ask you this. One common
22 denominator between Turkey Point and H. B. Robinson, as I
23 understand it, is that there was no stress relieving. The
24 original welds from the weldolet to the header, is that
25 correct, in the original construction?

1 MR. BURGESS: I can't answer that because I don't
2 remember.

3 CHAIRMAN JENSCH: Well this is a subject of some
4 interest in the field, is it not, this question of the breach
5 of the valve, the weldolet and the head, is it not, a pretty
6 current subject in the field today?

7 MR. BURGESS: With respect to the heat treatment?

8 CHAIRMAN JENSCH: Yes.

9 MR. BURGESS: I would say it's pertinent to the
10 problem and all I can say is on Robinson I don't recall the
11 fact that it was or was not heat treated prior to the time we
12 had the failure on H. B. Robinson No. 2.

13 CHAIRMAN JENSCH: By the way, was there stress
14 relieving at Indian Point 2 on the original headers and the
15 main steam line for the generator?

16 MR. BURGESS: Yes.

17 CHAIRMAN JENSCH: And you are adding welding material
18 how thick to the original installation, the welding material?

19 MR. BURGESS: The weld material is one inch thick.

20 CHAIRMAN JENSCH: Have you made an analysis of
21 the forces that it will be able to contain? Is that reflected
22 in some documents you have, not here, but perhaps in the course
23 of some work on this matter?

24 MR. BURGESS: Yes, sir. I am sorry. I didn't
25 understand the whole question.

1 CHAIRMAN JENSCH: What is the purpose of putting
2 the additional welding on? What will it contain which may
3 restrict it from blowing, rupture, incident, accident?

4 MR. BURGESS: Mr. Crowley testified a while ago
5 that the analytical methods that were done this, and we have
6 performed the analysis, UE&C has performed the analysis, to
7 assure that with all loads applied the stresses in the main
8 steam header adjacent to the safety valve nozzle will be
9 less than the code allowable.

10 Therefore, we concluded that this modification
11 provides an adequate installation.

12 CHAIRMAN JENSCH: Mr. Madsen, have you looked at
13 the original stress relieving records of the weldolet to the
14 header here at Indian Point No.2?

15 MR. MADSEN: I have looked at stress relieving
16 records for the main steam lines. I don't recall that I did
17 specifically for these valves at the location you are talking
18 about.

19 CHAIRMAN JENSCH: Well, maybe we will have an
20 occasion to talk to you again in the course of several of
21 these sessions. Will you have a chance to take a look at that,
22 examine the records of the first stress relieving of these
23 weldolet portions of the safety valve component system to
24 the header that goes to the steam generator? Will you do that?

25 MR. MADSEN: There is another man that took a

1 look at the main steam safety valve, main steam line welding,
2 et cetera, for me, so I will try and get an answer, yes.
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1 CHAIRMAN JENSCH: Thank you.

2 MR. ROISMAN: Mr. Chairman, I wonder if it would be
3 of any benefit -- I was just looking through the report that
4 Florida Power & Light submitted on the incident. I don't know
5 whether this contains the reference that Mr. Briggs referred
6 to regarding whether it was in fact the valves that had
7 opened and therefore the cause of the failure was overstressing
8 or whether there was a weakness in the weld.

9 CHAIRMAN JENSCH: There was no stress relieving, as
10 I understand, of the original weld, the weldolet to the header
11 down there.

12 MR. ROISMAN: But this report I see has Mr. Monroe's
13 name on it. That is, part of it does, Appendix 5A. Perhaps
14 it would be possible for it to go into evidence in our
15 proceeding so that there would be an evidentiary basis for
16 a comparison, if not necessarily now then at some other
17 convenient time for our purposes we would be happy to stipulate
18 that it can go in without having the particular witness here
19 to swear to it, if that would make the record more clear on
20 the subject.

21 CHAIRMAN JENSCH: Well, until that issue arises we
22 won't have to make a determination. As I understand it, Mr.
23 Monroe, from our discussion with Mr. Monroe, he had a basket
24 and went around and picked up the pieces and took them out
25 to Columbus and gave them an analysis. I don't know that

T3Bt2

1 he was there at the time of the original welding or the
2 incident. While we are happy to see him here I don't think
3 that his participation at Indian Point 2 qualifies for any
4 further evidence.

5 MR. BRIGGS: Mr. Monroe, I am not really familiar
6 with all that was done at the Turkey Point plant. The
7 ruptures that were observed there, were they ductile or were
8 they brittle?

9 MR. MONROE: They were a ductile rupture, almost
10 entirely in the pipe body material, pipe wall itself.

11 MR. BRIGGS: Was there any indication at all of
12 inadequacy in the quality of the weldolets, say? You say the
13 ruptures were in the base plate. Were you able to establish
14 where the ruptures started, what went first?

15 MR. MONROE: For each individual fracture, yes.

16 MR. BRIGGS: And can you indicate on the model there
17 where the fractures began?

18 MR. MONROE: The fractures began at the lowest point
19 on the intersection between the weldolet connection and the
20 main steam piping, which would be at this particular point
21 right here.

22 MR. BRIGGS: Did they begin in the weld, in the
23 heat-affected zone, or in the base metal itself? Were you able
24 to tell?

25 MR. MONROE: They began in an area that initially

1 consisted of heat-affected substance.

2 MR. TROSTEN: Mr. Briggs, the tail pipes in the
3 Turkey Point point out this way.

4 DR. GEYER: They go out sideways.

5 MR. TROSTEN: That's right.

6 MR. BRIGGS: That's fine.

7 Would you say the failure apparently started in the
8 heat-affected zone between the weld and the base plate, is
9 that right?

10 MR. MONROE: That is correct, although if I can add
11 to that --

12 MR. BRIGGS: Yes.

13 MR. MONROE: It happens to also be the point of
14 highest stress concentration.

15 MR. BRIGGS: And that is a bad place to have the
16 highest stress, I guess.

17 MR. MONROE: Well, I think the high stress is the
18 major factor.

19 MR. BRIGGS: I have no more questions. Thank you.

20 CHAIRMAN JENSCH: I don't think we have the
21 qualifications of Mr. Monroe. As I understand it he is a
22 metallurgist and not an engineer making calculations,
23 analyses of causes and effects. Is that correct, Mr. Monroe?

24 MR. MONROE: I am a metallurgical engineer. I am
25 not sure what that makes me.

T3Bt4

1 CHAIRMAN JENSCH: Well, I don't want to go all over
2 your Florida Power & Light testimony, but as I understand it,
3 the rupture was at a point about an eighth of an inch from the
4 weld, and that was the weldment area to which you referred,
5 and in that area the rupture occurred, correct?

6 MR. MONROE: Yes, sir.

7 CHAIRMAN JENSCH: There was no stress relieving on
8 the Florida Power & Light main header system, is that correct,
9 on the original weldment?

10 MR. MONROE: Excuse me. I believe you said the main
11 header system.

12 CHAIRMAN JENSCH: Whatever it is.

13 MR. MONROE: Well, the situation in Florida was
14 somewhat different in that there were small headers coming
15 off. These were not stress-relieved at the point where the
16 rupture initiated.

17 CHAIRMAN JENSCH: And am I to understand you
18 explained down there that the failure to stress relieve some-
19 times leads to what did you say, nil ductility? That means
20 embrittlement and susceptibility to easier fracture and
21 rupture than would be metal that had been stress relieved, is
22 that correct?

23 MR. MONROE: Sir, I believe you are making more
24 of the testimony of Mr. Metopoulos; although I certainly would
25 agree with the comments that he made at that hearing, I would

T3Bt5

1 like to clarify that this type of embrittlement only occurs
2 and would influence fracture at low temperatures.

3 CHAIRMAN JENSCH: Well, you called it a puzzle down
4 there. They have running recordings of the pressure in the
5 main steam header for something like a week, particularly the
6 day in question, and it was recording something like 990
7 pounds or psig, the valves were set for 1085, which one of the
8 cardinal rules of nuclear technology is bleed your instruments.
9 It would be that the valves did not relieve and therefore
10 when a rupture occurred it might have been due to pressure on
11 the weak weld.

12 Would not that be a fair inference?

13 MR. MONROE: I'm afraid I can't -- it's a fair
14 inference. I don't agree with it, sir.

15 CHAIRMAN JENSCH: I think that is about as far as
16 we need to go.

17 MR. TROSTEN: Mr. Chairman, I'd just like to offer
18 for the record a statement of Mr. Monroe's professional
19 qualifications.

20 CHAIRMAN JENSCH: Do you want it physically incor-
21 porated in here?

22 MR. ROYMAN: No objection.

23 MR. MARTIN: No objection.

24 MR. KARMAN: No objection.

25 CHAIRMAN JENSCH: The application is granted, the

T3Bt6

1 reporter is directed to physically incorporate it in the
2 transcript.

3 Is this a convenient place to interrupt our
4 examination? At this time let us recess, reconvene in this
5 room at 4:15.

6 (Hearing recessed.)

7 (Document follows.)

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PROFESSIONAL QUALIFICATIONS
ROBERT E. MONROE
CHIEF, JOINING TECHNOLOGY DIVISION
BATTELLE COLUMBUS LABORATORIES

My name is Robert E. Monroe, I am presently employed by Battelle Columbus Laboratories as the Chief, Joining Technology Division. My business address is 505 King Avenue, Columbus, Ohio 43201.

In my current position I supervise the research and development activities of the Joining Technology Division. This division has a staff of 22 people, including 13 professionals. We conduct a large number of technical programs for government agencies and industrial corporations involving welding, brazing, and related processes. I have been Chief of this division since 1967.

I graduated from Virginia Polytechnic Institute in 1950 with a B. S. degree in Metallurgical Education. I have had some graduate level course work at Ohio State University, but have not completed requirements for an advanced degree. After graduation, I joined Battelle as a research engineer in 1950. Since that time, I have been involved in joining research programs, first as a program engineer and subsequently assuming more responsible positions when I became an Associate Division Chief in 1958 and Division Chief in 1967. Many of the programs I have conducted or supervised have been of the failure analysis type. I have published about 50 technical papers, made contributions to 2 books, and the Welding Handbook, and have presented numerous technical talks. I am a member of the American Welding Society, Sigma Xi, Tau Beta Pi, Pi Kappa Pi and other honorary societies, and am a Registered Professional Engineer in the State of Ohio.

1 CHAIRMAN JENSCH: Please come to order. Are we
2 ready to proceed with further examination on the question
3 of the support rings and the shoes? Are we ready to proceed
4 further in that regard?

5 MR. TROSTEN: We are ready, Mr. Chairman.

6 CHAIRMAN JENSCH: Very well.

7 MR. ROISMAN: I'd like to go back to the Applicant's
8 witnesses with regard to this and --

9 MR. TROSTEN: Mr. Roisman, are you finished with the
10 Staff?

11 MR. ROISMAN: Well, you will remember that it won't
12 be until this evening that I will look at those documents,
13 but at least I'm fairly finished with the Staff and I would
14 suspect it's only some clean-up material. But I have not
15 finished with the Applicant with regard to the support rings.

16 CHAIRMAN JENSCH: While there is a pause, is there
17 a likelihood that we might conclude the interrogation of
18 witnesses by noon tomorrow?

19 MR. ROISMAN: Yes, there is a likelihood.

20 CHAIRMAN JENSCH: All right. A reasonable
21 probability, without undue risk.

22 You may then plan to have the arguments in the
23 afternoon.

24 MR. MARTIN: Mr. Chairman, at this time I'd like
25 to just go to the matter of the testimony of Lester M. Stuzin.

1 CHAIRMAN JENSCH: You have discussed this matter
2 with the attorneys. Is there any objection?

3 MR. MARTIN: I have discussed it with the attorneys.
4 There is a stipulation that if Mr. Stuzin were here and sworn
5 this would be his testimony, with the understanding that if
6 any of the parties wish to cross-examine at a future time it
7 will be made available for that purpose. Copies of the
8 testimony of Mr. Stuzin have been distributed, and sufficient
9 copies have been provided to the Reporter for incorporation
10 in the record.

11 CHAIRMAN JENSCH: Very well. Upon a statement by
12 Mr. Martin and a statement of the stipulation by the attorneys,
13 the previously-prepared statement of Lester M. Stuzin,
14 Chief, Assistant Planning Division, Power Division, New York
15 State Department of Public Service, may be physically
16 incorporated within the transcript as if read and shall
17 constitute evidence on behalf of the New York State Atomic
18 Energy Council.

19 MR. MARTIN: Thank you, Mr. Chairman.

20 (Document follows.)
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BEFORE THE
UNITED STATES ATOMIC ENERGY COMMISSION

In the Matter of)
)
Consolidated Edison Company of)
New York, Inc.)
)
(Indian Point Station, Unit No. 2))

Docket No. 50-247

Testimony of

Lester M. Stuzin
Chief, System Planning Section
Power Division

New York State
Department of Public Service

on

The Need for Additional Capacity

for the

Consolidated Edison System

May 17, 1972

BEFORE THE
UNITED STATES ATOMIC ENERGY COMMISSION

In the Matter of

Consolidated Edison Company of
New York, Inc.

(Indian Point Station, Unit No. 2)

)
)
)
)
)

Docket No. 50-247

The Need for Additional Capacity
for the
Consolidated Edison System

My name is Lester M. Stuzin. My business address is 44
Holland Avenue, Albany, New York 12208.

I am employed by the New York State Department of Public
Service as Chief of the Power Division's System Planning Section.
I have been in this position since August 13, 1970.

I graduated in June of 1961 from the City College of New
York with a Bachelor of Electrical Engineering degree. While completing
the required courses at this School, I joined the staff of the Public
Service Commission in August, 1960, and I have been continuously
employed. I am a licensed Professional Engineer in the State of New
York.

The System Planning Section of the Power Division is mainly
responsible for the following:

1. Conducts studies on the requirements and adequacy
of short and long range electric power system
planning.

2. Conducts short and long range supply-load studies and reviews supply-load studies prepared by electric utilities.
3. Keeps the Public Service Commission informed on the day-to-day power situation in New York State and surrounding areas. This includes data that the Chairman may use in his weekly reports to the Governor.

This testimony is submitted at the request of the New York State Atomic Energy Council to substantiate the need for Consolidated Edison of 770 MWe^{1/} for the winter of 1972.

I have analyzed the load, capacity and reserve picture for the periods November, 1972 through April, 1973, for the Consolidated Edison system. Table I details the results of this study. The "Total Capacity" as shown in Table I is that value supplied by Consolidated Edison to the Federal Power Commission in Docket R-362 and includes 873 MW for Indian Point No. 2. The load associated with the periods in question was also supplied in that Docket. The scheduled maintenance is as planned by Consolidated Edison. The Company has increased its November, 1972 maintenance program by 770 MW over that reported to the Federal Power Commission. The adjusted total is in line with recent experience. The unit deratings and forced outages are from data taken from the 1971-1972 Weekly Load and Capacity Reports as prepared by the System Planning Section staff. Due to the state of much of Consolidated Edison's capacity, an analysis based on unavailable capacity (unit

^{1/} Operation of Indian Point No. 2 at 90 percent of full power.

deratings and forced outages) must be included in analyzing Consolidated Edison's reserves. This state has been brought about by the Company's inability to replace old, unreliable inefficient units. After deducting average unavailable capacity (average unit deratings plus average forced outages), I believe that Consolidated Edison will be unable to meet its load in January and March, 1973. In February, 1973, the Company will not have the required operating reserve of 600 MW because of these outages and deratings. Under high unavailable capacity (high unit deratings plus high forced outages), the projected situation becomes even worse. In summary then, in the period from November, 1972, through April, 1973, the Company will not be able to meet its load in every month except two (December, 1972, and February, 1973), and in these two months, the Company will not have the required operating reserve of 600 MW. The operating reserve of 600 MW is an estimate of Consolidated Edison's portion of the New York Power Pool requirement of 1,400 MW, which is based on the load and on the two largest units in operation.

All these figures are based on excluding the 873 MW of capacity associated with Indian Point No. 2. If this amount, or some percentage of this amount, were added to the Consolidated Edison system, the situation would, of course, improve.

The above analysis was based on the following capacity additions to the Company's installed capacity:

1. Bowline No. 1 - 600 MW (Consolidated Edison's share - 400 MW) - Summer of 1972.
2. Narrows Gas Turbines - 348 MW - Summer of 1972.
3. Roseton No. 1 - 600 MW (Consolidated Edison's share - 240 MW) - Fall of 1972.

This analysis also reflects the delay in Consolidated Edison's planned 1971 retirements totaling 259 MW to December, 1972. The reliability of this old capacity is questionable.

The statewide power picture appears somewhat brighter. Table II shows the load, capacity and reserve picture for periods between November, 1972 and March, 1973. However, even the statewide picture shows an inability of the State's electric utilities to meet the required operating reserve of approximately 1,400 MW in two months; January and March of 1973. On those occasions, the New York Power Pool would be forced to go to outside the system in order to purchase power to prevent some load curtailment. These statewide studies were based on the installation of the additional Consolidated Edison capacity previously mentioned plus Gilboa 1 and 2 - 500 MW - December, 1972. Installation of 873 MW, or some percentage thereof, would, of course, improve the New York statewide power picture. This improvement is not as marked as that of the Consolidated Edison system, however. In fact, an additional amount of capacity equal to about 550 MW would put the New York Power Pool in a position to meet its required operating reserve in each and every month of this analysis.

Conclusion

On the basis of the above analysis, additional capacity is needed for the winter of 1972-1973 to help Consolidated Edison meet its load requirement.

TABLE I
CAPACITY, LOAD AND MARGINS - NOVEMBER, 1972 - APRIL, 1973

CONSOLIDATED EDISON

	<u>Nov. 72</u>	<u>Dec. 72</u>	<u>Jan. 73</u>	<u>Feb. 73</u>	<u>Mar. 73</u>	<u>Apr. 73</u>
<u>Capacity</u>						
Thermal (Conventional)	7,125 ^{1/}	7,125 ^{1/}	6,909	6,909	6,909	6,909
Thermal (Gas Turbine & Diesel)	2,842	2,842	2,842	2,842	2,842	2,842
Thermal (Nuclear)	1,138	1,138	1,138	1,138	1,138	1,138
Hydro (Conventional)	-	-	-	-	-	-
Hydro (Pumped Storage)	-	-	-	-	-	-
Total Controlled	11,105	11,105	10,889	10,889	10,889	10,889
Purchases	-	40	40	40	40	40
Sales	-	-	-	-	-	-
Total Capacity	11,105	11,145	10,929	10,929	10,929	10,929
<u>Peak Load</u>						
Estimated Load -	6,225	6,425	6,350	6,250	6,125	6,225
<u>Margins</u>						
Gross Margin (MW)	4,880	4,720	4,579	4,679	4,804	4,704
Scheduled Maintenance -	730	900	1,150	800	1,450	780
Margin After Maintenance	4,150	3,820	3,429	3,879	3,354	3,924
Indian Point Delay -	(873)	(873)	(873)	(873)	(873)	(873)
Increased Maintenance Schedule -	770	-	-	-	-	-
Delay Retirement + ^{3/}	259	259	-	-	-	-
Additional Purchase + ^{2/}	240	200	200	200	200	200
Margin After Deducting Indian Point, etc.	3,006	3,406	2,756	3,206	2,681	3,251
<u>Unavailable Capacity</u>						
<u>Past 12 Months</u>						
<u>Experience</u>						
Average Deratings -	1,100	1,200	1,500	1,400	1,300	1,000
Average Forced Outage -	1,300	1,100	1,400	1,300	1,500	1,500
Margin With Average Unavailability	606	1,106	-144	506	-119	751
High Deratings -	1,400	1,500	1,800	1,600	1,900	1,300
High Forced Outage -	1,800	1,600	2,400	1,500	1,700	2,000
Margin With High Unavailability	-194	306	-1,444	106	-919	-49
Required Operating Reserve	600	600	600	600	600	600
<u>1/ Includes New Units</u>						
Bowline #1	400	(Consolidated Edison's share)				
Narrows Gas Turbines	348					
Roseton #1	240	(Consolidated Edison's share)				
<u>2/ Recent Purchase</u>						
Agreements						
Maine Yankee	40					
Bowline #1	200	200	200	200	200	200
<u>3/ Delay Retirement</u>						
Hell Gate #2 & #3	115	115				
Waterside #1	35	35				
Hudson Ave. #2 & #3	94	94				
59th Street #7	15	15				

TABLE II

CAPACITY, LOAD AND MARGINS - NOVEMBER, 1972 - MARCH, 1973

NEW YORK STATEWIDE

	Nov. 72	Dec. 72	Jan. 73	Mar. 73
<u>Capacity</u>				
Thermal (Conventional)	15,627 ^{1/}	15,620 ^{1/}	15,400	15,410
Thermal (Gas Turbine & Diesel)	4,302	4,323	4,323	4,333
Thermal (Nuclear)	2,238	2,238	2,238	2,238
Hydro (Conventional)	4,019	4,024	4,013	4,025
Hydro (Pumped Storage)	-	500	500	500
Total Controlled	26,186	26,705	26,474	26,506
Purchases	88	126	126	128
Sales	150	150	150	150
Total Capacity	26,124	26,681	26,450	26,484
<u>Peak Loads</u>				
Sum of Individual Loads -	17,570	18,540	18,300	17,300
Coincident Loads -	17,410	18,540	18,280	17,260
<u>Margins</u>				
Gross Margin (MW)	8,714	8,141	8,170	9,224
Gross Margin (%)	50.1	43.9	44.7	53.4
Scheduled Maintenance -	1,400	900	1,300	2,500
Margin After Maintenance	7,314	7,241	6,870	6,724
Indian Point Delay -	(873)	(873)	(873)	(873)
Increased Maintenance				
Schedule -	770			
Delay Retirement + ^{3/}	259	259		
Additional Purchase + ^{2/}	40			
Margin After Deducting Indian Point, Etc.	5,970	6,627	5,997	5,851
<u>Unavailable Capacity</u>				
Past 12 Months Experience				
Average Deratings -	1,900	1,700	1,900	1,700
Average Forced Outage -	1,400	1,600	1,700	2,100
Margin With Average Unavailability	2,670	3,327	2,397	2,051
High Deratings -	2,000	2,000	2,000	2,300
High Forced Outage -	2,000	2,000	2,500	2,700
Margin With High Unavailability	1,970	2,627	1,297	851
Required Operating Reserve	1,400	1,400	1,400	1,400
<u>1/ Includes New Units</u>				
Bowline #1	600			
Narrows Gas Turbines	348			
Roseton #1	600			
Gilboa #1 & #2		500		
<u>2/ Recent Purchase</u>				
Agreements				
Maine Yankee	40			
<u>3/ Delay Retirement</u>				
Hell Gate #2 & #3	115	115		
Waterside #1	35	35		
Hudson Avenue #2 & #3	94	94		
59th Street #7	15	15		

1 CHAIRMAN JENSCH: Will you proceed, the Citizens'
2 Committee.

3 MR. ROISMAN: Mr. Branting. This is with reference
4 to the letter that you wrote to someone in Pennsylvania
5 Engineering Corporation whose name is not legible on the letter
6 dated January 19, 1968, and it's referred to as the Parameter,
7 Inc, reference D.13, I believe.

8 Just a moment and I will check.

9 Yes. Do you have a copy of that letter?

10 MR. BRANTING: I do not have it immediately
11 available, no.

12 MR. ROISMAN: I will read a portion just so we have
13 it here in the record. Then I am going to hand it to you,
14 let you look at it and ask you some questions about it.

15 The letter begins, "This letter is merely to confirm
16 our telephone conversation of Thursday morning, January 18, 1968.
17 Our customer has approved the fix discussed by us on
18 December 20th for the reactor vessel support ring. This fix
19 was discussed in general in my letter of December 21
20 confirming our conversation," and then on the second page of
21 the letter this statement appears. "You indicated that the
22 combination of spring in the ring and the limitation of
23 accuracy of the machine make a tolerance of plus zero minus
24 0.015 more probable. It seems reasonable to expect that the
25 ring can be moved at least .005 inches in elevation and setting

1 so that the additional .005 tolerance should not pose a
2 particular problem to the field. This observation does not
3 constitute a variant to the stated dimensions, however. The
4 customer is being queried on this point."

5 And I am going to now hand you the letter and I wanted
6 to ask you some questions about that later statement. Have
7 you looked at it?

8 MR. BRANTING: Yes. I presume you are particularly
9 interested in the last paragraph, the second page?

10 MR. ROISMAN: Yes, that's right.

11 Now can you tell me in fact after the work was done --
12 Well, first of all when you referred to the customer, to whom
13 were you referring there?

14 MR. BRANTING: To United Engineers and Constructors.
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1 MR. ROISMAN: And what was the resolution of the
2 discussion with the United Engineers and Constructors regarding
3 that tolerance question?

4 MR. BRANTING: At that time I secured no relief.

5 MR. ROISMAN: And what did you then require PECOR to
6 do?

7 MR. BRANTING: We requested they hold a stated
8 tolerance.

9 MR. ROISMAN: Were they successful?

10 MR. BRANTING: No.

11 MR. ROISMAN: Was the reactor support ring shipped
12 from PECOR without the stated tolerance having been achieved?

13 MR. BRANTING: It was.

14 MR. ROISMAN: And was the stated tolerance ever
15 achieved subsequently by some subsequent action that was
16 taken?

17 MR. BRANTING: I am not sure.

18 MR. ROISMAN: Was the tolerance problem handled in
19 the manner referenced in that paragraph, that is, were
20 certain things done with regard to the leveling of the ring
21 after it was at the reactor site to "overcome" the tolerance
22 problem?

23 MR. BRANTING: Since I was not at the site when the
24 ring was placed, I can't really tell you what was or was not
25 done except through hearsay.

U2Bt2

1 MR. ROISMAN: Mr. Berkowitz, I guess it's Mr.
2 Slotterback. You are with UE&C, and you are not familiar with
3 this subject, and what was it, Mr. Whitehouse who was also --

4 MR. BERKOWITZ: I think Mr. Whitehouse could respond
5 to your questions.

6 MR. ROISMAN: Okay.

7 Mr. Whitehouse, can you sort of pick up the story
8 of the warped ring after it got to the plant site? Mr. Branting
9 says that he is not aware of whether this problem that existed
10 when it was shipped from PFCOR was corrected prior to the
11 installation at the site. Can you fill us in on that?

12 MR. VOIGT: Mr. Chairman, I object to the form of
13 that question; the use of the terminology "warped ring" has
14 no support in the testimony that's been elicited here. I
15 request that Mr. Roisman refrain from injecting these
16 characterizations into his questions. He can elicit the
17 information from the witnesses without doing that, sir.

18 MR. ROISMAN: Mr. Chairman, on transcript Page 5147
19 the following exchange took place between Mr. Brill and Mr.
20 Karman:

21 "I call your attention now to Page 4 of the summary,"
22 meaning the summary of the Staff's testimony, "under Roman
23 numeral IVB, facts found.

24 "Mr. Brill stated that after stress relieving the
25 RVV support ring was warped as much as one and one half inches

U2Bt3

1 our of plane. He further stated this dimensional deviation
2 was reworked to the satisfaction of the UEC and FBI vendor
3 inspectors who accepted the reworked ring and authorized its
4 shipment to the I.P. 2 site.

5 "Is that an accurate statement, Mr. Brill?"

6 "Mr. Brill: You are asking if I made this statement.
7 I may have made this statement at that time based on mis-
8 information. My understanding is that the one and one-half
9 inch outer tolerance deviation that I am referring to here has
10 to do with the roundness of the ring, not the out-of-plane
11 as it's referred to here."

12 Now there is nothing either in the exchange there to
13 indicate that the Staff in any way is changing its statement
14 of the conversation or that Mr. Brill is changing his use of
15 the word warped. He did change whether he thought it was the
16 out-of-roundness or the out-of-plane. I think that the
17 terminology "warped" is well established by testimony already
18 in the proceeding.

19 There was another portion of the transcript, but I'm
20 afraid that I'm just not able to find it, where I, too, had
21 asked a question of Mr. Brill using the terminology warped
22 and he answered indicating that there was nothing wrong with
23 that terminology to describe the situation.

24 Mr. Voigt seems to be overly sensitive to the
25 subject, but I think the transcript establishes that it's

U2Bt4

1 permissible terminology.

2 MR. VOIGT: Mr. Chairman, Mr. Roisman's remarks
3 merely illustrate the validity of my objection. This is an
4 argumentative characterization and it's not a proper
5 question.

6 CHAIRMAN JENSCH: What is your statement about the
7 propriety of the word? Is it the one word warped that you
8 dislike?

9 MR. VOIGT: I believe that is the only character in
10 which the question is objectionable, yes, sir.

11 CHAIRMAN JENSCH: The objection is overruled.
12 Proceed.

13 MR. WHITEHOUSE: Would you restate the question,
14 please?

15 CHAIRMAN JENSCH: Reread the question, please.

16 (The pending question is read by the reporter.)

17 MR. WHITEHOUSE: Yes, sir. From a construction
18 standpoint we had no problems with anything that happened in
19 PECOR as far as warpage was concerned.

20 MR. ROISMAN: Was the ring as it was delivered to
21 the site, did it meet this tolerance requirement of plus
22 zero -- I am sorry, plus zero minus .01 inches?

23 MR. WHITEHOUSE: I was not concerned with that
24 dimension. I was concerned that the cooling pads were flat,
25 and we checked the cooling pads for being flat prior to

U2Bt5

1 installing within the reactor building.

2 MR. ROISMAN: Mr. Branting, do you know why that
3 requirement was, that is the requirement regarding the
4 levelness of the support ring, was included and why that
5 particularly stringent dimension was required?

6 You said the customer had refused to relieve you
7 on that. Did they give you any reason as to why they con-
8 sidered it important?
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1 MR. VOIGT: Mr. Chairman, I again object to the
2 form of the question. Mr. Roisman insists on characterizing
3 these things. He has referred to this requirement as
4 particularly stringent. Now why doesn't he just refer to
5 a requirement without using all the inflammatory adjectives?

6 CHAIRMAN JENSCH: Well, I didn't get that impression
7 from it. The witness can accept the premise that it seems
8 to be particularly stringent, I think Mr. Trosten's admonition
9 to a witness is very apt. If the witness does not know the
10 answer he should say he does not know the answer. He is
11 using something for conclusion. You may state it that now
12 in reference to this requirement which was not particularly
13 stringent --

14 MR. VOIGT: Equally objectionable, Mr. Chairman.

15 CHAIRMAN JENSCH: I think you have to use some
16 characterizations in discussing any of these matters and
17 I don't think that semantics are going to hurt one way or
18 the other what the facts really are. Maybe the witness won't
19 accept this stringent conclusion. Maybe it's a long hour and
20 we are trying to expedite the hearing in every way and we
21 want to utilize the time, but if it gets a little edgy for
22 the witnesses and the attorneys, why we had better knock off
23 and go back to our usual hours of ten to 4:30 and we'd be
24 very happy.

25 Objection overruled.

1 Do you have the question in mind, Mr. Witness?

2 MR. BRANTING: Yes, sir.

3 I do not recall receiving a particular reason for
4 refusal to relax that tolerance.

5 MR. ROISMAN: Is there any UE&C man here who would --
6 Mr. Slotterback, would you know why the tolerance requirement
7 was initially imposed?

8 MR. SLOTTERBACK: The tolerance was initially
9 specified to facilitate setting the reactor vessel as close
10 as possible with the diffused number of lifts raising it up
11 and down on the shims. So that our construction people
12 requested this tolerance to facilitate construction.

13 MR. ROISMAN: You mean it was a matter of
14 convenience for construction purposes?

15 MR. SLOTTERBACK: Yes.

16 MR. ROISMAN: Are you familiar with the communication
17 that Mr. Branting had with UE&C in which he requested in line
18 with this letter that the tolerance be permitted to be minus
19 0.015 instead instead of the .01?

20 MR. SLOTTERBACK: I don't recall.

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VIWt1

1 MR. ROISMAN: Would you, Mr. Whitehouse, be able to
2 indicate whether or not if the ring had been deceived with
3 the .015 as the minus figure, whether it would have caused the
4 unusual construction problem that would have warranted you,
5 in effect, having to return the ring and asked them to bring
6 it into a closer tolerance?

7 MR. VOIGT: I object to the question. It is
8 hypothetical and speculative and has no basis in the record.

9 CHAIRMAN JENSCH: May the question be reread, please.

10 (The last question was read by the reporter.)

11 CHAIRMAN JENSCH: I wonder if you would indicate
12 the purpose of your inquiry.

13 MR. ROISMAN: Yes. I am trying to find out whether
14 or not this ring was not able to be installed properly because
15 it was not level within the tolerances required.

16 Mr. Branting has indicated that when it left PECOR it
17 was not within those tolerances. Mr. Whitehouse has indicated
18 that he didn't look to see whether it was within those
19 tolerances or not.

20 I am trying to find out whether or not something had
21 to be done to that ring or whether this tolerance level was
22 set here, out of which everybody is purported to be concerned,
23 was sort of irrelevant, that it could have just easily been
24 .015 as it was .01. We have one bit of evidence in this record
25 to suggest that .01 was considered important by UESC, and that

v1wt2

1 is Mr. Branting's testimony that they did not agree to
2 relieve PB&I, and therefore PECOR had the responsibility to
3 bring it down to .01.

4 But it still wasn't met. It still left the shop
5 without being able to meet that standard. Now I am trying to
6 trace out and see if we can find out why UE&C was that con-
7 cerned about it. If it was never corrected, then UE&C's
8 concern was never satisfied and maybe that was the safety
9 problem. I don't know. I have to piece it together since
10 there isn't the person at the other end of Mr. Branting's
11 conversation that doesn't appear to be here.

12 CHAIRMAN JENSCH: The problem I am having is the
13 relevancy of the inquiry. The ultimate objective, of course,
14 no matter what was delivered, if the installation practices
15 were such as to make adjustments for whatever changes there
16 were from the original specifications, there are other
17 possibilities of handling that.

18 It seems somewhat remote and irrelevant, does it not?

19 MR. ROISMAN: I think the problem here is that we are
20 dealing with engineer conclusions. We get down to Mr.
21 Whitehouse's testimony that the ring was installed and
22 installed properly. The only way to get behind those
23 engineering things is to try to expose the underlying assump-
24 tions that go into the qualitative terminology, such as
25 adequate or satisfactory or that type of terminology.

V1Wt3
1 One of those underlying assumptions would seem to
2 be the assumption that dictated that the tolerance level had
3 to be .01. That was an assumption that was considered
4 sufficiently important that when Mr. Branting called and
5 requested relief from it, it was denied by UE&C.

6 I thought maybe Mr. Whitehouse might be able to
7 explain by telling us what kind of construction difficulties
8 would be associated with having received a reactor support
9 ring with .015 as the tolerance in trying to install it that
10 would have explained why Mr. Branting was denied the
11 opportunity for relief. That might cast some light on the
12 question.

13 It may be that when that answer is given, it will
14 turn out that it will be non-safe. I don't know that until
15 I have the answer from Mr. Whitehouse.

16 CHAIRMAN JENSCH: I am still having difficulty with
17 what really we are trying to resolve as to what was put in
18 place that was not adjusted to the requirements of the load.
19 That really is what we are seeking to resolve. I understand
20 Mr. Slotterback stated that some of these factors were con-
21 struction requirements to safe raising the reactors, as I
22 recall.

23 The objection is sustained.

24 MR. ROISMAN: Mr. Whitehouse, when you installed the
25 reactor ring at the site, did you have to use the leveling

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1 screws in order to get the desired degree of levelness?

2 MR. WHITEHOUSE: Yes, sir.

3 MR. ROISMAN: Did the leveling screws themselves
4 end up receding, or do they now have on them a load in order
5 to pick up whatever they are carrying?

6 MR. WHITEHOUSE: No, sir.

7 MR. ROISMAN: Can you explain to me how they no
8 longer carry a load and yet the reactor still remains level?
9 What replaced the leveling screw?

10 MR. WHITEHOUSE: The leveling screws, after we
11 poured the epoxy shim, which we used for a tamped plate, the
12 machine tool, the leveling screws were moved down so that the
13 shim plate set over the top of them.

14 MR. ROISMAN: As I understand the drawing on, or
15 diagram on Figure 6 of the Applicant's testimony -- do you
16 have that there?

17 MR. WHITEHOUSE: Yes.

18 MR. ROISMAN: That shows the leveling screws in a
19 present position, right?

20 MR. WHITEHOUSE: Yes.

21 MR. ROISMAN: Against what surface are the leveling
22 screws ends brought in contact?

23 MR. WHITEHOUSE: No surface. They are packed down
24 in recessers into the shim plate.

25 MR. ROISMAN: And they were used to level at the

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1 upper end, not at the lower end; is that correct?

2 MR. WHITEHOUSE: Yes. When you set the reactor
3 vessel first, it is setting on the jacking bolts. The shim
4 plate is not there. For the final setting, the jacking bolts
5 are ran down. You run them, screw them down into the girder,
6 tighten the locking nuts. They are still sticking up above
7 the screw.

8 MR. ROISMAN: I see that.

9 MR. WHITEHOUSE: Okay.

10 The bottom of the shoe plate, there is a recess
11 machined in there to take those.

12 MR. ROISMAN: So that when you did the epoxy cast,
13 if you will, if that's an appropriate term to use to do the
14 shim, you poured that epoxy around the settling screw. The
15 settling screw was what allowed you to find the exact
16 measurement for the placing of the shim plate; is that
17 correct?

18 MR. WHITEHOUSE: Yes, sir.

19 MR. ROISMAN: Thank you.

20 Is there a limit as to the differences between the
21 shim plates for the different nozzles at which point you would
22 feel that they should be no longer making up the lack of
23 levelness with the shim plate, or would it not matter at all
24 that one shim plate was 20 feet high and another one was 2
25 inches high?

1 MR. WHITEHOUSE: There was a requirement on the
2 thickness of the shim plates.

3 MR. ROISMAN: That they be no thicker than?

4 MR. WHITEHOUSE: No thicker than, no thinner than.

5 MR. ROISMAN: What is that figure?

6 MR. BERKOWITZ: Mr. Roisman, I believe I can
7 answer that.

8 The nominal thickness of the shim plates, as the
9 installation is supposed to be, is approximately one and one-
10 eighth inches. The minimum thickness of the shim plates is
11 supposed to be approximately one inch. I believe the shim
12 plates as supplied but before they are machined are approxi-
13 mately an inch and a half thick. So there is the possibility
14 of accommodating much more than ten or fifteen thousandths of
15 an inch in elevation difference.

16 MR. ROISMAN: Do you know why there is a limit placed
17 on the thickness and the thinness of the shim plate?

18 MR. BERKOWITZ: No.

19 MR. ROISMAN: Mr. Whitehouse.

20 MR. WHITEHOUSE: No, sir.

21 MR. ROISMAN: Mr. Slotterback.

22 MR. SOLTTERBACK: No.

23 MR. ROISMAN: Mr. Cunningham.

24 MR. CUNNINGHAM: That is the normal expected variation
25 in construction tolerances. If it fills the requirement of

1 the shim plate design, that is.

2 MR. ROISMAN: Is there any problem with the ability
3 to support the vessel if the shim plates were much thicker
4 or much thinner than those particular tolerance limits.

5 MR. CUNNINGHAM: Not to my knowledge.

6 MR. ROISMAN: Thank you.

7 Mr. Berkowitz, I will go back to you because I'm
8 not sure of whom to ask the question.

9 In the analysis that was done by the applicant and
10 its contractors and subcontractors, was there any analysis
11 made of possible problems associated with the elongation of
12 the holes that were in the reactor support ring? These are
13 referred to in the testimony by Parameter, Inc., on Page, I
14 believe, 9, Item IIB, 1.

15 MR. VOIGT: I will object to any examination by
16 Mr. Roisman concerning the Parameter, Inc., reports. If his
17 reference is intended merely for clarification, I have no
18 objection, but I wish to forestall any line of questioning
19 of my witnesses about someone else's documents.

20 end

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1 CHAIRMAN JENSCH: I think that general objection
2 is well taken, that each panel is limited to its own exhibits.

3 MR. ROISMAN: Mr. Voigt seems to be a little quick
4 on the trigger today, Mr. Chairman. Maybe he ought to
5 retire and let the rest of us go on. I thought it would help
6 the witness understand what I was talking about. If he simply
7 referred to that portion of it, it might be all right. I
8 didn't think I was asking any question about the study that
9 was done by Parameter, but they do describe the elongation
10 in a manner that I understood, and I hope he would understand,
11 and we would be able to talk about it.

12 CHAIRMAN JENSCH: For the purpose of clarification,
13 the question is proper.

14 MR. ROISMAN: I wonder if the Chairman would ask
15 Mr. Voigt to control himself so I would not have to sit here
16 and be exhausted all day responding to his hotheadedness and
17 at the same time trying to get through cross-examination,
18 lead documents that I get at the last minute and try to
19 cross-examine on all of them at the same time. The long
20 day is most tiring on me. Everyone else is shifting around.
21 It would make it a lot easier if the Chair would request
22 Mr. Voigt to restrain himself. He hasn't been here before.
23 I trust he will not be here again.

24 MR. VOIGT: Mr. Chairman, may I respond to that?

25 CHAIRMAN JENSCH: No. Any attorney who appears

1 in a case must assert the interest of his client as he sees
2 it to be. Will you proceed.

3 Do you understand the question for clarification,
4 Mr. Berkowitz?

5 MR. BERKOWITZ: I understand the question and I will
6 ask Mr. Slotterback to answer it providing he recalls the
7 question. Do you recall the question?

8 MR. SLOTTERBACK: I think I have the right page now,
9 if you could repeat what you are asking.

10 MR. ROISMAN: I just wanted to know with regard to
11 the question of the elongation of holes, anchor bolt holes
12 which are described on page nine of the Parameter, Inc. study,
13 was a study or analysis done by the Applicant or its
14 contractors or subcontractors to determine whether that caused
15 any problems? Maybe whether the modification caused any
16 problems.

17 MR. SLOTTERBACK: There was no analysis done. There
18 was a study done in investigation to check on the relation
19 of the elongated hole to the size of the nut that came down
20 on top of it, to be sure that the stresses would be, if there
21 were any loads applied to it, distributed over full washer
22 and the nut.

23 MR. ROISMAN: Who conducted that study?

24 MR. SLOTTERBACK: We did.

25 MR. ROISMAN: When was that done, roughly?

1 MR. SLOTTERBACK: Since this all began.

2 MR. ROISMAN: When you say this all, you mean since
3 Mr. Brill's letter?

4 MR. SLOTTERBACK: Yes.

5 MR. ROISMAN: At the time that the actual
6 modification was made, why was a study done at that time to
7 determine whether the modification caused the problem?

8 MR. SLOTTERBACK: Because the bolts were there for
9 locating the ring and holding it in position. There are no
10 real loads applied to the bottom plate due to that elongation.

11 MR. ROISMAN: I don't understand. Why wasn't that
12 adequate to deal with the Brill matter?

13 MR. SLOTTERBACK: This was in response to our first
14 meeting with Compliance.

15 MR. ROISMAN: In other words, it was something that
16 Compliance had asked, and in effect, they asked you the
17 question I asked you, and you said, you had to tell them,
18 well, no, not so far? You said, well, would you do it and
19 let us know?

20 MR. SLOTTERBACK: Yes.

21 MR. ROISMAN: Thank you.

22 Mr. Branting, Mr. Brill testified yesterday
23 regarding work that was done at his shop with regard to the
24 support ring. After the initial work was done on the ring
25 in an attempt to correct what he called -- Hold yourself,

1 Mr. Voigt. -- warping -- That work he didn't know precisely
2 what had been done before it was shipped out of his shop
3 to try to correct the problem. Do you know what was done and
4 could you describe it to us?

5 MR. BRANTING: Yes, sir. The warpage, if we want
6 to call it that, and confine ourselves temporarily, consisted
7 of a ring in halves moving inward, so that an oval shape is
8 formed. To compensate for this, we located the holes, so
9 forth and so on, on the ring with relation to the theoretical
10 center of the ring. So that in this compensation there was
11 no net effect of any warpage or anything of that type.

12 As far as work done in Mr. Brill's shop to correct
13 warpage, as he characterized it, there was nothing done
14 which, should we say, to open up the ring again. We are
15 talking about a very healthy size piece of steel. There was
16 nothing done along those lines.

17 I believe he made a statement regarding the fit of
18 the splice plates.

19 MR. ROISMAN: Right.

20 MR. BRAINTING: Which is covered and sketched in our
21 testimony I think rather adequately.

22 MR. ROISMAN: As I understand what happened then,
23 when you realized that the ring was slightly oval, you knew
24 where the holes that would be needed for attaching the ring
25 to the concrete support below had to be in terms of a

1 hypothetical circle, if you will, and you simply made the
2 hypothetical circle and placed the bolt holes where they should
3 be in order to match up the holes on the reactor's concrete
4 support pad, is that what you did in effect? If you would
5 ignore the ovalness of the ring, is that correct statement?

6 MR. BRANTING: Yes, that is in effect correct.

7 MR. ROISMAN: So the ring is installed on the
8 reactor and still is a little oval, but in your opinion it
9 is irrelevant because what you wanted to make sure was that
10 the holes and the ring and bolt holes and the concrete matched
11 up, and that was done; is that correct?

12 MR. BRANTING: Yes, sir.

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1 MR. ROISMAN: I assume, then, that this cutting
2 that was done on the splice plates was done prior to the
3 time that the holes were put into the support ring; is that
4 correct?

5 MR. BRANTING: Yes, sir.

6 MR. ROISMAN: When the reactor sets on the support
7 ring, is it any closer to some portions of the sides of the
8 support rings on one side than it is on another as a result
9 of the ovalness of the support ring?

10 MR. BRANTING: One diameter of that circle was
11 shortened by the pulling in, the horseshoeing or valley,
12 whatever you wish to call it. Yes, it would therefore be
13 closer to the reactor.

14 MR. ROISMAN: You mean at that point?

15 MR. BRANTING: Yes.

16 MR. ROISMAN: At a random point around the side?

17 MR. BRANTING: No.

18 MR. ROISMAN: It is not that it is all closer but
19 just close at one point; is that correct?

20 MR. BRANTING: The circumference of the ring didn't
21 change dimension, to my knowledge. We weren't stretching or
22 shrinking the steel.

23 The change in dimension was such that had the
24 splice plates been narrower and therefore the diameter closer
25 to the reactor vessel, it would have been stretched a little

1 bit, giving you this oval configuration.

2 MR. ROISMAN: What are the distances we are talking
3 about? Are we talking about between the edge of the support
4 ring and the reactor vessel itself, roughly?

5 MR. BRANTING: I don't know.

6 MR. BERKOWITZ: Mr. Whitehouse will answer that
7 question for you, Mr. Roisman.

8 MR. ROISMAN: Thank you.

9 MR. WHITEHOUSE: Approximately an inch and a half.

10 MR. ROISMAN: That would be the normal distance?

11 MR. WHITEHOUSE: The normal clearance between the
12 installation and the ring.

13 MR. ROISMAN: Do you know what the clearance is at
14 the narrowest point down?

15 MR. WHITEHOUSE: No, sir.

16 MR. ROISMAN: Does anyone on the panel or
17 Mr. Berkowitz, do you know of anyone who would know?

18 MR. BERKOWITZ: I don't believe so. The only
19 comment that I could make that would be relevant is that our
20 testimony states that the ring was oval by approximately an
21 inch and half in seventeen feet. This means that at the
22 splice plates the radius to the inner edge of the ring is
23 shorter by approximately three-quarters of an inch than
24 otherwise would have been had the ring not become slightly
25 oval.

1 MR. ROISMAN: Is the cooling pad that supports
2 each one of the nozzles, has it been placed in such a
3 position that the cooling pads' length is perpendicular to
4 the direction that the nozzle is pointed?

5 MR. BERKOWITZ: Yes. The cooling pads were installed
6 after the heat treating, and they were installed in the
7 PECOR shop.

8 MR. ROISMAN: Were they installed so that they would
9 remain perpendicular to the nozzles even though the support
10 ring itself was not round? In other words, was compensation
11 made on the cooling pad installation the same as compensation
12 had been made in terms of the placement of the holes?

13 MR. BERKOWITZ: I will let Mr. Branting answer
14 that question.

15 MR. BRANTING: Yes, sir.

16 MR. ROISMAN: What work was done -- I was unclear
17 as to how the cooling pads fit up to the support ring and
18 was taken care of. Mr. Berkowitz has suggested, and
19 Mr. Branting, you confirmed by inference, that this cooling
20 pad was attached to the support ring at the PECOR shop; is
21 that correct?

22 MR. BRANTING: Yes, sir, after the heat treating.

23 MR. ROISMAN: After the heat treatment?

24 MR. BRANTING: Yes, sir.

25 MR. ROISMAN: At what time was the surface of the

1 support ring machined in order to permit the support pad to
2 be at the appropriate height? As I understand, there was
3 an excess of material on the top of the support ring. Was
4 that done at the PECOR shop, also?

5 MR. BRANTING: Yes, after heat treating.

6 MR. ROISMAN: What about the machining that was done
7 on the top surface of the cooling pad? Where did that
8 machining take place?

9 MR. BRANTING: The cooling pads were machined before
10 installation on the top flange. They were welded to the top
11 flange, measured and a second machine operation was performed
12 to attempt to bring it to that plus zero minus ten thousand.

13 MR. ROISMAN: I'm glad that you reached that point
14 because that is the next thing I wanted to get to with you.
15 The plus zero minus ten-thousandths of an inch, was that a
16 measurement only with reference to the top surface of the
17 support of the cooling pad and not to the entire top surface
18 of the support ring?

19 MR. BRANTING: Yes, sir. That was only the machined
20 surface of the cooling pads. Incidentally, that second
21 machine operation was also performed at PECOR.

22 MR. ROISMAN: Can you explain to me what was the
23 difficulty in getting the support pad down to the .01 minus
24 measurement?

25 MR. BRANTING: The prime difficulty is the fact that

1 that ring is about seventeen feet in diameter, and we are
2 talking in terms of ten-thousandths of an inch. A piece of
3 equipment large enough to hold that or to swing it, the
4 accuracy of the bearings is such, or the inaccuracy of the
5 bearings is such that it is very difficult.

6 MR. ROISMAN: I think my problem stems from not
7 understanding how the machining was done. Was each pad
8 machined individually?

9 MR. BRANTING: I'd like to answer that in two parts.
10 Initially, yes, before the pads were installed on the girder.
11 After they were installed on the girder, it is my understanding
12 I put it that way because I did not witness the machining.
13 I did not go to PECOR to watch that.

14 The ring was put on the tool and levelness
15 established and so forth, and then the tool cut the top
16 surfaces of all four rings. I mean all four pads.

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1 MR. ROISMAN: As I understand it, the support ring,
2 when it was installed at the site, is installed on top of
3 a concrete surface with a grouting material under the support
4 ring; is that correct?

5 MR. BRANTING: Yes, sir, I believe shown in one of
6 our exhibits.

7 MR. ROISMAN: Is it true that there is some
8 springiness to the support ring such that if you didn't have
9 it evenly supported all the way around the bottom, it would
10 be possible for one side to be slightly low simply because
11 of its own weight carrying it down?

12 MR. BERKOWITZ: I will let Mr. Whitehouse answer that.
13 I think he is the appropriate one to answer.

14 MR. WHITEHOUSE: We found no evidence of this when
15 we were installing ring girders, sir.

16 MR. ROISMAN: No evidence of springiness?

17 MR. WHITEHOUSE: Right.

18 MR. ROISMAN: Then if you set the support ring down
19 on any surface at all, if it were set on this floor, would
20 it be possible to machine the tops of the cooling pads to an
21 even height plus zero minus .01 without regard to the fact
22 that when it was to be installed it would be set on a
23 different surface that wouldn't be uneven in the same way
24 that this is uneven?

25 MR. BRANTING: May I answer that one?

1 MR. ROISMAN: Yes.

2 MR. BRANTING: Mr. Whitehouse has testified that he
3 found no evidence of spring in the field. The question which
4 you ask is slightly different from that.

5 In a machine operation the material must be held
6 down, grouted down being the terminology. You put pressure
7 on it so it will not move. It is held in, in some instances,
8 by friction. So the cutting tool will not get the material
9 and the material is stopped, and it continues something of
10 that type. It would be theoretically possible and our
11 subcontractor thought it was possible and probable that this
12 type of spring, either in the ring or in the table of his
13 position, could occur to the extent of that five-thousandths.
14 It is just a little bit thicker than that sheet of paper.

15 MR. ROISMAN: That was the problem of holding the
16 ring in one place really more than it was a problem of having
17 it on a level surface. That was a problem with getting the
18 cooling pad machined down to proper tolerance; is that correct?

19 MR. BRANTING: I wouldn't want to say one was more
20 of a problem than the other. The accuracy, the initial
21 accuracy of the machine itself, providing the piece of material
22 were solidly attached to it with no movement, no spring,
23 no nothing, there would be a possibility of error just from
24 the slack in the bearings.

25 The second thing would be in holding this piece of

1 material down, there could, they felt, be sufficient spring
2 for this five-thousandths. I couldn't say which would be more.

3 MR. ROISMAN: I guess this would be for Mr. Whitehouse.
4 When the ring was received at the plant and it was installed,
5 was the ring permanently attached to the concrete before you
6 tried to fit up with the reactor vessel?

7 MR. WHITEHOUSE: Yes.

8 MR. ROISMAN: And was the grouting done at that time,
9 too?

10 MR. WHITEHOUSE: Yes.

11 MR. ROISMAN: When you used the grouting, were you
12 using it in order to try to achieve a certain given level
13 with regard to the top surface of the pads?

14 MR. WHITEHOUSE: No.

15 MR. ROISMAN: What was the purpose of the grouting?

16 MR. WHITEHOUSE: The area where the grouting was,
17 you had approximately three-quarters of an inch clearance
18 between the bottom of the ring girder and the top of the
19 concrete where the grout went eventually. We had shim packs
20 in there. This is nothing but a steel shim you use to set
21 a heavy piece of equipment on for initial leveling. We
22 adjusted the shim packs until we got the rim girder on the
23 tops of the cooling pads to the proper elevation.

24 MR. ROISMAN: Can I just stop you a second?

25 On page six of your testimony, is that the proper elevation,

1 fifty-nine feet, three inches, plus zero minus .01?

2 MR. WHITEHOUSE: This is proper as we could
3 achieve with the ring girder.

4 MR. ROISMAN: And then --

5 MR. WHITEHOUSE: With the anchor bolts tightened,
6 we grouted the ring girder, go back and retighten the anchor
7 bolts and then checked to get these readings that you are
8 looking at here.

9 MR. ROISMAN: The grout itself, how did you put
10 the grout in? Was it injected or did you use a trowel?

11 MR. WHITEHOUSE: I remember very carefully. Excuse
12 me. It was put in with wooden sticks. It was hammered in.
13 It was rodded in.

14 MR. ROISMAN: Was it such that you can now state
15 that there are no spaces except the spaces that you would
16 find in normally poured concrete, appropriately poured
17 concrete within the grout material?

18 MR. WHITEHOUSE: Yes, sir, it was done very carefully.

19 MR. ROISMAN: Was there any kind of test that was
20 done to see that there was any large air space observed or
21 imperfections in there?

22 MR. WHITEHOUSE: Not to the best of my knowledge.

23 MR. ROISMAN: After you had finished curing the
24 grout and had tightened down the anchor bolts on the support
25 ring, did you have to do any further work on the surfaces of

1 the cooling pads?

2 MR. WHITEHOUSE: No, sir.

3 MR. ROISMAN: Can you indicate, or Mr. Berkowitz,
4 can someone indicate to me? On page six, subparagraph four,
5 it refers to subsequent to repeat of the reactor vessel
6 support ring at the site, each cooling pad, after stoning,
7 was found to be flat within better than plus zero minus 0.01
8 inches.

9 What was that stoning and at what stage in the
10 installation of the ring was it done?

11 MR. BERKOWITZ: I will let Mr. Whitehouse tell you
12 that. The stage of installation was on receipt at the site
13 but before the ring was installed in the plant.

14 MR. WHITEHOUSE: Yes, sir.
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V5
1 MR. ROISMAN: In terms of the setting of the ring, as I
2 understand the ones you got at the site, you managed to see to it that
3 all four pads, which, if there they were on a perfectly smooth surface,
4 if the bottom of othe ring was on a perfectly smooth surface, would be
5 at the identical elevation. You managed to keep them at the proper
6 elevation, plus zero minus zero point zero one, through the use of the
7 shims, tighten down with the anchor bolts, putting the grout in, letting
8 it cure and tightening the anchor bolts down again; is that correct?

9 MR. WHITEHOUSE: That was retorquing the anchor bolts
10 just to insure they were the proper setting.

11 MR. ROISMAN: Retorquing them back to where they had originally
12 been, do you mean?

13 MR. WHITEHOUSE: Yes, sir. We didn't change anything. We
14 just wanted to verify that nothing had changed.

15 MR. ROISMAN: What assurances were you able to have that
16 the curing of the grout would not cause the grout to shrink or in any
17 way change its configuration so that it wouldn't provide the support?

18 MR. WHITEHOUSE: That's why we retorqued the anchor bolts.

19 MR. ROISMAN: In other words, if the grout had slipped a
20 little bit or had shrunk a little bit, you would have found, in effect,
21 one of the anchor bolts was slightly loose and you could still tighten it
22 a little more?

23 MR. WHITEHOUSE: Yes.

24 MR. ROISMAN: When you did that, were any of the anchor
25 bolts loose?

MR. WHITEHOUSE: No, sir.

MR. ROISMAN: They all were still at the same torque?

MR. WHITEHOUSE: Yes, sir.

V5 -2

1 MR. ROISMAN: Once the cooling pads are leveled to the
2 appropriate figure, the next thing that you do is you bring the vessel itself
3 down and go through the shim plate measurement process so that you, in effect
4 make the vessel take advantage of the levelness of the ring; is that correct?

5 MR. WHITEHOUSE: No, sir.

6 MR. ROISMAN: Where did I go wrong?

7 MR. WHITEHOUSE: You have a Westinghouse-supplied shoe that
8 sets on top of the cooling pad, and it is shown on one of these documents
9 we were just looking at.

10 MR. BERKOWITZ: Figure five. If it will help, we have a large
11 scale copy of that drawing we could put up.

12 MR. ROISMAN: I don't think it would be necessary.

13 Is that support shoe also machined to the same tolerances
14 as the cooling pad? That is plus zero minus point zero one.

15 MR. WHITEHOUSE: The shoe is machined to a Westinghouse
16 tolerance, and I would direct the question to somebody from Westinghouse.

17 MR. BERKOWITZ: Mr. Cunningham.

18 MR. ROISMAN: Is that the Westinghouse tolerance referred to
19 on page six of the applicant's testimony, point zero zero seventy-two
20 inches?

21 MR. CUNNINGHAM: No.

22 MR. VOIGT: Is there a question pending?

23 MR. ROISMAN: Yes.

24 MR. CUNNINGHAM: I said no.

25 MR. ROISMAN: Before that I was asking for the tolerance.
I thought we could save us both time if that was the one. It was the
Westinghouse tolerance for the support shoes that I had asked. That
question was still pending.

V5 - 3

1 MR. CUNNINGHAM: You want to know what the tolerance is for
2 the Westinghouse shoes?

3 MR. ROISMAN: Yes.

4 MR. CUNNINGHAM: Those tolerances are not identified in
5 our presentation here. But they are approximately -- I can give you
6 an approximate answer.

7 MR. ROISMAN: Yes.

8 MR. CUNNINGHAM: In the order of magnitude of plus or minus
9 ten mils or plus or minus .010.

10 MR. VOIGT: Of an inch?

11 MR. CUNNINGHAM: Yes.

12 MR. VOIGT: Thank you.

13 MR. ROISMAN: Can you tell me, Mr. Cunningham, if after --
14 We just got the explanation of Mr. Whitehouse and Mr. Branting together.
15 If after the elaborate procedures gone into in order to get the cooling
16 pads to a plus or minus zero figure, doesn't it destroy all of that effort
17 if the support shoe that sets on top of it can have a plus something
18 larger than zero? Isn't it sort of like the weakest chain, weakest link
19 in the chain?

20 MR. CUNNINGHAM: No.

21 MR. VOIGT: I object to the form of the question as
22 argumentative.

23 MR. ROISMAN: The question is answered.

24 MR. VOIGT: I will move to strike the answer. I do not
25 withdraw my objection.

MR. JENSCH: Objection overruled. Motion denied.

MR. ROISMAN: Mr. Cunningham, when you are trying to get
your levelness on the top of the cooling pad, is that for the purpose

V5 -4

1 of keeping the reactor itself level? Is that the reason that you are
2 trying to get the cooling pad surface level?

3 MR. CUNNINGHAM : It facilitates the general installation
4 of the reactor but does not directly allow us to pertain the precise
5 leveling dimension for the reactor vessel.

6 MR. ROISMAN: That leveling dimension, as I understand from
7 earlier testimony, really depends exclusively -- I shouldn't say
8 exclusively, but ultimately on the shipment; is that correct?

9 MR. CUNNINGHAM: Yes.

10 MR. ROISMAN: Does the grout itself form an important
11 part of what is supporting the support ring?

12 MR. WHITEHOUSE: I will let Mr. Slotterback answer that.

13 MR. SLOTTERBACK: Yes.

14 MR. ROISMAN: Is the ring in effect sitting on the grout?

15 MR. SLOTTERBACK: Yes, sir.
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1 MR. ROISMAN: What effect, if any, is there if the
2 grout is thinner in one place than it is in another? Is the
3 grout any stronger or weaker than the concrete on top of
4 which it sits?

5 MR. SLOTTERBACK: No, sir.

6 MR. ROISMAN: Same strength exactly?

7 MR. SLOTTERBACK: Yes, sir.

8 MR. ROISMAN: The strength of the concrete is no
9 way affected then by the manner in which it is installed,
10 I guess is the best word I can come up with. That is put into
11 the position that it's supposed to remain in. I take it that
12 the group, we have been told, was stuffed or something
13 equivalent to that, and the concrete is poured, that is the
14 concrete that is sitting there all along is poured.

15 MR. SLOTTERBACK: Yes, sir.

16 MR. ROISMAN: Those methods have no effect whatsoever
17 on the strength of the concrete once it's set?

18 MR. SLOTTERBACK: I am not sure whether you are
19 referring to the concrete or the grout when you are talking
20 about it. The group actually has a higher strength than the
21 concrete.

22 MR. ROISMAN: You mean it's a better material or
23 the way it's installed makes it stronger?

24 MR. SLOTTERBACK: The material.

25 MR. ROISMAN: Thank you.

W1Bt2

1 Mr. Berkowitz, or I am not sure who would be able
2 to answer this question, I am trying to find out whether
3 there are any parts with regard to the support ring that I
4 do not understand in which modifications to the support ring
5 took place at the plant site rather than modifications to the
6 support ring occurring? Were any modifications to the support
7 ring not conducted?

8 MR. BERKOWITZ: Yes.

9 MR. ROISMAN: And which modifications were those?

10 MR. BERKOWITZ: I believe I will let Mr. Whitehouse
11 testify to that. These modifications were not associated with
12 the distortion of the rings, however.

13 MR. ROISMAN: And you understand, Mr. Whitehouse,
14 by modification I mean something that was done to the ring
15 other than what you would normally have to do to it during
16 your regular installation work.

17 MR. WHITEHOUSE: Yes, sir.

18 MR. ROISMAN: Okay.

19 MR. WHITEHOUSE: There was weld repairs made or
20 additional weld material placed on the ring. The corners of
21 the access openings to the anchor bolts were removed. We
22 stoned the tops of the cooling pans.

23 MR. ROISMAN: What does that mean, stoned?

24 MR. WHITEHOUSE: It's like taking a stone that you
25 have used for sharpening a knife and rubbing it on top of the

W1Bt3

1 cooling pad. You remove a very, very small amount of material.

2 MR. ROISMAN: All right.

3 MR. WHITEHOUSE: And the hole were drilled for the
4 jacking bolts.

5 MR. ROISMAN: What was the purpose of the stoning?

6 MR. WHITEHOUSE: To insure that the cooling plates
7 were flat.

8 Mr. Roisman, I missed one point.

9 MR. ROISMAN: Yes, please go ahead.

10 MR. WHITEHOUSE: The shear keys were cut back.

11 MR. ROISMAN: I am sorry. The --

12 MR. WHITEHOUSE: Some of the shear keys were cut
13 back.

14 MR. ROISMAN: Now, Mr. Whitehouse, could you please
15 look at Items Number 6 and 7 which were attached to the
16 letter for Mr. Trosten to myself on May 6th, 1972, and which
17 were described in the attachment to that letter as UE&C data
18 sheet entitled Reactor Ring Cooling Plate Surface Flatness
19 Check and Number 7, UE&C data sheet entitled Readings of
20 Cooling Plates After Grounding?

21 MR. WHITEHOUSE: Could I see the sheets, please.

22 MR. ROISMAN: I wonder if your counsel could provide
23 you with copies so that I could keep these and have them in
24 front of me when we are talking.

25 MR. VOIGT: Just a moment, please, Mr. Roisman.

WIBt4

1 Unfortunately, I like to have my copy in front of me, too.

2 MR. WHITEHOUSE: I have them now, Mr. Roisman.

3 MR. ROISMAN: Mr. Voigt?

4 MR. VOIGT: Sir?

5 MR. ROISMAN: I am waiting for your okay.

6 MR. VOIGT: Oh. It's up to the witness.

7 MR. ROISMAN: Now, Mr. Whitehouse, in the measure-
8 ments that are shown on Number 6, the surface flatness check
9 for the reactor cooling plates.

10 MR. WHITEHOUSE: Yes, sir.

11 MR. ROISMAN: Am I understanding correctly that the
12 rectangles that are shown here numbered 1, 2, 4, 3, are in-
13 tended to represent the upper, the top surface of the support,
14 the cooling pads?

15 MR. WHITEHOUSE: Yes, sir.

16 MR. ROISMAN: And that the measurements that are
17 shown here, these little numbers alongside, indicate what the
18 measurement is of the pad at the various points where these
19 little numbers appear, that is from zero plus or minus, as
20 the case may be, is that correct?

21 MR. WHITEHOUSE: Yes, sir.

22 MR. VOIGT: Excuse me. So that the record may be
23 clear, Mr. Roisman, could you indicate what you mean by side?
24 The document I am looking at has a series of numbers which I
25 would have said run across the top of each rectangle.

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MR. ROISMAN: The numbers that I was thinking of are the ones that are both along what you have just called the top as well as numbers that are scattered through the middle of the rectangles in question.

1 MR. VOIGT: I think that clarifies it. Thank you.

2 MR. ROISMAN: Now on the item marked number one
3 there are also numbers that are running down the side.

4 MR. WHITEHOUSE: Yes, sir.

5 MR. ROISMAN: Of one, two, three, through twelve.
6 Can you tell me what do those numbers represent?

7 MR. WHITEHOUSE: Yes. That would be intervals that
8 readings were taken across the top of the surface, the top
9 surface of the cooling plate.

10 MR. ROISMAN: Now your understanding of the tolerance
11 requirements with regard to the cooling pads is that these
12 numbers had to stay with a plus zero minus .01. In other
13 words, it had to be within that range.

14 MR. WHITEHOUSE: Yes, sir.

15 MR. ROISMAN: Are all of these numbers that are
16 shown then minus numbers, that is all the ones other than the
17 zeroes?

18 MR. WHITEHOUSE: Yes, sir.

19 MR. ROISMAN: Now does the number seven reading of
20 cooling plates after grouting, are these figures in any way
21 tied in or can we relate them to the figures that are shown
22 in number six to indicate whether any of the figures have
23 changed?

24 MR. WHITEHOUSE: It could be done, yes. If you
25 know which one was number one, two, three and four at the time

1 we took the readings we were just checking, just for the
2 cooling plate. And we didn't make reference back.

3 MR. ROISMAN: Looking now at number seven, what
4 do the numbers following -- Let's look at the first line.
5 It says R center and then in the column marked SE and then
6 capital "E", we get 31.3 -- Excuse me. -- .847, and then
7 there is a dash or a minus sign, 008. Can you tell me what
8 does that figure represent?

9 MR. WHITEHOUSE: Which, the one right under SE or
10 the one under E? The one after the dash?

11 MR. ROISMAN: Both. Both the one right under SE
12 and the one under the E. What are they supposed to represent?

13 MR. WHITEHOUSE: Okay. The one under SE is relative
14 readings.

15 MR. ROISMAN: Relative to what?

16 MR. WHITEHOUSE: When we took the readings we had
17 a brass plug installed in the wall which was our reference
18 point to use for setting the ring girder reactor vessel, and
19 this is a relative reading. This second column where it's
20 .008 --

21 MR. ROISMAN: Right.

22 MR. WHITEHOUSE: -- is a deviation from that.

23 MR. ROISMAN: Now as I understand it, the brass,
24 as we go down to R center and R in, R center out, L center,
25 L center in, L center out, the numbers for your references

1 change, 31849, 31847, 31849. If each reference is different,
2 how does that affect the --

3 MR. WHITEHOUSE: I'm afraid I have misled you.
4 The reference is not different for each one. That is the
5 reading for it, but that is to another reference. I was
6 looking down at the bottom also.

7 MR. ROISMAN: I see, okay. In other words, I see
8 what you are saying. This 31849 represents the --

9 MR. WHITEHOUSE: The relative elevation.

10 MR. ROISMAN: Of the pad itself.

11 MR. WHITEHOUSE: Yes, sir.

12 MR. ROISMAN: All right. And then the number that's
13 under the lower G represents how much that relative elevation
14 differs from the reference point elevation.

15 MR. WHITEHOUSE: Yes, sir.

16 MR. ROISMAN: Does the dash mean that the figure
17 is a minus figure?

18 MR. WHITEHOUSE: Yes, sir.

19 MR. ROISMAN: Did you explain to me under the column
20 marked NW, which I assume is northwest, capital A, there are
21 several plus figures and then down at the bottom there is a
22 plus 001. Does that indicate that that pad was not in
23 conformity with the plus zero tolerance requirement?

24 MR. WHITEHOUSE: That was plus one-thousandth.

25 MR. ROISMAN: What was done once that was determined

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to bring that into the plus zero tolerance?

MR. WHITEHOUSE: Nothing.

MR. ROISMAN: Was that deviation corrected through the shim plates, eventually through the shim plates?

MR. WHITEHOUSE: Yes, sir.

W3Bt1

1 MR. ROISMAN: Do you know is there a point at which
2 you would have concluded that the plus figure was so high
3 that you should not correct it with the shim plates?

4 MR. WHITEHOUSE: We would have talked to our
5 designers and to Westinghouse at that point. When you are
6 talking about one thousandths there is very few instruments
7 that can measure that.

8 MR. ROISMAN: I also notice that these figures in
9 Item Number 7 looking still at pad number northwest A indicate
10 that the differences between different places on the cooling
11 pad may vary as much as-- I see you have one that's a plus
12 004 and another that's a minus 002, which gives you a net
13 variance of 006.

14 MR. WHITEHOUSE: Yes, sir.

15 MR. ROISMAN: Now is there any tolerance that you
16 are aware of regarding the evenness of the cooling pad?

17 MR. WHITEHOUSE: We tried to stay within the
18 ten thousandths.

19 The other readings that you looked at, the other
20 sheet, was taken -- the one we are looking at now, September
21 13th, and the other readings were taken much earlier, six
22 taken 6/68. This ring girder had been moved many, many times
23 and through installing it we could get some variations in it.

24 MR. ROISMAN: Now to your knowledge now that it is
25 set, the reactor is set in place, is there any change in

W3Bt2

1 levelness that should be expected under normal operating
2 conditions?

3 MR. WHITEHOUSE: I'd like to say something. I am not
4 the designer and that would be up to Mr. Slotterback. But
5 while I was doing the construction I did not experience any-
6 thing.

7 MR. ROISMAN: Mr. Slotterback, is it expected that
8 over time the levelness of the reactor vessel itself will in
9 any way change through normal operation?

10 MR. SLOTTBACK: Not to my knowledge.

11 MR. ROISMAN: You have not had any experience with
12 it in other, in older plants?

13 MR. SLOTTBACK: No, sir.

14 MR. ROISMAN: Mr. Branting, I take it you are the
15 person who is dealing, or at least the person who is here who
16 is dealing most directly with Mr. Brill during the period of
17 time that -- or I am sorry, dealing with PECOR during the
18 time that PECOR was doing the work on the reactor support
19 ring and the generator support shoes, is that correct?

20 MR. SLOTTBACK: Yes, sir.

21 MR. ROISMAN: Now during that time when any of the
22 problems that Mr. Brill had identified with regard to the
23 support ring and the tolerance problems came up did you indi-
24 cate the existence of those problems to anyone, any organization
25 other than UE&C and your own organization?

W3Bt3

1 For instance, did you communicate this to
2 Westinghouse or to Consolidated Edison?

3 MR. SLOTTERBACK: No, sir, I did not.

4 MR. ROISMAN: Were you continually involved with the
5 fit-up with respect to the reactor, the generator support
6 shoes?

7 MR. SLOTTERBACK: What do you mean by continually?

8 MR. ROISMAN: In other words, you were involved at
9 the time the support shoes were initially fabricated by
10 PECOR? Were you still involved in the support shoes and
11 knowledgeable about what was happening with them at the time
12 that they were being fit up to the generators in the plants,
13 or had it already passed into UERAC's jurisdiction at that
14 point?

15 MR. SLOTTERBACK: After the shoes were shipped, as
16 was testified earlier, there were fit-up measures which had
17 to be taken. I was acquainted with many of those fit-up
18 measures. We met in July as indicated by the minutes of those
19 meetings. However, after this work was done -- you said in
20 the plant itself -- after the work, the steam generator tower
21 and so forth is inside, the shoes were attached to that or
22 whatever the process was in the plant itself, no, sir, I was
23 not acquainted with that.

24 MR. ROISMAN: No. What I want to know about is
25 in terms of when an attempt was made to install the support

W3Bt4

1 shoes and it was determined that they had to be, some
2 corrective steps had to be taken, were you involved at that
3 time?

4 MR. SLOTTBACK: At that time, yes, sir.

5 MR. ROISMAN: Now do you know at that time was any
6 communication made by you to any of the other subcontractors
7 or to the prime contractor, Westinghouse, or to the applicant,
8 regarding the fact that modifications were going to have to
9 be made in the support shoes?

10 MR. SLOTTBACK: It was solely through UE&C and
11 those people who may have been present here from Westinghouse
12 or Con Ed at those two meetings.

13 MR. ROISMAN: By those two meetings you are talking
14 about the July 9th and July 10th, 1968 meetings?

15 MR. SLOTTBACK: Yes, sir.
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1 MR. ROISMAN: Mr. Branting, the meeting minutes
2 of the July 10th meeting which were provided to me the other
3 day by the Applicant and the July 9th meeting minutes, which
4 were provided by Mr. Brill at the time of his deposition, are
5 both signed by you, and these minutes indicate that those
6 present were from UE&C, Westinghouse and PB&I at the July 10th
7 meeting, and PECOR, UE&C, Westinghouse and PBI at the July 9th
8 meeting. To the best of your knowledge is that correct and
9 that did not exclude any organizational representatives?

10 MR. BRANTING: To the best of my knowledge everyone
11 who was present at the meeting was listed.

12 MR. ROISMAN: Now let me ask of the representative
13 of Westinghouse and of UE&C who are here if following those
14 meetings either of your organizations or members of your
15 organizations contacted Consolidated Edison and advised them
16 of the job meetings and apprised them of what had been
17 discussed and what your conclusions were.

18 MR. CUNNINGHAM: I have no formal writing
19 communication, but in the daily course of business on the site
20 I have met with the Con Ed assigned representatives, and these
21 items were discussed to the extent that I gave my assurance
22 that, yes, the proper designer for United was involved in
23 the technical determination and I was satisfied that, yes,
24 the right people were involved.

25 MR. ROISMAN: Were representatives of Consolidated

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1 Edison then advised to the best of your knowledge by you that
2 there were "deviations" in the support ring and the support
3 shoes, but also that they were being taken care of? Is that
4 your testimony?

5 MR. CUNNINGHAM: Yes. By what I considered the
6 proper technical persons.

7 MR. ROISMAN: By that you mean the persons --

8 MR. BRANTING: The designers.

9 MR. ROISMAN: Yes, I understand. Do you happen to
10 know which individuals at Consolidated Edison you had
11 communicated with, or can you remember that?

12 MR. CUNNINGHAM: At that time the assigned site
13 personnel, I believe, were Andy Corcoran and Paul Leo, and
14 between the two of them I'd say they both were pretty
15 involved with discussions directly with me.

16 MR. ROISMAN: At this time under the quality
17 assurance program that was in effect during the construction
18 period, what requirements existed regarding the obligation
19 of any of the contractors or subcontractors to record in
20 writing the existence of any deviations in equipment and the
21 corrective steps that were to be taken with respect to those
22 deviations?

23 MR. VOIGT: I object to that question. It calls
24 for a conclusion of law which this witness is not competent
25 to answer.

1 CHAIRMAN JENSCH: I didn't understand that the
2 question asked for anything other than what the technical
3 specifications would reveal as to their requirements. Was
4 that your question?

5 MR. ROISMAN: That's correct. Or the quality
6 assurance --

7 CHAIRMAN JENSCH: Requirements.

8 MR. ROISMAN: Requirements, yes, that's correct.

9 CHAIRMAN JENSCH: Objection overruled.

10 MR. CUNNINGHAM: Would you rephrase your question,
11 please. I don't understand the context of it. Do you mean
12 at the site? Did you mean the entire program?

13 MR. ROISMAN: Well, during the period that the
14 reactor was being constructed we have been led to believe
15 that there was a quality assurance program of the Applicant,
16 and that applied to the contractors and subcontractors as
17 well. What I am asking you is did that quality assurance
18 program have in it a requirement regarding the reporting in
19 written form of any deviations that arose in the design as
20 delivered of any equipment or components for the reactor
21 and the corrective steps that were to be taken?

22 MR. TROSTEN: Mr. Chairman, I object to that
23 question on the ground that we have had testimony and
24 evidence in the hearing on the quality assurance program.
25 There has been an ample opportunity for Mr. Roisman to

1 question concerning quality assurance matters. He has had
2 an ample opportunity to have discovery with regard to quality
3 assurance matters generally. This is a general question
4 having to do with the quality assurance program, and I object
5 to it.

6 CHAIRMAN JENSCH: Well, I think the more important
7 question is whether you are objecting for lack of the best
8 evidence. I suppose the quality assurance program's
9 specificity would provide the answer that he is seeking.
10 I think you are entitled to insist that the quality assurance
11 program answer the question. But it will move the case along
12 if this witness doesn't know what is in the program. It will
13 save some time. But you are entitled to the strict compliance.
14 I don't think the quality assurance program becomes extinct
15 in a proceeding at any time, and if a specific instance
16 comes up where its application would be pertinent, I think the
17 subject is present.

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W5-1

1 MR. TROSTEN: Well, Mr. Chariman, I respectfully refer
2 Mr. Roisman to Appendix B of the FSAR where the quality assurance
3 program for Indian Point 2 has been discussed, and to the other
4 evidence in the proceeding that's been introduced concerning the
5 quality assurance program.

6 CHAIRMAN JENSCH: Let me ask, is there a provision in there
7 regarding reporting? I don't ask you to recite it, but is there a
8 provision in there for the reporting? If there is, then the best
9 evidence, of course, is the program.

10 MR. ROISMAN: As I understand it, Mr. Chairman, what is
11 in the Appendix that Mr. Trosten refers to is a summary of the
12 program itself, and that the quality assurance program itself has not
13 been received in evidence in this proceeding.

14 MR. TROSTEN: What was that? I'm sorry.

15 CHAIRMAN JENSCH: He stated that the quality assurance
16 program in its entirety and in all its specifics has not been
17 presented or received and the portion to which you referred was
18 a summary. I don't have that appendix before me at the moment.
19 Is that correct?

20 MR. TROSTEN: It is correct, and I am sure, Mr.
21 Chairman, that not all facets of the quality assurance program have
22 been received in evidence in this proceeding. The appendix describes
23 the quality assurance program and its essential terms and more than
24 that I don't know the answer to that specific question.

25 CHAIRMAN JENSCH: Is it written down someplace? If you
don't have it now you can perhaps look it up overnight and give
us the answer in the morning.

1 MR. TROSTEN: All right, Mr. Chairman.

2 CHAIRMAN JENSCH: Very well.

3 MR. ROISMAN: Can you proceed, Mr. Cunningham, to the best
4 of your knowledge, and I will ask this of any of the other members
5 of the panel as well, with the exception of the written communications
6 which were attached to Mr. Brill's deposition which involved a letter
7 to Mr. Roddis from Mr. Haagensen and a response -- if you would like,
8 if you are not familiar with those I will run down them with you.
9 March 11, 1970 letter to Mr. Roddis from Mr. Haagensen, which is
10 exhibit 12 to the deposition; a letter from Mr. Husband to Mr.
11 Haagensen, dated April 6, 1970, which is Exhibit 13; a letter to
12 Mr. Husband from Mr. Stiefel dated April 28, 1970, which is Exhibit
13 14; and the two jobsite meeting minutes, July 10, 1968, July 9,
14 1968 we talked about a minute ago.

14 To the best of your knowledge are those the only written
15 evidences of any communication between the applicant and any of
16 the contractors regarding this matter prior to the time that Mr.
17 Brill's letter was mailed, namely March 14th of 1972?

18 MR. CUNNINGHAM: I have no way of answering that to
19 any degree of accuracy, because I was not included in or shown any
20 of the items you mentioned, with the exception of the jobsite minutes.

21 MR. ROISMAN: Any member of the panel who would be able to
22 answer the question with any more specificity?

23 MR. TROSTEN: Would you repeat the list of the
24 correspondence?

25 MR. ROISMAN: Well, basically what it is --

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CHAIRMAN JENSCH: Exhibits 12, 13 and 14 to the deposition from Brill.

MR. ROISMAN: And the jobsite minutes.

MR. TROSTEN: To the best of your knowledge. Go ahead.

MR. CUNNINGHAM: Could you repeat the question relative to those documents?

MR. ROISMAN: Yes. The question is was there any other written communication dealing with the problem of what we have been talking about the support shoes and the reactor support ring deviations, other than those five documents, between any of the contractors and the applicant?

MR. BEER: Not to the best of my knowledge.

MR. ROISMAN: Is this your first time?

MR. BEER: You haven't directed any questions to me.

MR. ROISMAN: And I apologize. If I can think of any, I will.

MR. BEER: That's quite all right.

MR. ROISMAN: I didn't mean to neglect you, Mr. Beer.

MR. VOIGT: So that the record will be clear, Mr. Chairman, Mr. Beer is with the Consolidated Edison Company, and therefore might have a little more knowledge about the communications that they received.

CHAIRMAN JENSCH: Thank you very much.

MR. ROISMAN: Mr. Chairman, I would like to have marked for identification and received in evidence the jobsite meeting minutes of July 10, 1968. Now the only copy that I have I believe is a copy that the applicant gave me. I don't even know if this is one that I am to return to them or whether it was an extra copy,

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2 and I didn't want to mark on it the exhibit number if it was their
3 only one.

4 MR. VOIGT: That was intended to be your copy, Mr.
5 Roisman. We have four or five spares. We are not in a position
6 to give you enough to supply to the Court, but if the few spares
7 that we have will facilitate matters, you are welcome to them.

8 MR. ROISMAN: Fine. Thank you very much. I think
9 for purposes of putting exhibits into evidence it's only necessary
10 to provide a copy to each party that requests one and three to
11 the reporter for inclusion with the official record. So I
12 would take up your offer to take whatever extras you have. I
13 will give them to the reporter and the Board, and the Staff will
14 wait till I return to my office, if they will, and I will make a
15 copy of and send them one.

16 CHAIRMAN JENSECH: Can we have a further identification
17 of the document? How many pages?

18 MR. ROISMAN: Yes. It's a two-page document
19 entitled Minutes Jobsite Meeting - 167-34 July 10, 1968, and the
20 minutes are signed by Mr. Reyman R. Branting.

21 CHAIRMAN JENSECH: The document consisting of two pages,
22 to which the Citizens' Committee has referred, may be marked for
23 identification as Exhibit HH, having been identified and having
24 been previously offered.

25 Is there any objection by the Regulatory Staff?

MR. KARMAN: No.

THE CHAIRMAN: Hudson River Fisherman's Association?

MR. MACBETH: No.

1 CHAIRMAN JENSCH: State of New York?

2 MR. MARTIN: No.

3 CHAIRMAN JENSCH: Applicant?

4 MR. TROSTEN: No.

5 CHAIRMAN JENSCH: Exhibit HH received in evidence.

6 (Exhibit HH, as described, is received in evidence.)

7 MR. ROISMAN: Mr. Beer, I promised you I wouldn't
8 forget you. There has been received in evidence what has been
9 marked as Exhibit No. 12 to the deposition of Mr. Brill, a letter
10 dated March 11, 1970, and addressed to Mr. Roddis and signed by
11 Mr. Haggensen. Do you have a copy of that letter in front of you?

12 MR. BEER: I will get one.

13 MR. ROISMAN: Thank you.

14 Were you with Consolidated Edison at the time that
15 this letter was written?

16 MR. BEER: No, I was not.

17 MR. ROISMAN: Is Mr. Grob still here?

18 MR. TROSTEN: No, he is not, Mr. Roisman.

19 MR. ROISMAN: Will he be able to return either
20 this afternoon or tomorrow so that I can discuss with him the
21 telephone conversations that are referred to on page two of
22 the letter?

23 MR. TROSTEN: Mr. Grob could be available, Mr.
24 Roisman, but I do not know the purpose of the questioning and the
25 purpose of your calling Mr. Grob as a witness. Mr. Grob is not
a member of the panel and in the absence of knowledge of this fact
I am not in a position to give you any better response.

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MR. ROISMAN: Well, I will explain. I am anxious to find out whether or not Mr. Grob received any communication from Mr. Haagensen through these telephone calls in which he was advised that in the opinion of Mr. Haagensen and the people at reactor there was a safety problem associated with the reactor support ring and generator support shoe problems, and then to find out in the context of examining applicant's program for quality assurance what Mr. Grob did about that information.

CHAIRMAN JENSCH: Well, is that something that you could present by way of stipulation in case it's inconvenient for Mr. Grob to come back? Can you ask him what it is, if he did receive it? If he didn't receive it there isn't anything he did with it. Would that be acceptable to the Citizens' Committee?

MR. ROISMAN: It would certainly be acceptable. I'd be willing to talk maybe on the telephone this evening with Mr. Grob and of course Mr. Trosten and Mr. Voigt on the phone and see if there is a possibility to work out a stipulation. I suspect it will be difficult, because unless Mr. Grob testifies he never received such phone call, I would then want him to give some summary of what information he obtained at the time of the phone call, if he has any memoranda that he made of those phone calls to provide them, and then to indicate what action he took based upon phone calls that he had received.

CHAIRMAN JENSCH: What was the telephone call you say you referred to on page 2 of Exhibit HH?

MR. ROISMAN: No, I am sorry. Not on Exhibit HH; on Exhibit No. 12, the letter to Mr. Roddis from Mr. Haagensen,

1 and it says on the second page, "For the past several weeks a
2 series of information telephone calls have been completed with
3 your staff, including the Chief Mechanical Engineer, Mr. Grob.
4 These calls have been to request the company to obtain the
5 as-built drawings from Pennsylvania Engineering Corporation for
6 the purposes stated."

7 CHAIRMAN JENSCH: That letter was dated what?

8 MR. ROISMAN: March 11, 1970.

9 CHAIRMAN: JENSCH: Then he was trying to get the as-built
10 drawings.

11 MR. ROISMAN: Mr. Haagensen was on behalf of Pecor,
12 that's right. And this letter was not addressed to Mr. Grob;
13 it was addressed to Mr. Roddis, who was at that time, according
14 to the address, the President of Consolidated Edison Company.

15 MR. FROSTEN: Mr. Chairman, I really think that
16 Mr. Roisman's request to interrogate Mr. Grob is irrelevant and
17 immaterial. I just don't see any real point in the interrogation
18 of Mr. Grob.

19 CHAIRMAN JENSCH: Well, if the telephone call is
20 limited to the as-built drawings I don't understand its relationship
21 to the quality assurance program. I take it --

22 MR. ROISMAN: Mr. Brill had testified in the
23 deposition, in that portion of the deposition that is in evidence,
24 that when Mr. Haagensen had used these terms, "a most serious
25 matter", that Mr. Brill had understood that to mean that Mr.
Haagensen was explaining that it was a safety matter, and assuming
that Mr. Brill's understanding is correct, and I would assume that

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2 in the course of these conversations it might have been Mr.
3 Haagensen's intent to communicate to Mr. Grob this same safety
4 consideration.

5 CHAIRMAN:JENSCH: Well, it's all founded on the premise
6 of an interpretation of some other person than the author or
7 the recipient of the letter. I would just wonder if it's
8 adequate foundation for the assumption that Brill entertained
9 any reference to the document. If there isn't, then there is
10 nothing for Grob to respond to.

11 MR. ROISMAN: Well, I would say that it would be
12 very quick for Mr. Grob to indicate then that the only thing that
13 was said to him was, "I'd like a copy of the as-built drawings," and
14 then describe what is shown in this letter.

15 CHAIRMAN JENSCH: Haven't the as-built drawings
16 been kind of eliminated now by Mr. Brill's statement here the
17 other day that sounded to me as if, and I don't want to mischaracterize
18 it, but he couldn't care less now about the as-built drawings and he
19 is willing to rely upon the analysis the staff has made and that
20 of the applicant and he has no concern. He was concerned because
21 he didn't have the as-built drawings. He is now concerned with
22 or without the drawings, but I wonder.

23 MR. ROISMAN: That's right, but his contention
24 made in his letter of March 14, 1972 was that on page 5 of
25 that letter, "It is not possible for the AEC to inspect these
structures to assure safety of operation until the deviations
are officially recorded by our company for these Class 1 structures."

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2 And the earlier part of the letter indicates that he
means recorded on the as-built drawings.

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4 Now, it's never been our contention that Mr. Brill's
5 personal opinion about the safety of the plant was
6 critical. However, his company is somewhat qualified in the
7 field of engineering and his opinion expressed in that letter
8 is of some moment regarding the need to have the as-built drawings
9 for the purposes of safety.

10 We aren't interested in having Mr. Grob come and
11 testify about the as-built drawings. What we are interested in
12 finding out is whether or not a similar comment was made to Mr.
13 Grob to indicate that there was a safety problem associated
14 with the failure to have the as-built drawings that would have alerted
15 Mr. Grob and Con Edison as early as March 11th of 1970, or
16 actually before that, when the phone conversations were made, that
17 there were safety problems associated with the steam generator
18 support shoes and the reactor support ring.

19 CHAIRMAN JENSCH: I am having trouble with the
20 foundation. It all turns on an interpretation Mr. Brill has put
21 on in reference to a concern he no longer entertains.

22 MR. ROISMAN: I don't see that it's pertinent
23 that he no longer entertains it to this purpose. The concern
24 remains, because it wasn't the purpose of the hearing to resolve
25 Mr. Brill's concern for Mr. Brill. It was the purpose to
resolve it for the benefit of, well I guess if you will, of
the Board and its general safety responsibility.

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2 CHAIRMAN JERSCH: Exactly. What was installed
3 provides reasonable assurance for an adequate basis that the
4 facility can be constructed without undue risk to health and
5 safety of the public.

6 Now Mr. Brill has gone both ways on this situation,
7 and he has made an assumption about a document that may not be
8 valid and in reference to an as-built drawing, he doesn't want
9 them, it doesn't help us.

10 Taking a look out there at what they did with the
11 pieces they received, the shoes and the ring, and I think there
12 is where the microscopic examination should be undertaken, not on
13 some documents or correspondence.

14 The objection is sustained.

15 MR. ROISMAN: Mr. Beer, at what time did you become
16 associated with Consolidated Edison Company?

17 MR. BEER: In April of 1971.

18 MR. ROISMAN: Mr. Cahill -- I will explain what the
19 question is before we start screaming about him not being on
20 the panel. This letter that's marked as exhibit No. 13 and
21 was addressed from Mr. Husband to Mr. Haagensen, it was a response to
22 the March 11, 1970 letter, and indicates a part that was sent to
23 you. There is a phrase, a sentence in the letter, which I will
24 read now, which says, "We are not able to furnish drawings and
25 detailed information on the basis you suggest."

I wondered whether you might know whether the "not
able" phrase meant we don't have these to furnish, or not able in

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2 a legal sense, or feel that you don't have a right to get them from
3 us or some other reason, if you have any idea what was meant by that
4 term, "able", or "not able".

5 MR. VOIGT: Mr. Chairman, quite apart from the
6 propriety of addressing a question to Mr. Cahill, I submit that the
7 question itself is irrelevant and immaterial. We aren't here
8 to rehash all of the correspondence. We are trying to find out what
9 the components were that were put in the plant.

10 CHAIRMAN JENSEN: I have difficulty. Neither the
11 author nor the recipient of the letter is involved in this matter,
12 and I don't know if Mr. Cahill ever saw the letter, if it came in
13 as a blind copy to him or a carbon copy to anyone. The interpretations
14 that we get people to put on letters that they are not responsible
15 for either in writing or receiving, I think we go quite a ways
16 in relevancy.

17 I am sorry I am having this difficulty. Can you
18 explain it a bit?
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1 MR. ROISMAN: Yes. First of all, Mr Cahill's position in
2 the company is such that it is possible. That is why I wanted to ask
3 Mr. Cahill. He actually had or has permanent knowledge of that statement.
4 Maybe he was consulted in the preparation of the letter which he could
5 quickly tell us if he does know what was meant by that. If he doesn't,
6 then I would agree with you that he couldn't add anything, and there is
7 no point in asking.

8 It seems very quick to ask him if he is able to make any
9 comment with regard to that with any assurance. If he answers, that's
10 fine.

11 MR. JENSCH: Supposing he said, well, I think it is such
12 and such. Then we are off on a tangent, and maybe it turns out that
13 Mr. Cahill was thinking about another thing, something else. I just
14 don't think there is any relevancy.

15 The objection is sustained.

16 MR. ROISMAN: If I may, Mr. Chairman, it seems to me the
17 Chair had ruled earlier that the quality assurance is an important and
18 proper issue. We are trying to piece together, from a panel which is
19 made up of only one man from Consolidated Edison, who did not begin
20 working with the company until just a little over a year ago, who really
21 can give us no personal knowledge of Con Edison's involvement in this
22 entire matter, the receipt of, modifications to and corrections to
23 these particular support shoes and reactor support ring.

24 Con Edison, according to its quality assurance program, was
25 supposed to be keeping abreast of these matters. The witnesses who are
here from Westinghouse and U E & C have indicated, and P B & I have
indicated to the best of their knowledge, they know of no other written
communications. There are, however, these communications that came from

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1 outside those organizations into Con Edison, and responses that were
2 sent out. That could shed light on the question of whether or not
3 Con Edison had some knowledge about these modifications, and whether
4 and why they did not on their own undertake the studies and analyses
5 which have now been undertaken and contained in this testimony dated
6 March 17, 1972.

7 Obviously, if the quality assurance program of the applicant
8 is nothing more than a program that assures us at any time someone
9 makes a big thing in the public about a problem that the applicant will
10 investigate, that is not a very good quality assurance program.

11 We are trying to find out whether that is the case here. The
12 Brill letter indicated problems. If the applicant knew about those
13 problems before, the question is, why didn't they investigate it before?
14 I thought maybe that it would be possible for Mr. Grob to comment on
15 that subject with regard to telephone conversations that he had, and
16 from Mr. Cahill, if he had any knowledge of this letter, to comment
17 on that subject. I don't see it going, quote, very far, unquote, or
18 far afield in any way. I can assure you that if Mr. Cahill's answer
19 were in the vague form that you suggested it might be, I would see no
20 purpose in pursuing it and would not choose to do so.

21 I think we are spending an awful lot of time, when Mr. Cahill
22 is sitting there, and could quickly tell us whether he has any concrete
23 information on whether or not Con Edison was capable of furnishing drawings
24 of the detailed information that was suggested or whether the problem
25 was simply that they thought that they shouldn't legally do it or some
similar thing.

MR. VOIGT: Mr. Chairman, when I used to practice before the
Interstate Commerce Commission, the rule was that the Examiner's ruling

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1 might be appealable but it was not debatable. The Chair has already
2 ruled, and I will therefore ask whether you wish to hear any further
3 argument on this subject?

4 MR. JENSCH: When I used to practice before the Interstate
5 Commerce Commission before I went in the Service, there used to be
6 another rule down there. If the witness knows, let him answer, which
7 I always thought was a full bushel basket. In any event, I don't know
8 that that qualifies any discussion here.

9 The serious question in my mind about knowledge -- and we
10 have had a lot of discussion before about it. The applicant here
11 supports its technical qualifications on the basis of several contractors.
12 Certainly the most immediate would be Westinghouse. On that basis
13 you could impute knowledge to the applicant on the basis of knowledge
14 that Westinghouse had.

15 Westinghouse and the rest of them -- I don't know if this
16 happens from time to time. Maybe there is a little adjustment to be made
17 and move the bolt over or tighten it a little tighter, or maybe several
18 times during the course of construction. Maybe these practical adjustment
19 problems that are made in the field don't always result in several
20 analyses with computer codes and so forth, but apparently these people
21 feel that they will stand up under analysis like that.

22 So that what they have done here is come up with a computer code,
23 and the conclusions that it does.

24 I don't think it is solely a question of saying to Mr. Cahill,
25 do you know about this; did the organization know about it? I infer
26 from this testimony that certainly the organization knew about it. So
27 that there is knowledge, and there is a question of what did they do
28 with it. From what I understand the evidence from the applicant and
29 from the Staff is, that they did what they felt was necessary to achieve

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1 the objective of a level support for the reactor. Sometimes practical
2 adjustments are made that don't look like a calculational delight, but
3 when they come to measure it at the end, it will fit. If it is a
4 question of knowledge, knowledge has been established by imputing
5 it to the applicant. Therefore, we are really concerned with what they
6 did.

7 The quality assurance programs were in some development
8 back at the time that these instances occurred. I don't think it was
9 until July 1970 before the Commission issued criteria for quality
10 assurance programs. Prio to that time many organizations did have it.
11 I think that is reflected in many proceedings, one of which, as I
12 recall, the construction permit proceeding for Indian Point Number Two
13 by Westinghouse.

14 So if the purpose of the question is to establish knowledge,
15 I think it may be imputed. The objection is sustained.

16 MR. ROISMAN: I have no further questions at this time, Mr.
17 Chairman, but I will be reading documents that I hope will be produced
18 this evening and that which were produced today, and have some questions
19 in the mornng. I will anticipate that I will be able to stay within
20 the Board's twelve o'clock conclusion of the cross examination.

21 MR. JENSCH: If you feel your inquiry should be longer than
22 that, we will make some practical adjustment and move the schedule a
23 little to fit the requirements. We may cut down the number of minutes
24 for the summaries to twenty minutes apiece or fifteen or some other
25 calculated figure that we can fit to our schedule.

MR. ROISMAN: I can assure the Board that I was not intending
to take thirty minutes for summary.

MR. JENSCH: We may want more time from you than from the

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1 applicant and the Staff. So I don't want you to feel restricted in
2 that regard either.

3 MR. ROISMAN: I will give all the time the Board asks for.

4 MR. JENSCH: I know equal time is quite prevalent, but you
5 may not get it thistime.

6 Is there any matter we can take up before we recess? At
7 this time let us recess to reconvene in this room tomorrow morning
8 at nine o'clock.

9 (Hearing adjourned)

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