

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of:

COMMONWEALTH EDISON COMPANY
(Byron Nuclear Power Station
Units 1 and 2)

Docket No.

50-454 OL
50-455 OL

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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| | Docket Nos. 50-454 OL |
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Eighth Floor Courthouse
Winnebago County Courthouse
Rockford, Illinois
Wednesday, 27 April 1983

Hearing in the above-entitled matter was recon-
vened, pursuant to adjournment, at 9:00 a.m.

BEFORE:

IVAN W. SMITH
Administrative Law Judge

A. DIXON CALLIHAN
Administrative Judge

RICHARD F. COLE
Administrative Judge

APPEARANCES:

On behalf of Licensee:

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5 U.S. Nuclear Regulatory Commission
6 Washington, D. C. 205557 On behalf of the Intervenors DAARE/SAFE and
8 League of Women Voters9 DAVID C. THOMAS, Esq.
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13 BRYAN SAVAGE, Esq.14 On behalf of Westinghouse:15 FRANCIS X. DAVIS, Esq.
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18 Pittsburgh, Pennsylvania
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C O N T E N T S

| | <u>WITNESSES:</u> | <u>DIRECT</u> | <u>CROSS</u> | <u>REDIRECT</u> | <u>RE CROSS</u> | <u>BOARD</u> |
|----|-----------------------|---------------|--------------|-----------------|-----------------|--------------|
| 1 | | | | | | |
| 2 | <u>WITNESSES:</u> | | | | | |
| 3 | John Blomgren) | | | | | |
| 4 | Lawrence Butterfield) | | | | | |
| 4 | Thomas Timmons) | | 6204 | | | |
| 5 | Wilson Fletcher) | | | | | |
| 5 | Michael Hitchler) | | | | | |
| 6 | (resumed)) | | | | | |
| 6 | Kenneth Green) | 6209 | 6212 | 6254 | | 6235 |
| 7 |) | 6284 | | 6306 | 6295 | |
| 8 |) | | | | | |
| 9 | Jai Rajan (recalled) | | 6309 | 6337 | | |
| 10 | Dalc G. Bridenbaugh | 6341 | | | | |
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1 JUDGE SMITH: Is there any preliminary business
2 before we begin with the in camera session?

3 MR. GOLDBERG: Yes, Judge, briefly.

4 In the same context in which the Staff brought
5 the Board notification to the attention of the Board and
6 parties, a week or two ago, I would also like to inform the
7 Board and parties that the Staff is in the final stages
8 of its review of the Applicant's request to receive the fuel
9 on-site under Part 70 authorization, and would anticipate
10 approval within the next week or so of that request.

11 JUDGE SMITH: Is there anything not in camera?

12 Mr. Davis, we do not have the resources to enforce
13 the in camera. I would appreciate it if you would be re-
14 sponsible for assuring that the people in the room are either
15 signatories or your employees or that it is agreeable to you
16 that they be here. And if somebody could close and lock that
17 door in the corner, it would be helpful.

18 Off the record.

19 (Discussion off the record.)

20 MR. DAVIS: In regard to a housekeeping matter:
21 Every Intervenor who has shown an interest in being in the
22 in camera session has signed an agreement, so that part is
23 all right. I propose to Xerox the appropriate number of
24 copies and mail each of those individuals out a copy.

25 Mr. Thomas has not signed the proprietary

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1 agreement pursuant to the order yesterday. I would suggest
2 that the terms of the agreement, that everyone interested
3 in Intervenor has signed -- that it should be applicable to
4 have signed that.

5 MR. THOMAS: I have no problem with that.

6 JUDGE SMITH: Then you are under that direction.

7 MR. THOMAS: That was my understanding of your
8 order yesterday.

9 MR. DAVIS: Mr. Savage apparently will not be with
10 us here today.

11 MR. THOMAS: Certainly not during the in camera
12 session.

13 MR. DAVIS: Thank you.

14 MR. THOMAS: Judge, I really think that I can
15 begin. I think that most of the -- Do you have an objection?

16 MR. GALLO: I would have Fletcher up there.

17 MR. THOMAS: Okay.

18 MR. GALLO: Let's wait another five minutes.

19 JUDGE SMITH: All right.

20 (Whereupon, the open session was adjourned at
21 9:05 a.m. to resume at the close of the in camera
22 session.)

23 (In camera session, pages 6162 - 6203)
24
25

End open
session

1 OPEN SESSION RESUMED

2 (10:30 a.m.)

3 JUDGE SMITH: We are now in open session.

4 Mr. Gallo, this would be a good time for you to
5 go through the line of questioning I believe, if you care
6 to, concerning the testimony on 59.99.

7 MR. GALLO: I have other redirect. I assume
8 that the cross-examination of intervenors is not complete
9 yet.

10 JUDGE SMITH: Let's take our mid-morning break
11 of ten minutes.

12 (Whereupon, a recess was taken.)

13 JUDGE SMITH: You have additinal cross?

14 MR. THOMAS: Yes, Your Honor.

15 CROSS-EXAMINATION (Continued)

16 BY MR. THOMAS:

17 Q Mr. Butterfield, is there presently a water bypass
18 system installed at Byron that would allow operation of
19 the 70/30 split?

20 A (Witness Butterfield) No, sir. There is a feed-
21 water bypass system. It is not presently set up to handle
22 a 70/30 split.

23 Q So in order to operate at a 70/30 split, it would
24 require a structural modification of that system; is that
25 right?

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A That is correct.

Q What about qn 80/20 split, would it be able to accommodate an 80/20 split without structural modification, that is?

A I do not believe so.

Q But as I understand your testimony, it can accommodate a 90/10 split without structural modification, is that right?

A That is correct.

Q Then I would direct a question to perhaps Mr. Fletcher or Mr. Timmons, that is, has this modification for the tube vibration problem, that is the 90/10 flow split, as part of that modification has that been reviewed by Westinghouse in light of the proposed modification for the water hammer problem, and is there a conflict between those two modifications?

A (Witness Timmons) As part of the evaluation of the proposed modifications, Westinghouse has included considerations of the possible effects of that mode of operation on water hammer and has determined that it does not adversely affect the capability of the system to operate without significant water hammer.

The bypass system was originally put in to avoid potential for water hammer in the preheater and the steam

1 generator at very low flows and the system will continue
2 to be operated in that fashion for those flow conditions.

3 For the condition at higher powers and flows where
4 you could be bypassing feed through the quxiliary nozzle,
5 the water hammer evaluations indicate that there is no
6 concern relative to that mode of operation.

7 Q What kind of testing has been done in that regard?
8 Can you give us a little more background on that, on what
9 you base that conclusion?

10 A Testing in what regard?

11 Q That the 90/10 split will not contribute to
12 water hammer problems. Is that what you said?

13 A I said the 90/10 split will not contribute to water
14 hammer problems, and that is based on computer calculations
15 and the results of those computer calculations. I don't
16 exactly what tests were used as a basis for the original
17 inputs to those calculations.

18 Q Does the water hammer modification involve an
19 80/20 split of feedwater flow, or am I misreading the
20 water hammer modification?

21 A I am not sure what you are referring to.

22 Q I am referring in part to the prefiled testimony
23 of Robert Carlson of Westinghouse, and let me tender a
24 copy of that prefiled testimony to you, and then I would
25 pose that same question.

1 MR. THOMAS: I don't have copies of this at the
2 present time, although I can make copies.

3 Let me show this to you.

4 (Document handed to counsel.)

5 (Pause.)

6 MR. THOMAS: Let me correct the record, Judge.
7 This is an affidavit that was submitted by Robert Carlson
8 in support of allicant's motion for summary disposition
9 with regard to the water hammer contention. Of course,
10 Mr. Carlson did testify here on the water hammer issue,
11 but this is not in fact a copy of his testimony but his
12 affidavit.

13 I would ask the witness to review the question
14 and answer again, please.

15 MR. GALLO: Just a minute. There is a question,
16 Your Honor, as to whether the information in that affidavit,
17 particularly the question and answer that was referred to
18 Mr. Timmons to review, there is a question as to whether
19 or not that information is still current based on changed
20 circumstances since the affidavit was written.

21 I have with me Mr. Ken Green who is from
22 Sargent and Lundy and is responsible for the design of that
23 system because Sargent and Lundy handles the balance of
24 plant system. Perhaps if he could review that question
25 and answer, he might be able to advise me what the situation

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1 is unless of course the witness already knows.

2 Do you know?

3 WITNESS TIMMONS: That is just what I was going
4 to say. This particular question and answer describes how
5 the plant could operate in loading and unloading going from
6 full-power operation down to some power operation less than
7 20 percent. This describes the criteria that must be meant
8 in order to assure that you won't get water hammer, and
9 when you go below 20 percent power and 20 percent feed flow
10 and switching from all of the feed going into the main
11 nozzle to feed going into the auxiliary nozzle.

12 So that I believe that the plant will no longer
13 be operated in this mode since the feedwater preheater
14 bypass valve will now be continuously opened during the
15 power operations from zero power up through 100 percent
16 power. The circumstances have changed. I do not believe
17 that this particular question and answer on the operation
18 of the feedwater bypass system applies any longer.

19 BY MR. THOMAS:

20 Q At the time that that affidavit was filed, which
21 was admittedly over a year ago, at the time they identified,
22 Mr. Carlson does identify that as a criteria to deal with
23 water hammer. Can you tell me what has changed in that
24 regard between then and now?

25 A (Witness Timmons) This describes the criteria

1 from switching feed to the auxiliary nozzle to the main
2 nozzle when beginning to load the plant going from low
3 power to a higher power level. I believe that these
4 criteria would still apply.

5 MR. GALLO: Your Honor, I think that Mr. Timmons
6 is trying his best to answer the question, but he is being
7 taxed since it is an area that is not of his primary
8 concern.

9 I do have Mr. Green here who, if I could be
10 permitted, I could put him on the stand quickly and have
11 him sworn and quickly qualify him. He is well able to
12 answer the questions posed by counsel.

13 MR. THOMAS: I have no objection to that. My
14 main objective is to see if there is any contradiction or
15 why there is not if there is not.

16 JUDGE SMITH: Mr. Green, would you come forward,
17 please.

18 Whereupon,

19 KENNETH GREEN

20 was called as a witness, and having first been duly sworn,
21 was examined and testified as follows.

22 DIRECT EXAMINATION

23 BY MR. GALLO:

24 Q Would you state your full name and occupation
25 and professional affiliation for the record, please.

1 A (Witness Green) My name is Kenneth J. Green. I
2 am the Mechanical Project Engineer for Sargent and Lundy
3 Engineers. I am working on the Byron and Braidwood design
4 projects.

5 Q Have you testified previously in this proceeding?

6 A No, I have not.

7 Q Have you filed any affidavits in this proceeding?

8 A No, I have not.

9 JUDGE SMITH: Off the record.

10 (Discussion off the record.)

11 BY MR. GALLO:

12 Q Would you briefly state your educational background,
13 please.

14 A I hold a bachelor of science degree in mechanical
15 engineering from the University of Illinois and a master's
16 degree in engineering in mechanical engineering from Old
17 Dominion University.

18 Q Is that in Virginia?

19 A Yes, Norfolk, Virginia.

20 JUDGE SMITH: Mr. Green, I do not believe that
21 microphone is as sensitive as others. Would you be sure
22 that you speak closely.

23 WITNESS GREEN: All right.

24 BY MR. GALLO:

25 Q Would you state briefly your work experience since

1 graduation from college?

2 A Yes. I have worked four years in the Navy nuclear
3 design program for a private contractor, and I have now
4 worked about almost seven years for Sargent and Lundy in
5 nuclear design.

6 Q How long have you been working on the Byron station?

7 A Approximately two years.

8 Q Are you involved in the design of what is known
9 as the balance of plant for the Byron station?

10 A Yes, I am.

11 Q Can you explain what the balance of plant means?

12 A The balance of plant can be defined as those
13 systems in the station that are external to the Westinghouse
14 nuclear steam supply system, but those systems interface
15 with the nuclear steam supply system.

16 Q Is the feedwater bypass system such a system?

17 A Yes, it is.

18 Q Have you performed any design work with respect
19 to that system?

20 A Yes. I have been involved in several aspects
21 of the evaluation of the system, and to some extent redesign
22 of the system.

23 MR. GALLO: At this point, Your Honor, I believe
24 I have qualified the witness and he is available to respond
25 to counsel's questions.

CROSS-EXAMINATION

BY MR. THOMAS:

Q Have you been present during the testimony yesterday and today by the panel regarding the 90/10 flow split?

A (Witness Green) Yes, I have.

Q Are you familiar with the way that modification would work, the way it is proposed to work at Byron?

A Yes, I am.

Q Are you familiar with Robert Carlson's testimony regarding the proposed water hammer modification?

A I have seen it some time ago. I guess I have it in front of me now. I have not read it in a month or so.

JUDGE SMITH: The affidavit.

MR. THOMAS: Yes.

BY MR. THOMAS:

Q What you have in front of you now is an affidavit that Mr. Carlson submitted in I believe January of '82 in support of a summary disposition of a contingent.

Let me ask you to review question and answer 10 in that affidavit before I put any questions to you.

(Pause.)

Have you had an opportunity to review that?

A Yes.

Q The basic question is whether there is an inconsistency between the proposed tube vibration modification

1 as represented in Mr. Timmons' testimony and the proposed
2 water hammer modification?

3 A No, there really isn't. The misunderstanding I
4 think has arisen because of two different operating conditions,
5 a normal operating condition and a startup condition.

6 Mr. Carlson's testimony addressed the startup
7 condition. During the startup condition the flow will be
8 fully diverted to the upper nozzle initially.

9 In Item one of his answer when he refers to
10 switching to the main nozzle only when the criteria one
11 is satisfied, that a minimum feedwater flow rate of approxi-
12 mately 20 percent of the full power flow rate is provided,
13 what he means is that during startup as flow is increasing
14 the flow will be diverted up until 20 percent of the flow
15 is achieved, in which case the main feedwater system will
16 then be brought into operation and as flow continues to
17 increase, the main feedwater flow valves will be opened when
18 full flow is reached, 100 percent feedwater flow, the main
19 feedwater and bypass feedwater valves would be fully opened.

20 At that time a flow split of approximately 90/10,
21 actually slightly greater than 10 percent and slightly less
22 than 90 percent, a slightly greater than 10 percent flow
23 to the upper nozzle and slightly less than 90 percent flow
24 to the main nozzle would be achieved.

1 Q If you know, would that flow split cause any
2 problems with regard to water hammer?

3 A No. It would not affect the water hammer system.

4 Q As I understand the panel testimony with regard
5 to the proposed tube vibration modification at full power,
6 the feedwater bypass system at Byron to accommodate 10
7 percent of the full power flow will be fully opened. If
8 that is the case, how can you get 20 percent through it at
9 low power?

10 A Because at the point where you are achieving 20
11 percent flow through the bypass, you have the main feedwater
12 nozzle completely closed; in other words, the valve -- there
13 is a valve in between the junction of the bypass line and
14 the main feedwater nozzle. When that valve is fully closed,
15 it is possible to achieve up to 20 percent flow through the
16 bypass line because all of the flow will be channeled in
17 that direction.

18 Q So are you saying at the low power conditions the
19 feedwater system pressure upstream of the control valve
20 is higher?

21 A Well, if you mean -- what do you mean by "control
22 valve"? Which valves are you -- are you referring to the
23 main feedwater isolation valve?

24 Q The bypass control valve.

25 A Yes, you would have a higher delta p across the

1 bypass system at that point.

2 Q And the higher delta p is then what accounts for
3 the additional 10 percent flow?

4 A It is not an additional 10 percent flow. If I
5 recall the results of the calculation correctly, we would
6 anticipate a maximum flow of 12 to 13 percent through the
7 upper nozzle with all valves open. There is an additional
8 tampering line that is a small line that also provides flow
9 to the upper nozzle which can be used to provide more flow.

10 Q Is that what makes up the 8 percent, the
11 approximate 8 percent difference?

12 A No. No, the approximate 8 percent difference
13 comes from the difference in the flow conditions, the
14 pressure differentials.

15 JUDGE COLE: I don't understand what the 13 or
16 14 percent is that you mentioned.

17 WITNESS GREEN: That is 12 to 13 percent. We
18 did a hydraulic calculation to determine what was the
19 maximum flow possible to achieve in the upper nozzle,
20 what percentage of the flow.

21 JUDGE COLE: Under what conditions in the
22 feedwater flow, though?

23 WITNESS GREEN: 100 percent main feedwater flow,
24 all valves in the system fully opened.

25 JUDGE COLE: 100 percent total flow, all valves

1 totally open.

2 WITNESS GREEN: Something between 12 and 13
3 percent would be diverted and flowed to the upper feedwater
4 nozzle.

5 JUDGE COLE: So the balance then going to the
6 main feedwater?

7 WITNESS GREEN: That is correct.

8 JUDGE COLE: The conditions under which you
9 achieved 20, you shut off the main feedwater flow and
10 then just put up with a greater head loss through that other
11 system in order to get 20 percent through?

12 WITNESS GREEN: That is correct.

13 JUDGE COLE: Is there any additional pumping or
14 anything, or is it just the same pumping system?

15 WITNESS GREEN: It is the same pump.

16 JUDGE COLE: You just get a greater head loss
17 through the system?

18 WITNESS GREEN: That is correct.

19 (Pause.)

20 BY MR. THOMAS:

21 Q At the present time, do the same criteria still
22 apply for the water hammer modification that are represented
23 in Mr. Carlson's affidavit, July '82 affidavit? Do you
24 want to look at it again?

25 A (Witness Green) Yes, if I could.

1 Yes, the five criteria in the response to question
2 10 would still apply.

3 MR. THOMAS: I suppose we better make that a
4 part of the record at this point or ask him to read the
5 five criteria into the record, whichever would be easier.

6 JUDGE SMITH: Yes. Otherwise, the answer does
7 not have much value.

8 MR. THOMAS: Why don't we have him read it?
9 It is not a long -- why don't we ask him to read that
10 question and answer into the record.

11 JUDGE SMITH: Any objection?

12 (No response.)

13 JUDGE SMITH: All right, Mr. Green.

14 WITNESS GREEN: The question was: "Can you
15 please describe how the feedwater bypass system at the Byron
16 Station will operate?"

17 The answer is: "The feedwater bypass system,
18 as implemented at the Byron Station, will automatically
19 determine which nozzle, main or auxiliary, is used in
20 supplying feedwater to the steam generator. During the
21 plant loading operation, the system will automatically
22 switch feeding from the auxiliary to the main nozzle only
23 when the following criteria are satisfied: one, a minimum
24 feedwater flow rate of approximately 20 percent of the full
25 power flow rate is provided; two, the feedwater temperature

1 as measured at the low points in the main feedwater piping
2 is 250 degrees Fahrenheit or higher; three, the section
3 of main feedwater piping between the bypass line branch
4 point, point A Figure 3, and the main feedwater nozzle
5 has been purged of cold water; four, the steam generator
6 pressure is greater than 700 psia; five, the steam
7 generator water level is within a specified range.

8 "The fact that all five criteria must be
9 satisfied before feedwater is introduced through the main
10 nozzle makes it extremely unlikely that cold water will
11 be introduced through the main nozzle.

12 "When the plant is being unloaded, the feedwater
13 flow is automatically switched from the main to the
14 auxiliary nozzle. When the flow rate drops to slightly
15 below the value for loading. This will prevent flipflopping
16 of the flow between the main and auxiliary nozzles by the
17 control system."

18 That answer is still correct. I might add one
19 clarification. A major difference in the operation of this
20 system would be that the bypass valve, which now is
21 automatically controlled closed when the main valve opens,
22 is -- it was controlled to close when the main valve opens.
23 It now will be left open even when the main valve opens to
24 ensure the greater than 10 percent bypass flow under all
25 conditions.

1 BY MR. THOMAS:

2 Q Has this feedwater preheater bypass valve been
3 tested by means of accelerated aging tests to determine
4 that it could function in the fully open position for the
5 entire design life for the plant? That would be directed
6 to anybody on the panel who would answer the question.

7 MR. GALLO: May I have the question back, please?

8 (The reporter read the record as requested.)

9 MR. GALLO: I object to the question. I believe
10 it assumes -- there are two infirmities with the question --
11 it assumes facts not in evidence. These accelerated aging
12 tests, it assumes that that test is relevant to testing
13 this particular valve.

14 Secondly, and perhaps more importantly, the
15 question goes to the environmental qualification of the
16 valve itself, which is really an issue outside the scope
17 of either the water hammer issue or the steam generator
18 tube integrity issue. It was the subject of one contention
19 that was ultimately dropped by stipulation by the parties.

20 It seems to me that the question is beyond the
21 scope of any of these witnesses' testimony and indeed any
22 of the issues before us.

23 JUDGE SMITH: Doesn't the modification depend
24 upon the valve being open, and isn't that an essential part
25 of the modification?

1 MR. GALLO: I think that is correct. That is
2 my understanding. Yes, that is correct. I have yet to
3 see any tie between the question asked and the ability of
4 this valve to stay open under the circumstances that the
5 modification seems to indicate.

6 MR. THOMAS: I have no problems with asking if
7 there are any tests, with the foundation question that he
8 posited, but I don't understand the statement that he just
9 made about not being any tie. My understanding is that
10 this valve is going to have to function in the fully open
11 position throughout the life of the plant.

12 JUDGE SMITH: Because of the modification, and
13 it otherwise would not have to.

14 MR. THOMAS: Right.

15 JUDGE SMITH: It seems the nexus to the issue.

16 MR. GALLO: Given that clarification, I would
17 agree that there is a connection and that the question is
18 relevant. But the real question seems to me ought to be
19 how do we know that this valve is going to stay open, not
20 whether this particular test has or has not been conducted.
21 It seems to me there is no record basis for such a question.

22 JUDGE SMITH: I think that may be a more direct
23 way to approach it, but I think he should have this
24 question on cross-examination to approach it reasonably in
25 the manner he selects, so if any aspect of the objection

1 that remains which I am not clear about is overruled.

2 BY MR. THOMAS:

3 Q Does anybody remember the question?

4 A (Witness Green) I think I can answer that.

5 The valve will remain in the open position. The only time
6 the valve would be closed would be during a maintenance
7 type operation. And therefore, we would not identify any
8 failure mode of this valve that would cause this valve to
9 close, and closing is the only way that it would not
10 fulfill its function.

11 Q Yes. But the question was whether there had
12 been any tests to determine that the system can function
13 over the entire life of the plant with the valve in a
14 fully open position.

15 JUDGE SMITH: Specifically, accelerated age
16 qualification tests, was the original question. Wasn't it?

17 MR. THOMAS: Right. As an example of a type of
18 test.

19 MR. GALLO: It is not of a system, it is of a
20 valve.

21 JUDGE SMITH: Of a valve.

22 WITNESS GREEN: The valve would now be considered
23 a passive component of the system under the current
24 requirements for qualifications of mechanical systems and
25 what is called pump and valve operability. There is no

1 requirement for passive valves to show that they can
2 function otherwise than to show that they can retain their
3 pressure integrity. And that has been demonstrated.

4 JUDGE SMITH: And their pressure integrity has
5 been demonstrated?

6 WITNESS GREEN: Yes, it is an ASME component that
7 meets the requirements for the system.

8 JUDGE SMITH: Over life of the plant?

9 WITNESS GREEN: That is true.

10 BY MR. THOMAS:

11 Q Given the necessity for valve to remain fully
12 open for this modification to function, what would advise
13 the operator if the valve closed?

14 A (Witness Green) There will be a flow indication
15 in the bypass line, and the flow indication would drop
16 naturally if the valve began to close.

17 Q Is that the flow meter?

18 A The flow meter is one term you could use, yes.

19 Q Has this flow meter been thoroughly qualified
20 for this service?

21 A At this point I am not aware of what particular
22 instrument we are using, so I cannot answer that.

23 Q Do you know how often this flow meter will be
24 inspected?

25 A No, I do not.

1 JUDGE SMITH: What is the relevance? It does
2 not seem to be a safety issue. We are talking about long-
3 term tube wear for flow-induced vibration. Let's assume
4 the worst case that you are addressing right now.

5 MR. THOMAS: Right. Where the system -- where
6 the valve closes. So we are getting 100 percent flow through
7 the main nozzle. You are saying what difference will that
8 make because they would pick up any tube degradation long
9 before it became of safety significance?

10 JUDGE SMITH: You are talking about minutes,
11 aren't you?

12 MR. THOMAS: Compared to years.

13 JUDGE SMITH: Yes.

14 MR. THOMAS: I have done a pretty job of
15 objecting to my own question.

16 (Laughter.)

17 MR. THOMAS: I believe I just have a few more
18 questions on the scale model tests and then I will be
19 finished.

20 BY MR. THOMAS:

21 Q Mr. Timmons, on page 19 of your testimony,
22 referring to the first three sentences of the first para-
23 graph on that page, I may have asked you this yesterday,
24 but just to put this in context, were strain gauges
25 or accelerometers used to measure vibration in the

1 full-scale model?

2 A (Witness Timmons) In the full-scale model and
3 the 16-degree model, we used accelerometers to measure
4 vibration.

5 Q Referring to the last sentence of that same
6 paragraph, where you indicate that the 16-degree model --
7 excuse me -- the 16-degree full-scale model, like the SSPB
8 model, was used to test various tube support plate inter-
9 actions under varying inlet flow velocities and distribu-
10 tions. I would like to ask you, does that statement mean
11 that you changed the tube support plate clearances as well
12 as the flow velocities?

13 A That is correct.

14 Q I think the last matter I have is yesterday,
15 Mr. Timmons, I think you indicated that the fact that no
16 structural modification would be required under a 90/10
17 flow split at Byron, you said that that had some input
18 into the recommendation, the final Westinghouse recommenda-
19 tion for modification. And I was interested in some
20 specifics on that statement.

21 First of all, when did that input take place?

22 A The formulation of the type of modification,
23 the extent of modification necessary for plants such as
24 Byron or plants such as Krsko took place over a period
25 of time starting September-October of 1982 and extending

1 through the end of January of 1983 and into the first week
2 or two or three.

3 In February of 1983 the modification concepts
4 that were looked at included utilizing only feed bypass to
5 effect the reduction vibration or utilizing only tube
6 expansion. And Westinghouse came to the conclusion, in
7 order to have a modification that was sufficient to
8 reduce the vibrations to a lower level, that a combination
9 of the two would be necessary for sufficiency. It was
10 determined that at least 10 percent bypass would be needed
11 for plants that had slow rates for four-loop plants and at
12 least 20 percent bypass would be needed for two-loop and
13 three-loop plants with D4, D5 steam generators.

14 Based on those inputs, the fact that the vibration
15 levels had been sufficiently reduced, that the tube
16 vibrations would be expected to result in wear of less than
17 40 percent over the lifetime of the plant, and it was
18 decided that it was not necessary to increase the amount
19 of bypass to say 20 percent or 25 percent or to 30 percent
20 such as had been done at Krsko.

21 Since we had made the modification for Krsko
22 earlier in 1982, we started out with 30 percent bypass as
23 a possible solution and then backed off as the efficacy
24 of the tube expansion became clear, and were able to
25 optimize on something that required both tube expansion

1 and bypass where neither one was quite sufficient.

2 Q Commanche Peak, what are the units at -- are
3 they D4?

4 A Commanche Peak has D4. Unit 2 has D5.

5 Q It is like Byron in that regard?

6 A Correct.

7 Q And what is the modification for Commanche Peak?

8 A The essential modification at Commanche Peak,
9 the recommendation is essentially the same: that they
10 bypass 10 percent of their feed and they expand approximately
11 100 tubes.

12 Q Are there any differences in the recommendation
13 for Commanche Peak vis-a-vis Byron?

14 A The recommendation is the same. The plant-
15 specific things that need to be done to implement that are
16 different because their feed system is different.

17 Q Are the 100 tubes the same, the 100 candidate
18 tubes?

19 A The same tubes.

20 Q Did Westinghouse ever receive from Commonwealth
21 Edison or otherwise take into account the dollar figure that
22 it would cost to make a structural modification to provide
23 an 80/20 split or a 70/30 split?

24 A I think Westinghouse had made estimates on their
25 own of the costs that might be incurred if you were to --

1 have to use different flow splits.

2 Q And what would the estimates of the modification
3 cost?

4 A Cost information is proprietary. The cost varies
5 with the amount of bypass and the extent of the modifica-
6 tions that are necessary to achieve a varying flow split.

7 Q Can you give us some ranges without giving us
8 absolute figures, just some ballpark --

9 A If you go to an 80/20 split, you have to increase
10 the resistance in the main feedline by installing either
11 a different valve or an orifice or something like that.
12 You go out and buy an 18-inch orifice and install it, it
13 costs hundreds of thousands of dollars. You also have
14 to change the valves and decrease the flow resistance in
15 the feed bypass line, and it depends on what type of
16 system you have installed, what kind of valves you have
17 and what the flow resistance is in that line.

18 It may result in small charge to something
19 that might be in the hundreds of thousands of dollars,
20 maybe a million dollars or something.

21 Q What about a 70/30?

22 A 70/30, you would probably have to install new
23 piping, install some kind of a flow restricter or flow
24 resistance device in the main feedline. You are probably
25 talking in the order of the same costs as for an 80/20.

1 You also have to worry about further complicating
2 the operation of the system, making it difficult for the
3 operators to operate the plant.

4 JUDGE SMITH: By an 80/20 or a 70/30 modifica-
5 tion, is that your reference?

6 WITNESS TIMMONS: Yes.

7 MR. THOMAS: Your Honor, that is all the
8 questions I have of the panel at this point. Thank you.

9 JUDGE SMITH: Mr. Goldberg.

10 MR. GOLDBERG: Yes, Judge. I had a handful
11 of prepared questions for Mr. Timmons, which I no longer
12 have, but do have one or two follow-up questions for him.
13 And I do have some limited prepared questions for
14 Mr. Hitchler which I can have distributed to the Board now.

end 10

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CROSS-EXAMINATION

BY MR. GOLDBERG:

Q Mr. Timmons, I believe you testified on Monday that there are 4,694 tubes in each steam generator, is that correct?

A (Witness Timmons) That is an D2 or D3 generator.

Q How about D5?

A D5 has 4,580.

Q And you have testified that upwards to 100 tubes are proposed to be expanded as part of the tube vibration modification at Byron; is that correct?

A That is correct.

Q I presume that you have determined that those tubes are most susceptible to tube vibration, is that correct?

A Those tubes are the tubes that have indicated the highest vibration levels from either accelerometer data from Krsko or else from testifying information from our scale model tests.

Q If wonder if you can tell me with the proposed modification for Byron in place, that is approximately 100 tubes expanded and the 90/10 feedwater flow regime, whether the tubes that are most susceptible to the effects of flow induced vibration -- let me start the question over again.

We have identified approximately 100 tubes that are most susceptible to tube vibration. Would the effect

11-2

1 on those tubes after the proposed Byron modification, namely,
2 their expansion plus the 90/10 flow regime be less than
3 if the tubes were not expanded and we had the Krsko 70/30
4 flow regime?

5 A Just a second.

6 (Pause.)

7 For the tubes most susceptible to vibration,
8 the vibration levels with the tube expansion and 90/10 flows
9 in place would be significantly less than those vibrational
10 levels that exist at Byron for the same tubes at a 70/30
11 split with no tube expansion.

12 Q That was my question. Thank you.

13 Finally, we have talked about the proposed modifi-
14 cation. I wonder if you can tell me with what degree of
15 certainty Westinghouse has that that will in fact be the
16 proposed modification for implementation at Byron?

17 A It is my understanding that Westinhouse fully
18 intends to implement that modification at Byron. I have
19 no indications from my contacts with the engineering and
20 project management people at Westinghouse that any other
21 modification or any other recommendation will be made.

22 Q Mr. Hitchler, I would like to direct your attention
23 to page 8 of your testimony, the first full paragraph which
24 comprises the final paragraph answer to question 8. Do
25 you have that in front of you?

1 A (Witness Hitchler) Yes.

2 Q Reading from that I see "Moreover, tube rupture
3 events are predicated to result in severe core damage and
4 at frequencies of ten to the minus seven per year for the
5 Byron station."

6 I wonder if you can tell me how you arrived at
7 that number?

8 A The number represents the summation of all tube
9 rupture events and combined consequences. In other words,
10 that number includes events such as LOCAs and combined
11 tube ruptures, steam breaks, tube ruptures and also tube
12 ruptures as single or multiple events as initiators by
13 themselves.

14 So I am dealing with those kinds of events now
15 and have used an event tree technique. It is standard format
16 that you have seen in NUREG 2300 and also a fault tree type
17 techniques to develop modal probabilities within the event
18 trees in coming up with a total frequency prediction for
19 the core damage from all events that have tube ruptures
20 also involved with them.

21 Q Was any credit taken for operator action in your
22 evaluation of the frequency probability?

23 A Credit for correct operation and also debits for
24 incorrect actions.

25 Q I would like to turn your attention to page 4,

1 answer 4 describing the purpose of your testimony, please.

2 You state in answer 4 that you are addressing
3 aspects of the steam generator contentions concerning tube
4 ruptures both during normal operation and under accident
5 conditions such as main steamline breaks and loss of coolant
6 accidents; is that correct?

7 A That is correct.

8 Q Do you know whether or not there are any procedures
9 at Byron to enable operators to deal with these types of
10 accidents?

11 A Recommendations have been made through the
12 Westinghouse Owners Group for the development of Byron's
13 specific procedures in particular in dealing with the main
14 steamline break type of events.

15 Q I believe it was either you or Mr. Butterfield
16 yesterday who discussed the emergency operating procedures
17 proposed generically by Westinghouse and expected to be
18 adopted for implementation at Byron; is that correct?

19 Do you have anything to add, Mr. Butterfield,
20 about the operator guidelines that will be utilized at
21 Byron to respond or to deal with the kinds of accidents
22 that Mr. Hitchler identifies in his testimony?

23 MR. THOMAS: I object. Two questions were
24 pur there. One was asked, and I guess answered by
25 Mr. Goldberg, and then he went on to put the next question

1 about adding something.

2 I would object to the compound nature of that
3 question.

4 MR. GOLDBERG: I can rephrase the question.

5 BY MR. GOLDBERG:

6 Q Do you recall the question I just posed to
7 Mr. Hitchler about the existence of operating procedures
8 to respond to the accidents he identifies in answer 4 of
9 his testimony?

10 A (Witness Butterfield) Yes, sir.

11 Q You testified yesterday about the translation
12 of the Westinghouse generic emergency operating guidelines
13 into Byron specific emergency operating guidelines, is that
14 correct?

15 A Yes, sir.

16 Q I wonder if you can tell me whether or not there
17 will be operator training or guidelines, emergency operating
18 guidelines or procedures in place at Byron to enable operators
19 to respond to these types of accidents?

20 A Yes, there will be. In a generic sense I can
21 say that there definitely will be to cover all of the
22 accidents that have been evaluated through the Westinghouse
23 Owners Group Procedures Subcommittee.

24 I do not have a list of the specific titles of
25 those, but they do include main steamline breaks, they

11-6

1 include LOCAs, I believe single and multiple steam generator
2 tube ruptures and all of those types of transients and
3 accidents.

4 Let me go back a little bit. After Three Mile
5 Island and the concern for improved procedures, the
6 Westinghouse Owners Groups undertook a generic development
7 of new guidelines to cover all emergency operating procedures,
8 as did other vendors.

9 These generic guidelines, as I indicated, have
10 been submitted to the NRC for approval, and as approved
11 have been distributed and when approved will be implemented
12 by the utilities. We are in the process of doing that
13 at not only Byron but all of our PWR stations as is the
14 industry.

15 This program is a very significant program and
16 includes not only the training groups at the stations, but
17 also the corporate training center to develop the same types
18 of procedures for our new simulators. So this will be all-
19 encompassing emergency operating procedure program based
20 on the latest technical developments and procedures and
21 are modeled after the generic guidelines provided by the
22 Westinghouse Owners Group and implemented through additional
23 training criteria provided by the Institute for Nuclear
24 Power Operations. So it is a total coordinated effort to
25 address all postulated transients and accidents.

1 MR. GOLDBERG: No further questions.

2 (Board conferring.)

3 EXAMINATION BY THE BOARD

4 BY JUDGE COLE:

5 Q Mr. Hitchler, in your testimony on page 5 you
6 provide some statistics for the frequency of single-tube
7 ruptures, multiple-tube ruptures. By my calculations,
8 you are predicting a single-tube rupture would occur at
9 about once every 33 years at the Byron plant. Is that
10 your understanding also, sir?

11 A (Witness Hitchler) Approximately. Yes.

12 Q I understand that the basis for that number was
13 a study of the history of steam generator tube ruptures
14 in existing plants. Did you then attach any range and
15 confidence limits to this once-every-33-years? Did you
16 make those calculations, sir?

17 A Yes, I have.

18 Q Could you provide those in summary form or read
19 them off?

20 MR. GALLO: Take your time.

21 (Pause.)

22 WITNESS HITCHLER: The uncertainty is with
23 respect to the range factor. The range factor, I would say,
24 is approximately 2.5.

25

1 BY JUDGE COLE:

2 Q What confidence limit is that, sir?

3 A (Witness Hitchler) That would get us to
4 approximately 80 percent. And including the uncertainties,
5 I would say in the model, for example, I stated there is
6 a linearity assumed in the degradation model. So therefore
7 I have also applied another factor of 2 for uncertainties.
8 I feel a total range factor of 5 on the values I have
9 provided with respect to the tube degradation portion gives
10 us an uncertainty or confidence level of 90 percent.

11 Q All right, sir. Thank you. On page 6, towards
12 the latter part of that page, the third line from the
13 bottom, where the sentence begins on the fifth line from the
14 bottom, "However, numerous events have been defined as
15 being at the design-basis limit."

16 Sir, your use of the term "design-basis limit"
17 there, are you saying that that is the same thing as what
18 you would consider to be the acceptable return period for
19 design-basis accidents? Is that the context in which you
20 are using that?

21 A No. The context I am using here is to show
22 examples of what things we have designed being at that
23 limit. I recognize there are a number of events that have
24 traditional or historical bases, and that is why the
25 analysis is performed. There are numbers in such as the SSE,

1 there are others to say this is the limit to which we
2 will design against certain recurring events.

3 Q So it is the return period of those kinds of
4 events that you are referring to there?

5 A Yes.

6 Q All right, sir. Thank you.

7 A I just recalled one other factor. Excuse me,
8 Your Honor. Another component in the confidence levels
9 used in that calculation of initiating events is with
10 respect to what confidence level I would use. Another
11 factor with respect to the uncertainties in the confidence
12 levels is your prediction that you are using on the
13 initiating event frequencies. In that case, we are dealing
14 with a large-break LOCA and the steam break frequencies.
15 The values that I used in the calculation of the frequencies
16 stated for the combined events are all mean values, and those
17 values have approximately an 80 percent confidence level.

18 Q All right, sir. Thank you. That is helpful.

19 Mr. Timmons, just a couple of questions for you.
20 On page 19, at the top of that page, you refer to the
21 16-inch full-scale model, indicating that it was used to
22 replicate in the laboratory the tube vibration responses
23 observed in operating steam generators.

24 I believe you answered this at least partially, but
25 my question is, sir, did it in fact replicate the tube

1 vibration responses observed in operating generators, and
2 what is your basis for saying that it did replicate those,
3 sir?

4 A (Witness Timmons) In the 16-degree model, we
5 have the capability to vary the tube to support plate
6 conditions so as to set up the vibration frequencies and
7 levels in the tubes in the model. We then took this
8 capability and achieved vibrational levels and frequencies
9 and characteristics in the model which were representative
10 of those that we had from data from the 12 tubes that had
11 been instrumented in the Krsko steam generators over the
12 period of the last year. So that by comparing the
13 frequency response and the vibration levels from Krsko
14 to the frequency response and vibrational levels in the
15 16-degree model, we were able to obtain excellent agreement
16 between the two, and we feel that we have been able to
17 replicate in the 16-degree model the vibration response
18 observed in the Krsko steam generators.

19 Q At different flow levels also?

20 A Yes.

21 Q I referred to it erroneously as the "16-inch
22 model," and of course, it is a 16-degree model. But can
23 you tell me why it is called the 16-degree model?

24 A The model consists of, if you refer to Figure 5
25 in my testimony, the model consists of half of the preheat

1 section. That is a 90 degree arc of the preheater split
2 along the center of the T-slot for the elevations between
3 the simulated tube sheet and the top of the D baffle or the
4 top of the inlet pass baffle. The tubes are represented
5 for the entire steam generator for the section of tubes
6 from the centerline out to I think it is about 16 tubes
7 wide. The tubes are full length and extend all the way up
8 to the top of baffle L, which would be above the top of
9 the preheater section. And those tubes have all of the
10 flow passes and the equivalent amount of flow for that
11 pass and the equivalent pass flow velocities represented
12 so that those tubes have all of the appropriate vibrational
13 characteristics over the entire range of the tube.

14 Q I guess I still do not understand where the term
15 "16 degrees" comes from.

16 A 16 tubes wide represents the circumferential arc
17 extent of 16 degrees of the circumferential arc extent of
18 the steam generator.

end 12

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1 Q The bottom part of page 19, the last sentence
2 say "Testing to optimize concepts and to obtain data on
3 performance will be completed in the second quarter of '83."
4 What is the status on that and do you expect any of those
5 results to change anything that you have said?

6 A Much of the testing is substantially complete.
7 We have a few tests that are currently ongoing to finalize
8 the locations of all of the tubes to be expanded.

9 We expect to have that data available for our
10 internal design review. I think I indicated it was on
11 May 12th and 13th. Data that has come in to date does
12 not indicate that there would be any change in our
13 recommendatios or in the proposed modifications, other than
14 perhaps the final number of tubes and the final locations
15 of the tubes to be expanded.

16 Q All right, sir, thank you.

17 On page 20 you indicate seven or eight lines
18 that the gap elements can be offset to simulate various
19 support conditions. I just had trouble visualizing how
20 that would be accomplished, sir. Could you explain that
21 sentence tome?

22 A This is a computer analytical model utilizing
23 in essence a stick or a line to represent the tube and
24 a circle gap element to represent the support plate hole.

25 Q So this was not a field setup. This was a

13-2

1 simulated experience?

2 A It is a simulated experiment.

3 Q Thank you. Just one or two further questions.

4 Is it safe to say that the flow induced vibration
5 problem is to peculiar to the preheating section and can
6 be considered to be isolated there?

7 A Yes, sir.

8 Q What is the purpose of the preheater section?

9 A In the evolution of steam generator designs it
10 became desirous to increase the efficiency of the steam
11 generator and installing a preheater allows you to increase
12 the efficiency by preheating the water that comes into
13 the steam generator before it goes into the major portion
14 of the bundle, so as to allow you to get more power out
15 of a steam generator of the same dimensions. So the pre-
16 heater is installed for purposes of economy and efficiency.

17 Q So you designed an environment inside the preheater
18 that provided for turbulence and rapid interchange of energy
19 from the tubes to the incoming water?

20 A The baffle plates are designed to allow the flow
21 to pass by all of the tubes and to pick up temperature and
22 energy as they do so and to pass by the tubes several
23 times in order to be able to more efficiently use the
24 temperature available in the primary coolant.

25 Q So by virtue of the purpose and the way it had

13-3

1 to be accomplished, the flow induced vibration just happened
2 to be an undesirable result of that effort. Is that safe
3 to say?

4 A Yes, sir.

5 Q This would also be the place where you would have
6 the maximum driving force for heat transfer, would it not,
7 sir, or is that just the other end?

8 A In the steam generator the temperature differential
9 is about, or I guess it is, incoming feedwater is normally
10 about 450 degrees and the cold leg temperature is about
11 550. So you have about 110 degrees temperature differential
12 in the preheater. You would have a higher differential
13 if you put the water into the hot leg side.

14 Q I did not know what leg it was coming in.

15 A The cold leg side in terms of thermal hydraulics,
16 that gives you a higher efficiency to take the last bit
17 of energy out of the cold leg side as opposed to the hot
18 leg side.

19 Q One last question concerning what has been described
20 as the 90/10 split.

21 Mr. Green, the system if it is going to be operated
22 with just the valves open, the split would actually be 87
23 or 88 into the main feedwater nozzle and 12 or 13 percent
24 through the auxiliary feedwater nozzle; is that correct?
25 Do you know if that is the way the system is planned to

13-4

1 operated?

2 A (Witness Green) That is what our calculations show
3 and that is the way we plan to operate this system.

4 Q So that 90/10 was just an approximation and in
5 actuality they will probably be operating at a different
6 split not significantly different or is it significantly
7 different in your opinion?

8 A (Witness Timmons) It is not significantly different.
9 The recommendation is that you have at least 10 percent
10 of the feedwater going to the auxiliary nozzle. They will
11 have met that recommendation by providing more feedwater
12 going to the auxiliary nozzle.

13 JUDGE COLE: I have no further questions.

14 JUDGE SMITH: We will break for lunch and return
15 at 1:15.

16 (Whereupon, at 11.58 a.m., the hearing recessed,
17 to reconvene at 1.15 p.m. the same day.)
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AFTERNOON SESSION

(1:15 p.m.)

JUDGE SMITH: On the record.

Whereupon,

JOHN BLOMGREN

LAWRENCE BUTTERFIELD

THOMAS TIMMONS

WILSON FLETCHER

MICHAEL HITCHLER

KENNETH GREEN

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

EXAMINATION BY THE BOARD -- Resumed

BY JUDGE CALLIHAN:

Q Mr. Timmons, I want to go back to a point discussed on your Attachment 5, which you told me yesterday was in the plan. Can you roughly locate the correspondence on your Attachment 5 of your 16-degree mockup? Maybe the interception of a wrapper with a column number or a row number might suffice.

This does not have to be accurate, not even precise, for that matter. Can you give me an idea, please?

A (Witness Timmons) The 16-degree model represents approximately half of this picture or half of the picture. If you removed the section of the picture starting between

1 columns 57 and 58, which is the centerline of the representa-
2 tion of the tube bundle, then the upper portion would be
3 represented from the area between columns 57 and 58 all the
4 way out through column 1.

5 The wrapper is represented, and there is a
6 plate at the centerline that would represent the back of
7 the model. All of the tubes in that section are represented
8 through the first pass through 16 rows of tubes. So it
9 would be from column 40 to column 56. I represented full
10 length up to baffle L.

11 Q It does include the T-slot?

12 A Yes, it does.

13 Q Looking further at your attachments -- and I
14 will choose, and you can correct me if my choice is
15 incorrect -- I will choose Attachment Number 1, Attachment
16 Number 4, and Attachment Number 5. I would like to get
17 these tied together somehow.

18 For example, since 5 is a horizontal section,
19 about where does it fit on Number 1, Attachment Number 1?

20 A Attachment 5 would represent the cold leg side
21 of the steam generator from the centerline of the steam
22 generator out to the wrapper.

23 Q At about what elevation?

24 A Any elevation. It would represent either the
25 tube sheet or baffle support plate.

1 Q Thank you. Therefore, the designations on
2 Attachment 5 of "nozzle" and "manway" are not really
3 definitive, are not important that they be representative
4 of something?

5 A In the picture in Attachment 1, the tube
6 divider plate which divides the channel head of the steam
7 generator hot and cold leg sides is not represented in the
8 -- this is more an artist's rendition than an actual slice
9 of the steam generator.

10 Q So it says generally that the lower manway, I
11 presume, is somewhere off to the left of Attachment Number 5.
12 It is not necessarily in the plane of Number 5?

13 A That is correct.

14 Q And I think you said yesterday that the nozzle
15 designation on 5 is a primary side nozzle; correct?

16 A That is correct.

17 Q Looking back at Number 1, about where is that
18 nozzle?

19 A The reactor coolant system nozzle or the feedwater
20 nozzle?

21 Q Whichever nozzle appears on Number 5.

22 A It is represented in the lower left-hand portion.
23 It says "coolant inlet." That is the primary side nozzle.
24 There is a nozzle in a manway on each side of the divider
25 plate, one in the hot leg side and one on the cold leg side.

1 A (Witness Butterfield) If I could add a statement
2 here. This nomenclature is consistent with all of the
3 types of maps that are used in work on the steam generators.
4 When you are working on them, you normally start with a
5 reference point, say, row 1, column 1, and the only way
6 you can continually discuss this intelligently is to know
7 its relationship to the nozzle. So we use the terminology
8 the "manway and the nozzle" on any one of our maps at any
9 time in order to keep our reference points clear.

10 Q There is a small indication that the nozzle and
11 the manway were in the plane. It was that which I wished
12 to clarify. Thank you for doing so.

13 If we can look again at Attachment 1 and Attachment
14 4, how does Attachment 4 fit into the schematic of Attachment
15 1, or where does it fit?

16 A Attachment 4 represents the area -- half of
17 Attachment 4 represents the area that is cross-hatched on
18 Attachment 1. And the left-hand half of Attachment 4
19 represents the baffles and support plates that are shown
20 on the left-hand of Attachment 1.

21 Q I think you told me yesterday that the steam
22 generator centerline is in the middle of Attachment 4.

23 A That is correct.

24 Q And the second vertical line from the left and
25 right, respectively -- I am sorry, I don't wish to say

1 that. The double line, the third and fourth lines from
2 the right and left, respectively, are the wrapper?

3 A That is correct.

4 Q And in Attachment 1, where is the wrapper, or
5 is it shown?

6 A It is shown. The third line in from either side.
7 And it is kind of difficult to pick up.

8 Q All right. Thank you. Is the flow on the
9 secondary side of the steam generator turbulent?

10 A In general. It has measures of turbulence as
11 it goes between the tubes and also upward. It starts out
12 subcooled near the bottom of the steam generator and becomes
13 less subcooled to the point where it includes large measure
14 of steam or froth or bubbly flow towards the top of the
15 steam generator.

16 Q One of you -- perhaps you, Mr. Timmons, and
17 let me say generally you can pick these up as you wish --
18 one of you commented on improved -- I hope I am not quoting
19 out of context -- an improved method of eddy current
20 testing. When is that effective? Is it something quite
21 recent? And let me put that in context. Mr. Malinowski
22 and I discussed eddy current testing rather generously two
23 or three weeks ago. And is the new method to which now
24 you refer something since then, or is it likely that he
25 included it in his discussion?

1 A (Witness Fletcher) Judge, the eddy current
2 techniques that are presently being utilized are improved
3 over those that were utilized a number of years ago.
4 Principally, the use of multifrequency eddy current and
5 the electronic analysis of the data from such multifrequency
6 work that has been in use since 1978-79 and has been found
7 to be quite effective and much more effective than that
8 technique used before that time, which was a single-frequency
9 eddy current technique.

10 With the multifrequency, you are able to diagnose
11 the signals in much better fashion to eliminate those
12 unimportant contributions to the lissajous pattern and
13 get right to the heart of determining whether or not the
14 tube has integrity or not.

15 Q That method, does it not, then allow separating
16 out the support plates, for example?

17 A Yes, it would.

18 Q And then do you opine that -- without perhaps
19 having read the transcript -- that it is likely that this
20 "new method" was the one discussed a couple of weeks ago?

21 A Yes, that is my opinion, based upon your
22 question, yes, sir.

23 Q Is there any evidence in your examination of
24 steam generators that have been in use or are in use of
25 any deposit inside the tubes on the primary side of

1 colloidal-sized particles of iron, iron, nickel, and so
2 forth?

3 A The presence of a deposit on the inside of the
4 tube has turned out to be a rare event. Should a deposit
5 be on the inside of the tube, the eddy current technique
6 will detect that. It does not take very much of a deposit
7 for it to detect it, but it does have to be centrally
8 located on the inside surface of the tube.

9 I can only recall on instance in which we found
10 such a deposit. The signal was clear, and it was discerned
11 to be a deposit after brushing techniques were applied to
12 the tube. So it is visible, a deposit. But that would be
13 a localized deposit.

14 Q This does not interfere -- or does it interfere
15 -- such deposits potentially interfere with any eddy
16 current or other dimensioning measurements?

17 A There is a potential for that, but there are
18 also techniques that can be used to null that signal away,
19 such as using a probe that has a magnetic feature to it.
20 Also, a brushing technique could be used to discern or to
21 remove that localized deposit. And that would be another
22 way of eliminating that interference. As I say, it is
23 a rare event that we run into such a deposit as that.

24 The tendency of primary side current, as it is
25 called, is not to deposit uniquely or nonuniformly on the

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inside of the steam generator tube.

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1 Q Coming to the technique of use of accelerometers,
2 I believe one of you, probably Mr. Timmons yesterday, reported
3 that to install an accelerometer you cut into a tube and
4 insert the measuring head to the appropriate location. Under
5 those conditions what is a pressure differential across
6 the tube during the primary and secondary side across the
7 tube wall?

8 A (Witness Timmons) When an accelerometer is
9 installed inside a steam generator tube, the tube is plugged
10 at the front primary face of the tube sheet and it is opened
11 at the top of the tube where the leads of the accelerometer
12 come out and exit through the steam generator. The pressure
13 differential is zero because the inside of the steam generator
14 tube is at steam generator secondary side pressure as is
15 the outside of the tube.

16 You have a tube that is plugged at the tube sheet
17 so that there is no primary water on the inside of the tube
18 where the accelerometer is located and the steam generator
19 is open at the top.

20 Q And during normal operation of a tube without a
21 sensor about what is the pressure drop across the wall?

22 A About 1250 pounds.

23 Q Does that difference in environment affect the
24 behavior of the tube? How do you reflect that back into
25 your accelerometer data? Is it cause for any concern?

1 A Westinghouse has done testing to determine the
2 vibrational characteristics of tubes in air with the accelero-
3 meter located in them as opposed to in water. So you have
4 a tube that is tested in air with air on the inside of the
5 tube and tested in air with water on the inside of the tube,
6 tested with water with water inside the tube and tested
7 in water with a differential pressure across the tube of
8 1000 pounds or so and the vibrational characteristics differ
9 less than one percent.

10 JUDGE SMITH: Any questions based upon the
11 Board's questions?

12 (No response.)

13 JUDGE SMITH: All right, Mr. Gallo.

14 MR. GALLO: First a preliminary matter.

15 You will recall yesterday an exchange between
16 Mr. Thomas and myself with respect to a letter from
17 Westinghouse which was to contain the recommendation for
18 the modification to the Byron station steam generators to
19 accommodate the flow induced vibration problem.

20 I passed out just prior to going on the record
21 this afternoon a copy of a letter that was sent I believe
22 yesterday -- I guess it was today -- dated April 27th and
23 it is signed by Mr. William Kortier addressed to Mr. Deress
24 of Commonwealth Edison.
25

1 Mr. Kortier is the representative of Westinghouse
2 Electric Corporation in their Projects Office. The letter
3 contains the Westinghouse recommendation. I passed it out
4 to all parties and the Board for their information.

5 MR. THOMAS: I acknowledge a receipt of a copy.

6 JUDGE SMITH: You do not offer it in evidence,
7 however?

8 MR. GALLO: No.

9 REDIRECT EXAMINATION

10 BY MR. GALLO:

11 Q Mr. Green, in response to a question from Judge
12 Cole, he asked you a question using the term "head loss."
13 Can you tell me what that means?

14 A (Witness Green) Head loss is in essence synonymous
15 with pressure loss. Head is the terminology for pressure
16 that is used in hydraulic calculations quite often because
17 the calculations rather than being done in pounds per square
18 inch, the pressure is expressed in feet of water equivalent
19 to a column of water, and as a result head loss is loss
20 in that pressure.

21 It is usually referred to as loss across a section
22 of a piping system or a component due to the flow resistance
23 of that section.

24 Q Mr. Thomas asked you a number of questions where
25 he used the term "water hammer modification." What did

1 you understand that term to be when you answered those
2 questions?

3 A I understood that to relate to Mr. Carlson's testi-
4 mony about the system installed at Byron whereby a certain
5 portion of the feedwater was diverted to the bypass system
6 in the upper nozzle during low power low flow operations.
7 That system consists of a flow monitoring system and
8 automatically controlled flow valves in the main feedwater
9 flow into the main feedwater nozzle and the bypass system
10 that flows to the upper feedwater nozzle.

11 Q Mr. Fletcher, there have been a number of arguments
12 among counsel and the Board over the purpose of your testimony.
13 I do not believe you have ever been clearly asked this
14 question. Can you tell me what the purpose of your testimony
15 is?

16 A (Witness Fletcher) Mr. Gallo, the purpose of
17 my testimony is not to summarize the previous witnesses'
18 testimonies I think. It is a rather unfortunate choice
19 of my words that called it a summary of the other Westinghouse
20 witnesses, but in fact it is a reflection of my own experience
21 in trying to provide an overview of the salient features
22 of the issues or the elements from the various disciplines
23 that have been discussed in this proceeding as well as have
24 been discussed at length throughout my experience with steam
25 generator work. Those disciplines individually can seemingly

1 lead one to assume that the issue is extremely complex
2 and disoriented when in fact one must consider each of
3 the different disciplines in the areas of interest and I
4 have tried to put in my testimony what I feel is important
5 and that has been gained from the years of experience that
6 I have working with steam generators.

7 Those disciplines, as you have heard in this
8 proceeding, have ranged the gamut from design features in
9 the Byron steam generators, which are state of the art
10 features that consider not only the mechanical but thermal
11 hydraulic aspects of steam generator design. That is extremely
12 important for one to consider.

13 The water chemistry aspects on the operational
14 control during operation of the steam generators, that is
15 another important feature and it has been brought out in
16 testimony that a considerable amount of work has done on
17 in the industry to arrive at water chemistry specifications
18 and operating guidelines which contribute to the long-term
19 integrity of the steam generator, the structural aspects
20 of the tube and the corrosion resistance of the steam
21 generator tube material and also other features that have
22 to be discussed.

23 MR. THOMAS: I am going to object. This is supposed
24 to be redirect examination. I realize that narrative answers
25 are common in these proceedings, but this seems to me to

1 go beyond the bounds even of that, and I also do not think
2 it is relevant to the question which was the purpose of
3 his testimony. Now I think we are going through each
4 item of his testimony.

5 MR. GALLO: I would ask the witness to conclude
6 his answer so it is not left dangling in the record.

7 JUDGE SMITH: You have just objected and it does
8 not do much. Do you object to him completing his answer
9 or do you move to strike?

10 MR. THOMAS: I am moving to strike.

11 JUDGE SMITH: Everything?

12 MR. THOMAS: Not everything, just in the interest
13 of accommodation on this issue, everything after he completed
14 the purpose of his testimony and started going through in
15 fact what his testimony was.

16 JUDGE SMITH: I am aware of the problems that
17 might come up with long narrative testimony, but it is not
18 so much a problem when you are dealing with highly qualified
19 technical technical people. I don;t believe that the
20 narrative answer is prejudicial or distorts the record.

21 You can have an opportunity for recross.

22 BY MR. GALLO:

23 Q Would you continue and complete your answer.

24 A (Witness Fletcher) The overall perspective that I
25 have tried to provide as the purpose of my testimony leads

1 me to conclude that the intertwining features that are
2 provided by each of the different areas that have been
3 addressed leads me to conclude that tube integrity should
4 not be a safety issue.

5 JUDGE SMITH: Is part of your concern, Mr. Thomas,
6 that the information came too fast for you? Is that part
7 of the concern, or is it just the narrative answer?

8 MR. THOMAS: I was able to keep up, Judge.

9 May I have a moment?

10 JUDGE SMITH: Sure.

11 (Counsel conferring.)

12 (Pause.)

13 MR. THOMAS: I have nothing further, Judge.

14 BY MR. GALLO:

15 Q Mr. Timmons, in answer to several questions I
16 believe from Mr. Savage yesterday, at least there was a
17 discussion about the approximately 100 candidates tubes
18 for expansion, you were asked a series of questions about
19 alternatives to expanding those tubes.

20 Did Westinghouse ever consider with respect to
21 those tubes the option of installing solid tubes I believe
22 the term was used in place of those 100 tubes?

23 A (Witness Timmons) Indeed consideration of
24 alternatives. Westinghouse at one point considered the
25 insertion of either solid rods or cables or something inside

1 inside the tubes, but never went to the extent of thinking
2 about replacing the tubes with solid devices.

3 Q When did this consideration take place?

4 A In the early aspects of the Model D program, October,
5 November or December of 1981.

6 Q Was this in connection with the D4/D5 modifications?

7 A It was in connection with the D2/D3 split flow
8 modifications.

9 Q Was that option selected in connection with the
10 D2/D3 modification?

11 A Not it was not.

12 Q Can you tell me why it was rjected?

13 A There were a number of factors that went into
14 the decision. One was that the insertion of such devices
15 would not provide a significant amount of damping and would
16 not necessarily lead to reduction in the vibrations of
17 the tube, although it would stabilize the tubes so that
18 they could not sever and become loose parts within the
19 steam generator.

20 The other was that there was a concern that the
21 application of those types of modifications to plants that
22 had operated previously would result in significant cumula-
23 tive radiation doses to the workers involved.

24 A third one was that it would take a significant
25 amount of resources to design and manufacture a sufficient

1 number of these devices to be able to apply them in the
2 plants in any short period of time.

3 Q If these devices are installed on the inside
4 of the tubes, does that mean that the tubes are taken out
5 of service?

6 A Yes.

7 Q Did Westinghouse consider as another alternative
8 plugging all of the approximately 100 tubes?

9 A Yes. Westinghouse did consider plugging all of
10 the tubes.

11 Q Was this in connection with the D2/D3 program
12 or the D4/D5 program or both?

13 A I believe it was for both, but again there was
14 concern that plugging the tubes does not keep the tubes
15 from vibrating.

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1 It takes the tube out of service, and unless
2 you take other measures to reduce the vibration, you will
3 still have trouble with wear of the tube.

4 Q Let me ask you, Mr. Timmons, wouldn't it simply
5 make sense to plug the tubes and to solidify the tubes in
6 some fashion so that you would avoid the vibration and
7 then take them out of service?

8 A That is not normal practice in the industry
9 to remove tubes from service unless it is necessary. It
10 is is common practice to leave tubes in service so as to be
11 able to monitor their condition and be able to utilize the
12 heat transfer service that they represent in the operation
13 of the steam generator.

14 The removal of tubes prematurely from service
15 without consideration of those facts is not normal practice,
16 and I do not believe it is necessary in this case because
17 the proposed modifications would serve to limit the
18 vibration of the tubes in any potential wear to very low
19 levels and would not create any residual safety concern.

20 Q Mr. Fletcher, do you agree with that latter
21 observation of Mr. Timmons'?

22 A (Witness Fletcher) Yes, I do.

23 Q Mr. Timmons, you indicated that in response to,
24 I believe in your joint testimony in response to questions,
25 that Krsko had a flow rate of approximately 7 percent greater

1 than the Byron steam generators. Is that correct?

2 A (Witness Timmons) That is correct.

3 Q If you were to make that extrapolation, I
4 believe in response to a question of Judge Cole, it was
5 approximately -- strike that. I will start again.

6 A 70/30 feedwater split at Krsko would translate
7 into what kind of split at Byron?

8 A Approximately a 75/25 split at Byron.

9 Q And why shouldn't the feedwater split be 75/25
10 at Byron rather than 90/10?

11 A At Byron the combination of expanded tubes and
12 reduction in main nozzle feed flow to 90 percent results
13 in sufficient reduction in diversion to eliminate any
14 residual concern with safety and to allow operation of
15 those tubes for the life of the unit. I don't believe it
16 is necessary to make modifications beyond that in order
17 to increase margin or anything like that.

18 Q Do I understand, therefore, that Krsko is
19 presently operating without any expanded tubes?

20 A Krsko has the one tube expanded, but that tube
21 is plugged.

22 Q And they are presently operating -- what is the
23 present feedwater split during the operation of Krsko?

24 A Krsko currently is operating at 100 percent
25 reactor power, with 70 percent of the main feed flow

1 through the main nozzle and 30 percent going through the
2 auxiliary nozzle.

3 Q And did I understand your testimony earlier
4 that they intend to expand the tubes at the next shutdown
5 of the Krsko reactor? Is that correct?

6 A The present plans are to make modification of
7 the Krsko plant by expanding approximately 100 tubes, and
8 then following that, they will operate with a flow split
9 of 80/20.

10 Q Is the proposed expansion of the tubes at
11 Krsko the same type of recommendation that Westinghouse
12 has made for Byron?

13 A It is the same type of recommendation, yes.

14 Q Can you explain why Krsko is taking the next
15 step and having the tubes in their steam generators
16 expanded?

17 A The expansion results in necessary reduction in
18 vibration levels and also would allow them to operate the
19 unit more efficiently by only bypassing 20 percent of the
20 main feed flow instead of 30 percent.

21 Q Does the 70/30 split at Krsko reduce the
22 vibration level sufficiently, in your opinion, in and of
23 itself?

24 A In and of itself it reduces it sufficiently so
25 it is not a short-term safety concern but rather a long-term

1 concern for the fact that they may suffer some wear over
2 a long period of time.

3 It is the Westinghouse position that it is
4 necessary to expand the tubes in order to -- to further
5 reduce the vibrations and completely alleviate the
6 problem.

7 Q Mr. Timmons, at the bottom of page transcript 5999
8 you had indicated in answer to one of Mr. Savage's questions
9 that across the 30-or-40-year life of the Byron Station,
10 that sufficient tube wear -- excuse me -- sufficient tube
11 wear might occur in the expanded tubes so that some of them
12 might be plugged. It is my understanding it was plugged
13 because of flow-induced vibration. Is that still your
14 testimony?

15 A No, it is not.

16 Q Can you explain why it is not?

17 A At the time that I made that statement, I was
18 taking into consideration some data that had been generated
19 by Westinghouse that included the effects of bypassing
20 flow and did not include the effects of the vibration
21 reduction that would occur due to the tube expansion.

22 Subsequently, I reviewed other information that
23 indicates that the reduction in vibration levels that
24 results from expanding the most affected tubes and bypassing
25 the feedwater flow is such that the levels of residual

1 vibration that would remain are below a threshold level
2 that would lead to wear that would require plugging of
3 the tubes, so that the resultant vibration after expansion
4 of the 100 tubes and operation with the 90/10 split is
5 such that one would not expect to have to plug any of those
6 tubes over the 40-year life of the plant.

7 JUDGE SMITH: Are you going to move on from
8 that?

9 MR. GALLO: Yes.

10 JUDGE SMITH: I think it would be helpful if
11 the record reflects that the in camera session was related
12 to his immediate past answer.

13 MR. GALLO: It will so reflect, Judge.

14 BY MR. GALLO:

15 Q Mr. Timmons, was Westinghouse, in making the
16 recommendation to establish a 90/10 feedwater flow split
17 at the Byron Station, was Westinghouse motivated to make
18 that recommendation by virtue of trying to save
19 Commonwealth Edison money in terms of backfit costs that
20 might result from some other flow split?

21 A (Witness Timmons) Westinghouse considered the
22 costs that might be associated with making modifications.
23 However, the data from the model testing indicated that
24 with the expansion of the tubes, diversion of 10 percent
25 of the feed flow was sufficient to reduce the vibration of

1 the tubes that were of concern to a level where there would
2 be no further concern with having to plug those over the
3 life of the unit.

4 Q What would Westinghouse have done if the data
5 showed that a 70/30 split was appropriate for Byron?

6 A We would have had to have made the recommendation
7 to Byron that the 70/30 split was necessary. In fact, we
8 have made the recommendations for other plants to implement
9 steps that required them to modify their feed system.

10 Q When you say "modify the feed system," do you
11 mean a backfit situation so they would have to redesign and
12 refabricate the system?

13 A That is correct.

14 Q Mr. Timmons, what is involved in installing an
15 accelerometer in a steam generator tube?

16 A In order to install an accelerometer in a steam
17 generator tube, the tube is first cut at the U-bend area and
18 bent back into a straight position. A hole is drilled in
19 the side of the steam generator, and provisions are made
20 to attach a seal connector on the outside of the steam
21 generator so as to prevent leakage and to allow the
22 leads from the accelerometers to be taken out of the steam
23 generator.

24 The accelerometers are fabricated onto an
25 assembly that is inserted into the steam generator and

1 pulled through the primary face -- pulled down through the
2 tube by an individual on the primary face of the tube sheet
3 and the channel head down to the position that is desired
4 for the accelerometer.

5 The leads for the accelerometer are connected
6 and then routed out through the steam generator and then
7 connected outside the steam generator to further signal
8 conditioning equipment.

9 Q Must the tube be plugged in that circumstance?

10 A Yes. The tube is then plugged at the primary
11 tube sheet.

12 Q Can two accelerometers be installed in the
13 same tube?

14 A Yes. Two accelerometers are normally installed
15 in the tubes. Usually, we have one at the inlet area and
16 one at another area, the longest span length.

17 Q Was that practice carried out at Krsko, Ringhals,
18 and Almaraz?

19 A Yes, it was.

20 Q What is the benefit of installing two
21 accelerometers in the manner you described, rather than one?

22 A It allows you to gather more information. It
23 gives you information about the tube vibration and the
24 inlet pass and whether there is a different vibration
25 characteristic at the point of the longest span. The

1 longer the span length, the more susceptible the tube might
2 be to certain types of vibration excitation.

3 Q Does an accelerometer measure tube wear?

4 A Accelerometers measure acceleration. They do not
5 measure tube wear.

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1 Q Mr. Timmons, you described in your previous
2 testimony in camera, you described a tube expansion process.
3 I believe you called it an hydraulic expansion process;
4 is that correct?

5 A That is correct.

6 Q Is that an experiemental or developmental technique?

7 A No, it is not. Hydraulic expansion of tubes has
8 been available as a process in American and international
9 industry for some time. Westinghouse has utilized hydraulic
10 methodology for expanding steam generator tube sheets since
11 approximately 1977. It has also utilized hydraulic expansion
12 in steam generator sleeving operations on a production basis
13 in steam generators in the field since 1980.

14 Q You say that the process has been used since 1977
15 with respect to expanding tubes in the tube sheet; is that
16 correct?

17 A That is correct.

18 Q And that is the hydraulic tube expansion process?

19 A That is correct.

20 Q Mr. Green, what about the diversion of the feedwater
21 flow, 90 percent main feedwater nozzle and 10 percent
22 auxiliary feedwater nozzle. Is there anythink unique or
23 developmental about that?

24 A (Witness Green) The only thing unique about it
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1 is that we now plan to do it during normal full power
2 operations. It has been a feature of the feedwater system
3 for purposes of startup for many years.

4 Q Does it involve in your experience any unusual
5 design considerations?

6 A No. The only unique or special design consideration
7 was merely calculations which had to be done to verify
8 that the system could meet the requirements that Westinghouse
9 had established for the steam generator bypass flow for
10 this particular concern.

11 Q Mr. Fletcher, is a split flow approach unique in
12 any way in your experience with respect to the design of
13 the steam generator itself?

14 A (Witness Fletcher) No, it is not. The feedwater
15 can be directed in the most efficient way across the steam
16 generator tubes and the split flow is one conventional
17 way to do that.

18 Q Mr. Timmons, I believe you indicated yesterday
19 that a final design review meeting would be held by
20 Westinghouse on May 12th and 13th. Do you recall that
21 testimony?

22 A (Witness Timmons) Yes, I do.

23 Q I believe you also testified that the purpose of
24 the meeting was to demonstrate the efficacy of the modifica-
25 tion proposed for Byron. Do you recall using that

1 language?

2 A Yes, I do.

3 Q Is the fact that this meeting is going to be held
4 in the future mean that Westinghouse has prematurely recommended
5 to Commonwealth Edison a modification that we have
6 discussing for the past two days?

7 A No, it does not.

8 Q I thought you indicated in your testimony that
9 you would decide the efficacy of the modification on May 12th
10 or 13th.

11 A Westinghouse has a design review and verification
12 process that requires that design reviews be held to ensure
13 that all aspects of design and design modifications are
14 properly considered in an engineering and quality assurance
15 sense.

16 We use a three-stage design review process in
17 which we have an initial conceptual design review to review
18 the concepts that are involved and whether they are actually
19 capable of being implemented.

20 Following that design review meeting, providing
21 you have successful completion and approval of the concepts,
22 design work is carried out, testing and other analyses.
23 Evaluations are conducted and performed and then an intermediate
24 design review is held at which a decision is made to
25 implement the design modification or to make a recommendation

1 to utility customers on that design or design modification.
2 Following that design review, the items which have not been
3 completed or are required to address concerns raised by
4 the design review committee are completed and then a final
5 design review meeting is held at some future date.

6 The meeting that is scheduled for May 12th and
7 13th is the final design review meeting. It would consist
8 of a series of presentations on the summary of all of the
9 data gathered by Westinghouse and how that data shows the
10 efficacy of the design, the demonstration of that design
11 and its ability to reduce vibration levels to a manageable
12 level and to be successfully implemented in the field took
13 place during the intermediate design review which was held
14 in early February.

15 Q Is that when the decision was made to make the
16 recommendation to Commonwealth Edison?

17 A That is correct.

18 Q We have heard a lot of testimony about meetings
19 with the NRC and that you have given in other meetings.
20 Was there some discipline to these meetings? Just what
21 was the process by which you has the manager of licensing
22 for this activity performed your duty?

23 A When the leak originally occurred at the Ringhals
24 plant in October of '81 Westinghouse was notified and provisions
25 were made to gather the information from the plant and to

1 try to ascertain the cause of the leak.

2 Following the gathering of preliminary information,
3 there were meetings held at Westinghouse internally to
4 review the information and to try to determine what steps
5 would be taken next. I was included in those meetings.

6 As information from eddy current testing became
7 available, it was transmitted back to Westinghouse on a
8 daily basis and meetings were held daily to try to ascertain
9 what should be done.

10 Following identification of the process of tube
11 wear examination of tubes removed from the Ringhals steam
12 generators, further meetings within Westinghouse were held
13 and a decision was made to inform our customers and ask
14 the operating plants to shut down and perform eddy current
15 testing to determine if they were experiencing a similar
16 phenomenon.

17 Recommendations wer made to those operating plants
18 to shut down and perform the eddy current testing. In the
19 case of Almaraz it was noted that they had eddy current
20 indications of the type similar to those observed at Ringhals.

21 Q When were the first meetings held with an
22 organization, either the utility or the NRC, in this country?

23 A On November 19th, 1981 we held a meeting with
24 the Dick Carr Company to discuss the state of our programs
25 and our recommendations. The following day, November 20th,

1 we had a meeting with the NRC to discuss information that
2 was available at that time, its application to McGuire Unit
3 I plant and how the Duke Power Company planned to operate
4 that plant until their next shutdown and when that next
5 shutdown would be and what recommendations Westinghouse
6 was making to them for operation.

7 As my testimony indicates, we had told them that
8 we wished them to operate for 1500 hours at a power level
9 such that there was 50 percent flow through the main feed
10 nozzle or less.

11 On January 15th, 1982 we held a telephone
12 conference call with Westinghouse, Duke Power and the NRC
13 in lieu of a meeting that had been scheduled for that day.

14 There was a snow storm in Washington, D. C, and
15 it was two days after that that the Air Florida went down
16 out of National Airport. So nobody wanted to travel.

17 The call was to further discuss Duke Power's
18 plans in the stated Westinghouse program at that time. At
19 that time we established with the NRC that we would begin
20 holding generic meetings with them to discuss the status
21 of the program as time went on to lay out our plans for
22 modifications and other things.

23 We held generic meetings with the utilities and
24 in general held a meeting with the NRC two days later. So
25 we had meetings with the utilities on February 17th, May

1 12th and July 10th, 1982, with meetings with the NRC two
2 days after that to go over much the same information as
3 to where we stood on the programs, what information was
4 available, what our recommendations would be and what our
5 plans were for the next period before we would again come
6 back to the NRC.

7 At the meetings I just mentioned we discussed
8 information that included both the split flow program and
9 the counterflow program.

10 Q Which meeting was that?

11 A All of those.

12 Q You are referring to the meetings with the utilities
13 or the meetings with the NRC?

14 A Both. The agenda for both meetings was generally
15 the same and the material covered was generally the same.
16 As a matter of fact, the slides and presentations were the
17 same for both meetings.

18 In addition to those meetings, there was also
19 a meeting in June, between June 6th and 9th in Yugoslavia
20 between Westinghouse, the utility which owns Krsko, and
21 a group of people from the International Atomic Energy
22 Agency which included a member from the U. S. NRC at which
23 the proposed modifications for the Krsko plant to implement
24 the 70/30 modification were reviewed.

25 MR. THOMAS: I am going to object. I do not see

1 the relevance of a meeting in Yugoslavia that does not
2 involved Commonwealth Edison or the NRC.

3 MR. GALLO: The cross-examination, Your Honor,
4 went to two points.

5 First of all, Commonwealth Edison's understanding
6 of the Westinghouse recommendation and Westinghouse's under-
7 standing of its own recommendation and the suggestion that
8 it was quickly arrived at prematurely, and discussion of
9 the Krsko meeting by this witness indicates one step in
10 the process by which Westinghouse arrived at its own judgment
11 in this matter.

12 Indeed, the information derived from Krsko is
13 relevant to the D4/D5 modification for Byron. So I think
14 it is appropriate.

15 JUDGE SMITH: Overruled.

16 WITNESS TIMMONS: A member of the NRC staff was
17 on the safety mission from the IAEA at that meeting also.

18 BY MR. GALLO:

19 Q Were there any further meetings after that one?

20 A (Witness Timmons) Yes. There was a meeting with
21 the NRC on October 22nd, 1982, which was not preceded by
22 a meeting with the utilities. The utility meeting covering
23 that information was held on November 17th, 1982.

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1 Following the decision by the Westinghouse
2 internal design review meeting in early February, there
3 was a discussion among Westinghouse personnel and
4 representatives from Commonwealth Edison Company on the
5 nature of the recommendation that would be made to
6 Commonwealth. And that discussion was held on February 2,
7 1983.

8 There had been a commitment between Westinghouse
9 and Commonwealth Edison to hold a meeting on February 7 and
10 8 to formally notify the upper management personnel of
11 Commonwealth Edison of the recommendation and to give them
12 more information on the Westinghouse plans for the
13 recommendation and the implementation of that recommendation
14 for the Byron plant.

15 At that meeting there was a further commitment
16 by Westinghouse to send engineering personnel to Chicago
17 to meet with Commonwealth Edison to give more detailed
18 engineering information to their engineering personnel
19 and exchange views and information on the specifics of the
20 Westinghouse recommendation.

21 On March 17 there was another generic meeting
22 between Westinghouse and Commonwealth and the counterflow
23 steam generator utility owners to discuss the Westinghouse
24 recommended modification, the engineering information
25 which supported that recommendation and the plans that

1 Westinghouse had at that time for implementation of that
2 modification.

3 There was a meeting the following day with
4 various of the utilities and also with a group that has
5 been referred to as a "counterflow steam generator owners
6 review group," which had been formed by a number of the
7 utilities owning counterflow steam generators. The meeting
8 was for the purpose of discussing the interactions of
9 Westinghouse with this group and their role in providing
10 technical review for the utilities of the Westinghouse
11 modification.

12 On March 31, 1983, there was a meeting with
13 Westinghouse and the NRC to discuss the counterflow steam
14 generator tube vibration issue and the recommended
15 modification. This was the meeting in the past that had
16 followed by one or two days the utility meeting.

17 And last week, April 21 and April 22, there
18 was a meeting, the Westinghouse and the counterflow steam
19 generator owners review group, to discuss responses that
20 Westinghouse had made to technical questions that had
21 been raised by that group and for that group to give
22 Westinghouse further feedback on the responses and to
23 provide Westinghouse with additional requests for
24 information.

25 At most of these meetings, with the exception

1 of the early ones in November of '81 and January, the
2 telephone call in January of '82, there were Commonwealth
3 Edison personnel in attendance, and they actively
4 participated in those meetings, in discussions and attempting
5 to provide Westinghouse with feedback and to gain for
6 themselves clarification of the information that was
7 presented by Westinghouse.

8 Q Mr. Butterfield, are you able to tell us after
9 listening to Mr. Timmons' testimony which, if any, of those
10 meetings you participated in?

11 A (Witness Butterfield) Yes, sir. I have
12 attended all of the meetings he mentioned since, I believe
13 it was, February 15, 1983.

14 Q What was your participation in those meetings?

15 A The February 15th meeting was the one where
16 Westinghouse presented to Commonwealth Edison engineering
17 personnel the details of this. We were there simply to
18 receive the information at that time and ask preliminary
19 questions.

20 On March 17, when Westinghouse met with
21 the counterflow utilities, owners of utilities owning
22 counterflow steam generators, I was there as a member of
23 the audience to listen to -- I think it was an all-day
24 presentation -- and again absorb the information on the
25 details of the tests that had been performed. We received

1 information from the Krsko data from the Krsko evaluations,
2 the model evaluations, the correlations that they were
3 putting together to describe the phenomenon, the effects
4 of the fixes that they wanted to put in, the modifications
5 at that time --

6 MR. THOMAS: Excuse me. It appears that the
7 witness is reading from some notes. Are you?

8 WITNESS BUTTERFIELD: I am sorry, I am not at
9 this point. I was just glancing.

10 JUDGE SMITH: Well, we have interrupted,
11 although we did rule that this line was relevant. I just
12 wonder if we need so much of it.

13 (Laughter.)

14 JUDGE SMITH: It is pretty powerful, and maybe
15 you don't need as much.

16 MR. GALLO: I have one more question.

17 BY MR. GALLO:

18 Q Mr. Butterfield, you say you attended the
19 meetings mentioned by Mr. Timmons as of about February 15,
20 1983?

21 A (Witness Butterfield) Yes.

22 Q Does that mean you did not attend the ones
23 prior to that time?

24 A That is correct.

25 Q In view of the fact that you did not attend those

1 earlier meetings, how are you able to offer the opinion
2 that you do offer in your testimony at page 5 that the
3 Westinghouse proposed modifications will minimize tube
4 wear due to flow-induced vibration?

5 A The actual discussion on the modifications
6 proposed began about February 15. I have been involved
7 in that operation since that time. I have spent a number
8 of days working with the counterflow steam generator owners
9 review group in active discussion of the data given to us,
10 development of questions which were then provided back to
11 Westinghouse for clarification, the results of the answers
12 to that. That is an ongoing procedure. So I have spent a
13 number of days involved in that; I would say roughly 25 to
14 50 percent of my time since February 15 has been involved
15 in this operation.

16 Q Have you had occasion to review the Westinghouse
17 information and the data generated prior to February 15
18 in your consideration of this matter?

19 A The information that pertains to this fix and
20 the results of the Krsko data and the models, yes.

21 Q Mr. Fletcher, I saved the best for last. On
22 page 8 of your testimony you mention the EPRI chemistry
23 guidelines. I believe that is true. Would you look at
24 the bottom of page 8 to confirm that for me?

25 A (Witness Fletcher) The bottom paragraph on

1 page 8 makes reference to EPRI and the AVT guidelines.

2 MR. GALLO: May I have a moment, Your Honor?

3 (Pause.)

4 BY MR. GALLO:

5 Q During the testimony of Mr. Wootten or Dr. Wooten,
6 when he was answering questions on cross-examination, he
7 had occasion to state -- and I am looking right now at
8 transcripts 4199 and 4200 and 4201. I guess before I ask
9 my question, I will ask you just to review those pages
10 briefly. Tell me when you are ready.

11 (Counsel handing documents to witness.)

12 It starts at 4199 in the middle.

13 A (Witness Fletcher) Through what page?

14 Q 4200, 4201, where he finishes talking about ion
15 conductivity.

16 A All right, sir.

17 Q Do you see where at the bottom of transcript
18 4199 that Dr. Wootten says that there is an item missing
19 from the EPRI guidelines. Do you see that?

20 A Yes, I do.

21 Q What is that item?

22 MR. THOMAS: Objection. Well, well, well beyond
23 the scope of any cross-examination that was conducted of
24 this panel, an attempt to buttress deficiencies in the
25 testimony of the prior panel through this panel. I submit

1 that is the purpose of Mr. Fletcher's presence here.

2 MR. GALLO: I cannot agree with that characteri-
3 zation.

4 JUDGE SMITH: The characterization I do not
5 think should be made, but the objection.

6 MR. GALLO: I am about to address that objection.

7 Mr. Timmons -- I am sorry -- Mr. Fletcher, as
8 the overview witness, has addressed the EPRI/AVT water
9 chemistry guidelines and has indicated in his testimony
10 at the bottom of page 8 that he believes that these
11 guidelines are a benefit and useful tool, and it represents
12 a part of his judgment that there is no safety problem
13 with respect to steam generator tube degradation.

14 Dr. Wootten has suggested that there is
15 something missing from those guidelines. I want to try
16 to determine from this witness if he agrees with that
17 characterization.

18 I believe that is the relevant connection. And
19 the fact that there was no cross-examination on this point
20 is really immaterial.

21 MR. THOMAS: What is the purpose of redirect
22 if it is not to respond to cross? That is the entire
23 purpose of it.

24 JUDGE SMITH: Mr. Gallo, if it is a point that
25 should be made, if it should have been made on direct, let's

1 make it and afford counsel an opportunity to address it.
2 But if it is not based upon cross, it should not be argued
3 as redirect.

4 MR. GALLO: May I continue? Are you sustaining
5 his objection?

6 JUDGE SMITH: I think what you should do is
7 seek leave to the Board to present the information if you
8 think it is necessary for a complete record.

9 MR. GALLO: Should I do it at this time?

10 JUDGE SMITH: It is appropriate.

11 MR. GALLO: I would move at this time,
12 Judge Smith, that I be allowed to, for the sake of
13 completing the record and to erase, if that is indeed is
14 the case, or to confirm if that indeed is the case, any
15 inconsistency between the testimony of Dr. Wootten and
16 the testimony of Mr. Fletcher.

17 MR. THOMAS: Objection, for what it is worth.
18 No notice. You know, for the reasons.

19 JUDGE SMITH: We will permit it. If you can
20 think of a remedy that will solve your objection, we will
21 entertain that too.

22 FURTHER DIRECT EXAMINATION

23 BY MR. GALLO:

24 Q Mr. Fletcher, turning your attention to the
25 statement in the transcript 4199 and -- you see there,
what was the item that Dr. Wootten said was missing from

1 the EPRI guidelines?

2 A (Witness Fletcher) At the bottom of page 4199
3 in the previous testimony, Dr. Wootten referred to the fact
4 that there were no guidelines for main steam chemistry in
5 the EPRI guidelines. The EPRI guidelines addressed those
6 fluids in the condensate feedwater system entering the
7 steam generator. That was the extent to which the scope
8 of the EPRI committee could address.

9 From a Westinghouse point of view, looking at
10 the system as a whole, it is appropriate, since we are
11 also vendors of steam turbines as well as steam generators,
12 to include in the completed guidelines those for main
13 steam as well as the condensate feedwater systems feeding
14 the steam generator.

end 18

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1 Q Has Westinghouse made such a recommendation, do
2 you know?

3 A We have formulated internally the complete cycle
4 chemistry guidelines. That includes the main steam chemistry
5 that is an extension of the EPRI guidelines.

6 Q Is the Westinghouse recommendation in addition
7 to the EPRI guidelines?

8 A The Westinghouse recommendation is in addition
9 to the EPRI guidelines, yes.

10 Q Further on in Dr. Wootten's testimony he talks
11 about what he believes to be an inconsistency in a calcula-
12 tion involving the ion conductivity. I am not sure I under-
13 stand what that point is. Can you first explain that point
14 and then I will ask my question.

15 MR. THOMAS: I object on the lack of notice. I
16 cannot believe that this is just coming up at this minute
17 and it never occurred to either Mr. Gallo or the witness
18 before that this matter has not been discussed.

19 JUDGE SMITH: There is an element of fairness,
20 Mr. Gallo. Also, we note that Mr. Thomas does not have
21 the transcript of Dr. Wootten's testimony. I don't know
22 if he can follow the oral recapitulation of it.

23 MR. GALLO: I do not know if we have another
24 copy of that transcript or not with us. Perhaps you can
25 give him yours if you don't need it.

1 JUDGE SMITH: What do you propose we do, walk
2 away from an incomplete record when it can be filled out,
3 or try to afford an opportunity for you to address that?

4 We have been rather liberal in bringing in late
5 developing information from both sides of every issue during
6 this hearing.

7 MR. THOMAS: I would agree with that.

8 JUDGE SMITH: Maybe Mr. Thomas can counsel us
9 as to what we should do.

10 MR. GALLO: I would suggest this as a potential
11 solution. During the course of the interlude between the
12 close of this week's hearings and the end of May when we
13 are going to reconvene, if Mr. Thomas feels that he must
14 have some further cross-examination, and I have not talked
15 to Dr. Wootten or Mr. Fletcher, but perhaps some arrangements
16 can be made to bring them back at that time.

17 MR. THOMAS: I just wished to make the objection
18 promptly of record. I think probably we should receive
19 the testimony and see of what importance it really is. It
20 does not strike me that it is all that important.

21 JUDGE SMITH: We will let it stand, recognizing
22 the way it came up and everything, that you do have an
23 argument to seek relief.

24 MR. THOMAS: That is fine with me.
25

19-3

1 BY MR. GALLO:

2 Q Can you explain that point, Mr. Fletcher? Do you
3 know what point I am referring to?

4 A (Witness Fletcher) I believe you were referring
5 to the point of cation activity.

6 Q What is that?

7 A Cation conductivity is the measure of solution
8 conductivity where the cations have first been removed from
9 solution and therefore it is called cation conductivity.
10 Electrical conductivity of a solution is dependent upon
11 the chemical constituency within that solution. The cation
12 conductivity then gives you a measure of the concentration
13 of the electrolytes in that water solution.

14 What one tries to do in looking at the chemistry
15 and the chemical analyses is to look at cation conductivity
16 as an overall measure of electrolyte concentration or
17 electrolytes being present.

18 Cation conductivity of itself does not provide
19 a specific indication of what electrolytes are in the water
20 and therefore in order to have internal consistency with
21 all of the chemical analyses that are performed, you not
22 only perform the cation conductivity tests for overall
23 water purity data, but then you determine through selective
24 chemical analyzes the concentration of individual species,
25 such as chlorides of sulfates and perhaps carbonates.

1 Those are items that provide a more thorough
2 understanding of what is contributing to cation conductivity
3 and where the techniques are available for the plant
4 chemist to utilize that gives him a more complete understanding
5 and explanation for the total overall value called cation
6 conductivity.

7 Q What is the inconsistency that Dr. Wootten is
8 referring to?

9 A The inconsistency is that in the EPRI guidelines
10 for species such as sulfates or carbonates ----

11 MR. THOMAS: Excuse me. I think I have an
12 objection to the form of the question. Again, I do not
13 have the transcript in front of me. I do not know exactly
14 what foundation this witness has toknow what inconsistency.
15 Another witness was referring to two weeks ago. I am not
16 trying to preclude his testimony, but I want to launch a
17 foundation objection at this point.

18 MR. GALLO: I will ask a new question and withdraw
19 the old one.

20 JUDGE SMITH: In the answer ---

21 MR. GALLO: He has not given an answer yet.

22 MR. THOMAS: He started. I would move to strike
23 that.

24 JUDGE SMITH: Just start fresh with the forthcoming
25 question and strike the portion of the previous answer.

1 BY MR. GALLO:

2 Q Mr. Fletcher, have you had any involvement with
3 respect to the development of the EPRI, AVT water chemistry
4 guidelines?

5 A (Witness Fletcher) Yes, I was a member of the
6 committee.

7 Q Was Dr. Wootten as well?

8 A No, Dr. Wooten was not.

9 Q And just briefly what was your role as a member
10 of the committee?

11 A I was a participating contributing member to
12 outline and provide the best guidance to the utility
13 industry operating PWR steam generators.

14 Q Did your participation include work in the area
15 that we have been discussing here about cation conductivity?

16 A Yes. I have been doing that type of work for a
17 number of years as have members of my staff. It should
18 be pointed out that Dr. Wooteen is a member of my staff.

19 MR. GALLO: At this point, Your Honor, I guess
20 I would show the transcript to counsel so that he can under-
21 stand and see the context of the consistency testified to
22 by Dr. Wootten. Do you want to do that, or I will ask the
23 witness to characterize it since it is in front of him
24 right now.

25 JUDGE SMITH: Why don't you go one step further

19-6

1 and also explain how he happens to be aware of what
2 Dr. Wooteen regarded as an inconsistency, and then whatever
3 counsel desires as far as looking at the transcript.

4 BY MR. GALLO:

5 Q Mr. Fletcher, can you tell me, first of all, what
6 is stated by Dr. Wooten as an inconsistency in the transcript
7 before you?

8 A (Witness Fletcher) If I look on page 4200 at
9 line 17, Dr. Wootten makes a statement. "If you take
10 the level of the EPRI guideline recommendations and you
11 take the levels of chloride and sulfide that they recommend,
12 there is I believe some inconsistency and they do not add
13 up to what the anion activity should be."

14 Q Does that statement of Dr. Wootten convey to
15 you an understanding of its meaning?

16 A It is very clear to me, sir.

17 Q Based on your participation in the development
18 of these guidelines, is that your view as well?

19 A It is my view that when you measure cation conduc-
20 tivity and then you identify the levels of concentration
21 of chloride and sulfate that the sum of the contribution
22 that they would have to total cation conductivity you would
23 have a deficiency. There would be a difference between the
24 sum of the conductance values of those individual anions
25 and the cation conductivity that you would have, meaning

1 that there must be some other species present.

2 In order to better understand what other species
3 are present, you would do analyses and that is what
4 Dr. Wooteen has referred to in my interpretation of the
5 inconsistency.

6 Q Let me ask you this last question. Is it the
7 kind of inconsistency that the EPRI ground, including your-
8 self should have dealt with during the development of the
9 EPRI guidelines on AVT water chemistry?

10 A The philosophy of the group that put the EPRI
11 guidelines together was to make certain that the overall
12 total electrolyte content of the solutions in question was
13 determined. That was the prime thrust of the committee.
14 That is provided by the cation conductivity and it shows
15 the total anion content of that solution.

16 It is on that basis then that we could establish
17 the criteria for acceptable solutions or those that went
18 beyond the guideline values.

19 In order to better understand where the source
20 of those electrolytes was coming from, then one would have
21 to have individual species identified in terms of their
22 concentrations and contributions to the conductivity. That
23 is more an operational issue than it is one pertaining to
24 maintaining the integrity of the steam generator tubes.

25 For operational purposes then, one would want

1 to go in and divide the solution up into its component
2 parts and therefore giving you a trace or a clew as to
3 where impurities might be derived from in the systems.

4 Q Did the EPRI committee attempt to address those
5 operational considerations in the guidelines this particular
6 area?

7 A Only in the broadest sense.

8 MR. GALLO: That is all I have on redirect,
9 Your Honor.

10 (Board conferring.)

11 JUDGE SMITH: Mr. Timmons, there is a question
12 I overlooked asking.

13 Is the auxiliary feedwater system part of the
14 nuclear steam supply system, the Westinghouse nuclear steam
15 supply system?

16 WITNESS TIMMONS: I believe in the case of Byron,
17 the feed system was provided as part of the balance of
18 plant and was designed by Sargent and Lundy.

19 JUDGE SMITH: Does it also serve as an emergency
20 feedwater system for loss of main feedwater?

21 WITNESS TIMMONS: I believe it does. In Westinghouse
22 nuclear steam supply systems we have a criteria that requires
23 that the auxiliary feed system be capable of acting as an
24 emergency feedwater system and then that it have the appropriate
25 safety grade considerations included in its design.

1 JUDGE SMITH: It is a safety system?

2 WITNESS TIMMONS: Yes, it is.

3 JUDGE SMITH: Would it be your testimony that
4 we do not have to be concerned about the increased demands,
5 if there are any, on the auxiliary feedwater because of
6 the modification?

7 WITNESS TIMMONS: The auxiliary feedwater system
8 does not have any increased demands as a result of these
9 modifications. The auxiliary feedwater system has piping
10 that attaches it that leads water from the auxiliary feed
11 or emergency feed system into the upper nozzle of the steam
12 generator and they utilize common piping for that purpose.
13 But that is the only connection between the two.

14 JUDGE SMITH: Is the entire system a safety system,
15 or is the auto-initiation, is that safety grade, too?

16 WITNESS GREEN: Yes. The auxiliary feedwater
17 system is what we refer to as a category one safety system.
18 That does include the automatic start provision.

19 JUDGE SMITH: The automatic start is not involved
20 in the modification?

21 WITNESS GREEN: No. The only common part of the
22 system would be a section of pipe between the upper feedwater
23 nozzle and what in essence could be termed a junction in
24 the piping. At this point there are no what we call active
25 components that are common between the bypass system and

and the auxiliary feedwater system.

1 JUDGE SMITH: Is there any recross?

2 MR. THOMAS: Yes.

3 RECROSS EXAMINATION

4 BY MR. THOMAS:

5 Q Mr. Green, Mr. Gallo asked you a series of
6 questions as to whether with regard to different elements
7 of the proposed modification and whether those were
8 experimental or developmental. Do you recall that series
9 of questions?

10 A (Witness Green) Yes.

11 Q My question to you is do you know of any other
12 operating plant which has run throughout its entire
13 operating life with the feedwater preheater bypass valve
14 open, fully open, all the time?

15 A No, I do not.

16 Q Mr. Butterfield, do you know of any such plant?

17 A (Witness Butterfield) Would you repeat the
18 question?

19 Q Yes. Do you know of any plant that has run
20 throughout its operating history with the feedwater
21 preheater bypass valve completely open all the time?

22 A No, I am not aware of any.

23 Q .. Timmons, do you know of any such plant?

24 A (Witness Timmons) No, not at this time.

25 Q And finally, Mr. Fletcher?

1 A (Witness Fletcher) No, sir, I know of none.

2 Q So in that sense, then Byron will be experimental,
3 is that right?

4 MR. GALLO: To whom are you addressing your
5 question?

6 MR. THOMAS: Mr. Fletcher.

7 WITNESS FLETCHER: My characterization of
8 "experimental," Mr. Thomas, is something that is brand-new.
9 To you have a valve operate in the open position and water
10 flowing through it is not a brand-new concept. It is
11 rather basic.

12 BY MR. THOMAS:

13 Q In the sense that Byron will be operating and
14 will be with that valve open, completely open all the time,
15 and you know of no other plant that has ever done that,
16 in that sense, Byron is experimental, isn't it?

17 A I will pass the comment on, but I do not consider
18 that to be experimental.

19 Q Mr. Timmons?

20 A (Witness Timmons) I do not consider it
21 experimental either. There had been a number of plants
22 which had operated for extended periods of time with
23 feed flow going through the bypass valve. Krsko, in the
24 early stages before the 70/30 modification, operated for
25 1,500 hours with a 50/25 split.

1 Q That is a long ways from 40 years.

2 JUDGE SMITH: Wait a minute. Isn't there room
3 for ambiguity here? Shouldn't there be a clarification
4 made between 40 years of a valve being open and never
5 closed compared to 40 years of operation which during the
6 operation it is open?

7 MR. THOMAS: I am sorry, I don't understand.

8 JUDGE SMITH: The testimony, as I understand it,
9 that will operate, the plant will have the bypass valve
10 open.

11 MR. THOMAS: Completely open all the time. Right.

12 JUDGE SMITH: But that is not the same as opening
13 it at the beginning of operation and having it never
14 closed again until 40 years later.

15 MR. THOMAS: I don't understand.

16 JUDGE SMITH: The plant will not be operating
17 continuously for 40 years. I just think the ambiguity
18 should be straightened up if there is any. The plant will
19 be closed down sometimes, and then if there is a question
20 about will a valve close if it has to close, it can be
21 closed.

22 The premise of your question was that the valve
23 would open at the beginning of operation and never close
24 again for 40 years. I just wanted to clarify whether that
25 premise is correct in the dialogue that is going on.

1 MR. THOMAS: Are you talking about shutdowns, is
2 that what you are talking about?

3 JUDGE SMITH: I am not talking about anything.
4 I want to know if the premise is correct that they will
5 open up the valve at next year and never close it again.

6 BY MR. THOMAS:

7 Q Does the valve ever close during operation,
8 during the operating life of the plant?

9 A (Witness Timmons) Sometime during the 40-year
10 life of the plant, the valve will be cycled open and shut.
11 I would imagine that would occur whenever the plant shuts
12 down. The valve would be --

13 Q What period of time is that ordinarily out of
14 the 40-year projected life of a plant?

15 A Normally, it occurs once per year, and then
16 experience with operating plants can occur with greater
17 frequency than that.

18 Q All right. Do you know of any plant -- obviously,
19 there is no plant that has ever operated with 100 tubes
20 expanded, is there?

21 A There are a number of plants which have operated
22 with every steam generator tube expanded. They are extended
23 in the tube sheet.

24 Q Expanded in the way these tubes are going to be
25 expanded?

1 A Not at the same locations, but using some of
2 the processes.

3 Q You mentioned Commanche Peak. This series of
4 questions is really based on this April 27th letter which
5 was furnished just after lunch today. Has a letter such
6 as this been sent to Commanche Peak?

7 A I do not know if the letter to them as gone
8 out. We have held discussions with them.

9 Q I know. But the question is whether you know has
10 such a letter been sent to Commanche Peak?

11 A I don't remember seeing such a letter.

12 Q Do you know whether Commanche Peak has received
13 an operating license yet?

14 A No, they have not.

15 Q So really they are about in the same stage as
16 Byron. Isn't that correct?

17 A About, yes.

18 Q You indicated in response to Mr. Gallo's questions,
19 I believe, that a decision on the modification in the nature
20 of the tube vibration modification was reached in early
21 February of this year.

22 A That is correct.

23 Q Do you know the reason for the delay between
24 early February and this letter that just went out today?

25 A No, not the details. I understand that the

1 letter was originally drafted to include a series of
2 technical recommendations and some of the technical
3 requirements or functional requirements for the feedwater
4 split, and that someone in the projects office did not want
5 to make the letter so detailed technically, so that there
6 were some revisions that occurred in the letter.

7 Q The reason they did not want to make it so
8 detailed technically is because some of those technical
9 details have not been finally determined, isn't that right?

10 A I don't know that for a fact.

11 Q From your understanding of the Westinghouse
12 process, isn't that the most likely reason?

13 A It could be. I think perhaps the project manager
14 wanted to make the letter simpler.

15 Q Now, as I understand the -- your recommendation,
16 in response to the questions from Mr. Gallo, I believe, or
17 the Board, your recommendation is that at least 10 percent
18 of the flow be through the auxiliary feedwater nozzles.
19 Isn't that what it is?

20 MR. GALLO: Do you have the letter?

21 WITNESS TIMMONS: The letter states that
22 feedwater flow through the main nozzle should be limited
23 to 90 percent of that required for rated full power. The
24 other flows should be the bypass to the auxiliary nozzle.

25

1 BY MR. THOMAS:

2 Q I am trying to pin this down a little bit. As
3 I recall your testimony, it was that at least 10 percent
4 should be through the auxiliary feedwater nozzle, is that
5 right?

6 A (Witness Timmons) Yes.

7 Q So 10 percent through the auxiliary feedwater
8 nozzle represents the minimum, right?

9 A That is correct.

10 JUDGE COLE: That would not necessarily be so.
11 The alternative is cutting down on the total flow. But as
12 I read it, the important part is the 90 percent, not the
13 10 percent.

14 MR. THOMAS: So not more than 90 percent, that
15 being the absolute maximum.

16 JUDGE COLE: Right.

17 WITNESS TIMMONS: When I mention 10 percent
18 bypass, I normally think in terms of 100 percent power.

19 BY MR. THOMAS:

20 Q In paragraph 2 of the letter it makes reference
21 to instrumentation to alert the operator if the 90 percent
22 flow limit through the main feedwater nozzle were exceeded
23 should be added. Mr. Butterfield, do you know what
24 instrumentation they are referring to there?

25 A (Witness Butterfield) Yes. I believe it would

1 be -- somebody this morning spoke of it earlier, perhaps
2 Mr. Green -- it would be an indicator put in the control
3 room to indicate when -- an engineer will decide when
4 you have exceeded the 90 percent flow.

5 Q Is that the flow meter we were referring to
6 this morning?

7 A Yes.

8 Q Is there any other instrumentation involved, as
9 you understand it?

10 A I don't believe so.

11 Q Mr. Timmons, do you know of any other instru-
12 mentation?

13 A (Witness Timmons) As Westinghouse envisioned,
14 it would be some flow monitoring device, such as a flow
15 meter.

16 Q Mr. Green, are you aware of any other instru-
17 mentation that is going to be added or necessary to be
18 added as a result of the modification?

19 A (Witness Green) No, I am not.

20 Q How long does Westinghouse contemplate it will
21 take to install, to fully install the modification?

22 A I think the preliminary schedule that we have
23 looked at indicates that the tube expansion portion will
24 take approximately three weeks, calendar time. And that
25 for the modifications to install the flow metering devices,

1 that could probably be accomplished within the same time
2 period or it might take a week or two longer.

3 Q I take it they could be done simultaneously?

4 A Yes.

5 Q So we are talking about perhaps a maximum of
6 five weeks?

7 A That is about the right time frame, yes.

8 MR. THOMAS: Excuse me, Your Honor, may I have
9 just a moment?

10 (Counsel conferring.)

11 BY MR. THOMAS:

12 Q Given the fact that Commanche Peak has not
13 received an operating license yet and given the fact that
14 Commanche Peak, to the best of your knowledge, has not
15 received a letter such as the one that we have in front
16 of us regarding Byron, don't you think that under those
17 circumstances Byron is at least as likely to go into
18 operation as soon as Commanche Peak is and therefore should
19 be instrumented with accelerometers, as we discussed
20 yesterday?

21 A (Witness Timmons) Based on schedule
22 information that I have seen, we intend to expand the
23 tubes at the Commanche Peak plant sometime in June and
24 early July. Following that, we will do the tubes at the
25 Byron plant. Commanche Peak fuel load schedule is

1 currently late August. The Byron fuel load schedule is
2 currently November 15.

3 Q That was changed two weeks ago, approximately,
4 from August itself?

5 A Yes.

6 Q Let me ask you this question: If it develops
7 and you determine that Byron is going to be in fact the
8 first plant to go into operation with this modification
9 and is going to precede Commanche Peak in that regard,
10 would you then instrument Byron with the accelerometers?

11 A If Byron were determined to be the first plant,
12 I would assume that Byron would be the plant that would be
13 instrumented with accelerometers.

14 JUDGE SMITH: What is the point there?

15 MR. THOMAS: What is the point?

16 JUDGE SMITH: Yes.

17 MR. THOMAS: Yesterday he said that they did not
18 plan to instrument Byron.

19 JUDGE SMITH: I understand.

20 MR. THOMAS: I think that really -- which to me
21 the implication is that there is a need to instrument the
22 first plant to go into operation and that there is further
23 implication from that that there are certainly experimental
24 aspects to what is being done at Byron, certainly, an
25 argument in that regard. And I wanted to secure what I

end 20

1 regard as some kind of a commitment at least, an intention
2 to instrument Byror as it is the first plant to experiment
3 with this modification.
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1 MR. THOMAS: That is all I have on recross.

2 JUDGE SMITH: Is there anything additional?

3 MR. GOLDBERG: Yes, sir.

4 RE-CROSS-EXAMINATION

5 BY MR. GOLDBERG:

6 Q Mr. Timmons, there was a suggestion in questioning
7 by Mr. Thomas of some future technical or design details
8 associated with the proposed modification. Would it be
9 fair to summarize your testimony that the only design
10 detail remaining is the exact number and location of the
11 candidate tubes to be expanded?

12 A (Witness Timmons) That would be a fair characteriza-
13 tion of the design details that remain for the tube expansion
14 process.

15 MR. GOLDBERG: Mr. further questions.

16 JUDGE SMITH: Anything further?

17 FURTHER REDIRECT EXAMINATION

18 BY MR. GALLO:

19 Q Mr. Green, we did not get an answer to the general
20 question posed by Mr. Thomas as to whether or not operating
21 the Byron plant with the valve open during operation is
22 an experiment or unique activity.

23 MR. THOMAS: I object. That was not the question.
24 The question that was being posed to the panel is whether
25 it was experimental in the sense that they know of no other

1 plant which has ever operated under those conditions. That
2 was the question.

3 I have no objection to that being put to Mr. Green.

4 MR. GALLO: That is my question.

5 MR. GREEN: If the question was with regard to
6 there being flow through the bypass line in that operation,
7 then the answer is that to the best of my knowledge, no
8 plant has ever run its entire life with flow with that
9 line full open.

10 Now there are plants currently in operation with
11 a higher flow rate through the equivalent line than Byron
12 is envision as has been testified to. If the concern is,
13 as was expressed about a valve remaining during operation,
14 every operating plant has a large number of valves which
15 are open at all times during normal operation throughout
16 the life of the plant and are seldom, if ever, closed.

17 So the specific concern in that question is
18 not really clear.

19 BY MR. GALLO:

20 Q You considered it developmental because that is
21 the way the operation is going to be and it has not
22 been done in any other plant with respect to that particular
23 valve?

24 A I don't consider any aspect of the proposed
25 operation to be development in the respect that I don't

1 consider any aspect of that operation to be untried or
2 different from the way that nuclear plant systems normally
3 operate.

4 MR. GALLO: That is all I have.

5 JUDGE SMITH: All right, gentlemen, thank you
6 very much.

7 You are excused.

8 (The panel was excused.)

9 JUDGE SMITH: Let's take a ten-minute break.

10 (Whereupon, a short recess was taken.)

11 JUDGE SMITH: Let's proceed.

12 Dr. Rajan is ready to testify.

13 MR. GOLDBERG: Let me just say that Dr. Rajan
14 has returned per the mutual agreement of the Board and parties
15 on April 15th to address proprietary matters involved in
16 his testimony and/or cross-examination that Mr. Gallo wished
17 deferred until this particular occasion.

18 JUDGE SMITH: Are there going to be parts of
19 his testimony in camera?

20 MR. GOLDBERG: I have no further direct testimony
21 other than what was introduced on April 14th in written
22 form, and that will depend on the avenue that the cross-
23 examination takes.

24 MR. GALLO: I have a cross-examination plan which
25 I will pass out.

1 JUDGE SMITH: Do you anticipate the need for
2 an in camera session?

3 MR. GALLO: I don't really know. My guess is
4 no. The cross-examination plan is more extensive than
5 the questions that I intend to ask.

6 JUDGE SMITH: Inasmuch as we did have the benefit
7 of the in camera session this morning, I hope it can be
8 avoided now with Dr. Rajan.

9 Whereupon,

10 JAI RAJAN

11 was recalled as a witness and, having been first duly sworn,
12 was examined and testified as follows:

13 CROSS-EXAMINATION

14 BY MR. GALLO:

15 Q Dr. Rajan, if I ask you a question that you believe
16 the answer involves proprietary data or you are not sure,
17 you ought to make a judgment in favor of assuming that it
18 is and just simply say so.

19 I will take it from that point and perhaps I will
20 rephrase the question or perhaps we will have to do something
21 different.

22 Basically, Dr. Rajan, I have just one area of
23 questioning that involves your revised testimony that is
24 in the transcript for April 14th. It is answer 8. Do you
25 see that? Do you have that testimony in front of you?

1 A No, I don't.

2 (The document was handed to the witness.)

3 BY MR. GALLO:

4 Q Have you turned to page 5 of your testimony?

5 A Yes, I have.

6 Q The answer says that based on the latest informa-
7 tion available, the applicant plans to install the necessary
8 steam generator modifications prior to the operation of
9 the Byron station to minimize the effects of flow induced
10 vibrations. What was the latest information that you had
11 in mind when you wrote this testimony?

12 A This latest information essentially consisted of
13 the general identification of the tubes that need to be
14 expanded, their matter of expansion and supporting data
15 from model tests which justified the selection of the
16 tubes.

17 Q Was this information furnished to the NRC and
18 to you by Westinghouse? Was this the source of that
19 information?

20 A This information was presented during a meeting
21 a week or ten days prior to this testimony.

22 Q In a meeting with whom?

23 A This was a meeting with Westinghouse.

24 Q Were you involved in any meetings with Westinghouse
25 prior to that date or that time?

21-6

1 A Yes, I was. In fact, I have attended most, if not
2 all, of the meetings enumerated by Mr. Timmons during his
3 testimony.

4 Q Are you referring to the meetings that he said
5 there were meetings held with the NRC?

6 A Meetings with the NRC as well as meetings with
7 the independent design review groups where NRC staff
8 representatives were present as observers.

9 Q Now you conclude your answer to question 8 by
10 saying "Based on the staff's preliminary review of the
11 proposed modifications, the objective of minimizing tube
12 degradation associated with flow induced vibration will
13 be accomplished by these modifications."

14 Upon what have you based this judgment?

15 A Primarily upon the level of vibration which would
16 exist after these modifications are in place, and this is
17 quantified by the parameter g delta which Mr. Timmons
18 described in sufficient detail during the in camera session
19 and the acceptance values below which the vibrations would
20 not result in excessive wear.

21 So all of this information was reviewed by the
22 staff, and their preliminary judgment was based on a review
23 of this data.

24 MR. THOMAS: Excuse me. At this point I
25

1 wish to lodge an additional objection to your testimony
2 based upon the meetings described by Mr. Timmons in redirect
3 testimony elicited by Mr. Gallo.

4 This was the first time that I have had any
5 notice of such meetings. I do not claim encyclopaedic knowledge
6 of the law underlying the regulations that govern these
7 proceedings, but to me that certainly has aspects of a
8 meeting between two parties -- or one party to this proceeding,
9 the applicant and the staff discussion and issue which was
10 under consideration in this proceeding without notice to
11 intervenors or their counsel.

12 So I am objecting to any testimony on that ground
13 and moving to strike it.

14 MR. GALLO: I am uncertain as to what the ground
15 is. Is it surprise at the information that was just
16 elicited today, or was it on some asserted ex parte basis?
17 What is the basis for the objection?

18 MR. THOMAS: It is a little bit of both. There
19 is surprise, and also on the basis of ex parte communications
20 and contents between the staff and the applicant out of
21 the presence of the intervenors and without any notice
22 to intervenors and without any knowledge of the intervenors.

23 MR. GALLO: On the first basis, that is a surprise.
24 Counsel for the intervenors had asked Mr. Timmons a number
25 of questions about meetings and had probed with respect

1 to the basis of both Westinghouse and Commonwealth Edison
2 for understanding the proposed modifications, had asked
3 questions suggesting that the decision on the proposed
4 modification had been made quickly, too quickly and
5 prematurely, and the testimony by Mr. Timmons where he very
6 systematically and methodically listed the times and places
7 where the matter was considered.

8 It is really in response to that cross-examination
9 and therefore it is not a question of surprise.

10 On the ex parte question, it is my understanding
11 that in the normal course of reviewing of generic safety
12 questions by the NRC staff that they meet routinely with
13 vendors and whoever else is necessary to review these problems
14 and in doing so they are discharging their normal regulatory
15 function that is vested in the NRC staff itself which has
16 responsibility for the regulation of operating plants.

17 In that capacity it is quite appropriate for
18 Westinghouse and the staff to meet together to discuss this
19 generic problem involving D4s and D5s and D2s and D3s and
20 there is no ex parte violation here.

21 MR. GOLDBERG: Judge ---

22 MR. GALLO: I would like to have one last statement
23 if I could. The ex parte rule in the regulations applies
24 to the trier of fact. The trier of fact is not supposed
25 to have ex parte communications with one of the parties.

1 The NRC staff in this proceeding is a party and
2 there is nothing wrong with two parties getting together
3 to discuss matters in any event.

4 So I would say that the objection on that score is
5 misdirected for that reason as well.

6 MR. GOLDBERG: Judge let me add one thing.

7 First, on the question of the existence of the
8 meetings, I believe that Dr. Rajan was examined on April
9 14 and/or 15 about his attendance at meetings with
10 Westinghouse at which presentations were made on the proposed
11 modification for Byron and antecedent proposals that were
12 later abandoned.

13 So I think on the question of meetings Mr. Timmons'
14 recitation of the history of the meetings, while it may
15 be more comprehensive than was provided during the course
16 of Dr. Rajan's testimony, is not the first indication that
17 there have been meetings on the subject.

18 With regard to the specifics of the meeting
19 discussed by Dr. Rajan in question, I would agree with
20 Mr. Gallo's remarks and add further that to my understanding
21 that was a generic meeting with Westinghouse to review progress
22 and plans for a corrective modification for the tube
23 vibration problem. It was not a Byron specific meeting,
24 nor was it a prelitigation meeting.

25 It is my further understanding that it was of

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1 a proprietary nature from which the public would ordinarily
2 be excluded in any event.

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1 MR. THOMAS: I do not want to use the word
2 "Ex Parte." I agree that with Mr. Gallo's characterization
3 basically of what "Ex Parte" means, and I wish to cast
4 no doubts or aspersions with regard to the tryer of fact
5 here, because that is not the thrust or the nature of
6 the objection.

7 But -- so I wish to delete the use of that term
8 from my objection. In response to what Mr. Goldberg said
9 and, to a certain extent, Mr. Gallo, we could argue all
10 day here about whether this issue is generic --

11 JUDGE SMITH: And I fear we are.

12 (Laughter.)

13 MR. THOMAS: I don't think it makes any
14 difference as to whether you call it generic or Byron-
15 specific, and it obviously has elements of both. It is an
16 issue that at that time had been stipulated as an issue
17 at this proceeding. The tube vibration issue was obviously
18 a significant problem. A decision was not made until
19 early February of this year as to the nature of the
20 modification. And I just think it paints a pretty sorry
21 picture when you have two parties, the staff and applicant,
22 meeting and coming up with a decision on this issue and
23 not even giving notice of that to another party to this
24 proceeding.

25 And it does not make any difference whether the

1 information was proprietary or not, because we are entitled
2 to proprietary information as an intervenor upon signing
3 these agreements, which we have done since the beginning
4 of this proceeding.

5 So I just wish to supplement, you know, with
6 those remarks before you rule.

7 JUDGE SMITH: What is the value of this
8 information? It is still your position that this was a
9 deliberate, carefully considered development?

10 MR. GALLO: Judge, you have to consider the
11 objection that is before the house. I asked Dr. Rajan
12 one or two questions about his participation in meetings,
13 and then moved on and was asking a question or two about
14 the basis for his conclusion at the bottom of page 5 of
15 his testimony, when Mr. Thomas decided to object to
16 questions and answers already elicited.

17 And really the remedy he is seeking is a motion
18 to strike. So I get from the tenor of your observation
19 that you are wondering why I am continuing to pursue this
20 point, and I am not.

21 JUDGE SMITH: All right. So let's move on. The
22 fact is that the questions and answers -- I had not been
23 sensitive to that. I thought that the last question was
24 in the context of the meeting.

25 MR. THOMAS: I thought so, too. There was a

1 motion to strike component to my objection. As this
2 develops here --

3 JUDGE SMITH: Is it your position that the
4 modification a spontaneously ill-considered, hasty?
5 If that is the case, if that is still your position, then
6 I think counsel had a right to establish the deliberateness,
7 if that is the case. Is that the issue, what is going on
8 here? I don't think we have to get to whether you were
9 invited to the party or not. That is a different considera-
10 tion. That is a very complicated problem.

11 MR. THOMAS: The first thing that you mentioned
12 was a relevancy objection which I made during the testimony
13 of Mr. Timmons to the recitation of his diary.

14 JUDGE SMITH: That was almost an invitation to
15 stipulate that you didn't.

16 MR. THOMAS: I did not recognize the invitation.
17 You overruled that objection on relevance because of the
18 fact that it is our position that, yes, this fix is being
19 rushed into operation.

20 JUDGE SMITH: And it is still our position?

21 MR. THOMAS: It is still our position.

22 JUDGE SMITH: And your motion is denied on the
23 basis of relevance. Continue your argument.

24 MR. THOMAS: The relevance objection, I
25 understand why you have denied it. This latest objection

1 was on the nature of the meetings and the lack of any notice
2 to a party.

3 JUDGE SMITH: You have not demonstrated, however,
4 that you are entitled to any notice.

5 MR. THOMAS: I think that as a party who is
6 willing to, and had signed previously, proprietary agreements
7 and information is being developed between two other parties
8 to the proceeding, I think that due process entitles us to
9 notice of those meetings and the right to attend and
10 find out what this information is before they choose to
11 reveal it either piece-meal to their prefiled testimony
12 or not even through cross-examination, such as the letter
13 which we discovered existed, and other matters such as
14 that.

15 JUDGE SMITH: In the sense that you were denied
16 full discovery opportunity, is that how you make it? We
17 have no jurisdiction over the staff outside this proceeding.

18 MR. THOMAS: I understand that. It is in the
19 nature of a discovery and notice objection to the development
20 of, you know, in February of information which was going
21 to be presented here in March or through the course of --
22 the later course of the hearing and of which we had no
23 notice at all, or I didn't as counsel for the intervenors.

24 JUDGE SMITH: The scheme of discovery, as we
25 explained in our ruling on discovery against the staff,

1 depends, in large part, upon self-help by the parties.
2 They are expected to monitor the public document room and
3 use the Freedom of Information Act and that type of access.
4 Meetings that were held in private and in secret do tend
5 to frustrate the parties' discovery rights. I think you
6 are right about that.

7 If matters of substance are being decided in
8 this hearing, in proprietary secret meetings, then you
9 are being frustrated in your discovery efforts.

10 On the other hand, if you are going to be urging
11 in your proposed findings that there was hasty, deliberate
12 fix and ask us to ignore relevant evidence, should we do
13 that? Are you really asking us to ignore relevant evidence,
14 evidence relevant to that?

15 MR. THOMAS: No, I am not asking you to ignore
16 evidence relevant to that. I think that a meeting in
17 early February is, you know, further evidence of the hasty
18 nature of the fix. But I would have liked -- it is a
19 discovery type of objection, you know, to the fact that
20 these are secret meetings, they are exchanging proprietary
21 information which formed the basis for their testimony,
22 and we don't know anything about this until it arises at
23 the hearings.

24 JUDGE SMITH: You have presented us with a
25 Hobson's choice here, and I think you really want us to

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4 that you are entitled to any notice.

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22 and we don't know anything about this until it arises at
23 the hearings.

24 JUDGE SMITH: You have presented us with a
25 Hobson's choice here, and I think you really want us to

1 -- you sit there making a motion to strike.

2 MR. THOMAS: Yes.

3 JUDGE SMITH: Isn't it the practice for the
4 staff to document even proprietary meetings?

5 MR. GOLDBERG: Let me make a comment. As a
6 matter of policy and policy alone, the staff has a practice
7 of inviting parties to a litigation to observe safety
8 or environmental review meetings conducted during the
9 course of the staff's review of an application with the
10 particular applicant.

11 Now, I did not attend a meeting in February or
12 otherwise, and I don't know really the office within the
13 staff that initiated the meeting. I do not know whether
14 or not there was notice of the meeting. I would assume,
15 as is the practice, that there will be a summary of any
16 meeting.

17 I also think that the last line of questions
18 concerned a March meeting, if I am not mistaken. Now,
19 there may have been a meeting also described by Mr. Timmons
20 in February. To the extent there was a February meeting,
21 the testimony here was filed in February and revealed,
22 I would assume, whatever it was, the status of the
23 modification proposal at that time.

24 Now, to the extent that that proposal has undergone
25 further evolution, I think that the parties endeavor to

1 reflect that in revisions to their testimony as soon as
2 they can.

3 But I do not know really any of the specifics
4 of those meetings other than that they were non-plant-
5 specific. They were in the context of their safety review
6 of a problem that is not unique to Byron with a vendor, and
7 it was proprietary.

8 Now, it might have been desirable, if there was
9 not notice, to at least apprise the parties that such a
10 meeting was going to be held. But unfortunately, I just
11 was not involved at that stage to --

12 JUDGE SMITH: The evidence of the meeting is
13 being offered more for the fact of the meetings rather than
14 for the substance of them? Is that correct?

15 MR. GALLO: That would be my position.

16 JUDGE SMITH: With regard to the substance of
17 them, we have had a lot of testimony as to what the
18 substance of the recommendations are. As to the fact of
19 the meeting, we cannot always assure perfect justice,
20 and I just do not believe that we should exclude the fact
21 of the meetings into evidence because of the point that
22 you make.

23 MR. GALLO: May I be heard one moment?

24 JUDGE SMITH: Yes, please.

25 MR. GALLO: Mr. Thomas is complaining about the

1 deprivation of discovery, and while the discussion has been
2 going on, I have been going through the depositions taken
3 of Ms. Chavez on February 8, 1983.

4 In the course of her questioning, she asked --
5 one of her questions was, "Will the Westinghouse proposed
6 modifications be submitted to the NRC for review?" "Do
7 you know if there has been an NRC review of the tube
8 vibration problem specifically at the Krsko plant?"

9 Answer: "Certain NRC personnel have attended
10 review meetings at which the tube vibration issue for the
11 Krsko plant was discussed."

12 Here was discovery going on in place.

13 JUDGE SMITH: In view of that, does that affect
14 your position?

15 MR. THOMAS: No, it really doesn't, Judge.
16 That's true, and I was present at those depositions. I
17 was present with Diane Chavez when Mr. Timmons was deposed.
18 We were in Pittsburgh maybe the very same week that the
19 meeting was going on. In fact, Dr. Rajan was in Pittsburgh
20 for those depositions, too. I don't know whether the
21 meetings took place around those depositions or not.

22 But, Judge, if you look at Mr. Timmons' February
23 25th version of his testimony, there is nothing -- while
24 it discusses a possible split flow as a concept and it
25 discusses on page 23, it says, "The concept under

1 consideration includes expansion of tubes at baffle plates
2 at a feedwater bypass." That's all it says. That is on
3 February 25, after this meeting has been held at which he
4 testified today that the 90/10 modification and the
5 expansion of the tubes had already been determined.

6 So we have testimony filed before this Board
7 some weeks after this meeting was held at which the
8 modification was made, and that testimony does not include
9 the modification.

10 JUDGE SMITH: Okay. I really am disappointed
11 that we are spending so much time on a matter that I
12 just think tends to be digressive from the substance of
13 the issues involved.

14 Let's just go on, argue it any way you want to
15 in the proposed findings, and we have begun to focus now
16 on meetings rather than on science and technology. I don't
17 think that the technical members of this Board are going
18 to be moved one way or the other about the pace of the
19 meetings.

20 I think we spent too much time on it. Let's
21 just move on.

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1 MR. GALLO: Dr. Rajan, getting back to you con-
2 clusion at the bottom of page 5 of your testimony, do you
3 see it? It says "Based on the staff's preliminary review
4 of the proposed modifications, the objective of minimizing
5 tube degradation associated with flow induced vibration
6 will be accomplished by these modifications," referring
7 to the tube expansion process and the 90/10 split.

8 My question was and still is what is the basis
9 for that judgment? I don't want to know about the meetings.
10 I want to know about the scientific and technical information
11 that formed the basis for that judgement.

12 THE WITNESS: As I pointed out earlier, certain
13 parameters were identified which were used as the basis
14 for arriving at acceptable tube level vibrations, and these
15 were root mean square which is sometimes referred to as
16 RMS, RMS displacements, accelerations and the parameter
17 σ delta which gives an indication of the level of wear that
18 the tube would undergo over the long term.

19 BY MR. GALLO:

20 Q How were you able to determine that those parameters
21 that you have just testified to were reliable?

22 A Initially this was an acceptable level of a
23 quantitative value for each of these parameters when
24 established as being acceptable. Then based on data obtained
25 from Krsko as well as from data obtained from model tests,

1 it was shown that the tubes which are proposed to be
2 expanded will; have values lower than the acceptable values

3 Q Is this the Krsko data and model test information
4 that is reflected in Mr. Timmons' direct testimony? Is
5 that the data you are referring to?

6 A That is the data I am referring to.

7 Q Dr. Rajaan, have you heard anything during the
8 cross-examination of Mr. Timmons and the other members of
9 that panel concerning the flow-induced tube vibration phenomenon
10 that would cause you to change the preliminary judgment
11 that is reflected at the bottom of page 5 of your
12 testimony?

13 A No, I haven't. I maintain that the statement
14 that I have on the bottom of page 5, that stands.

15 Q Maybe I did you a misservice. I characterized
16 your judgment at the bottom of page 5 as a preliminary
17 judgment. Is that a fair characterization or not?

18 A That is a fair characterization.

19 Q Can you tell me what the progress is, if any,
20 with respect to your consultant Argon National Laboratories
21 in reviewing the D4/D5 matter?

22 A Our consultants have regularly been attending
23 meetings on this subject with us and have been providing
24 us with their independent analyses and review of pertinent
25 information. Last Thursday or Friday I believe there was

1 a meeting in Pittsburgh where our consultants were present
2 as observers. This meeting was between Westinghouse and
3 the counterflow steam generator owners group as was stated
4 earlier.

5 So the point I am trying to make is that we are
6 continually getting information and independent evaluations
7 from our consultants at Argon.

8 Q Did advice from your consultants at Argon play
9 any role in your judgment that is reflected on the bottom
10 of page 5 of your testimony, your preliminary opinion?

11 A It essentially confirmed our preliminary conclusions
12 and reinforced the staff's own evaluations and results.

13 Q Who are the consultants at Argon? What is Argon
14 National Laboratory, first?

15 A Argon National Laboratory is a quasi-private
16 laboratory with a large body of scientific personnel which
17 has been engaged in vibration problems for a number of years.
18 They have scientists in this area who have national prominence,
19 who have published extensively in this area and command
20 a great respect both in the academic and the industrial
21 areas.

22 Q Who are the specific individuals involved in the
23 D4/D5 program?

24 A The principal investigators are Dr. Marty Wambsgans.

25 Q How do you spell that?

1 A W-a-m-b-s-g-a-n-s, and Dr. S. S. Chen who is
2 nationally known for his contributions in flow-induced
3 vibrations.

4 Q Did they provide you advice that you relied upon
5 with respect to the opinion reflected on the bottom of
6 page 5 of your testimony?

7 A Yes, they did provide advice.

8 Q Can you tell me in summary form what that advice
9 was?

10 A That advice was that the vibration levels that
11 could be expected with the expanded tubes, as discussed
12 earlier, and with the reduced flow through the main feed
13 nozzle, the vibration levels would result in tube wear
14 which would not reach 40 percent of a 40-year life of the
15 plant.

16 Q The opinion reflected on the bottom of page 5
17 of your testimony, is that a staff opinion or just your
18 opinion?

19 A As far as the flow-induced vibration is concerned,
20 it is my opinion that other aspects of this problem have
21 been reviewed by different branches of the Division of
22 Engineering of which I am a part of, and these were
23 discussed by Mr. Lou Frank during his testimony earlier.
24 These aspects relate to the residual stresses that might
25 be expected in the expanded portions, and Mr. Tad Marsh

1 who looked at the modification from a systems aspect.

2 MR. GALLO: That is all I have, Your Honor.

3 JUDGE SMITH: Mr. Thomas.

4 MR. THOMAS: Yes.

5 CROSS-EXAMINATION

6 BY MR. THOMAS:

7 Q Has the NRC staff itself, excluding for the moment
8 the consulting agreement with Argon, done any testing in
9 this area?

10 A The Division of NRC where I work does not
11 engage in independent testing of its own.

12 Q Has any other division of the staff, to your
13 knowledge, conducted any either scale model tests in this
14 area or tests at any operating plants?

15 A The research arm of the NRC sponsors research
16 efforts at various laboratories where such testing is
17 done?

18 Q With the exception of Argon, where has any testing
19 been done in this area under staff auspices?

20 A Are you specifically referring to tube vibration?

21 Q Tube vibration, yes.

22 A I am not aware of any other laboratory where
23 research on flow induced vibration has been done.

24 Q Other than Argon?

25 A Other than Argon.

1 Q Now when did the staff enter into this consulting
2 arrangement with Argon?

3 A This consulting arrangement was I believe finalized
4 soon after the problem at Ringhals was uncovered. So I
5 would say that the research effort with Argon has been going
6 on every since perhaps June of '81.

7 Q Was this a written agreement?

8 A Yes. I am not aware of the contractual details,
9 but it is a year-to-year effort in which the objectives
10 of the assistance from Argon is defined and we have an
11 exchange of information periodically.

12 Q It is a general consulting arrangement and staff
13 feeds the issues to Argon on a periodic basis as they arise;
14 is that a fair description of the arrangement?

15 A That would be a fair description, yes.

16 Q Is there a particular staff person designated
17 as Liaison with Argon on the tube vibration issue?

18 A Yes. That is myself.

19 Q Was there any written proposal made to Argon for
20 research regarding the tube vibration issue?

21 A Yes, there was.

22 Q Do you have a copy of that with you?

23 A No, I don't.

24 Q Do you know the date of that proposal?

25 A This proposal, as I said, was made in the time

1 frame of June of '81 and then it is a yearly contract which
2 is renewed based on the anticipated level of effort.

3 Q AS a liaison person with Argon on this issue, has
4 Argon conducted any tests at any operating plants regarding
5 the tube vibration issue either domestic or foreign?

6 A Argon has reviewed test information.

7 Q The question was have they conducted any of their
8 own tests?

9 A They do not conduct tests at operating plants.
10 They have looked at raw data from operating plants such
11 as McGuire, Ringhals, Almaraz and Krsko, and based on an
12 evaluation of that raw data have arrived at conclusions
13 which they have conveyed to us. In that sense they have
14 looked at the details of how the information was obtained.

15 Q I understand.

16 A They have visited plant sites. They have looked
17 at the installation techniques of the accelerometers and
18 the data collection techniques. So they are totally aware
19 of how this information was obtained and have made suggestions
20 from time to time on how to improve the quality of the
21 information as well as the type of instrumentation that
22 would best give the required data.

23 So they are very deeply involved in the information
24 gathering system from these plants.

1 from Westinghouse?

2 A My understanding is -- and I mentioned this
3 earlier in my previous testimony -- it is in the time
4 frame of May and June.

5 Q When do you think then you would have the report
6 from Argonne?

7 A Argonne, I do not have fixed firm date from them.
8 Within a week or two of the issuance of the Westinghouse
9 report I would expect to have the evaluation from Argonne.

10 Q Do you know how Westinghouse transmitted that
11 proprietary information to Argonne?

12 MR. GALLO: Objection. Irrelevant.

13 BY MR. THOMAS:

14 Q Was it in writing?

15 THE WITNESS: Shall I respond?

16 MR. GOLDBERG: There is an objection.

17 JUDGE SMITH: What is the question? How did
18 the staff transmit --

19 MR. THOMAS: No. Whether Westinghouse trans-
20 mitted -- he testified earlier without objection that
21 Westinghouse had given Argonne proprietary information
22 with regard to Argonne's review. I simply want to try
23 to find out whether that was transmitted in writing.

24 JUDGE SMITH: I think it is relevant, and I
25 overrule.

1 Q Has Argonne done any of their own scale model
2 tests regarding tube vibration?

3 A They have a single-tube model which can be
4 made -- can be simulated to obtain information on certain
5 aspects of the problem. They have not modeled the kind
6 of models that were discussed by Mr. Timmons in his
7 description of the four test models at Westinghouse.

8 Q What kinds of tests have they performed with
9 the single-tube model?

10 A These are a variety of tests in which essentially
11 the response of the tube is obtained for various support
12 conditions, and such information is used to validate the
13 predictive methods that Dr. Chen and Dr. Wambsgans have
14 evolved -- excuse me -- have developed.

15 Q Have they run any split flow tests on the
16 single-tube model, to your knowledge?

17 A No. As I said, this is a single-tube model
18 which does not look at the preheater geometry and therefore
19 the split flow aspects would not be modeled in such tests.

20 Q Have they done any tube expansion tests on the
21 single-tube model?

22 A No.

23 JUDGE COLE: Is this a computer or an experi-
24 mental model?

25 THE WITNESS: They are both computer models as

1 well as experimental models.

2 BY MR. THOMAS:

3 Q Has Argonne received proprietary information
4 from Westinghouse regarding the tube vibration problem in
5 connection with their research on this issue, to your
6 knowledge?

7 A Yes, they have.

8 Q You indicated in response to Mr. Gallo's -- is
9 it your understanding that Argonne has used their single-
10 tube model essentially to review the proprietary information
11 that has been provided to them by Westinghouse with regard
12 to this tube vibration problem?

13 A The single-tube model that they have used is a
14 tool that they have had for a long time. It was not
15 developed specifically for this purpose. They have used
16 that in a general way to validate the predictions that were
17 provided from the Westinghouse data, by the Westinghouse
18 data.

19 Q Have they reviewed the Westinghouse data in any
20 other fashion?

21 A They have checked the analyses. They have checked
22 the predictive methods. They have compared the raw data
23 with -- they have also reviewed the data in detail to
24 validate the 16-degree model of Westinghouse. The
25 Westinghouse has used data from Krsko to replicate the

1 data in the 16-degree model. And that aspect has been
2 reviewed by Westinghouse.

3 MR. GALLO: Argonne or Westinghouse?

4 THE WITNESS: Excuse me. By Argonne.

5 BY MR. THOMAS:

6 Q In response to Mr. Gallo's question, you indi-
7 cated that you have received advice from your consultant.
8 Was this advice in writing?

9 A This advice -- usually -- so far we have had no
10 detailed formal reports on the fix.

11 Q It is just conversations?

12 A This is telephone conversation, yes.

13 (Counsel conferring.)

14 Q Do you anticipate receiving a written report
15 from Argonne on this subject?

16 A Yes, I do.

17 Q When is that? When are you supposed to
18 receive that?

19 A No date has been set for it. Whenever they
20 complete their review, they will send me an interim report.
21 And of course, we will finalize our report after we have
22 received a report from Westinghouse on the modification.
23 And perhaps at that point it will be issued in the form
24 of a NUREG, as was done with the D2 and D3 fix.

25 Q When do you anticipate receiving the report

1 BY MR. THOMAS:

2 Q You may answer, Dr. Rajan.

3 A Usually, the proprietary information is in the
4 form of copies of viewgraphs made during presentations,
5 and they are made available to Westinghouse soon after
6 their attendance at the meetings. So that is one of the
7 major modes of transmission of information.

8 JUDGE SMITH: Made available by Westinghouse
9 or to Westinghouse?

10 THE WITNESS: Made available by Westinghouse
11 and then made available to Argonne by us, by the NRC.

12 BY MR. THOMAS:

13 Q Just one more question on this. Do you know
14 whether in order to conduct this review did Argonne only
15 have viewgraphs or did they have other detailed data on
16 which to base their review?

17 A As I pointed out earlier, they have looked at
18 copies of raw data which contains -- which was obtained
19 from different operating plants.

20 Q Excuse me. I am talking about Westinghouse,
21 from Westinghouse.

22 A I am sorry, can you repeat that question, please?

23 Q Did Argonne receive from Westinghouse for
24 Argonne's review of the tube vibration issue only viewgraphs
25 or did they have any more detailed data regarding

1 Westinghouse tests in this area?

2 A They have a formal report, which is a proprietary
3 report from Westinghouse, on the D2, D3 modification. That
4 document -- it is actually two large volumes that contains
5 the analytical methods. The data from operating plants
6 includes Ringhals, Krsko, Almarez, and their complete
7 evaluation package. So that that information has been
8 with Argonne for their review, in addition to the copies
9 of the viewgraphs and slides.

10 MR. THOMAS: Thank you, Your Honor. That's all
11 I have of this witness at this point.

12 JUDGE SMITH: Do you have redirect?

13 MR. GOLDBERG: Limited, Judge.

14 REDIRECT EXAMINATION

15 BY MR. GOLDBERG:

16 Q Dr. Rajan, since Argonne was retained as a
17 staff consultant in June 1981, have they had access to
18 all information supplied by Westinghouse to the NRC staff
19 relative to Westinghouse's proposed modifications for the
20 D4, D5 tube vibration matter?

21 A It has been our effort to provide all the
22 information to Argonne.

23 Q You talked about a written Westinghouse report
24 you expected to receive in May or June of this year. Do
25 you recall?

1 A Yes.

2 Q Is that report essentially a memorialization
3 of the oral and other meeting presentations that Westinghouse
4 has made to the NRC?

5 MR. THOMAS: I object to the form of the
6 question. It is awfully leading for his own witness. I
7 would prefer to have Dr. Rajan describe it.

8 JUDGE SMITH: It is unusually leading.

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1 MR. GOLDBERG: I will ask it another way.

2 BY MR. GOLDBERG:

3 Q The written report you anticipate receiving
4 from Westinghouse in May or June, do you know whether it
5 will contain anything more than has already been presented
6 to the NRC orally or in direct oral or written testimony
7 given during this proceeding from Westinghouse?

8 A I have responded to a similar question to
9 Mr. Thomas during my response last week. And as I said
10 then, I repeat, we do not expect any surprises. That
11 information has been made available to us over the last
12 several months. All we expect to see now are specifics
13 of the tubes perhaps that have been completely identified
14 for expansion. But the other details have been provided
15 to us over the past several months. So it is essentially,
16 as you said, it is documentation of previous information.

17 Q Is this why you believe that the Argonne report
18 can follow so closely from the provision of the Westinghouse
19 report to Argonne?

20 A That is essentially correct.

21 Q How long have you been with the NRC, Dr. Rajan?

22 A I joined, as stated in my professional qualifica-
23 tions, I joined the NRC in April of '74.

24 Q Given your almost nine years of employment with
25 the NRC, how would you characterize the level of staff

1 resources devoted to the review of the Westinghouse tube
2 vibration modification?

3 A I have not seen more detailed review of a single
4 component in my nine or so years with the NRC as has been
5 done for this particular item.

6 Q And finally, the nature of the modification itself
7 entails tube expansion and feedwater flow split, is that
8 correct?

9 A That is correct.

10 Q Is there anything unique or complicated about
11 this particular approach to resolving the concern from a
12 technical standpoint?

13 A There were a number of options perhaps available
14 which may have included an internal manifold or perhaps
15 some other techniques for alleviating this problem, but
16 the fix that has been chosen represents the simplest of
17 the solutions and choose the desired results.

18 The flow bypass does not involve any modifica-
19 tion, as has been pointed out. The tube expansion itself,
20 there is nothing new with that. Tube expansions have been
21 performed, expansion of the tube within the tube chute has
22 been performed routinely. There have been no problems
23 associated with residual stresses or other areas with that
24 technique. They have also been performed with sleeving,
25 which we have had considerable experience with.

1 a professional engineer and serve as consultant to a
2 number of different organizations and clients.

3 Q Do you have before you a document entitled
4 "The Prepared Direct Testimony of Dale G. Bridenbaugh on
5 Behalf of the Rockford League of Women Voters Regarding
6 Contention 22 Steam Generators"?

7 A Yes, I do.

8 Q And does that document consist of approximately
9 23 pages plus attachments?

10 A Yes, it does.

11 Q Did you prepare this document?

12 A Yes, I did.

13 Q Are there any changes which it is necessary to
14 make to this document at this time?

15 A Yes. I think that there are several changes
16 that should be made, and perhaps one small clarification
17 that I would like to make too.

18 Q Could you indicate maybe first what the
19 clarification is?

20 A Yes, I will. On page 8 of my testimony at lines
21 19 and -- I am sorry, 18 and 19. This is a listing of
22 the 12 actions that were included in the SAI report that
23 was discussed the week before last. And there is a small
24 typographical error. Lines 18 and 19 should be separated
25 by a space. Those are two different proposed actions. So

1 it is somewhat confusing the way those two lines have been
2 put together. So there should be a space between them,
3 although the words do not change at all.

4 JUDGE SMITH: Are these changes reflected on
5 the copy for the reporter?

6 THE WITNESS: No, sir, that particular change
7 is not reflected on the copy. All of the other changes --

8 JUDGE SMITH: Will you see that it is?

9 MR. THOMAS: Yes, I will, Judge. It is a spacing
10 problem. is what it really is.

11 JUDGE SMITH: I just drew a line through it and
12 indicated that was a space.

13 MR. THOMAS: I will do the same on the copies
14 for the record.

15 JUDGE SMITH: I drew the line between them and
16 indicated it was a space.

17 BY MR. THOMAS:

18 Q Are there other changes which need to be made,
19 Mr. Bridenbaugh?

20 A There are other changes for which we have
21 prepared revised pages and have distributed some of this
22 to the parties and to the Board, I guess, yesterday.

23 But since doing that, one member of the Board
24 has pointed out to me that there was an error on one of
25 the changes. And so we have revised those changes again.

1 and are prepared to hand them out again now, if they have
2 not already done so. I don't know if they have.

3 JUDGE SMITH: It is simply that you retained
4 the last two lines of your original page 17, is that it?

5 THE WITNESS: What I would propose to do, Your
6 Honor, is describe the change just to make sure it is
7 clear.

8 MR. THOMAS: We will provide corrected copies
9 of these.

10 THE WITNESS: There is a set of pages which we
11 had revised. There are four such pages: pages 14, 17, 19,
12 and 23. I have attached to those four pages the cover
13 page of the testimony, which says at the bottom "Revised
14 April 27, 1983," that have previously been identified as
15 Revised April 22. The 22nd date has been marked out, and
16 the date April 27 has been written in over it.

17 MR. THOMAS: May the record reflect that I am
18 distributing the four page packet that Mr. Bridenbaugh just
19 referred to, which has a Revised April 27, 1983, date at the
20 bottom of it.

21 JUDGE SMITH: Is it in the testimony that the
22 reporter is going to receive?

23 MR. THOMAS: We will take care of that now that
24 we have these corrected pages.

25

1 BY MR. THOMAS:

2 Q Are there any other changes which you wish to make?

3 A The only other changes that I should perhaps add
4 is that in these four pages that have been handed out, I
5 have subsequently, after listening to the testimony and
6 reflecting on what has been said here, I have made two
7 further changes, one on page 19 that has been handed out,
8 and one on page 23 because I felt that perhaps it was not
9 too clearly stated on that page.

10 The change on page 19 is at the top of the page
11 and discusses the water chemistry procedures. At the time
12 that I wrote the testimony, I had not heard the testimony
13 of the applicant and of the NRC on the EPRI guidelines.
14 And I felt that the statement that I had included on lines
15 1, 2, and 3 at the top of that page, I felt it was perhaps
16 overstated. And so I have revised that to indicate that.

17 There has been assurance provided. But I do
18 not consider it has to be complete, given this is such an
19 important issue.

20 The changes that I have made on page 23 are
21 merely to add clarification so that it is clear what I
22 was referring to in the recommendations that I have made.

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end 25

1 Q With those changes would that constitute your
2 testimony in this case?

3 A Yes, it does.

4 Q Other than those changes, have you reviewed this
5 testimony and it is true and accurate?

6 A Yes, I have, and yes, it is.

7 MR. THOMAS: Your Honor, at this time I would move
8 to admit Mr. Bridenbaugh's direct testimony into evidence
9 in this proceeding.

10 MR. GALLO: Objection.

11 JUDGE SMITH: I think you should identify how
12 many attachments there are and the number, Attachment A
13 through ---

14 MR. THOMAS: Fine.

15 BY MR. THOMAS:

16 Q Mr. Bridenbaugh, would you identify the number
17 of attachments and the title of each attachment and how
18 it is designated in your testimony?

19 A Yes, I will. The list of attachments is contained
20 on the third page following page 23. Those pages were
21 not numbered, but there is a listing of some six attachments
22 on that page. They are identified as A through F.

23 Attachment A is my resume. Attachment B is ---

24 JUDGE SMITH: That took care of it. I just wanted
25

1 to make sure that the quantity of attachments is accounted
2 for.

3 MR. THOMAS: Okay. With that I would then move
4 its introduction into evidence.

5 JUDGE SMITH: All right, Mr. Gallo.

6 MR. GALLO: Judge Smith, I have a series of
7 objections that fall into three categories. The objections
8 essentially address themselves to various of the attachments.
9 If the objection is sustained with respect to the attachments,
10 then portions of the first 23 pages of Mr. Bridenbaugh's
11 testimony should also be stricken.

12 What I propose to do in order to make this as
13 simple as possible is to make the objection to the attachment.
14 If the objection is sustained, I will then pursue the
15 effort to strike what I believe to be the portions of
16 the Bridenbaugh testimony, the first 23 pages that necessarily
17 have to be stricken if indeed the attachment is also
18 disallowed into evidence.

19 In order to save time, I will deal with the
20 attachment first and then proceed from there.

21 The first attachment that I am objecting to is
22 Attachment B. Attachment B is an NRC staff policy issue
23 information document dated February 18th, 1982, which
24 was transmitted from Mr. Dircks, Executive Director for
25 Operations to the Commissioners. Attached to the policy

1 issue paper itself is a memorandum from Mr. Dircks to
2 Mr. Minnoque, and attached to that is a document entitled
3 "Steam Generator Status Report," dated February 19, 1982,
4 U. S. Nuclear Regulatory Commission.

5 I will first address the steam generator status
6 report. This report has been the subject of previous
7 objections in this proceeding and was disallowed and was
8 a document to be introduced into evidence or used for
9 cross-examination on the basis that it had no probative
10 value.

11 MR. THOMAS: I object to that characterization.

12 MR. GALLO. I will give everybody a transcript.
13 Page 4587 Judge Smith states "The difficulty is I think
14 I told you that we don't believe the document" referring
15 to the status report" has sufficient probative value to
16 accept it into evidence. Therefore, I do not see how you
17 are injured." That is a statement made to me.

18 On page 4588, again in response to a statement
19 I made, Judge Smith says "I do not see how they could bring
20 it in attached to Mr. Bridenbaugh's testimony if they cannot
21 bring it in as an exhibit qualified by these witnesses."

22 The colloquy continued.

23 Finally on page 4593 Judge Smith rules. "Your
24 offer of the status report is rejected."

25 Now based on that law of the case, I am objecting

1 to the admission of this status report as a part of
2 Mr. Bridenbaugh's testimony.

3 I have a further objection on hearsay grounds,
4 but I do not think it is necessary to get into that.

5 MR. THOMAS: Judge, my recollection on that
6 earlier colloquy, and I do recall exactly when that took
7 place with regard to the cross-examination of the staff
8 on this same report. I don't think that there is any
9 law of the case established around this document.

10 Again, not having these transcripts, I think that
11 you rejected saying without prejudice to renew it, and I
12 then later decided not to renew it.

13 I think that the important matter here is rather
14 than discussing whether this is law in the case, is to get
15 to the merits of the issue on this matter and whether it
16 is properly submitted as an attachment to Mr. Bridenbaugh's
17 testimony to place his testimony in context.

18 I submit to the Court or to this Board that,
19 first of all, Mr. Bridenbaugh in his testimony simply refers
20 to the report as an historical survey of the background
21 of the steam generator tube integrity problem in connection
22 with his discussion of it as an unresolved safety issue
23 which it is.

24 Furthermore, I think it is an NRC document, and
25 I think it is certainly the type of document that experts

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1 such as Mr. Bridenbaugh ordinarily and customarily rely
2 on either as forming background for their opinions or as
3 providing an historical background or basis for the history
4 of the problem that he is discussing and that is all that
5 the report is submitted for.

6 We certainly are not going to ask this Board to
7 base findings upon the steam generator status report. I
8 said we are not going to ask the Board to do that. It is
9 difficult to discuss the issue without placing it in some
10 sort of historical context.

11 All of Mr. Hitchler's use of the PRA, which is
12 not introduced into evidence, but of which selected ---

13 JUDGE SMITH: That is entirely different.

14 MR. THOMAS: He prepared that report.

15 JUDGE SMITH: Yes. If Bridenbaugh had prepared
16 this report, you would have no difficulty.

17 MR. THOMAS: Mr. Bridenbaugh is testifying as
18 an expert. I don't think that that distinction is particularly
19 persuasive in the context of the testimony of an expert.

20 JUDGE SMITH: Let's look at his testimony.

21 MR. THOMAS: Can I just finish. That is that
22 Mr. Bridenbaugh could have included all of these statements
23 in his testimony without referencing it to the status report
24 or without attachment the status report to his testimony.

25 The fact that it is attached to his testimony

1 I think simply illustrates his testimony and places it
2 into context.

3 MR. GOLDBERG: Judge, can I be heard on this?

4 JUDGE SMITH: But I would like to remember to
5 come back to Mr. Thomas and let's see what type of expert
6 opinion Mr. Bridenbaugh has formed and expressed based upon
7 this document. I am not saying that when we come to that
8 that it will solve the problem. We indicated the weakness
9 of this document and I would like to see what kind of
10 expert opinion he is offering to us predicated upon this
11 document.

12 MR. THOMAS: Fine.

13 JUDGE SMITH: So let's finish this point.

14 MR. GOLDBERG: Sure.

15 MR. GALLO: I think the most critical point in
16 his testimony is at page 17.

17 MR. THOMAS: Let's begin at the beginning. It
18 is first referred to on page ---

19 MR. GALLO: Page 6.

20 MR. THOMAS: Yes, page 6, where he is discussing
21 the problem of steam generator tube degradation having
22 been designated as an unresolved safety issue, and he discusses
23 the Ginna event and then refers to the attachment and indicates
24 that the document discusses the history of steam generator
25 tube degradation and its designation as a USI by the NRC,

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1 and then a general description of what the document is.

2 It is attached to indicate the type of concerns
3 that led to its designation as an unresolved safety issue.

end 26 4

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1 The designation of the integrity, steam generator
2 tube integrity, forms an integral part of his testimony and
3 his opinion that Byron should not be permitted to operate
4 until this safety issue has been resolved.

5 JUDGE SMITH: Would you tell me again where the
6 second mention of it is?

7 MR. THOMAS: I think Mr. Gallo mentioned page 17.

8 MR. GALLO: It is referred to at pages 6 and 7,
9 as indicated by Mr. Thomas. And that is really on page
10 6. It starts with line -- I believe, line 2. And it goes
11 all the way over to page 7 through line 10.

12 MR. THOMAS: That is what I just discussed.
13 The reference on page 17 is merely, "What actions has CECO
14 taken to overcome the generic tube degradation problems
15 described in the letter?" That is the only reference I
16 see on page 17 at all.

17 MR. GALLO: There is another reference on
18 page 11, lines 18 and 20.

19 MR. THOMAS: I think the germane discussion is
20 the one.

21 MR. GALLO: There is another one on page 12,
22 lines 11 through 15.

23 MR. GOLDBERG: Judge, I do not believe there
24 is any basis to depart from the Board's initial determination
25 when the staff witnesses were testifying that the document

1 is without probative value and should not be admitted for
2 evidentiary purposes. I am not entirely clear, with
3 Mr. Thomas' representation that he intends to make no
4 findings from the document, why it must be introduced into
5 evidence.

6 But looking at the witness' answer, which
7 continues on page 7, to which our attention has been drawn,
8 particularly lines 5 through 10, it purports to summarize
9 the contents of the particular document. And it seems to
10 apply some purpose beyond a mere historical summary of the
11 steam generator tube degradation phenomenon. Particularly,
12 it talks about -- it attributes the document the status of
13 current regulatory approach, corrective action under way,
14 and implication of active consideration of a significant
15 change to the regulatory requirements governing the licensing
16 of Westinghouse and other affected reactors, all of which
17 I think, given the direct testimony of staff witnesses on
18 the steam generator contention, does not reflect present
19 staff positions as they relate to the matters in controversy
20 in this proceeding.

21 We have direct testimony on the contentions at
22 issue from the staff members. And I believe they charac-
23 terized the document as much in the nature of a resource --
24 a research document. Now, because it is an NRC document,
25 some of the traditional problems with reliability are

1 absent, although the document is clearly hearsay.

2 JUDGE SMITH: I disagree with you with respect
3 to reliability. You have to bear in mind the purposes for
4 which the document was prepared.

5 MR. GOLDBERG: Yes.

6 JUDGE SMITH: That is what we are going to
7 have to look at.

8 MR. GOLDBERG: I am just saying that certainly
9 it is a hearsay document, but its character as an NRC
10 document may remove some of my strenuous objections to its
11 receipt on purely hearsay grounds. I would rather rely
12 on the grounds that it is not relevant as indicated by
13 the testimony of the staff witnesses, given the issue at
14 hand here and the -- and then the fact that we are trying
15 to issue in April of 1983 and not February of 1982, when
16 there has been an evolution in the staff deliberation on
17 this issue, and also that even assuming it has some relevance,
18 that it is not probative, particularly when you have the
19 fact that we have direct testimony from cognizant members
20 of the staff who subjected themselves to cross examination
21 on their professional opinion as relevant to the contentions
22 at issue.

23 And I think when you combine those factors, it
24 just really ought not be given any evidentiary status in
25 the case. I am not really sure why it must necessarily be

1 introduced into evidence if it is only of historical
2 importance to the witness. And I am not so sure that of
3 his own expertise, that he could necessarily come to the
4 same observation, statement, or opinions that are repre-
5 sented in there.

6 So I am not sure that I agree with Mr. Thomas
7 that a shorthand way of doing it would have been just to
8 have this witness recite the contents of the document and
9 adopt it as his own opinions.

10 JUDGE SMITH: You are not offering this as a
11 shorthand method of getting Mr. Bridenbaugh's own opinions
12 into evidence? There are many things in here that he
13 simply could not of his own knowledge know about.

14 MR. THOMAS: No. I am not -- no, I am offering
15 it for the purpose I indicated, which is not that purpose.

16 JUDGE SMITH: Excuse me?

17 MR. GALLO: I would like at some appropriate time
18 to be heard on the hearsay objection that I made. I did not
19 offer argument because I thought the law of the case might
20 carry the day, but it appears it won't. So I would like
21 to be heard on the hearsay point.

22 JUDGE SMITH: We would not accept it when
23 better-qualified witnesses were here. And now I am trying
24 to fully explore all of their points.

25 (Discussion off the record.)

1 JUDGE SMITH: I want you to explain again why
2 you have to have this in evidence. You are not going to
3 make findings on it. Are the people who make judgments
4 in this case going to be allowed to look at this document?

5 MR. THOMAS: Yes.

6 JUDGE SMITH: What are they going to do with it?

7 MR. THOMAS: They are going to understand from
8 that document why -- the types of concerns that have led
9 the NRC to designate this as an unresolved safety issue,
10 which it still is at the present time.

11 JUDGE COLE: We already know that.

12 MR. THOMAS: Pardon?

13 JUDGE COLE: We already know that.

14 MR. THOMAS: If you know that, that is fine.

15 But I think it is also useful to have a statement in the
16 record regarding why this is an unresolved safety issue.

17 Now, Mr. Goldberg says that it is no longer the
18 staff position. I disagree with his characterization of
19 the testimony. My recollection of the testimony the previous
20 two weeks ago was that NRC has not arrived at a final
21 position.

22 JUDGE SMITH: The very argument, however,
23 demonstrates the problem because the authors of this document
24 are not here to demonstrate whether it is still the staff's
25 position or not.

1 MR. THOMAS: It is still an unresolved safety
2 issue.

3 JUDGE SMITH: That can be stipulated.

4 MR. THOMAS: This is a statement of the reasons
5 why it is an unresolved safety issue. Now, whether those
6 reasons are still valid or not is a matter for the Board
7 to determine; it is a matter for, I suppose, for the staff
8 to review. But I see absolutely no reason why it is so
9 provoking to have a statement of those reasons in the
10 record. Let's face it, it is an unresolved safety issue,
11 and there are reasons for it.

12 JUDGE SMITH: We understand that. We understand
13 the importance of the subject matter of the attachment.
14 We have been hearing evidence on it. There is no question
15 about that. Every time we come to a possible basis upon
16 which we can get it in, it just seems to wisp away to
17 nothing.

18 He does not make scientific judgments based upon
19 it, do you, Mr. Bridenbaugh? Do you make evaluations as
20 to the adequacy of fixes based upon this?

end 27

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1 THE WITNESS: In this testimony I do not.

2 JUDGE SMITH: You do not.

3 THE WITNESS: I included it as an attachment to
4 my testimony for a number of reasons, one of which is it
5 has generally been my practice when I write testimony to
6 try and include a package that is understandable on its own.

7 The other reason, however, is that I have been
8 involved in looking at this problem for a number of years.
9 I first looked at the issue of multiple-tube ruptures
10 when I was doing some work on the Sun Desert plant back in
11 '77. I could have incorporated in my testimony historical
12 summary of the issue based upon my own information. I
13 could obviously not have reported what the staff's
14 perception of the problem is, because I do not work with
15 the staff. And so there are some factors in there that
16 I could not directly report, but I felt that this was a
17 good summary of the background of the issue and put the
18 whole thing in perspective.

19 JUDGE SMITH: If this report had been written
20 in such a way that Mr. Bridenbaugh could adopt it as being
21 consistent with his own memory and his own experience and
22 his own observations over the years of watching the problem,
23 then it would be exactly that, a shorthand way of getting
24 his views into the record.

25 But it is obvious that there is information in

1 here, mixed in it inextricably, which are not the product or
2 not parallel with his own observations, his own experiences,
3 and his own knowledge.

4 The only way he can know about it is because they
5 are here. So that takes us necessarily to the reliability
6 of the document. And you say you are not going to use it
7 for proposed findings. Well, then it should not be in,
8 really. It should not be in if you are not going to use it.
9 It shouldn't be in, because when it is in, the people who
10 do decide things may possibly look at it, miss your point,
11 and use it for findings.

12 It is one of our responsibilities to exclude
13 from the record information which is not suitable for
14 decisions.

15 Now, Mr. Goldberg seems to be concerned about
16 disparaging the reliability of the document prepared by
17 competent people in the Commission. It is not whether the
18 document is reliable for the purpose for which it was
19 prepared. The document was prepared, as I can see it,
20 as strictly a background or for the Commissioners, I think
21 for Commissioner Bradford, as mentioned in here, and the
22 chairman, so that they have general background information.
23 But it was not submitted to the Commission for them to
24 make any judgments on any adjudication or any rulemaking
25 or any directions of the staff or anything else, because

1 they don't work that way. They are going to make a judgment
2 in this case based upon evidence of record.

3 So that is the element of unreliability: that
4 the Commissioners were entitled to have a brief summary of
5 the problem as a backgrounder so that they could attend
6 to it with a general overview, but they would not make --
7 in our view, they would not make any specific official
8 judgments based upon this document.

9 Even if they were, we certainly are not permitted
10 to make findings or judgments based upon a summary overview,
11 anonymous -- I don't know if it is anonymous -- yes, it is
12 anonymous -- document. If they wish, if the Commissioners
13 wish, at some later time to call upon their collective
14 memories of this background in deciding anything before
15 them, that is their prerogative. But we don't have that
16 privilege.

17 MR. THOMAS: I do not see how the fact that it
18 was prepared for a background is unreliable. I don't see
19 any indication of unreliability in the document at all.

20 JUDGE SMITH: I notice there are virtually no
21 references in it. Hardly any. There are some, although
22 we did rule against Mr. Gallo with respect to Part 9,
23 it being privileged because it was submitted at a Commission
24 meeting.

25 One of the very problems anticipated in that

1 regulation is present here. And that is, information
2 given to Commissioners as general direct Commissioner
3 information should not be distorted and used for other
4 purposes.

5 MR. THOMAS: I don't think I am trying to use
6 it for another purpose. I don't quite understand the
7 concern about misusing this for findings. This Board is
8 going to make the findings here. Right? The Board is the
9 finder of fact here, and you are not going to use it for
10 something that the record clearly demonstrates it is not
11 intended to be used for. The record is very clear on the
12 point.

13 I really don't see any possibility of its being
14 misused unless somebody simply ignored the entire record or
15 the record of this testimony. And furthermore, Judge, I
16 just don't think there is any demonstration that the report
17 is not reliable. It discusses events, in large measure,
18 that we have discussed here, Ginna and so forth. And
19 finally, we have some --

20 JUDGE SMITH: It is reliable only for the limited
21 purpose for which it was prepared.

22 MR. THOMAS: I don't wish to argue ad infinitum.
23 But I don't think that whatever the purpose for which the
24 report is prepared makes it necessarily reliable or
25 unreliable. I think you have to judge the report on its

1 merits.

2 And finally, I just wish to point out that
3 Mr. Bridenbaugh's testimony is based to a certain extent
4 on tube degradation being an unresolved safety issue, and
5 in that sense, this does -- but only in that sense -- this
6 does form one of the bases of his testimony.

7 JUDGE SMITH: I am not aware of any traditional
8 rules of evidence which would allow such a report to be
9 accepted absent a sponsor for it, except where you have
10 other elements, other elements assuring reliability. And
11 that is where I fall short because those elements are not
12 there because of the purposes for which it was prepared.

13 It is, as counsel has said, it is hearsay,
14 hearsay, hearsay. And it does not contain any of the
15 elements which gives an exception to the hearsay rule,
16 and that is an overriding demonstration of reliability.
17 There is nothing that Mr. Bridenbaugh brings to this
18 document which gives it any more reliability than it would
19 have without his testimony that I am aware of, except his
20 general statement that it comports with his own experience,
21 which we could possibly accept. If there were not too many
22 extraneous matters in here, we could possibly resolve this
23 to everybody's satisfaction by giving -- maybe this is our
24 solution -- if Mr. Bridenbaugh, in good faith, believed that
25 this document would save -- would demonstrate his own

1 knowledge, and now he finds at this moment that it will not,
2 perhaps we can give him the opportunity himself to narra-
3 tively explain what he sees to be the history of the
4 AAA-3 USI.

5 I can understand why there might be some
6 objections to that, but I think some accommodation should
7 be made. We know from our own knowledge that Mr. Bridenbaugh
8 has been a close observer of nuclear engineering, nuclear
9 problems, and has expertise in the area because of that.
10 And maybe we can accept that. But he cannot cloak himself
11 with the expertise of this anonymous author, nor can this
12 anonymous author be cloaked with Mr. Bridenbaugh's expertise.

13 MR. GOLDBERG: Just one or two brief points on
14 this. Number one, I did not mean in my arguments to
15 overstate the fact that in no way might some of the content
16 reflect current staff position. I did not mean to say that.
17 What I meant to say is that we have direct staff testimony
18 and witnesses on the matters in controversy, and that to
19 the extent they disassociated themselves from any of the
20 statements or opinions in the particular document in question,
21 I will let the record reflect that.

22 JUDGE SMITH: I do not regard that as a fatal
23 aspect of the document. The document could be received in
24 that it reflected staff opinion as of February 18, 1982,
25 and we would take that into account. I am saying it is not
reliable for that.

1 MR. GOLDBERG: I just did not want to leave the
2 impression that I am saying that none of the contents of
3 this reflect current staff position. I think there is
4 testimony that it was a research document and I think the
5 cognizant branch that developed this report, RES, is the
6 Research Branch within the NRC which reflects that fact.

7 I guess, finally, we already had a staff discussion
8 and exploration of the genesis of the USI A3 safety issue
9 and I do not think we need a collateral document to provide
10 that information, and I believe Mr. Bridenbaugh was present
11 when that discussion was undertaken by Mr. Frank and his
12 other co-panelists. It really adds nothing and has no
13 probative value.

14 I do not think we have been given a reason to
15 depart from the Board's earlier ruling where we had staff
16 members through whom the document was attempted to be
17 introduced and had the document rejected.

18 JUDGE SMITH: Yes. I think that as far as
19 reliability of the document is concerned, that point is
20 correct, but we had to give Mr. Bridenbaugh an opportunity
21 to demonstrate that there is a different and a better basis
22 for accepting it.

23 Mr. Gallo.

24 MR. GALLO: Judge, two short comments.

25 On the hearsay question, the bottom of my basis

1 for hearsay does not run as much to reliability as it does
2 to the fact that I am unable to cross-examine the authors
3 of this report and probe the truth or falsity of the
4 statements made in the status report.

5 It is clear, despite counsel's contrary indications,
6 that Mr. Birdenbaugh's testimony is offering the status
7 report for the truth or falsity of the document. There
8 are two instances I would point out to substantiate my
9 statement.

10 On page 7 he says "The status report implies
11 active consideration of significant changes to the regulatory
12 requirements governing the licensing of Westinghouse and
13 other affected reactors." He is making a factual statement
14 based upon the truth or falsity of that same implication
15 in the status report.

16 Secondly, on page 17 he answers a complete
17 question which is "Based on what actions has Commonwealth
18 Edison taken to overcome the generic tube degradation problems
19 described in Attachment B?" You have to go to Attachment
20 B to make any sense out of the question, and then the answer
21 ensues.

22 I think for those reasons it is clear, at least
23 in these two areas I have identified that Attachment B,
24 the status report, is being offered for the truth or falsity.

25 I am being prejudiced here because I am unable to probe

1 the truth or falsity of the status report because we do
2 not have a proper sponsoring witness for that report.

3 JUDGE SMITH: I used reliability in a sense that
4 I do not think you appreciated. We begin with a rule that
5 we do not accept hearsay evidence unless there are separate
6 elements of reliability which overcome the rule against
7 hearsay evidence.

8 I am not saying that this document was not reliable
9 for the purpose for which it was prepared.

10 MR. GALLO: I understand.

11 JUDGE SMITH: The author, I am sure, has -- all
12 of us write, and we write for background and we write with
13 less care and less precision because we know that the
14 individual specific statements in our writings are not
15 going to be taken for anything other than the purpose of
16 the writing, that is background.

17 MR. GALLO: Even if the other elements were
18 present to make this document reliable, I would still be
19 deprived of my cross-examination right. That is my point.

20 Finally the suggestion that you made, Judge, about
21 giving Mr. Bridenbaugh an opportunity to recoup because
22 of the way he used the report, I guess I have got three
23 observations.

24 One is that this is a problem that should have
25 been provided in advice to Mr. Bridenbaugh when his

1 testimony was reviewed. Legal counsel normally picks
2 up this problem in the review of testimony in draft form.

3 Secondly, intervenors were on notice of this
4 problem on April 11 or 12, whatever the day was that we
5 argued this point. They were on notice of the Board's
6 ruling. There has not been this instant surprise.

7 If the Board deems it appropriate to give
8 Mr. Bridenbaugh an opportunity to revise his testimony to
9 remove the objections to Attachment B, I would request
10 instead of him being permitted to do it orally now, that
11 he step down, revise his testimony, submit it in written
12 form and be recalled back when we come back in May, May
13 23rd, during that week.

14 I think there is ample basis just to go forward
15 and strike the attachment and strike the imperfect provisions
16 of this testimony.

17 That is all I have to say on that point.

18 MR. THOMAS: If you are going to rule, I would
19 like to say two things before you rule.

20 JUDGE SMITH: All right, proceed.

21 MR. THOMAS: No. 1, there is no law in the case,
22 and I think it is misleading to cite it to the Board. The
23 Board did make the statement on page 4593 "So your offer of
24 the status report is rejected." As I indicated to the Board
25 at that time, I was not offering the status report. I never

1 did offer the status report at that time. I asked to have
2 it marked for identification ---

3 JUDGE SMITH: I am not concerned about that
4 technicality. Mr. Gallo did read the observations that
5 the Board made at the time you were identifying it and under
6 the assumption that it was to be offered.

7 In comments on the next page you say: Judge Smith:
8 "Look if this report were being offered against you by the
9 staff witnesses, that were here, you would just win hands
10 down. They could not get that in and you know that."

11 MR. THOMAS: Judge, in my experience, and this
12 is the second thing I wanted to say, in my experience experts
13 are customarily allowed to testify at least in part on the
14 basis of hearsay reports.

15 JUDGE SMITH: And he is welcome to testify. It
16 has to be reliable. if he testifies, and there has to be
17 equilibrium there, if he testifies based upon unreliable
18 hearsay information, what does that do to his expertise?

19 MR. THOMAS: The Board gives his opinion no weight
20 and that is the answer to Mr. Gallo's confrontation objection,
21 which is that that is the other side of the coin for
22 experts. If experts are going to rely on document which
23 the finder of fact considers to be not reliable or what-
24 not, they don't give his opinion any weight. That is really
25 what Mr. Gallo's objections are going to is the weight to

1 be given to Mr. Bridenbaugh's opinion and not the admissibility
 2 of the documents underlying that opinion.

3 JUDGE SMITH: I think the Board is ready to consult.

4 (Board conferring.)

end 29

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HEMILOCK
 ERASABLE
 COTTON CONTENT

1 JUDGE SMITH: The objection to Attachment B is
2 sustained. However, we do wish to afford Mr. Bridenbaugh
3 a reasonable opportunity to amend his testimony so that
4 he can include his historical perspective as he sees it.
5

6 I think there have been administrative proceedings
7 in which the tries of fact are much more lenient in accepting
8 evidence than maybe this Board has been, and I think that
9 Mr. Bridenbaugh was not negligent in anticipating that this
10 might be accepted as basckground, historical background
11 for his testimony.

12 So if that can be cone without undue burden and
13 delay in the proceeding, we want to afford that opportunity,
14 but the document itself is hearsay and is not sufficiently
15 reliable because of the purposes for which it was prepared
16 to overcome the hearsay rule.

17 Nothing happened today to change our ruling when
18 it was offered when there was a staff panel here.

19 I would think also that Mr. Birdenbaugh should
20 be able to amend his testimony with an historical overview
21 which really would not require him returning here to be
22 subjected to cross-examination. Cross-examination is not
23 the only way ever invented to address and confront somebody
24 else's testimony.

25 Let's see what the parties can work out.

1 Incidentally, the value of Mr. Bridenbaugh's
2 historical overview of the problem is not going to be
3 the turning point for us to decide the issue. This is a
4 technical issue, a scientific issue.

5 MR. GALLO: I have further objections.

6 MR. THOMAS: I would like to hear all of them
7 to the attachments.

8 JUDGE SMITH: Do you want to go to the narrative
9 now? Isn't there a shortcut to that having heard the ruling?
10 Can we move on to the next attachment and work out with
11 counsel what has to be taken out of the body of the report?

12 MR. GALLO: I am willing to do that.

13 MR. THOMAS: So am I.

14 JUDGE SMITH: Let's go on to the next attachment.
15 Then the testimony will have to conform.

16 MR. GALLO: The next one is Attachment C.

17 JUDGE SMITH: Which attachments in all are you
18 going to challenge?

19 MR. GALLO: Attachment C and Attachment E.

20 MR. THOMAS: Did you say E?

21 MR. GALLO: Yes.

22 I would like to address my attention to Attachment
23 C. Attachment C is a one-page letter from Darrel Eisenhut
24 addressed to -- I am sorry. I will start that again. It
25 is from Darrell Eisenhut of the NRC staff to all pressurized

1 water reactor plant licensees. The date is not legible,
2 but this letter was the letter that was used by Mr. Eisenhut
3 to try and submit what we call in this proceeding the SAI
4 report to the various PWR licensees.

5 My objection to this letter to be understood
6 therefore has to couple with the way the letter is used
7 in Mr Bridenbaugh's direct testimony. If you look at
8 page 9 of his direct testimony, he states beginning at
9 line 6 "A recent generic letter" -- which is later identified
10 as Attachment C -- "from the NRC communicated to all PWR
11 plant licensees that the SAI draft report is currently under
12 staff review and will be modified to consider multiple steam
13 generator tube ruptures in combination with other events
14 along with single tube rupture scenarios. Presumably a
15 decision will also then be made on which of the proposed
16 requirements will be imposed on licensees:"

17 Now the only place that the mention of multiple
18 steam generator tube ruptures in combination with other
19 events is spoken to is in the first full paragraph of the
20 Eisenhut letter, the last sentence. Nothing in the SAI
21 report refers to that. The letter says "This report is
22 currently under staff review and will be modified to consider
23 multiple steam generator tube ruptures in combination with
24 other events along with single tube rupture scenarios."

25 My objection is that Mr. Bridenbaugh is citing

1 this portion of the letter for the truth and falsity of
2 the statement made in the letter and that presents two
3 problems.

4 First, that it is not clear just in what way
5 Mr. Eisenhut intends this matter to be considered or when
6 he intends the matter to be considered or how he intends
7 the matter to be considered.

8 Mr. Eisenhut is not here as a witness and therefore
9 I am unable to cross-examine him with respect to his
10 understanding of this statement.

11 So to that extent it is a hearsay statement and
12 I am deprived of the right of cross-examination.

13 Secondly, because of the uncertainty, as I pointed
14 out, with respect to this statement, it is really not
15 reliable in and of itself to form a basis for the judgment
16 reached by Mr. Bridenbaugh on page 9.

17 For those reasons I would object to the admission
18 of Attachment C and those portions of Mr. Bridenbaugh's
19 testimony which addresses Attachment C. That happens to
20 be not only on page 9, but also on page 12 I believe beginning
21 at line 16.

22 That forms and completes my objection to
23 Attachment C.

24 JUDGE SMITH: Is there a word missing from the
25 sentence in 9?

1 MR. THOMAS: Communicated is a verb there.

2 JUDGE SMITH: All right.

3 Mr. Thomas.

4 MR. THOMAS: I would like to hear from the staff
5 so I don't get sandwiched on the time between the applicant
6 and the staff.

7 MR. GOLDBERG: I think the letter standing alone
8 really does not have much relevance or probative value.
9 I that Mr. Marsh indicated the contest in which the staff
10 had requested consideration of multiple tube ruptures, and
11 that was in the context of devising emergency operating
12 procedures.

13 Since the context is not apparent just from the
14 covering letter identified as Attachment C, a different
15 implication can be drawn from Mr Bridenbaugh's testimony,
16 however fair he may have understood that inference to be.

17 I think it would have a tendency to lead a proponent
18 of findings or a reviewer of the facts to understand a
19 different staff position than that which has been offered
20 through the direct written and oral testimony of the
21 witnesses that have been presented, and I think for that
22 reason it should not be admitted.

23 MR. THOMAS: Judge, first of all, can there be
24 any doubt that this is Mr. Eisenhut's signature on this
25 letter? This is the cover letter for the SAI report. The

1 entire SAI report has been stipulated into evidence previously.

2 JUDGE SMITH: You are right. This is reliable.

3 His reference to the letter is precise and accurate.

4 Mr. Eisenhut is after all the Director of the Division of

5 Licensing. He did send the letter. The statement is there.

6 It is an unambiguous statement. It is clear. No one is

7 questioning the authenticity or the completeness of it.

8 What has happened since then may be subject to

9 dispute, but the letter is an appropriate basis for

10 Mr. Bridenbaugh's statement and the objection is overruled.

11 MR. GALLO: I would ask for leave to argue for

12 reconsideration.

13 JUDGE SMITH: All right.

14 MR. GALLO: The Board has ruled that they feel

15 that this statement is unambiguous. Obviously I do not

16 agree with that position. I do not intend to reargue that

17 point.

18 JUDGE SMITH: Maybe you better because maybe

19 I missed the point. It seems to me to be a straightforward

20 simply sentence that you can put on a board and parse.

21 MR. GALLO: The sentence says that the report

22 is under review the staff and the report will be modified

23 to consider multiple steam generator tube rupture in combina-

24 tion with other events, et cetera.

25 Now Mr. Bridenbaugh has interpreted it to mean

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that the report will consider it in an affirmative matter.

JUDGE SMITH: You had trouble with the last sentence in his testimony?

MR. GALLO: That is right, the sentence preceding that and the attachment.

end 30

HEMLOCK
ERASABLE
ADJUVIN CONTENT

1 MR. GALLO: My main basis for reconsideration
2 is that the understanding that is to be attached to
3 Eisenhower's statements really ought to be subject to
4 cross examination. Since he has not been proffered as a
5 witness by the staff and intervenors have not sought to
6 subpoena him in order to substantiate the statement, I
7 have lost my right to cross examination. And essentially,
8 I have no way to refute this unless I subpoena Eisenhower
9 myself as a rebuttal witness.

10 JUDGE SMITH: Your concern about what statement,
11 in Mr. Bridenbaugh's testimony are you concerned about?

12 MR. GALLO: You understand what sentence in the
13 Eisenhower letter I am concerned about?

14 JUDGE SMITH: "This report is currently under
15 staff review and will be modified to consider multiple steam
16 generator tube ruptures in combination with other events
17 along with single-tube rupture scenarios."

18 MR. GALLO: Yes, that is the one.

19 JUDGE SMITH: Yes.

20 MR. GALLO: I think that Mr. Bridenbaugh on
21 page 9 essentially cites the report beginning on line 6
22 through line 14, cites that statement in the Eisenhower
23 letter for the proposition that this report will be modified
24 to consider multiple steam generator ruptures, and presumably
25 a decision will be made thereafter.

1 My copy of the Eisenhut letter does not have a
2 date on it, but it is sometime in '82. That is what I
3 can read.

4 Now, we don't know whether Eisenhut ever followed
5 through with his statement in 1982. If he was called as a
6 witness, I might be able to find that out and therefore
7 destroy the inference that is being drawn in the Bridenbaugh
8 testimony.

9 So for that reason, I would reassert that the
10 letters and the testimony surrounding it is objectionable,
11 should not be admitted into evidence.

12 JUDGE SMITH: I see one problem with the Board's
13 ruling that was not addressed. However, without consulting
14 with the other Board members, I believe that the ruling is
15 the same. I recognize that Mr. Bridenbaugh in early '83
16 was almost given a verbatim quote from the generic letter,
17 and that is that the -- the draft report is currently
18 under staff review and "will be modified." And I
19 immediately leaped to the conclusion that there is full
20 support for that in Eisenhut's letter.

21 However, Eisenhut's letter demonstrated the
22 situation that indisputably Eisenhut believed to be
23 prevalent sometime in 1982, and it does not give a strong
24 basis for Mr. Bridenbaugh's April 27, 1983, statement
25 that the multiple steam generator tube ruptures will --

1 that the report will be modified. That I recognize was
2 an oversimplification before.

3 However, notwithstanding that, the letter reflects,
4 in my view, indisputably the simple statement that Eisenhut
5 made at that time of what existed at that time and is
6 reliable.

7 MR. GALLO: What probative value is it if we
8 cannot update it between '82 and the present time of
9 Bridenbaugh's testimony?

10 JUDGE SMITH: I do question the overall weight
11 that this aspect of Mr. Bridenbaugh's testimony can be
12 given. That is another problem. But as far as striking
13 the attachment is concerned, that is where we are now.
14 I have said it. I don't think anybody disputes that it
15 reflects what he believes to be the situation at the time.
16 And the attachment itself is reliable.

17 JUDGE COLE: Don't we have testimony in this
18 record that indicates that they are in fact considering
19 multiple-tube steam generator ruptures? Isn't that in our
20 record right now?

21 MR. THOMAS: Yes.

22 MR. GALLO: Is that your recollection of the
23 record?

24 MR. GOLDBERG: Yes.

25 MR. THOMAS: From the staff.

1 MR. GALLO: The SAI.

2 MR. GOLDBERG: I don't know about the SAI.

3 JUDGE COLE: I remember that being said here.

4 MR. GALLO: The question is, I don't recall
5 whether or not it is being done in connection with, first
6 of all, the resolution of unresolved safety questions and,
7 secondly, whether it is being done in connection with the
8 SAI report. Maybe other counsel can refresh my memory.

9 MR. GOLDBERG: Mr. Marsh did, Judge Cole,
10 testify that it was being considered not to, I think, use
11 his terms, extend the licensing basis but merely to devise
12 more desirable emergency operating procedures, which was
13 really the only point --

14 JUDGE COLE: That puts it in the proper context.

15 MR. GOLDBERG: I think it really is only a
16 contextual point.

17 JUDGE SMITH: We have listened to your argument
18 on reconsideration. And we continue to overrule the
19 objection. However, the observation we made as to the
20 difference in time and Mr. Bridenbaugh's -- the difference
21 in time tense -- is to be considered, but your objection
22 is overruled.

23 MR. GALLO: Your Honor, I have further objection.

24 JUDGE SMITH: D?

25 MR. GALLO: Unlike the first two objections, the

1 best way to get at this one is to go to Mr. Bridenbaugh's
2 testimony. It is E like in "easy." Turning to page 17
3 of Mr. Bridenbaugh's testimony, beginning with the -- I
4 gave the Board the wrong page. Beginning at the top of page
5 13, the top of page 13 and running through page 17, line 18.

6 Beginning with the question at the top of page 13
7 and continuing on through page 14 through page 15 through
8 page 16 up through line 18 on page 17.

9 That entire segment of testimony addresses the
10 occupational exposure matter that might result as a result
11 of installing the modifications to minimize the flow-induced
12 vibration problem at the Byron steam generators.

13 Attachment E contains information compiled by
14 the NRC staff with respect to occupational exposure informa-
15 tion for workers.

16 Now, this issue is no longer an issue in this
17 proceeding because Commonwealth Edison, through witness
18 Mr. Blomgren, has committed that the installation will
19 take place prior to startup. Therefore, the modifications
20 will not involve any radioactive exposure to workers. So
21 therefore, this whole section beginning at the top of page
22 13 through line 18 on page 17 is immaterial to this
23 proceeding and is irrelevant information and irrelevant
24 testimony and should be not admitted into evidence for
25 that reason.

1 And my objection would go not only to the
2 indicated pages but also to Attachment E.

3 JUDGE COLE: Do you mean line 20 on page 17?

4 MR. GALLO: Let me see if I misstated myself.

5 (Pause.)

6 MR. GALLO: No, it is line 18.

7 JUDGE COLE: The middle of a sentence.

8 MR. GALLO: All right. I forgot to take into
9 account the new pages in my objection.

10 JUDGE SMITH: I think this comes down not to a
11 question of evidence so much as a question of litigation
12 positions. What is your response to Mr. Gallo's argument
13 about the relevancy?

14 MR. THOMAS: Can we hear from staff first again
15 so I can respond to the whole panoply of objections?

16 MR. GOLDBERG: I think the relevance point is
17 well taken. Since we have a commitment for a preoperational
18 implementation of the modification, I don't see the relevance
19 of testimony about the occupational dose commitment that
20 might ensue if the modification were undertaken after the
21 plant had gone into operation.

22 I don't have anything to add.

23 MR. GALLO: Let me just answer that Judge Cole
24 is correct. Looking at the new page 17, it is line 20.

25 JUDGE SMITH: Okay.

1 MR. THOMAS: Judge, Mr. Gallo is seeking to
2 accomplish by obtaining rulings from the Board in advance
3 of the cross examination what are properly subjects of
4 cross examination itself. I would note that he is seeking
5 to strike a NUREG as an attachment. That is the genesis of
6 the motion is to strike a NUREG. He proceeds from there
7 to the testimony. A commitment on paper is one thing.
8 The actual realization of that commitment is quite another
9 thing.

10 We are asking that that commitment be made a
11 license condition. The reason that we are asking that the
12 commitment be made a license commitment is because, in part,
13 of the substantial ALARA considerations is that modification
14 is not installed prior to an operating license, Reg Guide
15 8.8, as I understand that reg guide, says that ALARA is
16 always a consideration whenever you have a proposed
17 modification.

18 I would note that the proposed modification
19 which has been suggested for the tube vibration fix was
20 made after the consideration of the ALARA issue in this
21 case. And I think that the Board should have some idea
22 and some testimony in the record of why it is absolutely
23 essential that that modification be installed prior to
24 startup.

25 If the modification were installed now, I would
agree perhaps with Mr. Gallo's objection. But it is not.

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1 JUDGE SMITH: Refresh us: In what context was the
2 commitment made?

3 MR. GALLO: Mr. Blomgren committed in his direct
4 testimony in the week of April 11th, and as a matter of fact,
5 changed his prefiled statement from a statement that if it
6 was possible the installation of the modifications would be
7 performed prior to startup, but they changed it from that
8 statement to a statement that unequivocally they would be
9 installed prior to startup.

10 JUDGE SMITH: Was it given as a factual demonstra-
11 tion of what the company intends to do, or was it given to
12 the Board as a commitment?

13 MR. GALLO: Firm commitment on behalf of the
14 Company, which I reaffirmed.

15 JUDGE SMITH: There is simply more you can gain
16 than what you have received. The Reg Guide is useless to us.
17 In the first place, the Reg Guide is not a regulation.

18 MR. THOMAS: Right.

19 JUDGE SMITH: We can look at it or not as we see
20 fit. There is nothing you can gain. If you want to leave it
21 open to litigation, they can withdraw the commitment.

22 MR. THOMAS: That's fine if that is what they
23 want to do.

24 JUDGE SMITH: Why, we would be hearing thing when
25 it is absolutely a total complete 100 percent victory for

1 you, and you have forgotten the first rule -- you know what
2 I am coming to.

3 MR. THOMAS: I know what you are coming to, so I
4 have not totally forgotten. I tell you what I will do,
5 Judge, to obviate this problem. If Mr. Gallo will stipulate
6 to make it a license condition, then I will join with him in
7 striking the testimony.

8 JUDGE SMITH: Now maybe you are trying to get into
9 a legal discussion about what is the difference between a
10 commitment made to a licensing board, a special licensing
11 condition, and we have Appeal Board law in a couple of, as
12 a matter of fact, steam generator cases, which has made it
13 clear that although the Commission itself in a policy state-
14 ment has looked on disfavor on having a long list of formal
15 license conditions.

16 The Appeal Board recognizes a commitment made in
17 the adjudication is as enforceable as a tech spec or licens-
18 ing condition.

19 Now let's go one step further, that if we are
20 wrong, if I am wrong about my understanding of the law of the
21 Commission, then let us say that we are accepting the commit-
22 ment as a disposition of the issue under the understanding
23 that the commitment has a force and effect as a license con-
24 dition.

25 Counsel made it. The witness made it. I don't

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1 know what more you can ask. You are asking advice of some-
2 body who cannot possibly know as much about the conditions,
3 commitment, law as a lawyer.

4 MR. THOMAS: He is the only representative of the
5 client that I have present. That is one reason I turned to
6 him. The second reason was just to have a chance to think
7 about what you said for a little bit. I don't have a blind
8 faith in paper commitments; let's put it that way.

9 Now, what you said to me went beyond that. Let
10 me talk to the witness for a second, all right?

11 (Counsel conferring with witness.)

12 JUDGE SMITH: It could very well be that our de-
13 cision would be that it is a license condition, too.

14 (Pause.)

15 JUDGE SMITH: The Board has the authority in its
16 decision to make it a license condition. Do you oppose that?

17 MR. GALLO: Yes.

18 JUDGE SMITH: Why?

19 MR. GALLO: Because I do not think it is necessary.
20 I think your characterization of the law -- I
21 will tell you why: Because the implication of the Interven-
22 ors' position is that my client cannot be trusted unless the
23 thing can be --

24 JUDGE SMITH: Litigated.

25 MR. GALLO: And the way to litigate that is to

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1 argue it on brief as to whether the Board Chairman's interpre-
2 tation of the law is correct or not.

3 JUDGE SMITH: You can argue to us persuasively
4 that you are hurt by it, but you cannot argue to us persua-
5 sively that we would want to do something that is unnecessary
6 unless the excess is injurious to you.

7 MR. GALLO: I have pointed out that the implication of
8 the requirement for a license condition is that, apparently,
9 the commitment is not good enough because the client is not
10 to be trusted. I resent that implication and I will not agree
11 to the license condition for that reason.

12 JUDGE SMITH: All of western jurisprudence makes
13 it unnecessary for adversaries to rely upon the good faith of
14 their adversary. So if you object to a condition then I think
15 it should be litigated.

16 MR. GALLO: There is no good faith here. You
17 characterize the situation as you understand the Appeal Board
18 law. It fairly comports with my understanding. A commitment
19 is binding on my client as made in this proceeding.

20 Now if Mr. Thomas does not believe, that presents
21 a legal matter that should be briefed. We need not take evi-
22 dence. We need not take evidence.

23 JUDGE SMITH: The only concern that I have with
24 your reservation of making it a condition is that it is a
25 legal reservation.

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1 I am wondering, too, what the reservation is.

2 MR. GALLO: It is not reservation. I think the
3 commitment, as you say, that we made on this record has the
4 same force and effect as a license condition.

5 JUDGE SMITH: I believe that is the case, but I
6 am not so assured of that that after consultation with the
7 Board we do have authority to make it a license condition.
8 In the first place, I do not care to spend the time arguing
9 about it unless your client is going to be prejudice, legally
10 prejudice by making it a license condition in the proceeding.

11 The implication that you are not to be trusted
12 is not implicit in our remarks at all, because let me say
13 this: If we felt that your client could not be trusted, of
14 the record here, to abide by a commitment, then there would
15 be greater problems other than just the issue that is the
16 subissue which is involved here.

17 MR. GALLO: I fully understand that, your Honor.
18 I am not by implication suggesting that the Board thinks that
19 my client's word is not reliable.

20 What the Judge is doing, what you are doing is
21 essentially negotiating an objection here. And in order to
22 give Mr. Thomas a few slices of a loaf of bread, I have to
23 acquiesce on that point when his motivation is simply based
24 on the matter of distrust. And that is what I object to.

25 JUDGE SMITH: It is still within the discretion of

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1 the Board as to whether it accepts the condition as a condi-
2 tion precedent to our decision, or if we just go one step fur-
3 ther and make it a specific condition.

4 We have the authority to make it a condition. Do
5 you agree that that is the case?

6 MR. GALLO: I think the Board could make it a
7 license condition if it thought it was necessary and appro-
8 priate, yes. But as it stands right now, I think legal argu-
9 ment has to be presented in the findings to justify that re-
10 sult.

11 JUDGE SMITH: Heavens. We are so busy, Mr. Gallo.
12 We have such a tremendously large record here of technical in-
13 formation, of scientific information. We still have a big
14 hearing ahead of us. I just really dislike the digression
15 that this entire argument takes. It is totally unnecessary.

16 MR. GALLO: It began with a suggestion that a
17 commitment was not good enough. You needed a firm license
18 condition, your Honor.

19 JUDGE SMITH: It is my view that a license condi-
20 tion is not necessary. It is my view, however, that a lic-
21 ense condition is an appropriate solution to this problem
22 right now.

23 In the first place, I don't feel comfortable in
24 giving any party to this hearing advice. I was just trying
25 to bring the issue to a conclusion. I do not feel comfortable

1 in giving Mr. Thomas advice as to my spontaneous recall of
2 two important appeal board decisions.

3 MR. GOLDBERG: Judge, let me also add, I think
4 I would tend to agree with you. I recall that there was a
5 Zion appeal board case a year ago. There may be some subtle
6 shadings of difference between the enforcability of a
7 commitment versus a condition. I am not really sure it is
8 a substantive difference, insofar as it may be a technical
9 difference. I think the real difference is the level of
10 importance attached to a subject, whether it is suitable
11 to accept a commitment or it ought to rise to the level
12 of a condition.

13 I want to agree with you that I think there might
14 be some shading. I am just not sure.

15 JUDGE SMITH: My experience at the NRC, if a
16 utility came to a licensing board and made a commitment for
17 the purpose of getting their ticket and then did not abide
18 by that commitment and then later tried to argue it was
19 not either implicitly or explicitly a condition of their
20 license, it would be a very, very noteworthy event, and it
21 just would not happen, in my view, practically speaking.

22 However it comes out, we are not going to --
23 based upon Mr. Gallo's repeated assurance that his only
24 objection to it is the implication that his client is not
25 to be trusted that he has reaffirmed again and again that

1 that is the commitment that you have.

2 I know you are familiar with the basic law of
3 evidence that a commitment by a party through its counsel
4 in litigation is the strongest basis for making a finding
5 over even a thousand Bishops sworn under oath.

6 (Laughter.)

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1 A commitment is all the basis we need to make
2 it a license condition if we decide to do so. So you make
3 your decision what you want to do. Over his objection we
4 cannot decide to do it right now, but we can take it under
5 consideration and decide what we are going to do when the
6 decision comes up.

7 MR. THOMAS: I understand that, too. It is not
8 the corporate psyche of Commonwealth Edison that I doubt
9 or see to injure or the personal word of Mr. Gallo. It
10 is just that things happen, you know, the best laid plans
11 and all that sort of thing.

12 Refusal of a party to do something or to make
13 firm something -- I don't want to get into any further
14 argument. I think that where we are now at this point is
15 that the testimony is still relevant for the most obvious
16 of reasons.

17 JUDGE SMITH: It is relevant because, as we ruled
18 earlier, even though based upon the evidentiary record,
19 there may be strong evidence against the evidence that you
20 are offering. It is not until the record is complete and
21 it is not a question of relevance.

22 Certainly the evidence is relevant. It does not
23 become irrelevant simply because of the commitment.

24 MR. THOMAS: Right.

25 JUDGE SMITH: It may become unnecessary because

1 of the commitment. That is a different issue.

2 MR. THOMAS: Right, and that was nature of the
3 objection.

4 JUDGE SMITH: Objection overruled.

5 Mr. Gallo, would you make your comments to the
6 Board.

7 MR. GALLO: I was talking to myself outloud.
8 I apologize.

9 JUDGE SMITH: You said it was necessary or relevant.
10 It was a motion for consideration I believe.

11 MR. GALLO: I think we have argued this point
12 long enough. I have no further motions or objections to
13 the Bridenbaugh testimony.

14 MR. THOMAS: Judge, as much as I had hoped to
15 finish, to complete the testimony today, as a matter of
16 fact, both Mr. Bridenbaugh and I checked out of our
17 accommodations in anticipation of that, I don't know how
18 much Mr. Gallo has. The Board has stricken the status report
19 and has suggested that we get together and attempt to resolve
20 that issue.

21 MR. GOLDBERG: I have one voir dire question
22 that may lead to a motion to strike one limited passage
23 in the testimony and then it may be that we can resume with
24 the cross tomorrow or whenever it is scheduled.

25 JUDGE SMITH: Go ahead.

1 VOIR DIRE

2 BY MR. GOLDBERG:

3 Q I would like to draw your attention, Mr. Bridenbaugh,
4 to page 19, line 19 of your testimony, please.

5 MR. GALLO: This is a new page?

6 MR. GOLDBERG: Page 19. It is unnumbered in
7 the revision, but it was line 19 in the original version.
8 It is the next to the last sentence, the "Ginna tube rupture
9 event."

10 THE WITNESS: Yes.

11 BY MR. GOLDBERG:

12 Q Do you have that, Mr. Birdenbaugh?

13 A Yes, I do. In my copy it is numbered. That is
14 maybe what is confusing.15 JUDGE SMITH: The numbers did not come through
16 on the reproduction. They were probably blue or something.

17 BY MR. GOLDBERG:

18 Q You make the statement there that if it not the
19 NRC position that the Ginna tube rupture event came close
20 to be a multiple tube failure; is that correct?

21 A Yes.

22 Q Where did you obtain that opinion?

23 A That is a statement that I read that has been
24 attributed to Mr. Eisenhut.

25 MR. GOLDBERG: Judge, I would move that that

1 be stricken on the grounds of hearsay. We had testimony
2 from Mr. Marsh and Mr. Rajan to the contrary. The Ginna
3 tube rupture event did not come close to being a multiple
4 tube failure, and to try to establish affirmatively that
5 it is the NRC position that it did through this witness,
6 I think is objectionable.

7 I would move that that entire sentence beginning
8 "The Ginna tube rupture event" be stricken.

9 JUDGE SMITH: Do you agree, Mr. Bridenbaugh?
10 Do you still stand by our testimony?

11 THE WITNESS: You are not asking me for a legal
12 conclusion, I assume.

13 JUDGE SMITH: No. I am asking do you really
14 believe that your statement is true.

15 THE WITNESS: I believe that my statement is true
16 at the time that I wrote it. I have heard the staff witnesses
17 say that that is not the case. I don't believe, however,
18 that the NRC has reached a firm position on this. So I
19 still stand by ---

20 JUDGE SMITH: You have asking us after all you
21 know to accept this statement as your sworn testimony?

22 THE WITNESS: I guess, Your Honor, I would change.
23 I do not think I can say it is the NRC position, but I believe
24 it is certainly unclear to me and I do not believe that
25 the NRC position has been formulated in a regulation.

1 (Counsel conferring with witness.)

2 MR. THOMAS: I think we would agree with Mr.
3 Goldberg's position to the extent of strikeing the words
4 "It is now the NRC position that."

5 JUDGE SMITH: The objection goes farther, doesn't
6 it, Mr. Goldberg?

7 MR. GOLDBERG: I did not want it to be attributed
8 to the NRC as an NRC position. I think we could either
9 explore on cross or voir dire whether this witness has an
10 opinion independent of that he derived from this source
11 he identified for making the statement. It may make the
12 statement otherwise infirm.

13 JUDGE SMITH: In his written statement he did
14 not make any attribution to that statement. So you can
15 explore it on cross. I hope we don't spend much time on
16 it because we have the testimony of the staff witnesses
17 here and his impresion.

18 MR. GOLDBERG: I will ask him the basis for the
19 opinon when it comes to that.

20 MR. THOMAS: I think that is a proper matter for
21 cross.

22 Have we concluded with the preliminary objections
23 to the testimony? I didn't mean to characterize. It has
24 been a long day.

25 Like I say, as much as anybody in the room, I

1 wanted to wanted to complete this, but I just do not see
2 it as realistic when given the fact that we are going to
3 have to make some alterations in light of the Board's ruling.
4 I would suggest that we attempt to do that overnight and
5 then come back tomorrow and finish it up.

6 JUDGE SMITH: Also, if we are going to this
7 business about the commitment and the condition, if this
8 were a summary disposition put before us now, I think we
9 would probably rule in favor of the utility because
10 of the commitment.

11 We simply are not oeing to allow a long litigation
12 on the relevance of the post-operation or occupational
13 exposure in view of the extreme improbability that the
14 commitment is not binding.

15 MR. THOMAS: Our entire testimony on that consists
16 of what is already in the record and anything else would
17 be elicited only in response to cross-examination. That
18 is all I can say.

19 MR. GALLO: As I understand the status,
20 Mr. Bridenbaugh's testimony is yet to be received because
21 it is subject to being revised consistent with the under-
22 standing of counsel to get together to see what they can
23 do.

24 JUDGE SMITH: Yes, that would be better because
25 that way the version received would reflect the negotiations.

1 MR. THOMAS: But other than that, other than
2 the one steam generator issue, that is all we are going
3 to have to contend with as I understand it, right? We
4 are not going to come back to tomorrow and have to go through
5 another entire round.

6 MR. GALLO: Do you mean while I get smarter
7 overnight?

8 (Laughter.)

9 MR. GALLO: No, we won't have to do that.

10 MR. THOMAS: What time?

11 JUDGE SMITH: Off the record.

12 (Discussion off the record.)

13 JUDGE SMITH: Back on the record.

14 We will adjourn until 9 o'clock.

15 (Whereupon, at 6 o'clock p.m., the hearing
16 in the above-entitled matter adjourned, to reconvene at
17 9:00 a.m., Thursday, April 28, 1983.)

18 * * *

CERTIFICATE OF PROCEEDINGS

1
2
3 This is to certify that the attached proceedings before the
4 NRC COMMISSION

5 In the matter of: COMMONWEALTH EDISON COMPANY
6 Byron Nuclear Power Station

7 Date of Proceeding: Wednesday, 27 April 1983

8 Place of Proceeding: Rockford, Illinois

9 were held as herein appears, and that this is the original
10 transcript for the file of the Commission.

11 Barbara Whitlock

12 Official Reporter - Typed

13 *Barbara Whitlock*

14 Official Reporter - Signature