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# UNITED STATES
# NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

METROPOLITAN EDISON COMPANY

(Three Mile Island Nuclear Station, Unit No. 1)

DOCKET NO: 50-289 OLA
(Steam Generator Repair)

ORAL ARGUMENT

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

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Nuclear Regulatory Commission
Fifth Floor Hearing Room
4350 East-West Highway
Bethesda, Maryland

Wednesday, April 3, 1985

The above-entitled matter came on for oral argument, pursuant to notice, at 2:00 p.m.

BEFORE:

GARY J. EDLES, Chairman
Atomic Safety and Licensing Appeal Board

W. REED JOHNSON, Member
Atomic Safety and Licensing Appeal Board

REGINALD L. GOTCHY, Member
Atomic Safety and Licensing Appeal Board

APPEARANCES:

LOUIS BRADFORD and JOANNE DOROSHOW, Three Mile Island Alert
(Intervenors)

BRUCE W. CHURCHILL, Metropolitan Edison Company, et al.
(Applicant)

MARY E. WAGNER, Nuclear Regulatory Commission Staff

1 P R O C E E D I N G S

2 JUDGE JOHNSON: Good afternoon. This afternoon
3 we are hearing oral argument in connection with the
4 Intervenor Three Mile Island Alert's appeal from the
5 Licensing Board's October 31 initial decision, and also
6 its December 10, 1984 motion to reopen the record.
7 Each side is allotted one hour. A reasonable portion
8 of TMIA's time can be taken for rebuttal if you like, and
9 also the Staff and Applicant together have an hour, and if
10 you would please advise me when we get around to asking
11 for appearance statements, if you have decided on an
12 allocation of time, but I think I'll ask, first, for the
13 parties to please introduce themselves starting with TMIA.
14 MS. BRADFORD: My name is Louise Bradford and
15 beside me is Joanne Doroshow.
16 CHAIRMAN EDLES: Do you want to reserve any of
17 your hour for rebuttal?
18 MS. BRADFORD: Yes. I would like to reserve 15
19 minutes.
20 CHAIRMAN EDLES: For the Applicant?
21 MR. CHURCHILL: Yes, my name is Bruce Churchill
22 for the Applicant licensee. With me at the end of the
23 table is Evans Hubert. We represent GPU in this
24 proceeding.
25 MS. WAGNER: My name is Mary Wagner, I represent

1 the NRC Staff. With me to my left is Mitzi Young, also
2 counsel for the Staff. And to my right is Mr. Conrad
3 McCracken, section chief, chemical technology branch.
4 CHAIRMAN EDLES: Thank you very much. We'll
5 begin the argument with TMIA.
6 MS. BRADFORD: I represented TMIA in the steam
7 generator hearing, and it was my feeling that the hearings
8 did not allow development of facts which would provide
9 reasonable basis to conclude that there is reasonable
10 assurance that the repaired tubes can withstand normal
11 operating and accident conditions.
12 I also felt that the Board unjustifiably restricted the
13 scope of the issues at the hearing and, in addition, the
14 new evidence which has come to light since the close of
15 the hearing would tend to indicate that our position was
16 correct, that in fact the scope of the hearing was
17 unjustifiably restricted.
18 CHAIRMAN EDLES: Would you give me sort of a
19 thumbnail -- exactly what your argument is with respect to
20 the scope of the proceeding being restricted?
21 MS. BRADFORD: One of the issues that was a
22 contention which was dealt with at summary disposition --
23 and it's in that regard that I feel that the hearing was
24 restricted in scope. It was never, or it seemed to me
25 that it was not clearly established that the contaminant

1 itself had been identified, and the scope of the hearing
2 was restricted inasmuch as we -- that was settled on
3 summary disposition.
4 CHAIRMAN EDLES: Your point being that the Board
5 improperly granted summary disposition at that stage?
6 MS. BRADFORD: That's correct.
7 Perhaps it would be -- TMIA had requested that the
8 Appeal Board give us some indication of what points they
9 wanted us to make, and that would be very helpful to me.
10 CHAIRMAN EDLES: I realize we did not do that in
11 advance. I'm happy to do it, at least for my part. My
12 colleagues can then join in.
13 I would like to hear somewhat more about your concerns
14 in connection with the motion to reopen; namely, the more
15 recent information that has come to light and how you
16 believe that bears on the Licensing Board's decision in
17 the case.
18 MS. BRADFORD: Okay. From the documents
19 available to TMIA, it would seem that there is a great
20 deal of uncertainty concerning the contaminant and the
21 scenario surrounding the contamination and the degradation
22 of the steam tubes.
23 Additionally, there is a very small data base, and that
24 seemed to be agreed upon by the third party review group
25 and also some of the consultants, Dr. McDonald, for

1 instance.

2 Despite that small data base and all the various

3 uncertainties, let me just go into some of what I perceive

4 to be the uncertainties connected with that.

5 The tubes at TMI are sensitive, and that is agreed upon,

6 and in this case they are susceptible to sulfur corrosion.

7 I think the Brookhaven lab, and also Dr. McDonald, has

8 indicated that in low-sensitized Inconel, is susceptible

9 to corrosion from levels of sulfate as little as 70 PPB.

10 Now, licensee argues that the lithium will -- which

11 they have added to the reactor coolant system, will

12 inhibit any such corrosion. However, there seems to be

13 some contention over that point, and Dr. McDonald, for

14 instance, points out that this is not well established.

15 So, in light of the new corrosion, or the new indications

16 of corrosion, it would seem that that possibility is very

17 real.

18 CHAIRMAN EDLES: For the purposes of argument

19 now, let's assume that we don't know, genuinely, the

20 source of the corrosion.

21 Aren't all of the procedures in place, including the

22 monitoring that's going to go on of leak rate information

23 and all that, aren't those all sufficient so that the

24 company could very quickly discover if there was any

25 continuing problem?

1 MS. BRADFORD: That leads me to another point
2 that seemingly not a great deal is known about. The
3 Licensee describes the original, the 1981 degradation of
4 the tubes as a rapid attack of sulfur on the material.
5 I have searched the documents and I have not been able
6 to find a definition for "rapid," so it's not clear to me
7 how -- and I assume, since Licensee has not defined a time
8 period in which this attack takes place, it appears to me
9 that it is quite possible that it could happen in a matter
10 of days. And I don't know if the monitoring in place
11 would be able to detect those problems before there would
12 be a steam tube break.
13 JUDGE JOHNSON: What level of monitoring is the
14 Applicant required to maintain? How big a leak must there
15 be before the Applicant is aware that there's a problem?
16 MS. BRADFORD: I think the standard is .1
17 increase over an established base line.
18 JUDGE JOHNSON: .1 what?
19 MS. BRADFORD: .1 gallon per minute over the
20 established base line.
21 JUDGE JOHNSON: Does that represent large scale
22 degradation or very large scale degradation in the tube
23 bundle? In other words, how bad does the tube bundle have
24 to be, before one would expect to see -- I think it's .2 GPM
25 increase in the leakage?

1 MS. BRADFORD: I'm not sure.

2 JUDGE JOHNSON: Is that one tube with a big leak

3 or five tubes with a big leak or five tubes with little

4 leaks or --

5 MS. BRADFORD: Dr. Johnson, that's not clear to

6 me, and that's one of the uncertainties.

7 JUDGE JOHNSON: Is it clear to somebody?

8 MS. BRADFORD: I hope it's clear to somebody.

9 JUDGE JOHNSON: I mean, you say that the

10 monitoring is not enough, but yet it would seem to me you

11 would have to have a feel for what is the monitoring, in

12 terms of -- is one tube beginning to leak as a result of a

13 pit going through, is that going to hide? Or is that

14 going to show up right away? That's -- whether the

15 monitoring is adequate or not, it would seem to depend on

16 that.

17 MS. BRADFORD: I understand that it's from all

18 sources within the steam generator; so it could be either

19 one tube or multiple small leaks.

20 JUDGE JOHNSON: But if just one tube had a leak

21 in it, would they pick that up?

22 MS. BRADFORD: I assume. The point is that if --

23 it is not clear to me whether they would be able to shut

24 down the reactor in sufficient time, before the tube --

25 before the leak became much bigger or the tube ruptured.

1 JUDGE JOHNSON: You are saying that the leak
2 could go from little to big, very, very quickly before
3 they could take any corrective action? Or any protective
4 action, such as shutting the plant down?
5 MS. BRADFORD: I think that's a possibility.
6 CHAIRMAN EDLES: Go ahead.
7 MS. BRADFORD: In an affidavit which was in
8 support of motion for summary disposition, which was
9 submitted in February of 1984, the licensee stated that
10 400 PPB of sulfate was the maximum observed during the
11 cleaning process.
12 Now, in reading that affidavit I had assumed, from the
13 language, that that high incidence of sulfate occurred
14 during the 400 hours of cleaning itself. But, as the
15 documents which are attached to our motion to reopen
16 indicate, this was a much more protracted concern. In
17 fact, it went on until possibly January of 1984 when the
18 cleaning took place in July of 1983.
19 The thing is, during the time of the cleaning itself,
20 there were several precautions taken. The ph was raised
21 to I think 8 to 8.5 -- it's not clear to me that that
22 condition existed in the months after the cleaning itself.
23 CHAIRMAN EDLES: Will some of those precautions
24 be continued?
25 MS. BRADFORD: The lithium addition, I

1 understand, is continued.

2 Additionally, the documents attached to the motion to

3 reopen indicate that the -- that it took a matter of days

4 to reduce the sulfate level in the bulk solution back down

5 to its administrative level, which was 100 PPB.

6 JUDGE JOHNSON: Did I understand you to say it

7 took them until January?

8 MS. BRADFORD: No. No. It took several days.

9 However, there were spikes frequently from the period of

10 clean up, which was July of 1983, through until January of

11 1984, at least.

12 JUDGE GOTCHY: Are you saying that there's

13 something in addition to what we have in TDR-638? This is

14 the only sulfur spike that I remember seeing. It looks

15 likes it lasted about a week, in the end of July. Is

16 there something that came after that that we don't have?

17 MS. BRADFORD: In the documents which I attached

18 to our motion to reopen, which are memos, status reports

19 from Mr. Hukill, they indicate that every time the reactor

20 is drained and then refilled, that there -- they

21 experience spikes of sulfur and chloride, and they hadn't

22 figured out the source of those spikes.

23 JUDGE JOHNSON: Are you saying that this period

24 is what is responsible for the corrosion that has led to

25 the most recent tube failures or tube pitting?

1 MS. BRADFORD: I'm saying it's a possibility.
2 Because in addition, in the TDR that Dr. Gotchy just
3 mentioned, it indicates that on at least two occasions
4 there was oxygen introduced into the system. So that
5 there was possibility for the oxygenation phase, or
6 oxidization, phase -- excuse me -- and, so, if there were
7 sulfides present in the system there was an opportunity
8 for them to alter and change into the more aggressive
9 species.
10 JUDGE GOTCHY: Are you saying that the, I
11 believe it was just one day there was some oxygen released
12 there.
13 MS. BRADFORD: There were two occasions,
14 Dr. Gotchy.
15 JUDGE GOTCHY: There were two occasions. They
16 mention there was something like a 30:1 lithium to sulfur
17 relation at that time. You don't feel that would have
18 prevented the sulfur attack?
19 MS. BRADFORD: Given Dr. McDonald's uncertainty
20 as to the inhibiting effect of lithium -- he states that
21 it is not clear if, indeed, it will inhibit.
22 JUDGE JOHNSON: Is it clear, though, that it
23 does? Did you phrase that as it's not clear to him why it
24 does? Or that it does?
25 MS. BRADFORD: I'd have to go back and read the

1 language exactly. My reading of it was that he was not
2 sure. He said that not enough information was available
3 to him and that you could definitely say that it did
4 provide an inhibiting effect.
5 JUDGE JOHNSON: It's the Applicant's position, I
6 believe, that they have duplicated in testing a series of
7 chemical conditions with TMI tubing that is more severe
8 than the history of the tubes that were in the steam
9 generator, and they have seen no increase in the corrosion
10 or no additional attack as a result of these conditions.
11 How do you square that with your feeling that maybe
12 these conditions did contribute to the corrosion? Don't
13 you believe their experiments? Or do you think their
14 experiments were inadequate in some way? Or what is your
15 position on that?
16 MS. BRADFORD: I think the experiments were
17 inadequate in two instances: one, in that they do not
18 factor in the total environment that will be seen by the
19 actual steam generator tubes. They do not factor in the
20 flow-induced vibration, for instance.
21 JUDGE JOHNSON: I'm talking about corrosion that
22 had occurred subsequent to 1981, that gave rise to the
23 most recent IGA, supposed IGA attack.
24 Have they not had tubes in essentially the same
25 environment as the layup?

1 MS. BRADFORD: I think you are talking,
2 Dr. Johnson, about the long-term corrosion test. I don't
3 know of any other test that Licensee has done. At least
4 that was the one I was describing --
5 JUDGE JOHNSON: I may well be.
6 MS. BRADFORD: Which does not factor in the
7 flow-induced vibration.
8 I went back and I looked at the data on the long-term
9 corrosion tests. Licensee describes it there, as adding
10 sulfate -- they tested several loops of the tubes. In
11 three loops they added sulfate to the level which would be
12 seen in the reactor coolant system under the
13 administrative limits. And that would be 100 PPB.
14 There's no indication that the spikes, which were
15 actually seen for, apparently for several months, that
16 that was reflected in that long-term corrosion test. If
17 there were any other tests done I have not seen any of the
18 data on them.
19 And, in addition, it appears that Licensee has not
20 removed any of the tubes in which the new indications have
21 appeared, to do destructive testing on those tubes which
22 would appear to me to be the one way to conclusively show,
23 or discover if, indeed, there was new corrosion or --
24 JUDGE GOTCHY: Haven't they looked at some of
25 those with fiberscope?

1 MS. BRADFORD: I believe that was part of their
2 testimony.
3 I think another thing that has concerned me, it appears
4 that the actual steam generator tubes are far more
5 susceptible to this type of attack than any other
6 materials that have been tested. I have not seen any
7 attempt to discover what effect the four -- there were
8 five, I think, intrusions of contaminants, sulfur-bearing
9 contaminants, from 1979 through to 1981. And it is not
10 clear to me whether those earlier contaminations would
11 have predisposed these particular tubes to later attack,
12 although I think the long-term corrosion test partially
13 takes that into consideration -- of course they are pieces
14 of the same tubes -- because it does not represent the
15 total environment that the steam generator tubes will see
16 during their lifetime, I'm not sure that it does totally
17 take into effect the conditions that will be seen by these
18 tubes.
19 JUDGE JOHNSON: With regard to the environment
20 you mentioned vibration. What other aspect of the
21 environment is not reproduced in the long-term experiments?
22 MS. BRADFORD: It seems to me the spiking that
23 was seen, at least until January of 1984.
24 JUDGE JOHNSON: Now you are telling me that
25 those tests are supposed to represent operating conditions;

1 right?

2 MS. BRADFORD: Yes.

3 JUDGE JOHNSON: Is there any -- these spikes

4 that you refer to are spikes that have occurred during

5 perturbations during the lay-up period, filling, draining

6 -- things that would not necessarily occur during normal

7 operation?

8 MS. BRADFORD: That's true. But nevertheless

9 these are the same tubes that have experienced that

10 spiking which will later be put into operation.

11 JUDGE JOHNSON: You are saying that -- okay.

12 But the tubes that are in the long-term test are being

13 exposed at the limit of the tech expected limits of sulfur

14 and chlorine and oxygen, are they not? Or maybe beyond

15 the limit?

16 MS. BRADFORD: It appeared to me that they were

17 being exposed to the administrative limit, which I

18 understand to be 100 PPB of sulfur.

19 JUDGE JOHNSON: Is there anything magic about --

20 I mean if I run along at 50 part per billion for 100 days,

21 and then I have two days where it runs up to 120, and then

22 it goes back town to 50, does that represent -- I mean the

23 spiking per se, does that represent a particular problem

24 from the standpoint of corrosion?

25 MS. BRADFORD: I'm not sure. But it would seem

1 that caution would dictate that you would include those
2 spikes in those tests to be absolutely certain, given the
3 amount of degradation that the steam generators have seen.
4 JUDGE JOHNSON: Okay. The differences in
5 environment that you are pointing out are, one, no
6 flow-induced vibration; and, two, I guess what you are
7 telling me is that these tubes do not have precisely the
8 same history as those tubes which will eventually operate
9 in the TMI steam generator; is that right?
10 MS. BRADFORD: That's right.
11 JUDGE JOHNSON: So it's not really an
12 environment, it's a history difference.
13 MS. BRADFORD: Yes. I think one of the other
14 things that the long-term corrosion test did indicate,
15 there were C rings that were part of one of the loops and
16 they had small -- after -- I'm not sure at what time
17 during the long-term corrosion test, okay? -- they showed
18 islands of IGA. And Licensee decided that because they
19 were the same shape and approximately the same size as the
20 islands of IGA that they had seen in 1981, that they were
21 probably there and were just now showing up. I think that
22 was their rationale.
23 What I can't understand is why the size and the shape
24 would cause you to make that assumption; and why it might
25 not indicate that new corrosion was occurring on those C

1 rings. And that's exactly the same rationale that
2 Licensee has used in stating that these new indications on
3 the 37 tubes, I think there was --
4 JUDGE GOTCHY: 47.
5 MS. BRADFORD: -- which are also roughly the
6 same size and shape as earlier indications of IGA, then
7 they have assumed that actually it was old corrosion
8 and -- rather than new corrosion. And it is not clear to
9 me why they have made that assumption.
10 JUDGE GOTCHY: Were there any other differences
11 in the long-term corrosion test in the loops that you are
12 talking about? For example, loading on the tubes?
13 Temperature and pressure? I mean tensile load,
14 temperature and pressure and that sort of thing?
15 MS. BRADFORD: I believe all of those were
16 representative of loads that will be experiencing in --
17 JUDGE GOTCHY: Is that right?
18 JUDGE JOHNSON: Let me ask where your position
19 is leading you? I think you are saying that you do not
20 agree with the Applicant's explanation for the pitting
21 that was found in the fall of 1984. The Applicants said
22 this was damage caused during the intense attack of 1981.
23 Your position is that it is not that intense attack,
24 but that these tubes during the subsequent period have
25 been attacked, leading to this pitting, by some -- as a

1 result of the chemistry during the lay-up period, a
2 combination of spiking with various impurities, even
3 though the Applicant says at these levels no corrosion
4 should take place?
5 MS. BRADFORD: That's correct.
6 JUDGE JOHNSON: Now, at the end of this period,
7 1981 to 1984, assuming that operation starts -- if I can
8 make that assumption -- the steam generators will go into
9 a period of operation which is totally unlike the period
10 of the last three years, four years, which you say has
11 caused this new corrosion. Am I characterizing your
12 position properly?
13 MS. BRADFORD: Yes.
14 JUDGE JOHNSON: If they have done tests which
15 indicate that during normal operation the tubes will not
16 corrode, and if they have monitoring systems that say any
17 additional corrosion causing leaks will stop the leak -- I
18 mean will allow -- not stop the leak, but will allow the
19 corrosion to be identified through the leakage, I'm not
20 sure where you want us to go or -- I mean if you say this
21 period of strange chemistry caused the corrosion, all
22 right, they have picked up that corrosion. They have
23 plugged those tubes or they are planning to plug those
24 tubes, and we are going into an entirely different mode of
25 operation, which they have tested in their long-term test,

1 which has indicated that it will not cause corrosion.
2 What do you want done now? I think I know the bottom line,
3 but I mean what would you like us to do?
4 MS. BRADFORD: At the very least, in order to
5 make -- to draw a conclusion that there is note a
6 continuing corrosion problem, that they have in fact
7 identified the corrodant species correctly, that further
8 tests should be done on the new areas of corrosion that
9 have been discovered in 1984.
10 Additionally, without the flow-induced vibration tests,
11 I don't believe there's any way to determine for sure that
12 the tubes have not been weakened, such that they will not
13 withstand -- that they will be able to withstand the
14 flow-induced vibration that they will see during operation.
15 And I understand that operation at reduced levels, below
16 100 percent, increases the instance of flow-induced
17 vibration, or the flow-induced vibration is more severe.
18 That was from a B&W document that I was reading, which
19 didn't indicate where the most severe flow-induced
20 vibration would be experienced, at what level.
21 So, I think it's not clear that these --
22 JUDGE JOHNSON: Is there any flow-induced
23 vibration during a hot functional test?
24 MS. BRADFORD: I expect that there was some
25 flow-induced vibration.

1 JUDGE JOHNSON: Did they -- were they able to
2 determine whether or not this was detrimental to the tubes
3 in the generator? In other words, they didn't crumble?
4 The tubes that were in there were not so badly damaged
5 that they could not withstand at least whatever vibration
6 was associated with the hot functional test; is that
7 correct?
8 MS. BRADFORD: Of course the hot functional test
9 is just a short duration test.
10 JUDGE JOHNSON: Okay. So you are saying this is
11 a long-term effect? The flow-induced vibration effect is
12 long term?
13 MS. BRADFORD: Yes.
14 JUDGE JOHNSON: Okay.
15 Do you have a theory or concept that connects
16 flow-induced vibration to intergranular attack on the
17 inside or primary side of the tubes?
18 MS. BRADFORD: No, I don't, Dr. Johnson. I just
19 believe that with these -- with this steam generator,
20 where there is so much degradation and so much damage,
21 that it would be prudent to examine all of the various
22 operation modes that this steam generator is likely to see,
23 and make absolutely sure that they -- that there's no
24 chance of it to rupture.
25 JUDGE GOTCHY: I want to make sure I understand

1 you. Wasn't there testimony that about 95 percent of all
2 the damage from the sulfur attack occurred within the tube
3 sheet and is now somewhere back there behind the minimum
4 6-inch joint?
5 MS. BRADFORD: That's correct.
6 JUDGE GOTCHY: You are only worried about the
7 remaining 5 percent that is in the tube -- yes -- free
8 span area?
9 MS. BRADFORD: I think even one tube, it would
10 appear to me that even one tube rupturing would be
11 dangerous when 5 percent of those 31,000 is a fairly large
12 number. So that you have 1500 tubes that could possibly
13 be weakened in the free span. And I think that's of
14 concern. And I believe of that 5 percent, most of the
15 damage is in the 16th span, which is the span most likely
16 to rupture, or which gets most of the flow-induced
17 vibration.
18 JUDGE GOTCHY: It's the longest free span, as I
19 recall.
20 MS. BRADFORD: That's correct. Additionally, in
21 looking through the documents I see that in Unit 1, TMI
22 Unit 1, there is already erosion on the outer dimension of
23 those tubes at the 15th support plate.
24 So, we can't look at these tubes as if they had no
25 outer dimension. There is pitting and other problems on

1 the outer depths of these tubes, especially in that region
2 of the 16th span.
3 JUDGE JOHNSON: I don't recall hearing, seeing
4 that particular argument in any of your papers before.
5 Last that been made before?
6 MS. BRADFORD: No. That information is
7 contained in the B&W document. I just recently reread
8 that document. It's the document that --
9 JUDGE JOHNSON: It doesn't really matter since
10 it's not before us; does it?
11 MS. BRADFORD: That's true. It is not part of
12 the record at this point.
13 JUDGE JOHNSON: But you say you reread it. It's
14 not something they just put out last week?
15 MS. BRADFORD: No. No. It was the a document
16 concerning how far through wall a defect could be in a B&W
17 steam -- it was a generic study, 1980 study. Forgotten
18 the number of the document.
19 CHAIRMAN EDLES: Mrs. Bradford, you have 10
20 minutes left on your three quarters of an hour, so why
21 don't you keep that in mind in making what other points
22 you think are critical at this stage.
23 MS. BRADFORD: I just wanted to touch on the
24 plugging.
25 In their motion for summary disposition, Licensee

1 assured the Board that the -- all of the tubes, and
2 particularly the Westinghouse tubes, had been qualified
3 and we found out later that the tubes did not retain the
4 plugs, or numerous tubes did not retain the plugs.
5 Licensee is coming now and making another argument that
6 they have repaired those, they have reinstalled those plugs.
7 And once again they are seeking to reassure us and say
8 that the tubes -- the plugs have been qualified.
9 CHAIRMAN EDLES: Is that true? Haven't they
10 replugged those?
11 MS. BRADFORD: Yes, they have. I'm not sure,
12 given the last assurances of the qualification, how good
13 this qualification program is.
14 CHAIRMAN EDLES: How many tubes that have been
15 plugged lost the plugs, not all that many, as I recall?
16 MS. BRADFORD: No. But I think several hundred
17 were loosened. They were not seated well in the tubes.
18 CHAIRMAN EDLES: But they have now done a 100
19 percent check, is that correct, and they have gone back
20 and fixed all the ones that were loose or had come out.
21 MS. BRADFORD: That's correct. But I think you
22 can't ignore the fact that they assured us that they had
23 done that before.
24 CHAIRMAN EDLES: Okay. I understand. You are
25 going to have to jump in because otherwise there will be a

1 big dead space in that gentleman's transcript there.
2 We'll have to put something like "pause."
3 MS. BRADFORD: Ms. Doroshow has --
4 CHAIRMAN EDLES: As long as you keep it within
5 the remaining seven minutes.
6 MS. DOROSHOW: Just a few quick points. I think
7 our concern with regard to the leak limits that are going
8 to be imposed when the plan begins to operate is the fact
9 that -- and I think Licensee will tell you -- that the
10 basis for their analysis, and their assurances that the
11 leaks will be -- that the leaks will detect ruptures
12 before it occurs and the plant can be shut down safely
13 before any ruptures occur is the fact that these tubes
14 have been qualified to withstand main steam line break and
15 that the Licensee's technical analyses support the fact
16 that these tubes have been so qualified. I think that we
17 attempted to make arguments along the way that, in fact,
18 these tubes are not properly qualified.
19 The Board dismissed the aspects of our contentions that
20 dealt with the qualification of the repair and therefore
21 these issues were not properly litigated, in our opinion,
22 in the hearing.
23 JUDGE JOHNSON: I'm not exactly sure what you
24 mean by "qualified."
25 MS. DOROSHOW: Before the repairs were

1 undertaken, the Licensee put several -- or did several
2 sorts of technical analyses and ran the tubes through
3 several experimental processes to determine that, if the
4 kinetic expansion process were performed, that the tubes
5 would be able to withstand the design basis accident or a
6 main steam line break. That is what they characterize as
7 their qualification program.
8 The Licensing Board interpreted our contention as not
9 encompassing that aspect of Licensee's assurances; that
10 basically we were concerned with post-repair plant
11 performance testing. But I think that a fair reading of
12 our contention -- and I think Licensee confirmed this in
13 their summary disposition motion -- that one cannot
14 determine whether the license conditions and the post-repair
15 testing is adequate, unless you examine the basis for
16 determining that the tubes are qualified in the first
17 place. And that that was -- we perceived our contention
18 as encompassing that aspect of the Licensee's program and
19 the Board did not, and dismissed any -- or disallowed any
20 discussion of the qualification program during the hearing
21 itself.
22 JUDGE JOHNSON: Because it was beyond the scope
23 of the hearing?
24 MS. DOROSHOW: Of the contention; yes.
25 JUDGE JOHNSON: And the scope of the hearing was

1 the repair of the tubes?

2 MS. DOROSHOW: The scope of the hearing was,

3 according to the Board the scope of our contention was

4 only the post-repair testing, not the qualification

5 program, which seemed to be the primary basis for

6 Licensee's assurances; that is, the qualification program

7 itself. I think probably Ms. Bradford could speak to what

8 actually went on in the hearing with regard to that, but I

9 think her experience was that the Board disallowed

10 questioning along those lines.

11 JUDGE JOHNSON: Let me stop you a minute. That

12 gets into a rather confused area. But you were relating

13 all of this to the leak rate limit. I don't -- can you --

14 the leak rate limit sounds like something that might

15 pertain to corrosion in the future.

16 Tell me where lack of qualification bears on the leak

17 rate limit, here.

18 MS. DOROSHOW: It has to do with whether or not,

19 and how quickly a crack is expected to propagate through

20 the wall and ultimately around the circumference of the

21 tube, and that is all based on fracture mechanics analysis

22 and stress analysis and so forth.

23 JUDGE JOHNSON: But this is during normal

24 operation. We are not -- these cracks are not propagating

25 through a main steam line break. They are not normal

1 operating plant -- you've got corrosion going on and got --
2 the tubes are under stress because there's 1000 pounds
3 difference between the internal pressure and the external
4 pressure. So the main steam line break is down the road.
5 I want to know why the .2 or .1 GPM leak rate limit is not
6 a good indicator of the integrity of the tubes?
7 MS. DOROSHOW: I don't know whether I'm going to
8 give you a very adequate expert explanation of that.
9 Certainly our main concern is the possibility that under
10 certain kinds of accident conditions, in these transient
11 situations, that this repair process is not going to hold.
12 JUDGE JOHNSON: Wait a minute. Now you said the
13 repair process is not going to hold. I thought we were
14 talking about corrosion in the free span of the tubes,
15 which is entirely -- am I wrong? I thought that's what
16 you were talking about.
17 MS. DOROSHOW: I think we are talking about all
18 of it. I think that there are certain indications
19 currently in -- excuse me a minute. I think Louise might
20 be able to give you a more technical explanation.
21 MS. BRADFORD: Not technical. But I understood
22 the qualification program to qualify the joint and that is
23 the pull out, the load on the joint itself on the 6-inch
24 joint.
25 JUDGE JOHNSON: When is that load imposed? Is

1 that load imposed during the main steam line break or
2 during heat --
3 MS. BRADFORD: Certainly I think the main steam
4 line break was the bounding accident scenario. 3140
5 pounds, I believe, pressure, would be exerted under a main
6 steam line break.
7 JUDGE JOHNSON: Okay.
8 CHAIRMAN EDLES: Do you have any further
9 questions?
10 JUDGE JOHNSON: No.
11 JUDGE GOTCHY: No.
12 CHAIRMAN EDLES: Do you want to take one more
13 minute to sum up?
14 MS. DOROSHOW: I think in summary I would just
15 say I think one of the problems that this entire process
16 has suffered from is the fact that we have not been able
17 to present any sort of expert analysis of not only the
18 kinetic expansion, but also most recently why there are
19 further indications of corrosion or possible corrosion and
20 what this really all means as far as the safety of these
21 steam generators.
22 I would ask that the ACRS possibly get involved in
23 doing some sort of independent review of not only the
24 specific license amendment involved here, but also whether
25 or not these tubes are going to continue to pose dangers.

1 And if indications are going to continue, is there further
2 corrosion going on? I think what this really needs is
3 some sort of independent evaluation which has not been
4 forthcoming.
5 JUDGE JOHNSON: It's your position that the ACRS
6 did not look at the kinetic expansion process?
7 MS. DOROSHOW: I don't believe they did. I know
8 they had one -- the hearing that I know of, meeting on
9 this, but I don't think -- it was quite some time ago and
10 I don't believe -- my knowledge is that they have not done
11 any sort of detailed look at this, particularly with
12 regard to the most recent indications.
13 CHAIRMAN EDLES: Thank you very much.
14 Mr. Churchill, have you and the Staff decided on a
15 division of time?
16 MR. CHURCHILL: Yes. We'll split it, a half hour
17 each.
18 CHAIRMAN EDLES: Why don't you take your 30
19 minutes now.
20 MR. CHURCHILL: Thank you. I think probably
21 what I should do is discuss briefly the motion to reopen
22 section of this; particularly as it deals with the latter
23 point that seems to have been dwelled on the most just
24 previously.
25 CHAIRMAN EDLES: As part of that discussion,

1 spell out for me as carefully as you can why I ought to
2 have confidence that this leaking is not going to continue
3 and not going to be a problem?
4 MR. CHURCHILL: Yes, sir. I will try to do that.
5 Let me first say that basically what we did discover
6 was we found some new eddy current indications in the eddy
7 current testing in November of 1984. And there also were
8 these brief transient spiking indications of sulfur and
9 chlorides fairly recently. These were the points that
10 were raised by the Intervenors in their motion to reopen.
11 We have, in our response, presented very extensive
12 affidavit evidence to show why neither one of those
13 indicates that the corrosion will reinitiate, and there is
14 no evidence on the record that would counteract that.
15 Basically, the analysis that shows that corrosion is
16 not reinitiating is presented in TDR 638, which is
17 attached to our response which is attached to the
18 affidavit of Mr. Scott Jacoby.
19 JUDGE JOHNSON: Let me just interrupt, and I
20 think I am interpreting your words right: you are not
21 saying that there's proof that these conditions did not
22 lead to the pitting found in the fall of 1984, you are
23 saying that there's no indication that these conditions
24 caused it; is that correct? Do you understand the
25 distinction I'm making, I hope?

1 MR. CHURCHILL: I hope I'm not overstepping --

2 JUDGE JOHNSON: Do we have a smoking gun that

3 says the conditions which led to the pitting were created

4 in 1981 and that nothing that has happened subsequent to

5 1981 had any effect on that pitting except the stressing

6 of the tubes during the hot functional test?

7 MR. CHURCHILL: And the hot drop out which

8 caused us to be able to see it.

9 JUDGE JOHNSON: Is there a smoking gun that says

10 that?

11 MR. CHURCHILL: I think TDR 638 shows that. It

12 was an extraordinary program which was a continuation of

13 the long-term corrosion program that had been in existence

14 before, when the licensee was first, a couple of years ago,

15 going through this very extensive scientific detective

16 program to determine the cause of it.

17 This long-term detective program used actual tubes as

18 well as archive tubes, so that the corrosion process could

19 be compared. It used actual plant conditions, or

20 simulated them as much as possible, very closely. And,

21 contrary to what was said earlier this afternoon, that in

22 fact did, as indicated on page 12 of TDR 638, include

23 spikes in both the sulfur and the chlorides.

24 JUDGE JOHNSON: Let me clarify something. The

25 long-term program, did it duplicate operating conditions

1 generally or the layup between 1981 and 1984 conditions?
2 MR. CHURCHILL: The long-term program duplicated
3 the layup conditions. Part of the essential elements to
4 get the kind of corrosion cracking that we saw was low
5 temperatures and a certain amount of oxygenating
6 conditions. Those conditions are not present during
7 operation of the reactor.
8 JUDGE JOHNSON: So, most of the tests were
9 performed without stress?
10 MR. CHURCHILL: No, sir.
11 JUDGE JOHNSON: They were all stressed?
12 MR. CHURCHILL: Not all of them. I know that a
13 number of the specimens were stressed. Whether they all
14 were stressed or not, I don't believe they were. But
15 there were a number of C ring samples.
16 JUDGE JOHNSON: But they are run at room
17 temperature, not run at operating temperatures?
18 MR. CHURCHILL: They were run at the
19 temperatures experienced by the plant during these
20 conditions, including hot functional testing and cooldown.
21 JUDGE JOHNSON: So the long-term test actually
22 underwent temperature spikes which would be comparable to
23 the hot functional tests?
24 MR. CHURCHILL: That is my understanding, yes.
25 The long-term tests, in addition to those described in

1 TDR 638, I believe were described in the affidavits which
2 were attached to our response to the motion for summary
3 disposition.
4 And when you say was there a smoking gun -- I guess in
5 a negative sense that said it wasn't caused by these
6 recent events but by the earlier events -- I believe there
7 was such a smoking gun. I think this was a very good
8 program and I think it was very persuasive. I think this
9 is good, solid evidence. I think it was a very thorough,
10 widespread program. And as a matter of fact not only the
11 spikes that we saw of the contaminants recently, but the
12 different temperatures to which the plant -- which this
13 primary system had been exposed, were duplicated along
14 with it in the long-term corrosion program.
15 That, together with the very conclusive evidence of
16 what caused this intergranular, stress assisted cracking
17 in the first place -- really, maybe as a lawyer I can
18 overstate things more than scientists who are more
19 cautious -- but I just don't see how there's any other
20 possible explanation. And it has literally been accepted
21 by all experts who looked at it, including the ACRS.
22 JUDGE GOTCHY: Could I ask you a couple of
23 questions, Mr. Churchill? I know that there were -- I
24 believe there were four tubes. This is out of TDR638.
25 There were four tubes at which you did fiberscopic

1 deposits.

2 As I recall, the pitting -- it wasn't pitting, actually.

3 What you were seeing there, they call them "deposits"

4 where these patches were that represented, I presume, IGA.

5 In other words, they weren't pits yet. It sounds like

6 they were grains coming up out of these areas where the

7 intergranular attack had occurred.

8 MR. CHURCHILL: That is what they define as pits.

9 Pits are these grains that have been attacked, whether or

10 not they have fallen out yet. That's my understanding.

11 JUDGE GOTCHY: It seems to me there's a

12 difference between a dimple and a pimple.

13 MR. CHURCHILL: I stand corrected. I think

14 maybe if it hadn't fallen out yet it wouldn't be visible

15 yet. These recent fiberscopic examinations did show

16 something that indicated -- indications like that which

17 were IGA.

18 JUDGE GOTCHY: Right. Those were detectable

19 with eddy current tests too, you had eddy current

20 indications in that same region?

21 MR. CHURCHILL: Yes.

22 JUDGE GOTCHY: Why is it -- I believe these were

23 done since November -- before January, anyway, before this

24 test was done, it's quite recent -- if these were grains

25 sitting there hanging ready to fall out, why didn't they

1 fall out in the last two hot functional tests? I mean
2 what's keeping those things in there? How do I know this
3 is not new corrosion that's occurring, pushing these
4 grains out since the last hot functional test?
5 MR. CHURCHILL: The way we know that, and the
6 way we are fairly certain, is that we know -- we
7 understand the mechanism which causes the IGA, as well as
8 the IGSAC, and the conditions to cause that simply weren't
9 there.
10 In the long-term corrosion tests, they not only prove
11 that, but they prove that by controlling the chemistry you
12 can prevent that.
13 Why, if there were some hot functional tests before
14 that and some stresses, why they didn't fall out then I
15 don't know. But they may have. Because the last eddy
16 current examinations that we are comparing these to were
17 1982, I believe.
18 JUDGE GOTCHY: No. These are November '84.
19 MR. CHURCHILL: That's right. But you have to
20 compare it to what went before.
21 JUDGE GOTCHY: To the base line?
22 MR. CHURCHILL: Sure. And that was a while ago.
23 So it is conceivable those grains could have fallen out
24 any time during that period.
25 JUDGE GOTCHY: Go ahead.

1 MR. CHURCHILL: I think that I do want to
2 respond to some of the points made by Ms. Bradford earlier,
3 but I would like to point out one thing that I think is
4 worth noting. The subject matter of this hearing is
5 really the adequacy of the kinetic expansion repair joint.
6 That is what was set out in the Commission's notice of the
7 hearing, and that was what was primarily litigated. And
8 in none of the issues that have been raised in either the
9 motion to reopen or the appeal do I see the integrity of
10 that joint actually challenged.
11 The closest that we have come is they have mentioned
12 the fact -- they raised the issue of whether or not
13 plugging somehow weakened the tube, such that -- I'm sorry,
14 that the expansion somehow weakened the tube so that
15 plugging wouldn't come out. I think it's clear from the
16 evidence on the record that that is not the case.
17 In contest to the affidavit evidence that we've put in,
18 primarily the 634 --
19 JUDGE JOHNSON: Wait a minute. Let me go back
20 to your previous statement. Do you recall the words of
21 the original application for license amendment?
22 MR. CHURCHILL: Sort of. I have them here. I
23 can read it.
24 JUDGE JOHNSON: Well, let me -- okay. Go ahead
25 and read. Not the whole thing.

1 MR. CHURCHILL: Well, it said the amendment
2 request would revise the tech specs to recognize steam
3 generator tube repair techniques other than plugging.
4 JUDGE JOHNSON: Okay. That's all I want.
5 Now we are talking about tube repair subsequent to --
6 if I may characterize it this way -- gross damage of 1981;
7 are we not?
8 MR. CHURCHILL: Yes, sir.
9 JUDGE JOHNSON: Are you not telling me that what
10 we are looking at in the tubes right now is not some of
11 that same damage? In other words, the IGA is explained as
12 damage resulting from the 1981 period of chemical uncontrol?
13 MR. CHURCHILL: Yes, sir. Yes, sir.
14 JUDGE JOHNSON: Therefore, since that IGA still
15 exists and it's the subject of the motion to reopen, why
16 is that not within the scope of the hearing? There's
17 nothing in that amendment request that specified, at that
18 point, kinetic expansion. It says, "Repair other than
19 plugging."
20 MR. CHURCHILL: The second paragraph did go on
21 to say: "It's further requested that the Commission
22 approve within the provisions of the proposed tech spec
23 change, the kinetic expansion -- "
24 JUDGE JOHNSON: That's sort of an afterthought;
25 isn't it?

1 MR. CHURCHILL: Well, actually, it's not. To
2 tell you the truth, your Honor, we wanted it to be broader,
3 as you suggest in the beginning. The Staff would not go
4 along with it.
5 They said, "Yes, we will consider this tech spec
6 amendment, but it's clear that it has to be related to the
7 kinetic expansion repair." That's all we are talking
8 about.
9 JUDGE JOHNSON: But we are talking about repair.
10 MR. CHURCHILL: Yes.
11 JUDGE JOHNSON: Of the steam generator tube
12 damage. All right? We are talking about repairing the
13 steam generator tubes to the extent they could be operated.
14 MR. CHURCHILL: That's right. And I didn't mean
15 to suggest the questions we are talking about are outside
16 the scope of the hearing. I did mean to suggest that the
17 focus of this hearing has been on the adequacy of the
18 kinetic expansion repair technique and I don't really see
19 that challenged.
20 CHAIRMAN EDLES: But the application, again --
21 let me read from it -- it says -- this is your original
22 application back in May of '83: "We requested the NRC
23 immediately publish in the Federal Register a notice of
24 receipt of both our requests for a technical specification
25 change and of our request for approval of the heat up and

1 subsequent operation of TMI-1 using repaired steam
2 generators."
3 In other words, the application embraces subsequent
4 operation of the plant using the kinetic-expanded tubes.
5 Why can't we now look at whether that operation would be a
6 safe operation?
7 MR. CHURCHILL: I didn't mean to suggest that
8 you couldn't. In fact, we have --
9 CHAIRMAN EDLES: Wouldn't I be correct that if
10 we had a problem in 1981, the kinetic expansion technique,
11 as I understand it, was designed to solve that problem,
12 and what the Intervenors are saying, I believe, is that it
13 hasn't done that.
14 Now, maybe it has and you are arguing that it has. But
15 their argument in terms of the motion to reopen is that
16 the kinetic expansion technique has not adequately solved
17 the problem that was at the heart of this application.
18 I'm not quite sure why that's not right.
19 MR. CHURCHILL: What the kinetic expansion
20 repair technique did, it was elements analogous to
21 plugging in that it was intended to remove from service
22 those portions of the reactor pressure boundary, the
23 primary pressure boundary which had indications of greater
24 than 40 percent.
25 If you just plug, you remove those from service by

1 plugging and you remove the whole tube.

2 If you repair this way, you come down with an expansion

3 process that cuts off the damaged tubes; so what you are

4 left with are tubes, one way or another, which no longer

5 have indications above 40 percent. That's the analogy I

6 was making.

7 JUDGE JOHNSON: Yes. But the eddy current tests

8 of 1984 indicated that the tubes that were existing, that

9 were not plugged, did, in fact, have indications greater

10 than 40 percent. In other words, the kinetic expansion

11 process did not take care of all of those indications.

12 MR. CHURCHILL: To the extent that we found that

13 there were greater indications, we did do things. We

14 evaluated very carefully to determine the cause of that --

15 and I don't want to suggest that that's outside the scope

16 of this hearing -- to determine the cause of that so we

17 could make sure that this wasn't recurrence of the same

18 corrosive process. It says that right at the beginning of

19 TDR.

20 Why did that occur?

21 CHAIRMAN EDLES: So we are all agreed that why

22 this occurred is fully within the scope of the proceeding,

23 and whether it is continuing presumably is within the

24 scope of the hearing?

25 MR. CHURCHILL: The Applicant agreed to that

1 early in the proceeding, prior to the first prehearing
2 conference. And I'm not disagreeing with that.
3 Now, what we have before you is what we consider very
4 good evidence that this corrosion is not propagating; that
5 this is, in fact, simply what happened back then.
6 Chemically and environmentally, our program has shown that
7 there are no conditions that could have caused it.
8 The fiberscopic examination and the eddy current
9 examinations have shown, as well as the leak testing which
10 has shown no increase of leakage if there was any kind of
11 propagation -- you have always got something of various
12 degrees, detectable or not, you would have expected
13 leakage some way or another --
14 JUDGE JOHNSON: Well, wait a minute. The plant
15 has been laid up at essentially room temperature for these
16 four years since 1981 when you say this corrosion took
17 place. And now we are talking about going into an
18 entirely different mode of operation.
19 Now we do know, it has been portrayed to us, that the
20 eddy current indication, the pit, occurred when grains
21 dropped out during stressing of the tube during cooldown
22 after a hot functional test. So stress caused the grains
23 to drop out in one steam generator more than another --
24 more than the other. And that was explained to us as the
25 differential pressure of 12 percent. And yet there was a

1 five times greater occurrence of the pitting in the steam
2 generator with high pressure, or high stress, as opposed
3 to the steam generator with the lower stress. Yet there
4 was only a 10 or 1 percent difference in the stress level.
5 What's going to happen if that steam generator, A, now
6 the tubes are stressed to 15 percent higher level than
7 they were during that cooldown?
8 MR. CHURCHILL: Okay. Two points in response,
9 sir.
10 One is that the reason you saw more grain drop out in
11 the one than the other is that you had more corrosion
12 initially than the other.
13 JUDGE JOHNSON: That's not the way it is
14 explained. You may be saying that now, but as I recall,
15 TDR638 makes the point or the distinction between
16 generators A and B and the difference between the stress
17 levels of A and B.
18 MR. CHURCHILL: Yes. Unless I misunderstood
19 you -- yes, that's correct. But the other point is when
20 the grains drop out, that is not damage occurring. The
21 damage has occurred when those grain boundaries have been
22 weakened already. The damage is there.
23 JUDGE JOHNSON: It's the damage being made
24 manifest; is it not?
25 MR. CHURCHILL: It's the damage being made

1 manifest. That's exactly right.

2 JUDGE JOHNSON: How do we know that it's all

3 made manifest now?

4 MR. CHURCHILL: All I can say to that, your

5 Honor, and I think this is a pretty good statement, is

6 that with the the eddy techniques we have at this plant we

7 know probably better than any other operating reactor in

8 this country. We are in the frontiers of technology,

9 actually; there's been tremendous development in eddy

10 current detectability throughout this program, primarily

11 developed by this licensee. It is considered to be about

12 175 times as sensitive as the techniques that were used --

13 JUDGE GOTCHY: Let me ask you about that. I

14 think that was a statement made in the transcripts of the

15 Staff discussions too. Yet I read TDR178, and I read 175

16 percent, not 175 times. Are you comparing the old

17 circumferential or differential probes, the low-gain and

18 high-gain probes, or are you comparing a low-gain probe

19 with the 8 by 1 absolute probe?

20 MR. CHURCHILL: It's the former. I'm not

21 talking about the 8 by 1 absolute probe. The real

22 sensitive probe is the 540 probe, which, if anything,

23 overcalls.

24 JUDGE JOHNSON: All of this weaponry you have

25 was not capable of detecting intergranular attack prior to

1 stressing of the tubes; is that correct? In other words,
2 the base line test run in 1982 did not pick up the damage
3 which occurs, or the manifestation, the damage which was
4 made manifest in 1983 and subsequently determined to be
5 there in 1984? Figure that out for me.
6 MR. CHURCHILL: Well, that is also, just as much
7 as I understand it, a function of the total volume of the
8 defect, which volume could or could not be filled with
9 grains.
10 The truth of the matter is that the eddy current
11 detection devices do see that. If it's filled up with
12 grains, and of too small a volume, that signal tends to be
13 hidden in the noise. It's there, but it's hidden in the
14 noise.
15 Now, as the grains drop out you saw the depth of the
16 original defect hadn't whether or not we can see it,
17 because of the noise. It is noted by the angle of the
18 signal. Those angles of the signal are the same.
19 What we did is went back and looked at the old base
20 line data where originally there were no calls because it
21 didn't come up to the criteria for making the call or it
22 was just hidden in the noise. And, in most cases you
23 could see something that you wouldn't have called
24 originally, but you could see something that had the same
25 or roughly the same angle.

1 So you know the indication was there before, but
2 because the volume was too small -- and by that I don't
3 mean just the fact that the grains hadn't dropped out, but
4 the fact that the defect itself, even with the grains, was
5 very small. Had the grains not dropped out and the defect
6 would have been bigger, perhaps it would have been seen.
7 But it was there. The angle was basically the same, and
8 therefore we know that propagation didn't continue.
9 As to eddy current detectability, nobody has ever said
10 that that's 100 percent. That is one line of multiple
11 defenses. All I can say on this point, however, is I
12 don't think there is better eddy current detectability in
13 the country, probably the world, than is being used at
14 Three Mile Island right now.
15 JUDGE JOHNSON: You seemed upset a minute ago
16 when I said, or stated my understanding that it was a
17 difference in stress between steam generators A and B
18 which resulted in many more pits being found in A than in
19 steam generator B. I also stated my understanding that
20 this difference was a result of the levels of stress that
21 the two were subject to during the cooldown from the hot
22 functional test.
23 Is there, in this record or these papers, any other
24 distinctions that you are aware of between steam
25 generators A and B that resulted in more defects being

1 found in A than in B?

2 MR. CHURCHILL: Could I have a moment to consult?

3 Perhaps I could answer you.

4 JUDGE JOHNSON: Yes, you can.

5 (Discussion off the record.)

6 MR. CHURCHILL: The basic difference is simply

7 that there have always been many more defects in steam

8 generator A than in steam generator B. I don't know that

9 I can give you an answer why. It's probably just the fact

10 that that happens to be the way the distribution of the

11 contaminants, back in 1981, and before, had occurred.

12 JUDGE GOTCHY: Isn't it true that before sulfur

13 was injected there was a history in steam generator A of

14 more plugging than there was in B?

15 MR. CHURCHILL: Yes, sir. Right now when the

16 current plugging program is completed, the A generator

17 will have about 1214 different tubes plugged, give or take,

18 the B generator 231. So there have been more defects

19 found in tubes in the A generator.

20 JUDGE GOTCHY: But I'm saying prior to the

21 sulfur attack I think there was evidence I recall reading

22 that there was historically more tubes plugged in A than

23 in B?

24 MR. CHURCHILL: I think that's right. Yes, I

25 believe that's right. In these totals I gave, most of

1 these were tubes before then --

2 JUDGE GOTCHY: Are you aware of any difference

3 in the distribution of primary coolant flow in the two

4 generators?

5 MR. CHURCHILL: You are way beyond my state of

6 knowledge on that, sir.

7 CHAIRMAN EDLES: Mr. Churchill, why don't you

8 bring your argument to an end and make whatever additional

9 points quickly which you would like to make.

10 MR. CHURCHILL: All right. I think, basically,

11 the main points I would like to make -- I think I probably

12 should comment just briefly on this recent filing, the

13 notice and demand for hearing. The demand for hearing was

14 not in this proceeding. The notice, however, was to you,

15 and it attached the demand for hearing. And the notice

16 attempted to make the argument that in a Staff meeting

17 which was held for the purpose of considering the Company's

18 request to change the repair limit, the Staff

19 representative somehow "questioned TDR 638 and therefore

20 undermined the Staff's position and response."

21 I think if I could just briefly state that, although it

22 may be clear from the transcript, TDR638 was not the

23 subject of that meeting. There was another TDR which was

24 the subject of the meeting. It was the TDR388. Most of

25 the comments that I think you'll find in there which refer

1 generally to an analysis, was in reference to 388, not 638.
2 388 had nothing to do with the reoccurrence of chemical
3 corrosion. It just wasn't touched on in there. The Staff
4 members who made the comments that they cited, most
5 admitted on the transcript record that they hadn't read
6 638. Nor apparently, did they say, as alleged, that they
7 disagreed with the B and L analysis. In fact it looked
8 like that hadn't even been seen by the maker of that
9 statement either.
10 That's not meant to be a criticism. Those items simply
11 weren't before the Staff at that meeting. They were
12 referenced because some questions were asked, but I would
13 like to point that out, as well as note that I do think
14 that material is probably improper supplementation of a
15 motion which can't be entertained by this Board.
16 CHAIRMAN EDLES: Dr. Johnson, did you have
17 another question?
18 JUDGE JOHNSON: Yes. Is there anything in TDR638
19 which gives any indication that the occurrence of the
20 pitting or the IGA damage resulting -- that has resulted
21 from the 1981 chemistry attack has been fully exposed? I
22 know that somewhere there is a statement that one expects
23 the pits to continue to occur. But -- in other words,
24 this one episode of heat up and cooldown is used as the
25 explanation as to why 348 tubes all of a sudden have to be --

1 or some number of tubes, I have the number wrong, I'm sure --
2 have to be plugged because there are indications greater
3 than 40 percent.
4 Is there any evidence, any demonstration before us that
5 this is it? The damage that's going to show up from 1981
6 has shown up? Or can we expect to find over a period of
7 time, or can the eddy current tests expect to find over a
8 period of time, more damage that will be blamed on the
9 1981 episode?
10 MR. CHURCHILL: I do not recall in 638 the
11 statement made that this is it. If I'm wrong I would
12 stand corrected, and I think that will speak for itself.
13 But I don't think it said that.
14 I do know, however, that the heat-up from the hot
15 functional, and the cooldown, gives these tubes a pretty
16 healthy yank.
17 JUDGE JOHNSON: You wouldn't want to quantify
18 that in terms of maximum expected loading during the life
19 of the plant, would you? "A healthy yank"?
20 JUDGE GOTCHY: 16 years?
21 JUDGE JOHNSON: Is that permissible for him to
22 get that?
23 MR. CHURCHILL: The definition of a healthy yank,
24 coming right up.
25 (Discussion off the record.)

1 MR. CHURCHILL: I don't have a number, sir, but
2 I do know that is the maximum. During the other scenarios,
3 the operation of the plant in the normal operation, they
4 are not subjected to stresses any greater than they are
5 subjected to during cooldown following the hot functional
6 test to which they were subjected and which caused the
7 grain drop out.
8 CHAIRMAN EDLES: When you say "normal operation,"
9 that includes transients?
10 MR. CHURCHILL: Yes, sir.
11 JUDGE JOHNSON: The obvious question, does it
12 include major steam line break?
13 MR. CHURCHILL: No, sir. However, none of the
14 indications that we have are of a size which would, or
15 would be expected to cause a rupture during the main steam
16 line break, obviously. They all have to be plugged well
17 before that.
18 JUDGE JOHNSON: Well, except -- there were some
19 that had to be plugged as a result of a cooldown. Suppose
20 all of that had happened during -- I mean suppose these
21 things had not shown up during the testing?
22 MR. CHURCHILL: The answer is the same. Those
23 indications are very, very small indications. In fact,
24 that's why they weren't seen.
25 JUDGE JOHNSON: Let me follow that. I'm sorry

1 to run you overtime.

2 Is there any demonstration here that if there were a

3 defect, an IGA defect, that was large, that even though

4 the grain was still in place that that defect would be

5 identifiable with eddy current testing?

6 MR. CHURCHILL: TR008, your Honor, which was one

7 of the primary bases for the original application, has

8 curves in the back which show that even without grain

9 dropout, any defect which could possibly rupture would

10 show up in eddy current testing well before any

11 possibility of rupture.

12 JUDGE GOTCHY: That assumption is what,

13 throughwall up to 70 percent and no less than .2 of an inch

14 circumferential crack?

15 MR. CHURCHILL: No, sir.

16 JUDGE GOTCHY: What are you talking about? The

17 pits you are talking about now or circumferential cracks?

18 MR. CHURCHILL: Actually, it's both. Anything

19 that goes through a wall with sufficient volume. It's

20 based on the analysis given there on the remaining amount

21 of metal left to hold the tubes intact.

22 JUDGE GOTCHY: Let me ask you one question:

23 Have you established a new base line leak rate that you'd

24 be operating with in the event you were given permission

25 for restart?

1 MR. CHURCHILL: I understand that that base line
2 is being established right now. There was some discussion
3 about the leak testing earlier, and whether it was
4 adequate.
5 I believe that the leak test limits that we have, if
6 they are not the most rigid in the industry, are perhaps
7 tied for the most rigid with one other. We have a .1 GPM
8 over the base line, which is about probably one gallon per
9 hour or so.
10 There is a 1-gallon-per-minute tech spec limitation
11 which most plants have. What we have is a .1 GPM increase
12 over the base line and we have to shut down.
13 JUDGE GOTCHY: I'm curious what that base line
14 was. I know it was .02 at one time, gallons per minute.
15 I assume it's now a little larger, maybe, than it was.
16 But I don't know.
17 MR. CHURCHILL: Perhaps I can get some --
18 (Discussion off the record.)
19 MR. CHURCHILL: We have to go hot before we can
20 reestablish it, but because of the tubes plugged we expect
21 the base line now to be lower than the .02 gallons per
22 minute.
23 JUDGE GOTCHY: Just a couple of quick questions.
24 Is there any new information on the status of those
25 missing plugs since the January '85 SER came out?

1 MR. CHURCHILL: The coolant system hasn't been
2 opened up, so there's no new information on that.
3 JUDGE GOTCHY: The long-term corrosion test, the
4 metallographic examinations that were testified to on the
5 record, those, as I understand it, are not complete and TDR638
6 is the only place where we have this information where we
7 can review it, or is there another report that's available?
8 MR. CHURCHILL: I believe there has been an
9 interim report which we have shown to the Staff but the
10 final is expected out shortly.
11 JUDGE GOTCHY: That's all I have, thank you.
12 CHAIRMAN EDLES: Okay, Mr. Churchill. Thank you
13 very much. We'll take a 10-minute recess.
14 (Recess.)
15 CHAIRMAN EDLES: Can we come to order, please?
16 Ms. Wagner, for the NRC Staff.
17 MS. WAGNER: Thank you. I would intend, today,
18 to briefly address first some of the issues --
19 CHAIRMAN EDLES: You can raise the lectern if
20 you think you'll be more comfortable. There's a button, I
21 believe. Tom, can you help out?
22 MS. WAGNER: Is that better?
23 CHAIRMAN EDLES: Thank you.
24 MS. WAGNER: I would like to briefly address
25 some of the issued raised by TMIA in their appeal and then

1 move on, if that's the Board's pleasure.

2 CHAIRMAN EDLES: I would suggest you take on the

3 appeal briefly and then move on to the motion.

4 MS. WAGNER: That's what I will do then. It's

5 the Staff's position that the Board adequately considered

6 the capacity of the kinetic expansion repair process to

7 return the TMI-1 steam generator tubes to their originally

8 licensed condition, and that the Board properly limited

9 the scope of the hearing.

10 We believe that TMIA was not denied the ability to

11 prepare its case by the Licensing Board prehearing rulings,

12 by the appointment of a special panel, and on its

13 discovery rulings. As to the ruling on proprietary

14 information, TMIA argued it would be too difficult to

15 abide, and burdensome, to protect proprietary information

16 in that it would burden its ability to do research and

17 that it would be intimidating to its volunteer members who

18 would be assisting TMIA in the preparation of its case.

19 We think these arguments are unpersuasive because TMIA

20 should be able, without much difficulty, to determine

21 which members would assist it in preparing its case and

22 present to them the proprietary agreement for signing.

23 And further, if as TMIA claims there is no motive by any

24 of its members to disclose information, that agreeing to

25 not disclose it should not really be intimidating.

1 CHAIRMAN EDLES: The gist of their motion, as I
2 understand it, was that this was not really proprietary in
3 the first place.
4 MS. WAGNER: I don't believe as to the discovery
5 information -- there are two claims. There are two issues
6 where proprietary information arises. One is in the
7 discovery phase --
8 CHAIRMAN EDLES: And the other at the hearing.
9 MS. WAGNER: As to the hearing phase, it
10 certainly is their position that the information wasn't
11 proprietary. To the extent it might had been proprietary,
12 that had been waived by licensee by producing documents
13 containing that information in the discovery phase.
14 As to the documents that were ultimately covered by
15 protective order, I don't believe that's the crux of their
16 claim. They basically said they couldn't operate under a
17 protective order because it would be too burdensome.
18 CHAIRMAN EDLES: I understood them to make more
19 than one argument, the first of which, you are right, is
20 that it would be too burdensome but also that they did not
21 believe the material to be genuinely protectable, and they,
22 indeed, went on to criticize the Licensing Board, as I
23 recall, because the Licensing Board in point of fact never
24 made a finding on that. Am I correct?
25 MS. WAGNER: The Licensing Board never made the

1 detailed, line by line finding or review of the documents.
2 That's correct. The Licensing Board did review the
3 affidavit submitted by licensee in support of their --
4 CHAIRMAN EDLES: When did they do that? When
5 did they actually review it? Did they do that prior to
6 the time they issued their protective order? Is that
7 anywhere in the transcript?
8 MS. WAGNER: Well, licensee's affidavit in
9 support of their motion, their affidavits in support of
10 their motion --
11 CHAIRMAN EDLES: Was submitted --
12 MS. WAGNER: -- was submitted before the
13 protective order issued.
14 CHAIRMAN EDLES: I'm just wondering if you can
15 point to anything that demonstrates that the Licensing
16 Board in fact looked at the materials before they issued
17 the protective order.
18 MS. WAGNER: The affidavit submitted by licensee?
19 CHAIRMAN EDLES: Right.
20 MS. WAGNER: I don't have the Licensing Board's
21 order in front of me. I have no reason to doubt that they
22 read the paper submitted by the parties before ruling on
23 the motions, however.
24 CHAIRMAN EDLES: Go ahead.
25 MS. WAGNER: I would also like to point out that,

1 although the Licensing Board made no final determination,
2 line by line determination, from my review of the
3 documents, the Staff -- a number of the same documents
4 that would be covered by the protective agreement have
5 been submitted to the Staff with the claim of proprietary
6 treatment and we had afforded it that treatment.
7 JUDGE JOHNSON: Does the Staff ever not afford
8 proprietary treatment to a document with "proprietary"
9 written on it? Does the Staff evaluate documents that
10 they are asked to treat as proprietary, or do they just
11 normally treat them --
12 MS. WAGNER: The Staff is obligated to make a
13 determination as to whether they will afford these
14 documents proprietary treatment. And I believe when the
15 determination is made a letter is sent from the Staff to
16 the requester, notifying them that they have made that
17 determination.
18 JUDGE JOHNSON: Okay. Thank you.
19 MS. WAGNER: I have seen, in this case in
20 particular, a couple of that kind of letter.
21 TMIA did argue that the documents are relevant to the
22 issues in contention, but again this really has no bearing
23 on the question of whether they are proprietary or not.
24 In conclusion, we think it was not the Board's ruling,
25 but really TMIA's refusal to accept the Board's -- to

1 accept the information under the proprietary order that
2 created any claimed restrictions that TMIA is now saying --
3 CHAIRMAN EDLES: Let me pose this hypothetical.
4 Let's assume the Applicant presents all this material in
5 camera to the Board, ex parte, does not serve it on any of
6 the parties. And the Licensing Board in fact doesn't even
7 look at the material, but it simply issues a protective
8 order.
9 What if TMIA, in those circumstances, were to refuse to
10 accept the document? Could they later argue that the
11 Licensing Board was in error in having issued the
12 protective order at the outset?
13 MS. WAGNER: Before making a review of the
14 documents?
15 CHAIRMAN EDLES: That's correct. Let's assume
16 that all they do -- there's a motion for protective order.
17 And without even looking at the documents they have, they
18 stamp it "protective order," and they say now, TMIA, you
19 look at these things and we'll get to all of this stuff
20 later.
21 Could TMIA go to the Appeal Board and say, look, that
22 was just an arbitrary decision? No basis on which they
23 could have made a decision on the proprietary nature of
24 that?
25 MS. WAGNER: Well, there is a provision in the

1 rule that provides for making documents available under a
2 proprietary order, prior to a determination that, indeed,
3 they are proprietary.
4 CHAIRMAN EDLES: Isn't there sort of an implicit
5 requirement that there be at least a threshold
6 determination that these are protectable?
7 MS. WAGNER: I think that's right and it's our
8 position that licensee made a prima facie case on their
9 submittal.
10 CHAIRMAN EDLES: The Board reviewed the
11 materials and at least made a prima facie determination
12 that these were protectable?
13 MS. WAGNER: I have no reason to believe that
14 they didn't review the affidavits submitted.
15 JUDGE GOTCHY: I think they said they did. I
16 think the question is was it after the fact?
17 MS. WAGNER: Was it after they issued the
18 protective order?
19 JUDGE GOTCHY: This is a TR76, where Judge Wolf
20 was talking about it now being a nonissue because the
21 hearing was over. He said, "I would add that we have
22 reviewed the 35 unexpurgated documents and concluded that
23 none of the documents invoke any concern with respect to
24 health and safety."
25 The question is, when they reviewed them was it before

1 or after they made the decision to grant a protective
2 order?
3 MS. WAGNER: The documents were reviewed after
4 the order issued. It was on the basis of the showing by
5 licensee that the order issued.
6 CHAIRMAN EDLES: Just one little point. I hate
7 to take too much time on this but I'm a little curious on
8 that. How do you know that? Weren't all the things
9 submitted at the same time? How do you know they looked
10 only at the affidavits and not at the documents at that
11 time? I thought everything was submitted together.
12 MS. WAGNER: Everything was submitted together.
13 I don't have -- as I say, I don't have the order in front
14 of me. But it is my belief, or recollection based upon
15 the facts and possibly the timing of the issuance of the
16 order, that led me to that conclusion.
17 CHAIRMAN EDLES: I'll go back and check. Why
18 don't you continue.
19 MS. WAGNER: Briefly addressing TMIA's argument
20 that the Board erroneously denied their motion for a
21 special panel, we believe the Licensing Board correctly
22 found that the Atomic Energy Act authorizes the Commission
23 to appoint licensing boards to preside over proceedings
24 and, among other things, to hear evidence.
25 There is only one exception to this in the Commission's

1 rules and that's for the appointment of a Special Master,
2 which must be done upon the consent of all parties. That
3 was not the case in this instance.
4 We don't believe TMIA's reasons for the appointment of
5 a special panel are compelling. They assert that they
6 have lack of expertise, that they have difficulty in
7 obtaining experts, and that they had difficulty in
8 traveling some 10 miles to the room where the documents
9 that should be reviewed were located.
10 This is really nothing more than the normal burdens of
11 litigation which a party to a proceeding generally assumes.
12 In conclusion, we think --
13 CHAIRMAN EDLES: What about their argument that
14 they don't trust the Licensing Board or the Staff? That
15 was a second prong to their argument, as I recollect.
16 MS. WAGNER: That they wanted someone truly
17 independent.
18 CHAIRMAN EDLES: Right.
19 MS. WAGNER: Well, I'm not sure. Their proposal
20 did not really propose to have people who were truly
21 independent. Indeed, they proposed that they appoint one
22 of the representatives.
23 CHAIRMAN EDLES: They wanted a reasonable
24 proposal. Maybe in their heart of hearts they would have
25 liked to pick all four of these people, but what they were

1 saying is: Look, we don't trust the NRC process. Here's
2 a proposal to have sort of an impartial panel.
3 MS. WAGNER: Actually the NRC process can also
4 provide in special instances for the appointment of expert
5 panels. But, again, it would be members chosen by the
6 Board.
7 If they want to go outside the process, that's just
8 something that's not provided for in the procedures we
9 have.
10 CHAIRMAN EDLES: Why don't you move on to the
11 motion to reopen.
12 MS. WAGNER: Yes, sir. We don't believe TMIA's
13 motion to reopen meets the standards of reopening, and it
14 should be denied. We don't really contest them on the
15 timeliness grounds as we say in our brief. Maybe one to
16 three months delay in the filing of the motion does not,
17 under the circumstances, seem grounds for denying the
18 motion. But we don't believe they meet the other two of
19 the three tests for reopening.
20 TMIA asserts that the record should be reopened on the
21 basis of new information in six documents which they
22 append to their motion. Really, boiling it down it comes
23 to two arguments: That the failure of 80 plugs out of --
24 the failure of 280 plugs supports their contention 1-C,
25 which was dismissed on summary disposition which alleged

1 the kinetic expansion has reduced the ability of the tubes
2 to retain plugs; and two, the increase in sulfates and
3 fluorides and recent eddy current indications of defects
4 in the tubes indicate that corrosive contaminant and
5 failure mechanisms haven't been identified, as they had
6 alleged in their contention 2-A; the cleaning process had
7 initiated additional corrosion and the 20 to 50 percent
8 sulfur remaining trapped after cleaning had reinitiated
9 corrosion.
10 None of these assertions raises a significant safety
11 issue as set forth in our affidavits.
12 CHAIRMAN EDLES: As I understood their argument,
13 at least in part, it was that we really don't know what
14 initiated all of this. The Applicant has put forth a
15 theory, which may well be correct, but what Dr. Johnson
16 calls a smoking gun really isn't there.
17 Why isn't that a reasonable argument to put forth?
18 Maybe, as Mr. Churchill has suggested, that's just wrong
19 on the facts. But why isn't that the kind of argument
20 that we ought to look into?
21 MS. WAGNER: Well, the Staff believes that we do
22 know what caused the corrosion. Extensive tests and
23 analysis were done. The Licensing Board further found on
24 motions in response to the motions for summary disposition,
25 that the corrosive contaminant was identified and we are

1 convinced that these newly identified defects are not, in
2 fact, new defects at all, but are now just becoming
3 apparent.
4 CHAIRMAN EDLES: In order for us to deny the
5 motion, would we have to be satisfied that you are right,
6 that we have properly identified the causative agent here
7 and it's not likely to reoccur?
8 MS. WAGNER: I think you would have to be
9 convinced that they present new information that's of a
10 significant safety nature and that might influence the
11 result reached below.
12 CHAIRMAN EDLES: We wouldn't have to necessarily
13 be convinced absolutely that they are right, but merely
14 that they have raised an adequate doubt as to the
15 licensee's or Applicant's explanation for why this all
16 happened and why it won't happen again?
17 MS. WAGNER: They would have to cast a doubt on
18 the adequacy of the decision below. That's right.
19 CHAIRMAN EDLES: Okay.
20 MS. WAGNER: In fact, their assertions are
21 wholly conclusory. They do not explain the safety
22 significance of their assertions and the significance is
23 not apparent.
24 CHAIRMAN EDLES: Do you mean if there is
25 continuing corrosion and the pipes crack, that they have

1 to say something more than that? What's the last sentence
2 they should have put in their motion?
3 MS. WAGNER: They haven't shown continuing
4 corrosion. They haven't shown that any of these new
5 defects are a result of a continuing corrosive process.
6 CHAIRMAN EDLES: I understand that argument. I
7 thought what you were saying is that they haven't
8 demonstrated that this has any safety significance. Maybe
9 we are talking about the same thing.
10 Run that by me one more time. Let me try, and you tell
11 me if I'm wrong.
12 What you are saying is that there is an explanation put
13 forth by the Applicant, basically accepted by the
14 Licensing Board, and that nothing in their papers really
15 undermines that explanation. Is that basically the Staff's
16 position?
17 MS. WAGNER: That is our position. They see
18 some defects that were not detected earlier. They
19 conclude --
20 JUDGE JOHNSON: Everybody sees defects that
21 weren't detected earlier. It's not something the
22 Intervenors made up. This is a fact.
23 MS. WAGNER: We all see the recently identified
24 defects. TMIA concludes from that that it could well be
25 that corrosion is continuing. Our position is we know

1 what caused the corrosive problem back in 1981. We know
2 the conditions under which intergranular stress cracking
3 can occur. Those conditions weren't present here, and
4 TMIA has not said anything to cast doubt on the analysis
5 that was done earlier, or the Licensing Board's decision.
6 They are saying it's possible that it could be
7 continuing -- new corrosion. But that doesn't really get
8 them far. That doesn't raise a safety significance issue
9 on the basis of what they've said.
10 JUDGE JOHNSON: Let me ask you from a slightly
11 different direction.
12 Does the Staff agree with the Applicant that any defect
13 caused by the chemical attack of 1981 that could result in
14 leakage is now detectable with eddy current techniques
15 presently being used?
16 In other words, their most recent eddy current test in
17 the fall of 1984 picked up a number of defects, none of
18 which were through walls. All right?
19 MS. WAGNER: Right.
20 JUDGE JOHNSON: That were not previously
21 determined.
22 MS. WAGNER: That's right.
23 JUDGE JOHNSON: Is it the Staff's position that
24 their eddy current techniques are adequate to pick up any
25 defect in those tubes which might cause leakage as a

1 result, say, of there being stress and a grain popping out?
2 MS. WAGNER: That certainly is our position.
3 But I don't want you to think by that that it is the Staff's
4 position that the eddy current tests that have taken place
5 have necessarily picked up all the grain dropout that may
6 occur. That's not what you are asking, though; is that
7 right?
8 We do believe the eddy current tests, with their very
9 restricted limitations, the most restrictive in the
10 country, are adequate to pick up any additional grain
11 dropout that might occur.
12 JUDGE GOTCHY: During the next 90 to 120 days,
13 at any rate. That's when the next eddy current tests are
14 being done.
15 MS. WAGNER: That's right. That plus the leak
16 rate requirements.
17 CHAIRMAN EDLES: Is it your position that once
18 they power up the reactor that the problem should go away
19 because the chemical conditions are no longer present?
20 MS. WAGNER: Well, it's our position that by and
21 large the dropout that is going to occur has by and large
22 occurred. That's not to say that with additional stress
23 there may not be some additional grain dropout. But it's
24 our position that this will be readily detectable by both
25 the stringent leak rate requirements --

1 CHAIRMAN EDLES: What about the argument that
2 this is a fast-developing phenomenon? I don't know what
3 the magic words were, but that's roughly how I construed
4 it, that this happened very quickly and you may not pick
5 it up in either eddy current testing, which I gather are
6 done periodically, or through the leak rate data?
7 MS. WAGNER: May I have a minute to consult?
8 CHAIRMAN EDLES: Sure.
9 (Discussion off the record.)
10 MS. WAGNER: It is my understanding it is a
11 fast-occurring low-temperature phenomenon, and really
12 should not be seen during normal operation of the plant.
13 Does that answer your question?
14 CHAIRMAN EDLES: I think so, but I'm a layman.
15 That low temperature phenomenon means that it doesn't
16 occur at the temperatures at which the plant operates
17 normally?
18 MS. WAGNER: That's my understanding, sir.
19 JUDGE JOHNSON: You are, of course, referring to
20 the attack that occurred in 1981 as being the
21 low-temperature effect?
22 MS. WAGNER: That's correct. As well as IGA.
23 Both of them.
24 JUDGE JOHNSON: Let me ask you if the Staff has
25 given that period of corrosiveness that occurred in 1981 --

1 that gave rise to intergranular stress -- cracking that
2 resulted in leakage, and the big problem that primarily
3 was resolved by kinetic expansion.
4 It also gave rise to intergranular attack, which we
5 have talked about a great deal this morning, and at least
6 it apparently has manifested itself in these pits, but
7 they have -- presumably most of them have been repaired by
8 plugging or they are not deep enough to be a problem.
9 But these are two results of this corrosive environment
10 of 1981 which have affected the tubes. Up until last
11 summer, no one gave much thought to the IGA attack.
12 Is there any possibility that there is a third or
13 fourth mode of tube degradation resulting from this
14 corrosive period that has not yet been made manifest?
15 For instance, do the tubes still have the same strength
16 properties that they had when they were -- before 1981?
17 Has the Staff done anything to assure itself that these
18 tubes are, in effect, structurally -- in their ability to
19 withstand loading, fatigue strength, things of this nature --
20 are they the same tubes that the plant was analyzed for?
21 MS. WAGNER: I can try to answer your question.
22 I believe, yes. Extensive tests were done that showed
23 that the tubes were restored to their original licensing
24 basis. Is that the kind of answer you are looking for,
25 or would it be better if I consult with my expert?

1 JUDGE JOHNSON: Why don't you consult with your
2 expert. We are dealing with a motion to reopen here, we
3 are not dealing with a record. I think it's permissible
4 for you to talk to your technical consultant.
5 (Discussion off the record.)
6 MS. WAGNER: During the course of the Staff's
7 review of the corrosive mechanisms, there were 21 tube
8 sections removed from steam generator tubes, and the only
9 IGA and IGACs were identified. Those are the only two
10 mechanisms that the Staff believes were in operation.
11 JUDGE JOHNSON: Were these tubes subjected to
12 the same type of testing to determine what a new tube
13 being qualified would be subjected to to determine whether
14 they still had the properties they were put in there with?
15 The tensile properties? Fatigue properties?
16 MS. WAGNER: That is my understanding.
17 JUDGE JOHNSON: Are these tested documented by
18 the Applicant? Or is there a Staff SER which documents
19 the review that you have --
20 MS. WAGNER: The SER is NUREG 1019, and 1019
21 supplement 1. It's in there.
22 JUDGE JOHNSON: You must recall that I am a
23 latecomer to this particular proceeding.
24 MS. WAGNER: Let me just continue briefly. The
25 temporary increases in sulfates, as again we set forth in

1 our affidavits, are not unexpected. The recently reported
2 defects, the Staff has concluded at the time of its
3 affidavit -- the time of our response to the motion to
4 reopen -- it was just a preliminary review -- we had
5 concluded that the defects are not caused by a
6 continuation or reinitiation of intergranular stress
7 corrosion cracking, but from grain dropout and grain
8 boundary separation.
9 CHAIRMAN EDLES: What's the status of that
10 review? You mentioned that as a preliminary review. Are
11 you looking into it further?
12 MS. WAGNER: We have looked into it extensively
13 since that time. Our initial review was -- which
14 supported our submittal of January 24, was done partially
15 on the basis of a document that wasn't submitted to us
16 until January 14th. But since the submission of our
17 response to the motion to reopen, the Staff has devoted
18 approximately a man-month's worth of time to further
19 review of the cause of the newly reported defects. And --
20 CHAIRMAN EDLES: But there's no published
21 conclusions as yet?
22 MS. WAGNER: Well, as of today the technical
23 people on the Staff have signed off on a conclusion. It
24 has not been issued yet. The conclusion confirms what was
25 said in the affidavits submitted on January 24th, that

1 this is, indeed, due to grain dropout and not a
2 reinitiation of corrosion. And I expect that that
3 document will be publicly available within the next couple
4 of days.
5 As to the likelihood of different results being reached,
6 the issue of plugging, per se -- to take the plugs first,
7 that TMIA is pointing to, the issue of plugging, per se,
8 is not a usual -- properly within the scope of the
9 proceeding, and the Licensing Board properly noted that.
10 Because plugging per se is not an issue, if there is no
11 nexus between the repair and the failure of the plugs,
12 plug failures cannot have any material bearing on the
13 outcome of the proceeding. And so there would be no
14 reason to reopen the record, absent some nexus.
15 Again, the Staff affidavits establish that the majority
16 of the plug failures did not occur in the region of the
17 tubes where the repairs took place, and all the failures
18 really bear no relationship to the kinetic expansion
19 repair process. In fact if you take a look at the
20 location of the tubes which failed to hold their seals,
21 most of the loose plugs are located at the bottom of the
22 sheet, a full 60 feet away from where the expansion took
23 place.
24 I think I've touched on most of my points now.
25 CHAIRMAN EDLES: If you have one or two other

1 very quick points, that's fine.

2 MS. WAGNER: Why don't I just conclude quickly,

3 since most is set forth in my brief, that while the motion

4 may not be objectionable on timeliness grounds, TMIA has

5 not demonstrated there exists a safety issue, nor is there

6 the likelihood of a record which would be developed in any

7 way other than that developed by the Licensing Board.

8 Accordingly TMIA's motion should be denied.

9 I am prepared to touch on the issues raised in TMIA's

10 notice to the Appeal Board, which was appended to their

11 formal demand for an adjudicatory hearing if you have --

12 CHAIRMAN EDLES: I have no questions about that.

13 My colleagues might. Do you?

14 No. We have no questions on that matter. Unless you

15 have something else, thank you very much.

16 MS. WAGNER: No. Thank you.

17 CHAIRMAN EDLES: Ms. Bradford or Ms. Doroshow,

18 you have got 15 minutes remaining for rebuttal.

19 MS. BRADFORD: I would like to quickly raise --

20 discuss some of the issues that both Licensee and Staff

21 addressed. Both Licensee and Staff are relying on TDR 638,

22 which they say conclusively proves that the new

23 indications that were found in 1984 are not, in fact, new

24 corrosion sites, but a result of grain dropout.

25 I wasn't able to find such a proof in going through TDR

1 638, but I note on page 12 of that TDR, that what seems to
2 be in the fourth paragraph there, Licensee says that: "Some
3 intergranular attack during the long-term corrosion
4 program was noted on four C rings that were from tube
5 material, actually TMI-1 tube material, and that they
6 evaluated this to be independent damage." They haven't
7 indicated where they made that evaluation, and it seems to
8 me they have made a similar evaluation concerning the tubes
9 themselves and the IGA attack.
10 I haven't been able to discover where in this document
11 they have shown any conclusory proof that it was, indeed,
12 old damage just showing up.
13 Dr. Johnson had asked the licensee some questions about
14 the difference between the generators A and B. I noted
15 that the original damage was more heavily concentrated in
16 the A generator than in the B generator, although the
17 documents indicated that the wipe samples of these two
18 steam generators proved that there was a heavier
19 concentration of contaminant in the B steam generator.
20 That's another one of these unexplained problems
21 surrounding the original contamination itself.
22 In looking back on the history of the tubes themselves,
23 I noted that the A steam generator was subjected to higher
24 temperatures for a much longer time period than was the B
25 steam generator, in the stress-relieving process.

1 I have no idea what effect that has on the material
2 itself, but it seems to have sensitized them or made the A
3 steam generator more heavily sensitized. And I don't know
4 what that -- why these discrepancies seem to appear.
5 It has not been explained adequately, I don't think, on
6 the record.
7 I believe for at least -- as I said before, that one
8 way of providing some more definite proof that this is not
9 new corrosion occurring, one would have to extensively
10 examine, and destructively examine, some of those
11 indications, and that has not been done.
12 I think it's just --
13 JUDGE GOTCHY: How can you tell if it's new?
14 Even if it were pulled -- if they pulled the tube, how
15 could you tell it was new?
16 MS. BRADFORD: I noted during the earlier
17 examinations that they found various levels or various
18 states of sulfur on the cracked surfaces themselves. And,
19 since the cleaning process was intended to remove that, if
20 there were new sulfur, or new contaminant appearing there,
21 that would give some indication whether indeed this was
22 new corrosion.
23 The Staff stated that they were not -- that the
24 increased contaminant levels in the bulk solution were not
25 unexpected by the Staff and by the Licensee. But I see by

1 Licensee's February 1984 affidavit supporting their motion
2 for summary disposition, to the paragraphs to which
3 Licensee directed the Board's attention, they do not
4 indicate that there would be high levels of -- or spikes
5 of contaminants. In fact --
6 JUDGE GOTCHY: These weren't really high levels
7 they were talking about, just increases?
8 MS. BRADFORD: That's right. They were talking
9 about increases, and increases to the level that was
10 observed in the months after the cleaning is discussed in
11 paragraph 95. It seems -- my reading of that paragraph
12 would indicate that those levels -- that is the 400 PM --
13 were only experienced during the --
14 JUDGE GOTCHY: PPB.
15 MS. BRADFORD: PPB. Excuse me -- were only
16 during the actual cleaning process itself.
17 The paragraphs that Licensee has directed the Board to
18 do not indicate that there would be increased levels, in
19 my reading. Therefore, I don't understand the Staff's
20 statement that these increases were not unexpected.
21 JUDGE JOHNSON: Well, we did have the testimony
22 of, I think it was Dillon about -- it may have been
23 someone else -- who expected 5 to 10 PPM during the
24 cleaning process. That came out at the hearing below; did
25 it not?

1 MS. BRADFORD: Yes.

2 JUDGE JOHNSON: So at least the idea that during
3 the cleaning process there would be elevated levels was
4 certainly current.

5 MS. BRADFORD: But, Dr. Johnson, what I was
6 referring to was that it would be continuing for several
7 months after the cleaning process.

8 JUDGE JOHNSON: Well, as I recall that chart in
9 TDR 638, the levels went up during July and then they came
10 right back down below 100 right at the end of July, and
11 they stayed there with the exception of one or two spikes.
12 I mean they weren't really up there for several months;
13 were they?

14 MS. BRADFORD: No. From the status reports
15 written by Mr. Hukill, there appeared to be spikes at
16 every occasion that the primary side is refilled. And
17 that would suggest that, when -- at least I assume from
18 that information that when the -- the steam generator was
19 drained, that there would be a film. And, in fact,
20 licensee discusses that, and it would seem that that film
21 would have a higher concentration of the contaminant thank
22 the bulk solution, so that actually the levels of
23 contaminant during those peak periods might have been
24 greater than the 200 PPM that is discussed in Mr. Hukill's
25 memos.

1 JUDGE JOHNSON: Okay.

2 MS. BRADFORD: I believe Ms. Doroshow -- and the
3 other point I wanted to make about the memo was that it
4 appears that Licensee did not understand what was causing
5 these levels. And, so, again, the statement that they
6 were -- that they were expected by both Staff and Licensee
7 seems to be contradicted by the statements in these memos.

8 CHAIRMAN EDLES: Do you have any questions?

9 JUDGE JOHNSON: No.

10 JUDGE GOTCHY: No.

11 CHAIRMAN EDLES: Thank you very much. I want to
12 thank all the participants for your help, and the case now
13 stands submitted.

14 (Whereupon, at 4:30 p.m., the oral argument was
15 adjourned.)

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CERTIFICATE OF OFFICIAL REPORTER

This is to certify that the attached proceedings before the UNITED STATES NUCLEAR REGULATORY COMMISSION in the matter of:

NAME OF PROCEEDING: METROPOLITAN EDISON COMPANY

(Three Mile Island Nuclear Station, Unit No. 1)

ORAL ARGUMENT

DOCKET NO.: 50-289 OLA (Steam Generator Repair)

PLACE: Washington, D. C.

DATE: Wednesday, April 3, 1985

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission.

(sigt) Joel Breitner

(TYPED)

JOEL BREITNER
Official Reporter

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