

COMMONWEALTH OF PENNSYLVANIA

PUBLIC UTILITY COMMISSION

-----X
: :
4 Pennsylvania Public Utility Commission, et al. : :
versus Philadelphia Electric Company. : : Docket No.
5 Investigation into a requested \$660 million : :
annual rate increase. : : R-850152
: :
6

Further hearing. : :
: :
7 -----X

8 Pages 2716 through 2832 Hearing Room No. 1
9 State Office Building
10 Broad and Spring Garden Streets
Philadelphia, Pennsylvania

11 Friday, February 7, 1986

12 Met, pursuant to adjournment, at 10:00 a.m.

13 BEFORE:

14 JOSEPH MATUSCHAK, Administrative Law Judge

15 APPEARANCES:

16 MARLANE R. CHESTNUT, Esquire
17 DANIEL P. DELANEY, Esquire
18 P. O. Box 3265
Harrisburg, Pennsylvania 17120
(For PUC Trial Staff)

19 WALTER R. HALL, II, Esquire
20 DAVID B. MacGREGOR, Esquire
21 MICHAEL A. McGRILL, Esquire
22 STUART W. FRASER, Esquire
Morgan, Lewis & Bockius
2000 One Logan Square
Philadelphia, Pennsylvania 19103
23 (For Philadelphia Electric Company)

RECEIVED

FEB 11 1986

SECRETARY'S OFFICE
Public Utility Commission

DOCKETED
FEB 12 1986

**DOCUMENT
FOLDER**

1 APPEARANCES (Continued):

2 DAVID WERSAN, Esquire
3 IRWIN POPOWSKY, Esquire
4 1425 Strawberry Square
5 Harrisburg, Pennsylvania 17120
6 (For the Office of Consumer Advocate)

7 J. THOMAS MORRIS, Esquire
8 Reed, Smith, Shaw & McClay
9 1600 Avenue of the Arts Building
10 Philadelphia, Pennsylvania 19107
11 (For SEPTA and Amtrak)

12 MARK WIDOFF, Esquire
13 129 State Street
14 Harrisburg, Pennsylvania 17101
15 (For University of Pennsylvania and
16 Utility Users Group)

17 CHARLES RAINEY, Esquire
18 15th Floor
19 Municipal Services Building
20 1101 Market Street
21 Philadelphia, Pennsylvania 19107
22 (For the City of Philadelphia)

23 ROGER E. CLARK, Esquire
24 P. O. Box 8010
25 Harrisburg, Pennsylvania 17105
(For Governor's Energy Council)

C O N T E N T S

<u>WITNESS</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>
Stephen H. Hanauer				
By Mr. Wersan	2760	----	2825	----
By Mr. Hall		2764	----	2829
By Mr. McGrail		2823	----	----

E X H I B I T S

<u>NUMBER</u>	<u>FOR IDENTIFICATION</u>	<u>IN EVIDENCE</u>
<u>Office of Consumer Advocate</u>		
Statement No. 2 (Hanauer)	2760	2761
<u>Philadelphia Electric Company</u>		
Exhibit No. 5 (IR-PECo-OCA-4-1 through IR-PECo-OCA-421)	2763	2763
Exhibit No. 6 (Memo, S. H. Hanauer to J. F. O'Leary, F. E. Kruesi and L. Rogers, 9/20/72)	2774	2774
Exhibit No. 7 (Memo, S. H. Hanauer to J. Hendrie, 6/20/78)	2774	2774
Exhibit No. 10 (Excerpt from NUREG-0487)	2799	2799
***Exhibit No. 10 renumbered as Exhibit No. 9 at page 2824		

P R O C E E D I N G S

1 JUDGE MATUSCHAK: This is the time and place set
2 for the further hearing in the matter of the Pennsylvania
3 Public Utility Commission against the Philadelphia Electric
4 Company at Docket No. R-850152

5 Are the parties ready to proceed?

6 MR. MacGREGOR: Yes, Your Honor.

7 MS. CHESTNUT: Yes, Your Honor.

8 JUDGE MATUSCHAK: Do we have any preliminary matters?

9 MR. RAINEY: Your Honor, I have a couple of
10 preliminary matters, if I might raise them.

11 One has to do, Your Honor, with an outstanding
12 interrogatory that is over a month overdue from the company.
13 What we received with respect to that was only a partial
14 response, and I refer specifically to Set II, Question 60,
15 which was served on PECO on December 6, 1985, which asked
16 that PECO supply all reports commissioned by PECO which
17 included estimates of demand elasticities by customer
18 class between 1975 and 1985.

19 In response PECO referred us to a document entitled
20 Electric Price Elasticity, 1959 through 1979, by Darwin
21 King. However, we have learned that such information was
22 contained in reports provided to PECO by Wharton Energy
23 Forecasting Associates, and that information came as a
24 result of our review of rebuttal testimony provided in the
25

1 Limerick 2 case by George Shenk.

2 We had specifically asked for that information in
3 Interrogatory Set IV, Question No. 71, and asked that that
4 material be provided by Monday, February 10, 1986. We
5 would request that PECO reply by that time.

6 We would like to use that information to confirm
7 Dr. Shinnar's estimates of demand elasticity. We would
8 further like to have that information for Dr. Shinnar's
9 use in cross-examination.

10 I have spoke with the company by telephone with
11 respect to this matter as well.

12 Additionally, Your Honor, in order to better respond
13 to cross-examination questions concerning Dr. Shinnar's
14 model and how it works, we would like to use overhead
15 transparencies next week, the 13th of February, and we
16 would ask if the Court may be able to provide a screen for
17 us to project onto.

18 JUDGE MATUSCHAK: Does the company have a response?

19 MR. MacGREGOR: Your Honor, the company responded to
20 Interrogatory OCA Set II, No. 60, and we will respond to
21 OCA Set IV-71 by February 10, 1986.

22 We have no objection to the use of overhead
23 transparencies.

24 MR. RAINEY: Thank you, Your Honor.

25 JUDGE MATUSCHAK: Before we proceed with testimony

1 we indicated that we would hear arguments on the Staff's
2 motion to strike the testimony of Joseph Brennan and
3 Thomas Hill, the supplemental testimony of Joseph Brennan
4 and Thomas P. Hill, Junior.

5 Is the Staff ready to proceed?

6 MS. CHESTNUT: Yes, Your Honor. And before I start
7 I would like to reserve a few minutes time for rebuttal.

8 JUDGE MATUSCHAK: Very well.

9 MS. CHESTNUT: Your Honor, on January 23rd Staff filed
10 a motion to strike the supplemental testimony of two of
11 PECO's witnesses. Staff in that motion showed five distinct
12 reasons why that testimony is inadmissible, and those
13 reasons are: collateral estoppel, bifurcation, Section 316
14 of the Public Utility Code, Pennsylvania Rule of Appellate
15 Procedure 1701 and the fact that in Staff's opinion the
16 testimony is not in compliance with the clear directives
17 contained in the Commission's ECR 8 order.

18 These issues have pretty much been discussed and we
19 aren't going to go into any further legal discussion because
20 I think everybody here knows the requirements for these
21 grounds.

22 The company filed an answer and it essentially
23 answered all of the different grounds for inadmissibility
24 with essentially one argument. The company reiterates in
25 its answer the fact that in its opinion it was denied due

1 process in the ECR 8 investigation and therefore the
2 Commission must have intended that this issue be relitigated
3 in this proceeding.

4 Your Honor, Staff submits that that position is
5 absolutely in error for several reasons. First, there is
6 absolutely no support in the order for that position. The
7 Commission never said that it is issuing the 80/20 split
8 for comment or for discussion or for any other type of
9 modification. The Commission is very clear that in its
10 opinion it is necessary that 20 percent of PECO's energy
11 costs not be reconciled in order to provide a sufficient
12 incentive for the company to modify its operating practices.

13 The company was unable to point to any kind of
14 language in the order to support their position. The two
15 passages that they cite are clearly inapplicable to what they
16 say they stand for. At page 162, the statement that any
17 modifications or refinements eventually resulting from the
18 generic investigation could be applied to PECO's ECR at that
19 time by its very terms refers to any kind of revision that
20 may result from the generic investigation. It has
21 absolutely nothing to do with modifying the 80/20 split.

22 The Commission felt on the basis of the record before
23 it in the ECR 8 investigation that PECO had abused its ECR
24 and that it was necessary for the Commission to take a
25 preactive kind of step rather than to be reactive to deal

1 with these costs after they had already occurred. That is
2 why the Commission took the unprecedented step that they did,
3 and it's obvious from the language in this order that the
4 Commission felt that the 80/20 percent split should be
5 implemented immediately upon the completion of this case
6 and should remain in effect until there are any changes that
7 come out of the generic investigation that will apply to
8 all utilities.

9 The only other reference that the company is able to
10 dredge up in its answer is on page 163 of the Commission's
11 ECR 8 order, and there the Commission says upon investiga-
12 tion of the ECR filing and accompanying data by the
13 Commission, and after hearings thereon and approval by the
14 Commission of the ECR, the company will commence recovery
15 of the energy costs included, et cetera. It's obvious there
16 that the Commission intended that what would be examined in
17 this proceeding is simply the data required to be supplied
18 in compliance with Appendix B. There is no doubt that the
19 only issue the Commission intended to be litigated in this
20 case is the reasonable projected energy costs that are
21 expected to be incurred in the future. That is what the
22 Appendix B data goes specifically to and that is what the
23 Commission is referring to here.

24 I think it's obvious, Your Honor, that the Commission
25 was certainly well aware of the multitude of complex issues

1 that would be in this rate case and I'm sure that they
2 recognize that it's going to be a difficult case to
3 litigate by itself. I think common sense would tell us that
4 if they wanted to relitigate the entire question of whether
5 PECO's ECR should be revised and how it should be revised,
6 they would have said that explicitly in their order. They
7 would have said that Phase 3 is therefore combined with the
8 current base rate proceeding, or they would have used
9 language indicating that. Instead, they said that Phase
10 3 of the ECR 8 investigation is terminated and closed. To
11 their minds there is no further need to discuss that issue
12 any further.

13 In addition, Your Honor, the company's position that
14 the Commission must have intended that this question of
15 whether and how the ECR should be revised was to be litigated
16 in this case is contrary to a well-established principle of
17 legal thought known as the presumption of validity. Your
18 Honor, this principle is discussed in Pennsylvania Law
19 Encyclopedia, Section 241 and the cases cited therein.

20 What it says there is that when you're dealing with
21 claims of collateral estoppel there's a presumption of
22 validity that attaches to the prior proceeding.

23 JUDGE MATUSCHAK: How does collateral estoppel apply
24 if the Commission itself said in the recent case, in the recent
25 motion in limine, that collateral estoppel applies to facts?

1 Is this a fact? Is that a fact, that the 80/20 should
2 prevail? Or is that a policy question of the Commission?

3 MS. CHESTNUT: Your Honor, there are two responses
4 to that. First, there are factual determinations that the
5 Commission made that are applicable in this proceeding.
6 The first factual determination was that PECO was unable --

7 JUDGE MATUSCHAK: I understand they found certain
8 facts. That's true. Now, we are not in those facts. We
9 are in the determination of the Commission that the future
10 ECR should be based on a recapitulation of 80 percent to
11 be recovered against the actual costs and 20 percent should
12 be borne by the company.

13 MS. CHESTNUT: Your Honor, the factual determinations
14 made by the Commission are, one, that a 20 percent recon-
15 cilable piece of energy cost is necessary to provide a
16 sufficient incentive --

17 JUDGE MATUSCHAK: Is that a fact? Or is that a legal
18 conclusion?

19 MS. CHESTNUT: Your Honor, that's a fact.

20 JUDGE MATUSCHAK: That's a fact?

21 MS. CHESTNUT: Yes.

22 JUDGE MATUSCHAK: I can't see that. I cannot see
23 that.

24 By the same token, how does 316 or collateral
25 estoppel apply?

1 MS. CHESTNUT: Your Honor, 316 goes to what I'm
2 talking about now, the presumption of validity. That is
3 discussed in the Salem adjustment case.

4 The Court there said, "It is true that an order is
5 deemed final, and therefore capable of being res judicata,
6 unless and until it is reversed."

7 JUDGE MATUSCHAK: We are not talking about res
8 judicata. We are talking about collateral estoppel and
9 316. Res judicata is something else.

10 MS. CHESTNUT: Your Honor, 316 applies because the
11 Commission's order in the ECR 8 investigation was to be
12 deemed conclusive unless and until it is reversed on
13 appeal. There has to be some finality to each hearing.

14 JUDGE MATUSCHAK: Isn't it a fact that the
15 Commission found that 316 would apply was that PECO did not
16 properly compute its ECR in the past?

17 MS. CHESTNUT: Yes, Your Honor. That's a fact.

18 JUDGE MATUSCHAK: That's a fact?

19 MS. CHESTNUT: That is a fact.

20 Your Honor, I also would like to direct your attention
21 to the Keystone Water Company case -- that is the Keystone
22 Water Company-White Deer District, reported at 81 Common-
23 wealth Court 312. That was issued in 1984. The Court
24 there discusses the Commission's Salem finding and refers
25 to that as factual determinations. I will cite you to the

specific language in just a moment.

1 (Pause.)

2 MS. CHESTNUT: Here we go, Your Honor. That is
3 footnote number one, and that's on page 318 of the
4 Commonwealth Court Reporter. It says, "The Commission
5 here says that not the principle of res judicata but that
6 of collateral estoppel should have been named as the
7 principle which in Philadelphia Electric Company versus
8 Pennsylvania PUC, supra, bars relitigation of the factual
9 issues of PECO's imprudent management and its effect on the
10 cost of Unit No. 1."

11 JUDGE MATUSCHAK: That case may be all right. The
12 facts have been litigated. But here we are not talking
13 about facts. We are talking about a Commission determination,
14 a conclusion of policy, that because of the facts that have
15 been litigated the Commission says you're going to do this,
16 you're going to provide for an 80/20. Now, how does that
17 come under either 316 or collateral estoppel?
18

19 MS. CHESTNUT: Well, Your Honor, with all due respect
20 I think I must disagree with your conclusion that what the
21 Commission did is a legal conclusion. The way that I
22 analyze it, there were three different types of findings
23 that are obviously legal conclusions, such as, a company
24 was unreasonable or imprudent, such as in the construction
25 of Salem Unit No. 1. That is obviously a legal conclusion.

1 These are legal terms of art, an ultimate conclusion,
2 unreasonable, imprudent.

3 There are clearly factual determinations and there
4 are some that are a little gray but are basically factual
5 or legal. Here the Commission made factual determinations.

6 JUDGE MATUSCHAK: How if I make a decision today that
7 requires you to do this or that because you have been
8 negligent or you have been imprudent in the past, how is
9 that a fact?

10 MS. CHESTNUT: The fact is that the Commission made a
11 factual finding that PECO was imprudent in the past based
12 on the record before it.

13 JUDGE MATUSCHAK: All right. We will concede that,
14 that that's a fact, that PECO was imprudent in establishing
15 their ECR in the past.

16 MS. CHESTNUT: They made another factual determination,
17 Your Honor, that 20 percent of PECO's energy costs shouldn't
18 be reconciled to provide an incentive. They equated
19 incentive to 20 percent. That's a fact.

20 JUDGE MATUSCHAK: How is that a fact? Isn't that a
21 conclusion of the Commission that we are going to try to
22 remedy that situation by requiring something new, something
23 in the future, prospectively, not looking back but
24 prospective?

25 MS. CHESTNUT: Your Honor, it's a conclusion, a factual

1 conclusion: as a matter of fact, this is what has to be
2 done.

3 JUDGE MATUSCHAK: Okay.

4 MS. CHESTNUT: But even without that, Your Honor,
5 I think it's pretty clear that it's completely inappropriate
6 to relitigate --

7 JUDGE MATUSCHAK: What I would like to stress, and
8 I think from your position you may be on more solid ground,
9 is whether we have any business in the 80/20 because the
10 matter is now on appeal and whether even the Commission can
11 change that until that appeal has been disposed of.

12 The **second** thing that disturbs me is I'm quite concerned
13 as to whether in fact the Commission intended for us to go
14 into the 80/20 in the first place. It seems to me that the
15 Commission realized that the 80/20 meant nothing, the ECR
16 could be manipulated by the use of data and the mix that
17 was included in the ECR. So this 80/20 would be meaningless
18 unless the proper ingredients were put in and our job was to
19 ensure that the proper ingredients were put in.

20 I don't see anything in the order or the Commission
21 or the opinion of the Commission or the referral which says
22 you check in to see if the 80/20 was appropriate.

23 MS. CHESTNUT: Your Honor is exactly right. The
24 80/20 is meaningless if the energy level used to compute the
25 projected energy costs is not accurate.

1 JUDGE MATUSCHAK: For instance, if the company put
2 in its high cost mix in the ECR, then it's very possible
3 that they could recover their 100 percent costs if they
4 only got the 80 percent if they used less cost production
5 equipment.

6 MS. CHESTNUT: Your Honor, that's a concern, that
7 the company could inflate its projections in order to
8 achieve that result. And I can tell Your Honor and the
9 parties that Staff's testimony which we intend to file will,
10 in fact, be looking at and be recommending adjustments to
11 the particular energy -- the assumptions which underlay
12 the company's projection of its future energy costs. We
13 disagree with some of the data and some of the assumptions
14 in that and we are recommending a different energy cost
15 level to which the 80/20 split should be applied.

16 In our view that's the appropriate way to deal with
17 this issue because I think it's very important, Your Honor,
18 that we remember one thing, which is that were it not for
19 the Commission's 80/20 order we wouldn't even be looking at
20 any issues involving an ECR in this case. It's not a rate
21 case issue and there's no reason that we would be looking
22 at it here.

23 JUDGE MATUSCHAK: That's one reason why ordinarily
24 we wouldn't be involved in an ECR in this rate case. And
25 we are very concerned about complying strictly with the

1 referral that the Commission gave us in this case. We are
2 not a court of appeal on the Commission to retry that
3 determination of the 80/20. That is a matter that bothers
4 me.

5 MS. CHESTNUT: Well, Your Honor, I think your
6 reading of the order, obviously, is a correct one because
7 that's the way we read the order also and that's the way,
8 I think it's clear from the discussions that the Commission
9 had, that that is what they intended the order should do.

10 There is no reason to relitigate the 80/20 split.
11 It's not a rate case issue. The Commission already made
12 its decision and although the company makes the argument in
13 its answer that they are not attempting to modify the ECR,
14 they are attempting to supplement it, Your Honor, I submit
15 that that is just an outrageous statement.

16 First off, their primary position is that there should
17 be no change in the ECR as it currently is. And that's
18 obviously not consistent with an 80/20 split. They are
19 recommending that the 80/20 split be ignored, and even
20 though they say that's not what they are doing that is
21 exactly what they are doing.

22 JUDGE MATUSCHAK: The company says that they did not
23 have due process because Phase 3 was to include the possible
24 modification of the ECR and the Commission terminated Phase
25 3 and didn't go into that and therefore the company had no --

1 that the 80/20 or any modification was raised by any of
2 the parties, no one responded to it, no one brought the
3 question up and the Commission out of the blue sky came
4 up with 80/20.

5 Now, assuming that that is so -- assuming that that
6 is so -- that they had no opportunity to respond to any
7 modification of the ECR, what in your opinion is the
8 relief for the company, to obtain their relief in this
9 rate case or to obtain it in some other way?

10 MS. CHESTNUT: There is a pending appeal of that
11 80/20 order, Your Honor, and that is where the relief will
12 be granted. If the Court determines that there was
13 inadequate due process then it will either reverse or remand
14 the decision.

15 I would also like to note in connection with this,
16 Your Honor, that the company never filed a petition for
17 reconsideration. They have never filed a petition for
18 rehearing. They never filed a petition for a stay. So if
19 they felt that their due process rights were violated, that
20 there was additional testimony that they would have put on,
21 then obviously they had avenues open to them of which they
22 did not avail themselves.

23 So, Your Honor, for the reasons that I've mentioned
24 this order has to be deemed valid until it's overturned on
25 appeal. I think that's just fundamental as well as being

1 common sense.

2 I would also like to address Your Honor's question
3 with respect to the application of PA. RAP 1701. Your
4 Honor, we agree with the company there that the clear
5 language of that rule is that once a timely appeal is taken
6 of an order then the agency is without authority to modify
7 that order, that all the agency really can do is to enforce
8 that order.

9 What we are talking about here is whether or not the
10 Commission's order should be enforced. The company is saying
11 that its attempts to overturn the 80/20 split or to modify
12 it constitute enforcement, and Your Honor that is just
13 absurd on its face.

14 If we are talking about enforcing the order then we
15 have to go strictly with the 80/20 split that the Commission
16 determine, and that's Staff's position in this case and
17 that is what Staff's testimony is going to discuss.

18 JUDGE MATUSCHAK: Very well.

19 Mr. MacGregor.

20 MR. MacGREGOR: Thank you, Your Honor.

21 Your Honor, it's the company's position as set forth in
22 our answer that Trial Staff's motion should be rejected for
23 two principal reasons. First, the issue of the 80/20 ECR
24 was not and could not have been finally decided by the
25 Commission in that proceeding.

1 JUDGE MATUSCHAK: All right. Assuming that's so --
2 assuming that's so -- what is the remedy of the company?
3 Is the remedy of the company to have us open that case up
4 again, which has been appealed from? Or is the remedy of the
5 company to take that matter to the Commonwealth Court and
6 have the Commonwealth Court remand the matter to the
7 Commission and provide for a proper hearing on the matter?

8 MR. MacGREGOR: Your Honor, when the Commission
9 entered its final order in the ECR 8 investigation it had
10 two choices. It could have continued the investigation,
11 it could have conducted Phase 3 of the investigation and
12 considered all the issues that the company is trying to
13 present today. They could have considered the cap. They
14 could have considered the 80/20 ECR. They could have
15 considered the financial impact on the company. They could
16 have considered performance standards. All those issues were
17 specifically reserved for Phase 3 of the investigation. The
18 Commission could have held that part of the investigation
19 and considered them there.

20 JUDGE MATUSCHAK: I understand that.

21 MR. MacGREGOR: They did not do that. They terminated
22 Phase 3 and in their order -- and I rely on page 162 and 163
23 of the order, and we cite that in our answer -- all the
24 Commission told us to do was to file an 80/20 ECR in this
25 case and they specifically say that on investigation of this

2754
1 ECR filing and the accompanying data and after hearings
2 thereon and approval by the Commission of the ECR, then
3 we will commence recovery under the 80/20 ECR.

4 The Commission had to give us one bite at the apple
5 somewhere to litigate this issue. They could have done it
6 in Phase 3 or they could have done it in this case. It's
7 our opinion that they did it in this case.

8 JUDGE MATUSCHAK: Assuming that you're right, will
9 you agree with us that the Commission's order determining
10 the 80/20 was a final order? You must have because you
11 took an appeal from that order.

12 MR. MacGREGOR: Your Honor, my understanding is that
13 our appeal was a protective appeal to guard against just
14 this type of motion. The company's interpretation of
15 the 80/20 order is that it does not finally decide the issue.
16 That is why we have presented our testimony in this case and
17 that is the consistent position we have taken. In order to
18 protect our rights against just this kind of motion trying
19 to bar us from litigating these issues in this case we took
20 a protective appeal.

21 JUDGE MATUSCHAK: Let's take it out of context. Let's
22 take any case. Suppose we had no referral to us in this
23 matter. Suppose we had no referral to us by the Commission.
24 Do you feel that you did not have proper due process rights
25 because you were not granted a hearing because Phase 3 was

1 terminated -- and frankly, I join you in that respect and
 2 I think you may have some proper concern -- but assuming
 3 that you did not have due process, you were not given an
 4 opportunity of an hearing, you did not have an opportunity
 5 to address that phase, the modification, possible modifica-
 6 tion, what would be your remedy?

7 MR. MacGREGOR: The remedy would be to take an
 8 appeal, Your Honor. So I think you have two choices here,
 9 Your Honor. You can either affirm a position that its
 10 unconstitutional on its face or you can let us litigate
 11 the issue in this case.

12 JUDGE MATUSCHAK: We are not an appellate court
 13 here. It's not up to us to determine whether something is
 14 constitutional. It's not up to us to determine whether you
 15 had due process in your proceeding before the Commission.

16 MR. MacGREGOR: That's correct, Your Honor.

17 JUDGE MATUSCHAK: That's not our duty. We are not an
 18 appellate court.

19 MR. MacGREGOR: That's correct, Your Honor, but we
 20 have two possible interpretations of the Commission's order.
 21 One interpretation will give us our first chance to litigate
 22 this issue. The other interpretation will deny us our due
 23 process rights because it's clear that the issue was never
 24 raised or litigated.

25 If we can correct the constitutional problem by what

1 we believe is the only reasonable interpretation of the
2 Commission's order -- they say right on page 163 of the
3 order that we are to have hearings and investigation of the
4 ECR filing in this case. Why should Your Honor interpret
5 the order another way when it's clear that that other
6 interpretation would be unconstitutional?

7 JUDGE MATUSCHAK: Can the Commission change its order
8 on 80/20 now that you have taken an appeal?

9 MR. MacGREGOR: Certainly, Your Honor. If we don't --
10 well, the Commission cannot change its order. We are not
11 asking the Commission to change its order. We are complying
12 with what the Commission told us to do. The Commission told
13 us to file an 80/20 ECR in this case --

14 JUDGE MATUSCHAK: I'm not talking about what the
15 Commission required you to do. Can the Commission change
16 its determination and its order that the recapitulation,
17 reconsideration, provide for an 80/20 split? Can the
18 Commission change that now that you have taken an appeal?

19 MR. MacGREGOR: Certainly. They never found that
20 as a final order to begin with. They never found -- there
21 was no final determination that there should be an 80/20
22 ECR. We were directed to file an 80/20 ECR in this case.
23 The issue was never litigated.

24 JUDGE MATUSCHAK: I don't know how you can say that
25 they didn't find that.

1 MR. MacGREGOR: The Commission found that they had
2 concerns about PECO's administration of its ECR and that
3 therefore it seemed to them that an 80/20 ECR might be
4 a proposal which should be considered.

5 JUDGE MATUSCHAK: You're misreading the phraseology
6 of the Commission's order. On page 160 the Commission
7 says, "Twenty percent of the actual experienced energy costs
8 will not be subject to reconciliation under Section 1307
9 of the Public Utility Code. The company, therefore, will
10 have an incentive to operate its generating plants in an
11 efficient manner to minimize fuel costs. If the company
12 does not do so the stockholders will bear a portion of the
13 burden resulting from the company's operating of facilities
14 in less than the optimal manner. Conversely, if the company's
15 performance exceeds that which is expected the stockholders
16 will receive a portion of the benefits associated with such
17 efficient operation."

18 MR. MacGREGOR: Your Honor, the Commission made those
19 policy conclusions in its order -- in its opinion. In its
20 order all it directed us to do was to file an 80/20 ECR in
21 this case --

22 JUDGE MATUSCHAK: That is what was bothering me. I
23 was looking at the order too, and if you look in the order --

24 MR. MacGREGOR: All the order does, Your Honor, in
25 paragraph five is direct us to file in our current rate filing

1 a proposed new energy cost rate. It does not state that
2 its policy judgement is not subject to review.

3 Your Honor, this is not a historic fact. It's
4 clear, crystal clear, under the case law that collateral
5 estoppel can only apply in a public utility rate proceeding
6 where the facts are historic, immutable and static and not
7 subject to change.

8 JUDGE MATUSCHAK: We will agree with you on that.
9 That's our own impression.

10 MR. MacGREGOR: But these policy judgements are
11 subject to change by the Commission at any time. Your
12 Honor, even assuming for purposes of argument that the
13 Commission made a final determination in this order on the
14 80/20 ECR, there is absolutely nothing stopping the
15 Commission from changing its mind at any time.

16 JUDGE MATUSCHAK: That's true. The Commission can
17 do that and we agree with you.

18 Now, I want to ask Ms. Chestnut one question.
19 Ms. Chestnut, will you look at the order of the Commission
20 and show me where the Commission ordered that the ECR should
21 be based on an 80/20?

22 MS.CHESTNUT: Your Honor, the entire section is that,
23 the exclusion of 20 percent of the total energy costs from
24 reconciliation. That is on page 161.

25 JUDGE MATUSCHAK: Where in the order does it say that

1 the conclusions we have reached in this order or determina-
2 tion, in our opinion, shall apply -- where does it refer
3 anywhere to 80/20 or refer to its opinion? That bothers
4 me.

5 MS. CHESTNUT: I don't know if I understand what
6 Your Honor's question is. There are numerous references
7 to the fact that 20 percent of the energy costs are no longer
8 going to be reconciled.

9 Page 160: "Twenty percent of the actual experienced
10 energy costs will not be subject to reconciliation."

11 JUDGE MATUSCHAK: I'm asking you to look at the order
12 on page 165.

13 MS. CHESTNUT: Well, Your Honor, of course the order
14 incorporates this discussion.

15 JUDGE MATUSCHAK: Where does it incorporate it?

16 MS. CHESTNUT: Your Honor, it says at Ordering
17 Paragraph No. 5 on page 165 that PECO shall file as a
18 supplement to its current rate filing a proposed new energy
19 cost rate, blah, blah, blah, in accordance with the energy
20 cost -- present and future -- contained in this opinion and
21 order together with the filing data herein set forth.

22 I don't think it can be any clearer than that, that
23 the Commission intended it to be an 80/20 ECR.

24 JUDGE MATUSCHAK: Well, does that say anything about
25 an 80/20? That order requires the company to do something.

1 It doesn't require them to prepare an ECR based on 80/20
2 or anything else.

3 MS. CHESTNUT: It absolutely has to, Your Honor. It
4 says in accordance with the --

5 JUDGE MATUSCHAK: If that isn't done the 80/20
6 doesn't come into play until the company does that.

7 MS. CHESTNUT: Your Honor, in the Commission's opinion
8 and order it discusses how the energy rate is to be revised.
9 In its ordering paragraph it says that the company is to
10 submit a revised ECR in accordance with the Commission's
11 directive.

12 MR. MacGREGOR: Your Honor, all the ordering paragraph
13 states is that PECO shall file, and we have filed. We have
14 exactly complied with the Commission's order.

15 In addition, Your Honor, I just want to point out that
16 we are talking about a policy judgement by the Commission.
17 The Commission established the energy cost rate for the
18 company in 1980. If that's binding then the Commission can't
19 change it to go to an 80/20 ECR.

20 It can't be binding. The Commission has to base its
21 judgements on the financial facts and the operating facts
22 that apply in each case.

23 JUDGE MATUSCHAK: Well, we aren't going to go that
24 far. That's not our problem.

25 MS. CHESTNUT: Yes, Your Honor. That's ridiculous.

JUDGE MATUSCHAK: That's not our problem. That's
1 a problem for an appellant court. That's not our problem.
2 We aren't here as an appellate court to determine whether
3 the Commission acted properly.

4 Our problem here is as far as the order is concerned.
5 Ordinarily the Commission says in its order that the
6 provisions we have made in our discussion and so forth
7 shall apply, or something to that effect.

8 MS. CHESTNUT: Your Honor, in the first paragraph
9 before the ordering paragraphs, where it says, "Conclusion,"
10 it says, "We further conclude," which is the language Your
11 Honor has just mentioned, "that PECO will modify its ECR
12 filing in accordance with directives contained within the
13 body of this opinion and order."

14 MR. MacGREGOR: We have done so, Your Honor.

15 MS. CHESTNUT: Well, Your Honor, that's the question
16 that we have before Your Honor right now.

17 Your Honor, there are two points that Mr. MacGregor
18 made that I would like to discuss.

19 With respect to his contention that this is a policy
20 judgement that is subject to change, of course that's correct,
21 Your Honor.

22 JUDGE MATUSCHAK: You don't agree with that?

23 MS. CHESTNUT: I do agree with that. I think that's
24 obvious. The fact is that this is not the proceeding in
25

1 which to do it. ECR revisions are not part of a rate case
2 under the normal course of events. If there had been no
3 order and PECO had come into this proceeding with some
4 kind of revision to its ECR then that would not have been
5 an appropriate issue and I'm sure Your Honor would not
6 have entertained it.

7 MR. MacGREGOR: We were directed by the order to
8 file.

9 MS. CHESTNUT: They could file a petition to change
10 their ECR and the Commission would act on it in a separate
11 proceeding. I think that's obvious to anybody with any
12 kind of understanding of how this Commission operates.

13 MR. MacGREGOR: That's absolutely right.

14 MS. CHESTNUT: The second point, Your Honor, is
15 this is --

16 JUDGE MATUSCHAK: Suppose the company says to you
17 if the Commission wanted to provide and they ordered an
18 80/20 reconciliation why didn't they say it in the order?

19 MS. CHESTNUT: They did say it in the order. They
20 said it in numerous places. They said it explicitly.

21 JUDGE MATUSCHAK: Well, you show me in the order.
22 There are only so many paragraph and most of them refer to --

23 MS. CHESTNUT: Paragraph No. 5, Your Honor, is as
24 clear as it's ever going to be

25

1 JUDGE MATUSCHAK: All paragraph five is is a
direction as to what the company should do.

2 MS. CHESTNUT: And what they should do is file an
3 80/20 ECR.

4 JUDGE MATUSCHAK: Is there anyplace in that order
5 that says the company shall be permitted to only reconcile
6 80 percent of its estimate?

7 MS. CHESTNUT: Your Honor, there is no ordering
8 paragraph specifically saying that. It says in the
9 ordering paragraph they have to file a revised ECR in
10 accordance with the Commission's discussion in the opinion
11 and order. And that is where they say the 80/20 split.

12 Of course the Commission is not going to regurgitate
13 its entire discussion in the ordering paragraphs. I think
14 that's not the way these things are done. It's not
15 necessary.

16 JUDGE MATUSCHAK: It may not be disturbing to you but
17 it's disturbing to us, that a matter of such magnitude and
18 importance is not included in the order and not even referred
19 to by a paragraph incorporating any of the conclusions in
20 the opinion as an order.

21 MS. CHESTNUT: Your Honor, in the conclusion section
22 they incorporate the discussion. In the ordering paragraph
23 they incorporate their discussion. That's all that is
24 necessary. They don't have to repeat it in the ordering
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

paragraph.

JUDGE MATUSCHAK: Be that as it may, even if the Commission didn't do that, our further question is what did the Commission intend in its referral to us in this proceeding, which is ordinarily not a matter for rate case disposition?

Frankly, I can see a number of concerns in this whole matter. But it resolves itself as to what we are expected to do in this case under the assignment because that's the only basis we have, that's the only authorization we have to even get into the ECR, the Commission's referral to us, whether the Commission acted properly, whether the 80/20 should apply or should not apply.

MS. CHESTNUT: Your Honor, there are two ways you can go in this. You can either adopt Staff's position that the 80/20 decision has already been made and we are simply implementing it in this proceeding, which is the Staff's position and that's the testimony that we are putting on, or Your Honor can agree with the company that the entire issue is to be relitigated. And if that's the case, Your Honor, I can assure you that the only issue is not whether or not there should be a \$35 million cap. If the issue is whether or not the ECR should be revised then there are a lot of issues that that encompasses.

JUDGE MATUSCHAK: The question comes in as to whether

1 we are bound and the parties are bound by res judicata
2 since the Commission has announced a recapitulation of
3 80/20 despite some question as to the language of the
4 order. It does appear from its opinion that they intended
5 to do it and the company evidently felt they were bound
6 by the 80/20 because they took an appeal from the order
7 and in their appeal they refer to the 80/20 as one of the
8 things they are appealing from.

9 MR. MacGREGOR: Your Honor, the appeal was purely a
10 protective appeal in just the event that this kind of
11 thing happened.

12 JUDGE MATUSCHAK: Suppose the appeal was heard before
13 our case was heard. Would you argue to the Commonwealth
14 Court that that adjudication by the Commission, the 80/20,
15 is improper because of due process or any other matter?

16 MR. MacGREGOR: Your Honor, first of all, it's
17 virtually impossible that the case is going to be heard by
18 the Court before then. And if it was, we would simply
19 take alternative positions to the Court, saying we believe
20 that we should get a chance to litigate this but the
21 Commission Staff is trying to block our effort to litigate
22 it in this case and if they succeed then we would have to
23 proceed with our appeal. If we are allowed to litigate it
24 as we believe we were permitted to do by the Commission's
25 order, which only directed us to file the ECR and did not

1 make findings with respect to the 80/20, then we would have
2 no basis for the appeal.

3 JUDGE MATUSCHAK: Well, we are not going to decide
4 it right at this time, but it would seem to us that the
5 referral by the Commission did not ask us to look into
6 whether the 80/20 was a proper disposition or not. It
7 would seem to us that what the Commission asked us to do
8 was to look in and see that the proper ingredients were
9 put in by the company.

10 MR. CLARK: Your Honor, may I interject a comment?
11 The Governor's Energy Council at this time is not going to
12 take a position on the procedural and legal issues of this
13 motion. But I would like to address the substantive issue
14 of performance.

15 The Governor's Energy Council is concerned about the
16 cost of service and one of the key factors in that cost
17 is the performance of the company's generating units. We
18 think that that performance is a key issue in this case
19 whether or not there had even been an ECR order.

20 One of the aspects of the rates here is ways of
21 providing incentives to improve the performance of the
22 generating units.

23 JUDGE MATUSCHAK: Isn't that what the Commission
24 evidently intended for us to determine, whether the proper
25 input was put into the ECR for the proper performance of

the different production facilities and so forth?

1 MR. CLARK: You're exactly right. The performance
2 incentive was probably the major concern of the Commission
3 in suggesting the 80/20 ECR.

4 What the Governor's Energy Council is interested in
5 doing is suggesting improvements to those performance
6 incentives, strengthening those performance incentives
7 in this case.

8 JUDGE MATUSCHAK: Don't you agree that unless we
9 go into that, unless we look into that, the 80/20 is
10 meaningless, unless you get the proper mix and the proper
11 performance standards in the ECR? If you don't do that
12 then the 80/20 is meaningless.

13 MR. CLARK: I agree.

14 JUDGE MATUSCHAK: If you manipulate it you can
15 recover all your costs on an 80/20 basis.

16 MR. CLARK: I agree with that very strongly, Your
17 Honor, and the testimony we are submitting in response to
18 the ECR testimony will discuss that as one of the major
19 issues in the ECR.

20 JUDGE MATUSCHAK: Do you have anything further, Mr.
21 MacGregor?

22 MR. MacGREGOR: Your Honor, just to reiterate our
23 position, these are facts that change constantly. The
24 financial position of the company changes. They are not
25

1 historic facts. They cannot be subject to any kind of
2 bar. They are policy judgements which the Commission can
3 change at any time and if that is true then the company has
4 to be permitted to present its case on these issues.

5 JUDGE MATUSCHAK: Well, I think you're right in that
6 respect. But we also think that that has to be approached
7 in a proper manner and we don't think that approach is in
8 this rate case.

9 Very well, we will issue an order.

10 Mr. Wersan, do you have a witness?

11 MR. WERSAN: Yes, Your Honor. At this time the
12 Office of Consumer Advocate would like to present Dr.
13 Stephen H. Hanauer.

14 Whereupon,

15 STEPHEN H. HANAUER

16 having been duly sworn, testified as follows:

17 MR. HALL: If Your Honor please, before we begin with
18 Dr. Hanauer, I'm going to be doing the cross-examination of
19 Dr. Hanauer. An associate is coming over from my office with
20 some materials I need, so I'm going to have to ask for
21 about a ten minute break.

22 JUDGE MATUSCHAK: Very well.

23 MS. CHESTNUT: Your Honor, I would like to mention that
24 our ECR testimony is due today and I discussed with Mr.
25 MacGregor the fact that Staff would like an extension until

1 Monday, possibly Tuesday. He indicated that the company
2 did not have a problem with that.

3 MR. MacGREGOR: That's correct, Your Honor.

4 MS. CHESTNUT: We think we will have it Monday, but
5 just in case it might be Tuesday.

6 JUDGE MATUSCHAK: Very well. The motion is granted.

7 Ten minute recess.

8 (Recess.)

9 JUDGE MATUSCHAK: Before we proceed, when will the
10 reconciliation of the ECR take place? When will that be?
11 One year after June, 1986?

12 MS. CHESTNUT: Your Honor, it would operate the same
13 way the ECR does now, which is that the reconciliation
14 takes place on an after the fact basis. They collect their
15 projected cost --

16 JUDGE MATUSCHAK: How often is that consideration
17 made?

18 MS. CHESTNUT: Once a year, Your Honor. They file
19 quarterly reports and then there is one filing made. It's
20 an annual basis.

21 JUDGE MATUSCHAK: When is the final reconciliation
22 made, a year after?

23 MR. MacGREGOR: Once a year, yes.

24 MS. CHESTNUT: Once a year.

25 JUDGE MATUSCHAK: So actually the 80/20 won't come

1 into play until sometime around June of 1987.

2 MR. HALL: I'm not sure that's absolutely correct,
3 Your Honor. I think the order does not describe precisely
4 the period. I think there is a question as to whether it
5 would run from July 1 to June 30 or if the audit staff
6 would find a different period appropriate.

7 JUDGE MATUSCHAK: Whether it applies to the beginning
8 of January or whether it applies to the beginning of June,
9 that's the problem?

10 MR. HALL: That is a potential issue that the
11 Commission could adjust in its final order here, I believe.

12 Presently the clause runs from February 1st to
13 January 31.

14 MR. MacGREGOR: The reconciliation period.

15 MS. CHESTNUT: Right.

16 MR. MacGREGOR: Our proposal is to continue to two
17 month lag in the reconciliation period. So the year for
18 reconciliation would end at the end of May each year.

19 JUDGE MATUSCHAK: The 80/20 wouldn't apply to that
20 reconciliation, would it?

21 MR. MacGREGOR: No. The 80/20 will not apply,
22 except to any over/undercollections, until after June 27,
23 1986. That would be the first time it applies, Your Honor,
24 under the company's proposal.

25 JUDGE MATUSCHAK: Actually there wouldn't be any

1 final reconciliation of the ECR that you're going to
2 file effect in June of '86 until June of '87; is that
3 correct?

4 MR. MacGREGOR: That's correct, Your Honor.

5 MS. CHESTNUT: The precise month, Your Honor, is a
6 little unclear.

7 MR. MacGREGOR: Yes. But in general that's correct.

8 JUDGE MATUSCHAK: So regardless of what decision we
9 make here it's not going to have any effect on the rate
10 case itself or on the allocation of energy costs in base
11 rates --

12 MR. MacGREGOR: As long as both the 80 percent and
13 20 percent components are in the ECR and there is no change
14 made to the base cost of energy, that would be correct.
15 That is the company's proposal and it's not clear at this
16 time whether that proposal is going to be tested or not.

17 JUDGE MATUSCHAK: Well, with what you have in base
18 rates, the energy costs you have in base rates, you can
19 pretty well assume that that would be part of the 80 percent,
20 can't you?

21 MR. MacGREGOR: Your Honor, the company is proposing
22 to keep the cost of energy in base rates the same and to
23 implement the 80/20 ECR modification in the ECR. What we
24 will do each year is come forward with a projection of our
25 total energy costs for the next 12 months and at the end of

1 that period when it's reconciled for over/undercollections
2 when we apply the E factor, or the reconciliation factor,
3 we would only recover 80 percent of undercollections and
4 would only flow through to ratepayers 80 percent of
5 overcollections. That's the company's proposal.

6 JUDGE MATUSCHAK: But that won't affect the base
7 rates?

8 MR. MacGREGOR: Under the company's proposal that
9 is correct, Your Honor.

10 MS. CHESTNUT: Your Honor, that's not true of Staff's
11 position.

12 JUDGE MATUSCHAK: What's that?

13 MS. CHESTNUT: That's not Staff's position.

14 JUDGE MATUSCHAK: What is Staff's position?

15 MS. CHESTNUT: Staff's position is that the Commission's
16 order, although it's a little ambiguous on this point, is
17 that 20 percent of the unreconciled piece of the energy
18 costs are to be put into base rates not the ECR and be treated
19 as a base rate. The way the current base rate component
20 energy cost is now, it will be the 20 percent -- it's
21 currently set at 28 mills -- that will be set at 20 percent
22 of the company's projected energy costs and will not be
23 reconciled at the end.

24 JUDGE MATUSCHAK: Well, how are you going to
25 implement that in the rates? It would seem to me that the

030
1 easier way to do it is maybe as Mr. MacGregor suggested
2 because the portion of the energy cost in base rates will
3 have to be -- could not exceed the 80 percent in any event.
4 So that it would seem to me that if there's any reconcilia-
5 tion made it would be made in the ECR and actually the
6 consumer gets the benefit of it one way or the other. The
7 way you have it, you may be complicating the rates.

8 MS. CHESTNUT: Your Honor, with all due respect, you
9 have not yet seen our testimony on this point and I think
10 we explain in that testimony very clearly the basis for our
11 position and show how it works.

12 MR. MacGREGOR: Your Honor, the company's position
13 is that we have chosen the most efficient way of doing this
14 and if we do end up changing the base cost of energy it's
15 going to completely foul up the cost of service study we have
16 put in in this case, the allocation of the rate increase, and
17 everything else we have filed is going to have to be
18 completely redone.

19 JUDGE MATUSCHAK: It would seem to us that that is
20 doing something the hard way.

21 MS. CHESTNUT: Your Honor, in addition to efficiency
22 we also have to look at legality. I can briefly state
23 now, although I don't want to really get into a big
24 discussion of it at this point, our position is that costs
25 that are not reconcilable must be recovered by means of

2104

1 Section 1308 of the Public Utility Code. They don't go
2 through 1307. If they go through Section 1307 they have to
3 be reconciled. And since the Commission ordered that a
4 portion are not going to be reconciled the only other
5 means by which they can be recovered is through 1308;
6 and 1308 are base rates.

7 We can explain this in more detail how it will work.
8 It's not as complicated as the company would have you
9 believe.

10 JUDGE MATUSCHAK: It would seem to us that the
11 company's procedure would be the most efficient, at least
12 at this stage, unless you educate us otherwise.

13 MS. CHESTNUT: We will try, Your Honor.

14 MR. HALL: If Your Honor will permit me one last
15 comment, with respect to the motion which was argued this
16 morning, Ms. Chestnut is stating her position and will be
17 presenting testimony to you with regard to it. I would
18 simply suggest that Your Honor might defer ruling on that
19 motion as you have done with regard to the motion in limine
20 until you have all of the parties' position before you.

21 As you have heard, the Governor's Energy Council
22 is active in this area and making proposals in this area.
23 The Staff has their own proposals and legal positions.
24 They have moved here to strike the company's position and
25 evidence the company has presented in support of that. I

1 think before Your Honor takes that position and tries to
2 make judgements about what evidence on this issue -- and
3 with regard to the '76 and '78 deferral issue -- are relevant
4 to this proceeding you should see all of that evidence
5 and see those legal positions.

6 MS. CHESTNUT: Your Honor, that is absolutely
7 outrageous. We are presenting our testimony in accordance
8 with our view that the Commission's ECR 8 order is binding.
9 If Your Honor rules that that order is not and that the
10 entire issue is to be relitigated in this case, 80/20 is
11 not our position and we will be submitting different
12 testimony in support of our position.

13 So, Your Honor, I think it's most important that we
14 receive a ruling from Your Honor as soon as possible so
15 that the company's due process rights will not be
16 prejudiced and so that they can have a sufficient time to
17 review our testimony and cross-examine on it prior to the
18 ending of this case.

19 JUDGE MATUSCHAK: We are concerned about the mechanics
20 of this case. We had indicated, I think yesterday, that
21 where we were going to strike testimony we would prefer
22 doing it in this manner: that the testimony be included in
23 the record subject to exceptions and objections and then if
24 we are going to strike we will strike. By the same token,
25 then, we would probably strike portions of the cross-

1 examination and any submission in response to that
2 testimony.

3 What we are trying to preclude here is having the
4 case unfinished and having it remanded to us to be reopened
5 and then get back into it. I would rather have everything
6 there for the Commission and the Commonwealth Court to be
7 able to review and if they want to strike something we did
8 not strike they may do so, and if they want to reinstate
9 something we did strike they may do so, and the record will
10 be complete rather than having it remanded for, perhaps, the
11 submission of further evidence and further testimony and
12 further cross-examination.

13 We would suggest -- we would suggest -- that your
14 response include your position in the matter and that
15 alternatively you respond also in the event that we do
16 not strike the testimony so that the Commission can have
17 that before them in the event that we make an error in our
18 decision.

19 MS. CHESTNUT: Your Honor, then we need at least
20 another two months to prepare our testimony.

21 JUDGE MATUSCHAK: Well, we don't go with that. We
22 can't give you two months because the Legislature doesn't
23 give us two months.

24 MS. CHESTNUT: It's not physically possible for us
25 to prepare testimony on this type of complex issue in the

time frame that we have here. It's just not possible.

1 We are doing our best to comply with the time
2 constraints here, but we can't put on alternate testimony,
3 Your Honor --

4 JUDGE MATUSCHAK: We will give the parties the
5 opportunity to respond in the direction that we indicated.
6 We are not going to have loose ends here if the case will
7 be remanded to us for further testimony. We have a certain
8 time limitation in these matters and we would like to have
9 the matter fully litigated so that the Commission and the
10 Commonwealth Court can look at the record and either
11 strike some of it or -- we will do our job initially.
12 We aren't afraid to do that. We will do our job initially.
13 But we don't want to be put in a position where the matter
14 will have to be remanded to us to reinstate something that
15 was stricken or to strike something that was presented.

16 MS. CHESTNUT: Your Honor, it's Staff's intention to
17 work within the time constraints of this proceeding. However,
18 I don't think Your Honor understands that this is a very
19 complex issue and it requires a lot of work for us to put
20 testimony on if we go with anything other than the 80/20.
21 We are prepared to put testimony on consistent with the
22 80/20.

23 JUDGE MATUSCHAK: We think the Commission realized
24 that when they gave us the assignment.
25

1 MS. CHESTNUT: We are prepared to go with the 80/20
2 and put testimony on on that basis. If we have to do
3 otherwise --

4 JUDGE MATUSCHAK: We aren't telling you how to
5 proceed, but --

6 MS. CHESTNUT: Well, Your Honor, I would like to
7 make it clear that if Your Honor rules against us and opens
8 the door to relitigate this issue we would like to put
9 supplemental testimony on and we will endeavor to do that
10 in a timely fashion in this case.

11 JUDGE MATUSCHAK: Well, that's not the point we are
12 trying to stress. Suppose we side with you and then an
13 appellate court decides that we were wrong or the Commission
14 decides that we were wrong. Then we have to come back and
15 let the company put in their position and then let you
16 respond to it.

17 MS. CHESTNUT: Well, Your Honor, the company's position
18 already is on the record.

19 JUDGE MATUSCHAK: All right. We have to come in and
20 let you respond to it. Suppose the Commission or appellate
21 court says that testimony should have been in? Then you
22 say you want an opportunity to respond to that. Then we are
23 put in a position where we have to reopen the case, in all
24 fairness to you, to give you an opportunity to respond.

25 MS. CHESTNUT: Your Honor, I think Staff is concerned

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

with pragmatics here as much as anybody. We don't want to complicate the issue. We don't want a remand. And we don't want to have to relitigate this issue. I really don't think that will be a problem in the future, Your Honor.

JUDGE MATUSCHAK: I can't envision that you should need two months to respond to the testimony of Mr. Brennan and Mr. Hill, the supplemental testimony of Mr. Brennan and Mr. Hill, in this matter assuming that we would deny your motion. I can't see where it would take two months to do that.

MS. CHESTNUT: Your Honor, we need a consultant to do that issue and it takes time for us to get one. We have a consultant standing by but they have not been directed to prepare and that takes time.

JUDGE MATUSCHAK: Suppose that we grant your motion and then the Commission or an appellate court decides that we were in error and they would reinstate the testimony of the company. Then where are we?

MS. CHESTNUT: I can't say what we would do at that point, Your Honor.

JUDGE MATUSCHAK: Well, then in fairness to you wouldn't you say that they would have to --

MS. CHESTNUT: That's a risk that we are taking, Your Honor. I mean, we are willing to abide by that.

JUDGE MATUSCHAK: All right. We will proceed.

1 MR. WERSAN: Your Honor, the Office of Consumer
2 Advocate is presenting Dr. Stephen Hanauer. He was sworn
3 before the break and the discussion you just had.

4 DIRECT EXAMINATION

5 BY MR. WERSAN:

6 Q. Could you please state your name and your
7 address for the record?

8 A. Stephen H. Hanauer, 6723 Whittier Avenue,
9 McLean, Virginia.

10 Q. Dr. Hanauer, do you have before you a document
11 entitled "Testimony and Exhibits of Stephen H. Hanauer"?

12 A. I do.

13 Q. And does this document consist of both text and
14 of exhibits of yourself?

15 A. Yes, it does.

16 MR. WERSAN: Your Honor, at this time I would like
17 to mark for identification as OCA Statement No. 2 the
18 testimony and exhibits of Stephen H. Hanauer.

19 JUDGE MATUSCHAK: The motion is granted.

20 (Whereupon, the document was
21 marked as OCA Statement No. 2
for identification.)

22 BY MR. WERSAN:

23 Q. Dr. Hanauer, is the document that has been
24 identified as OCA Statement No. 2 your testimony in this
25 proceeding?

1 A. Yes, it is.

2 Q. And was that testimony prepared by you or under
3 your direction and supervision?

4 A. Yes, it was.

5 Q. If I were to ask you the questions contained in
6 OCA Statement No. 2 would your answers today be the same
7 as set forth therein?

8 A. Yes, they would.

9 Q. And would those answers be true and correct to
10 the best of your knowledge, information and belief?

11 A. Yes, they are.

12 Q. Do you have any changes or corrections at this
13 time?

14 A. No, sir.

15 MR. WERSAN: Your Honor, I would like to move into
16 evidence OCA Statement No. 2 subject to any outstanding
17 motions, in limine motions, to strike or any other motions
18 that may arise; and Dr. Hanauer is available for cross-
19 examination.

20 JUDGE MATUSCHAK: The motion is granted subject to
21 any timely motions or exceptions to the testimony.

22 (Whereupon, the document marked
23 as OCA Statement No. 2 was
24 received in evidence.)

25 JUDGE MATUSCHAK: You may proceed.

MR. HALL: Thank you, Your Honor.

1 Your Honor, before proceeding, I would like to
2 identify for the record an exhibit that I will use during
3 the cross-examination of Dr. Hanauer. This exhibit I would
4 ask be identified as PECO Exhibit No. 5. It contains all
5 of the answers to interrogatories which Dr. Hanauer has
6 provided to us through the Office of Consumer Advocate.

7 MS. CHESTNUT: Your Honor, Staff -- I'm sorry, Mr.
8 Hall. Was that all the interrogatories with respect to
9 Dr. Hanauer?

10 MR. HALL: Each and every one.

11 MS. CHESTNUT: Are you going to refer to all of them
12 in your cross-examination?

13 MR. HALL: I will not necessarily refer to each and
14 every one, but I will refer to several and they all may be
15 relevant to discussions that I have with Dr. Hanauer.

16 MS. CHESTNUT: Well, Your Honor, Staff objects at this
17 point, then. The revised rules of procedure preclude the
18 wholesale moving into evidence of exhibits without an
19 expressed showing of relevancy.

20 MR. HALL: Your Honor, I don't think the new rules of
21 procedure deny something of this nature. What I am seeking
22 to do is to put in the specific responses -- there are only
23 about 20 or 21 response -- that Dr. Hanauer has provided to
24 us. We will refer to five or six; we may refer to all 20
25 as we go through the cross-examination. It is far more,

1 I think, procedurally convenient. It does not clutter the
2 record to have these materials before you.

3 JUDGE MATUSCHAK: It's our understanding that you
4 intend to identify the exhibit at this time but you're not
5 presenting it for inclusion in the record. Is that correct?

6 MR. HALL: No. I will move for its entry into the
7 record. I assume that Your Honor will grant that subject to
8 motions to strike such as the one that Ms. Chestnut is
9 raising here if you do not believe that we have tied this
10 in during the cross-examination.

11 JUDGE MATUSCHAK: What's the nature of your objection?

12 MS. CHESTNUT: Your Honor, the revised rules of
13 procedure -- one of the reasons that the rules were revised
14 was to prevent the wholesale moving into evidence of
15 quantities of interrogatory responses.

16 JUDGE MATUSCHAK: Well, I think we have to be
17 reasonable in this matter and I think when they are collected
18 in this manner that it enhances rather than destroys the
19 efficient use of these responses. We will overrule the
20 objection.

21
22 (Whereupon, the document was
23 marked as PECO Exhibit No. 5
24 for identification, and was
25 received in evidence.)

JUDGE MATUSCHAK: You may proceed.

MR. HALL: Thank you, Your Honor.

CROSS-EXAMINATION

1 BY MR. HALL:

2 Q. Dr. Hanauer, I would like to start this morning
3 by talking about that portion of your testimony, which is
4 the majority of it, which deals with the question of the
5 Mark II containment.

6 Dr. Hanauer, would you agree with me that the Mark
7 II containment is referred to as a pressure suppression
8 containment?

9 A. Yes, sir.

10 Q. And could you define for me, sir, your under-
11 standing of that term?

12 A. The term pressure suppression containment refers
13 to a containment design where the energy from steam released
14 in an accident, primarily, is somehow absorbed other than
15 just being contained within the containment.

16 Let me expand on that a little. In the containment
17 we are talking about, the Mark II, this is done in a pool
18 of water and the absorption of the energy in the steam heats
19 up the water. In another design, which is not subject to
20 litigation here but which is pressure suppression, there is
21 a chamber full of ice and the steam is used to melt some
22 ice. You can't get rid of the energy; you simply absorb it.

23 In non-pressure suppression containments there is a
24 large volume of the pressure and temperature of the air and
25

1 steam and the volume is simply allowed to increase and the
2 containment is made strong enough to contain the added
3 energy.

4 Q And would I be correct, Mr. Hanauer, that one of
5 the purposes of pressure suppression as a basis for contain-
6 ment design is to permit the construction of smaller contain-
7 ments; thus to obtain cost savings in containment construction?

8 A That intention has been stated. There is some
9 debate whether it is actually achieved.

10 Q Now, would you agree, Dr. Hanauer, that the
11 pressure suppression containment concept which is used as a
12 basis of the Mark II containment design was developed
13 following testing at two nuclear facilities in the late
14 1950's and 1960's -- earlier 1960's -- known as the Humboldt
15 Bay and Bodega Bay facilities?

16 A No, sir, that's not correct.

17 Q And would you supplement that for me, please?

18 A Neither Humboldt Bay nor Bodega had been built
19 in the late 1950's and Bodega was never built. The tests
20 were performed in contemplation of building those two
21 facilities and they were performed in non-nuclear facilities.

22 Q I stand corrected. That is correct.

23 Would you agree with me, Dr. Hanauer, that the tests
24 which occurred in these non-nuclear facilities were viewed
25 by the industry as establishing the feasibility of use of

a pressure suppression containment concept?

1 A. No. I think that's incomplete. They were
2 certainly viewed that way but there were others things in
3 addition that the tests were to do.

4 Q. And what were those things, in your opinion, sir?

5 A. They were intended to supply the data which were
6 required to design these pressure suppression containments.
7 So establishing the feasibility was not the end but only
8 the beginning of their purpose.

9 Q. And is it not correct, sir, that the Atomic
10 Energy Commission was present at certain of these tests
11 and that reports of those tests were reported to it?

12 A. It is certainly true that the results were
13 reported. It is my understanding that Atomic Energy
14 Commission people attended them from time to time, but I
15 don't really know this.

16 Q. Would you agree with me, sir, that there are
17 three different containment designs that are based upon the
18 pressure suppression concept, that being the Mark I, the
19 Mark II and the Mark III design, all used in BWR facilities?

20 A. There certain are those three; there are others.

21 Q. And would that include a number of PWR designs
22 as well?

23 A. At least one.

24 Q. Would you agree with me, sir, that based upon
25

1 the tests which we have discussed in the late '50s and
2 earlier '60s General Electric designed the Mark II
3 containment concept and that that concept was approved for
4 licensing by the Nuclear Regulatory Commission?

5 A. That's a difficult question. General Electric
6 performed a number of calculations intended to provide the
7 design basis for that concept. But the detailed design
8 of the containment was not provided by General Electric
9 and was not approved at that time.

10 Q. Is it not correct, sir, that some 22 Mark I
11 facilities, a type of pressure suppression containment,
12 were constructed by more than ten different utilities and
13 several different architect engineers in the late 1960s
14 and early 1970s based on data obtained from the tests at
15 the facility related to Bodega Bay and Humboldt Bay?

16 A. I don't know if your numbers are exact. Your
17 timing is wrong. The last one is just now being completed
18 in the mid-1980s.

19 Q. I'm sorry, sir, I did not include the ones
20 that are presently under construction.

21 A. And I don't know the numbers exactly but that
22 sounds right.

23 Q. And is it not correct, sir, that the Nuclear
24 Regulatory Commission granted those construction permits
25 and operating licenses to those facilities which were

1 designed using the pressure containment concept based on
2 the test results we have discussed?

3 A. I'm sorry, now. Are we still on Mark I?

4 Q. Yes.

5 A. Most of those construction permits were granted
6 by the Atomic Energy Commission, the predecessor to the
7 Nuclear Regulatory Commission. But they were indeed
8 granted construction permits and most of them operating
9 licenses.

10 Q. And in granting construction permits and
11 operating licenses would it not be correct that the Atomic
12 Energy Commission or its successor, the Nuclear Regulatory
13 Commission, made a determination that the containment
14 design of those plants and the plants themselves could be
15 operated with a reasonable assurance of public safety?

16 A. Yes, they did make such a determination.

17 Q. And did not that determination involve a review
18 of the specific designs of the containments, the loads
19 employed as the basis of that design, by the Atomic Energy
20 Commission and the Nuclear Regulatory Commission?

21 A. Probably not. The review at the time the
22 construction permits were granted were performed by what
23 was then a small staff and they reviewed the concepts and
24 some technical data to a greater or lesser extent in their
25 reviews of these different plants. But to say that they had

1 reviewed the design is certainly not correct. The design
2 consists of thousand of drawings and calculations which
3 underlie these drawings and neither the AEC nor the NRC
4 ever purported to review the details of the design.

5 There was a technical review of the basis, both
6 theoretical and test basis, for these and they were accepted.

7 Q. Well, are you saying, sir, in your answer that
8 there is some question as to whether the Atomic Energy
9 Commission or the Nuclear Regulatory Commission with respect
10 to Mark I BWR facilities failed to properly perform a review
11 to assure that those facilities could be operated with a
12 reasonable assurance of safety for the public?

13 A. There are two answers to that question. They
14 performed what review was deemed to be proper at the time.
15 It's now known that certain forces were not adequately
16 included in the design of these plants when they were
17 approved up at least until the mid-1970s and that the plant
18 design and in many cases the plant hardware had to be changed
19 as a result.

20 Q. But it is your testimony that under the procedures
21 and with the knowledge of the time and with the views of what
22 was appropriate in design matters at the time the Atomic
23 Energy Commission and the Nuclear Regulatory Commission where
24 appropriate did review the design of these plants and did
25 find them to be designed so as to meet the legal standard of

1 a reasonable assurance of safety for the public?

2 A. I don't know how to comment on the legal standard.
3 Reviews were conducted that were believed to be adequate
4 and approvals were given.

5 Q. Now, is it not also correct that a number of Mark
6 I BWR facilities employing the pressure suppression concept
7 were also constructed in foreign countries by foreign
8 utilities and foreign architect engineer firms and were
9 approved to operate as safe in those foreign jurisdictions
10 by foreign nuclear regulating bodies?

11 A. All of that is true except I don't know that
12 the architect engineers were foreign or American.

13 Q. Would you know the number of such facilities
14 that were constructed, sir?

15 A. No, sir.

16 Q. Now, the Mark II design, which is contained in
17 Limerick, is also a pressure suppression design concept,
18 is it not?

19 A. Yes, sir.

20 Q. And the hydrodynamic loads problem that is
21 discussed in your testimony is a problem that is present,
22 is it not, both in the Mark I and in the Mark II designs?

23 A. Yes, sir.

24 Q. Now, the Mark II design was developed, was it
25 not, based upon the Humboldt Bay and Bodega Bay related

test results that we have discussed? Is that not correct?

1 A. Yes, and other things too.

2 Q. And is it not correct, sir, that some 11 Mark II
3 plants were ordered by more than five different utilities
4 and were designed by a number of architect engineers, or in
5 part designed, and were licensed by the Nuclear Regulatory
6 Commission for construction, or the Atomic Energy Commission,
7 in the early 1970s?

8 A. Yes, sir.

9 Q. And in fact, sir, am I not correct that you, as
10 a member of the Advisory Committee of Reactor Safeguards,
11 in 1969, reviewed the construction permit request of the
12 Shoreham facility and recommended that the Nuclear
13 Regulatory Commission should license that facility for
14 construction?

15 A. That's correct.

16 Q. And that facility has a Mark II containment, does
17 it not?

18 A. Yes, it does.

19 Q. Would I be correct, sir, in stating that the
20 principal design concern of the Atomic Energy Commission in
21 containment design during the late 1960s and early 1970s
22 was a concern that the containment be able to withstand
23 pressure forces within it; that it not become over-pressurized
24 and rupture?
25

1 A. That was a principal concern, yes. Whether it
 2 was the principal concern, I couldn't say, I couldn't
 3 confirm. There were several concerns. I don't know how
 4 to characterize them as to principal or otherwise. There
 5 was, for example, in the Mark II design a concern about the
 6 strength of the floor of the drywell, which is the ceiling
 7 of the suppression pool and which experiences forces on it
 8 during the blowdown of an assumed accident and which, if
 9 it leaks excessively, bypasses the pressure suppression
 10 feature. Whether you want to include that as pressure
 11 capability, I don't think it matters. There were several
 12 concerns related to such things.

13 Q. But that concern, I take it, sir, is related to
 14 pressure and over-pressurization?

15 A. Yes. There is a differential pressure, if you
 16 would like, concern. There was another concern about the
 17 later possibility of vacuum conditions which you can if you
 18 would like also characterize as a pressure concern. There
 19 were some temperature-related concerns of these containments
 20 also but they were resolved.

21 Q. And I take it none of those concerns that you
 22 have mentioned to us, sir, are hydrodynamic load concerns.
 23 None of them relate to hydrodynamic loads.

24 A. Well, I don't quite know how to put it in your
 25 terms. In fact, the jet of water issuing from the

1 downcomer, which seems to me to be a hydrodynamic concern,
2 was included in the loads of the early designs, but a number
3 of other hydrodynamic loads which we now worry about where
4 not included in the concerns.

5 Q. Is it not correct, sir, that in 1972 you drafted
6 a memorandum to your colleagues on the NRC staff in which
7 you identified a number of what you perceived to be
8 significant safety concerns respecting the BWR pressure
9 containment concept?

10 A. Yes. As a matter of fact, I was dealing with
11 pressure suppression containments in general and not just
12 the BWRs.

13 Q. And did you not in fact in that memorandum
14 recommend to your colleagues that they should consider, or
15 the NRC should consider, whether or not to continue to
16 licensing pressure suppression containments?

17 A. Yes, I did.

18 Q. And would I not also be correct, sir, that in
19 that memorandum no place did you identify any concerns
20 with hydrodynamic loads such as had been developed in the
21 mid-1970s as a concern with Mark II containments?

22 A. That's correct, not explicitly. My concern was
23 that problems kept coming up but I did not explicitly
24 consider hydrodynamic loads.

25 MR. HALL: Your Honor, at this time I would like to

1 offer for the record a copy of Dr. Hanauer's memorandum
2 as well as a copy of a subsequent memorandum which I will
3 discuss with him in a moment which he drafted in 1978
4 relating to the same matter.

5 JUDGE MATUSCHAK: Any objections?

6 MR. WERSAN: I would like to see them first.

7 JUDGE MATUSCHAK: Show them to Counsel.

8 (Documents handed to Counsel Wersan.)

9 MR. HALL: Your Honor, if there are no objections I
10 would ask that this material be entered into the record as
11 PECO Exhibits 6 and 7.

12 MR. WERSAN: No objection, Your Honor.

13 JUDGE MATUSCHAK: PECO Exhibits 6 and 7 are admitted
14 into evidence.

15 (Whereupon, the documents were
16 marked as PECO Exhibits Nos.
17 6 and 7 for identification, and
18 were received in evidence.)

19 BY MR. HALL:

20 Q Now, did you not in the second memorandum, which
21 has also been provided as PECO Exhibit 7, Dr. Hanauer,
22 provide some additional data respecting your views as stated
23 in 1972 and also your views as they existed in 1978 with
24 respect to the safety of the BWR Mark II containment concept
25 even despite your knowledge at the latter time of the
existence of the hydrodynamic load phenomenon?

A Yes, sir.

1 Q And did you not say in that memorandum that it
2 was your view and belief in 1972 that BWR pressure suppression
3 containment concepts were safe and provided adequate assurance
4 of safety to the public?

5 A Yes, sir. The memo was broader than that but it
6 included BWR pressure suppression containments.

7 Q And in addition did your memo not also state that
8 as of the time of its drafting in mid-1978 you remained of
9 the view that even despite the then-knowledge of the
10 hydrodynamic loads phenomenon that BWR pressure containment
11 suppression systems provided adequate assurance of safety
12 to the public?

13 A Yes, sir.

14 Q Dr. Hanauer, am I correct that the 1978 memorandum
15 was prepared by you to be submitted of either the House of
16 Representatives or the Senate respecting an investigation
17 that they were conducting relative to this issue at that
18 time?

19 A I can't remember what their investigation was
20 but it was intended that this go to Congress.

21 Q Dr. Hanauer, this is, as we discussed, a third
22 containment concept in BWRs which relies upon the pressure
23 suppression principle and that is the Mark III concept;
24 is that not correct?

25 A That is correct.

1 Q And is it not correct that in the early 1970s,
2 and I believe specifically in 1972, the Nuclear Regulatory
3 Commission, including both yourself and Mr. Joseph Hendrie
4 who were top officials at that time, were reviewing --
5 this may be the Atomic Energy Commission -- were reviewing
6 that particular concept to determine its acceptability as
7 providing adequate assurance of safety for the public for
8 licensing and use of BWR facilities?

9 A I no longer recall the dates of our reviews of
10 that but it certainly was proposed in the early 1970s and
11 accepted somewhat later, probably toward the mid-1970s. I
12 don't recall the dates.

13 Q Dr. Hanauer, I would like to show you at this
14 time a memorandum that was prepared during the course of
15 that review by Mr. Hendrie who subsequently, I believe, was
16 Chairman of the Nuclear Regulatory Commission -- that is
17 correct, is it not?

18 A That is correct.

19 Q -- dealing with his review of the Mark III
20 concept in mid-1972.

21 MR. HALL: Your Honor, I may or may not put this in
22 the record.

23 BY MR. HALL:

24 Q Dr. Hanauer, have you had occasion to review this
25 memorandum previously?

1 A. I don't know. It's the kind of thing I would
2 have likely received more than 13 years ago but I can no
3 longer tell you whether I did.

4 Q. In perusing this memorandum, Dr. Hanauer, is it
5 not correct that this memorandum does not raise any questions
6 respecting to hydrodynamic loads at pressure suppression
7 containment facilities?

8 A. Well, I would have to read it.

9 Q. Would you care to take a moment to review it?

10 A. Yes, sir.

11 I first observe in paragraph three on the first page,
12 "The conceptual nature of the material presented to us thus
13 far on the Mark III containment leaves many details unsettled
14 and raises many questions," and refers to papers by others
15 not before us today. I must say I do not recall whether
16 hydrodynamics loads began to appear as an unsettled question
17 at that time or not.

18 It was during the testing related to this concept by
19 General Electric that the additional loads and forces from
20 hydrodynamic effects were observed.

21 (Witness perusing document.)

22 A. I have now completed my reading of this and there
23 is no reference to hydrodynamic forces.

24 Q. And would you agree with me, Dr. Hanauer, that
25 at the start of the memorandum Dr. Henry states that the

1 memorandum is being written because he has completed, or his
2 staff has completed their review of the GE topical reports
3 relating to the proposed Mark III containment concept?

4 A. That's what it says but the apparent thrust of
5 that sentence is belied by the later material which calls
6 for more tests, more information and more reviews. This
7 was the review of a preliminary concept rather than any kind
8 of review for licensing purposes.

9 The result of this review was the addition of tests
10 and other additional work by General Electric that finally
11 resulted some years later in the approval of the Mark III
12 concept.

13 Q. And, indeed, as a result of the tests which flowed
14 out of this review of the Mark III concept I believe beginning
15 in 1975 the hydrodynamic loads began to be observed and
16 defined; is that not correct?

17 A. No, I don't think that's correct. I think they
18 were observed before 1975, not only in these tests, although
19 I don't have a detailed chronology anymore of these tests,
20 but also in the Wurgassen incident.

21 Q. And the Wurgassen incident directed itself, did it
22 not, at an SRV-related incident in a hydrodynamic load
23 problem? Is it not correct that this particular hydrodynamic
24 load problem discovered through the Mark III testing involved
25 a LOCA incident, loss of coolant accident?

2119
1 A. That's correct, but more generally you might say
2 that both of these events, and the Browns Ferry tests, pointed
3 up the need for investigating and including hydrodynamic loads
4 wherever they might appear.

5 Q. Now, the Wurgassen events, Wurgassen is a BWR
6 facility, is it not, in West Germany?

7 A. Yes, sir.

8 Q. And it is a BWR facility?

9 A. Yes, sir.

10 Q. The event that you're describing with regard to
11 Wurgassen occurred in 1972; did it not?

12 A. Yes, sir.

13 Q. Can you describe for me the circumstances under
14 which that event occurred?

15 A. Only approximately. A safety relief valve stuck
16 open for a prolonged period and the resulting steam that
17 escaped from the primary system was quenched in a pressure
18 suppression containment which was not a Mark I, Mark II or
19 Mark III, but was similar to the General Electric-designed
20 Humboldt Bay reactor in California in which there was a
21 rectangular suppression of a somewhat different size and
22 shape of the later Mark Is, IIs and IIIs.

23 Since the valve didn't reclose because there was a
24 malfunction in the valve, a lot of energy was transferred
25 from the reactor system into the suppression pool, and it

1 warmed up. As it quenched the steam the water got warmer
2 and warmer.

3 The quenching hydrodynamic effect, which were
4 observed as loud banging noises, got louder and louder and
5 in the course of this event a part of the suppression pool
6 was cracked and there was structural damage to the pool
7 itself.

8 The event was finally terminated and nobody was hurt.

9 Q. Dr. Hanauer, you have mentioned one difference
10 between the Wurgassen facility and the United States BWRs
11 and that is the containment design is, in fact, different;
12 is it not?

13 A. It was similar to Humboldt Bay; just how similar
14 I no longer remember except they both have rectangular pools
15 instead of circular ones.

16 Q. But it is significantly different, is it not,
17 than current vintage Mark II BWRs such as Limerick?

18 A. I no longer know enough about the Wurgassen
19 configuration to have an opinion about that. It contained
20 a large pool of water with, in this case, safety relief valve
21 downcomers, which is in some ways similar and in some ways
22 different from the Mark II.

23 Q. But you would not know the configuration of the
24 bottom of the pool, the basic materials used to construct the
25 pool and the load carrying capacity of those structures?

1 A. No, sir.

2 Q. Dr. Hanauer, can you state for me any other
3 significant differences between the Wurgassen plant and the
4 current Mark II BWRs and Mark I BWRs in the United States?

5 A. It's my recollection that the power level of the
6 Wurgassen plant was a good deal smaller, but that's the only
7 other thing I recall.

8 Q. But is it correct, Dr. Hanauer, that the
9 Wurgassen plant does not employ what is termed a ramshead
10 at the end of the CSRV downcomer?

11 A. I don't know.

12 Q. United States nuclear plants do employ a ramshead,
13 do they not?

14 A. Not anymore. They used to.

15 Q. They did at the time of the Wurgassen incident,
16 didn't they?

17 A. They did. I don't know whether Humboldt Bay had
18 ramsheads but the Mark Is did.

19 Q. And is it not correct that the ramshead's purpose
20 is to deflect and to diffuse the forces associated with
21 an SRV valve left open or the downcomer pressure?

22 A. That is its intention.

23 Q. And is it not correct that various tests in U. S.
24 BWR I reactors indicated that the ramshead does serve that
25 function and does permit operation of the plant with an

open SRV at much higher suppression pool temperature levels than were experienced at Wurgassen?

A. I don't know. I do know that the tests conducted in the U. S. with ramshead on the safety valve relief pipes at Browns Ferry showed that the ramshead did not adequately dissipate and distribute the steam and large forces were experienced there. How this compares to the forces in Wurgassen I don't know.

Q. Which test were you referring to?

A. Browns Ferry safety relief valve tests.

Q. And these are the tests described in your testimony?

A. Yes, sir.

Q. Now, Dr. Hanauer, is it not correct that there are some operating procedure differences of some significance between Wurgassen and United States BWRs?

A. I don't know.

Q. Is it not correct, Dr. Hanauer, that United States BWRs under their technical specifications are required to scram the reactor, i. e. shut it down quickly, whenever they have a stuck SRV valve or whenever their suppression pool temperatures increase to a level of approximately 110 -- I have 110 degrees but that may be wrong, but there is a level stated?

A. There is a level stated in the technical

1 specifications. Whether a scram is required or an orderly
2 shutdown I can't say.

3 Q And is it not correct that at Wurgassen in the
4 incident at Wurgassen that the operators deliberately
5 permitted the plant to operate for an extended period with
6 the SRV valve open, an event which could not occur in the
7 United States consistent with technical specifications
8 required by the NRC?

9 A I don't know what they did at Wurgassen in that
10 respect. Such an event, such a prolonged operation, would
11 indeed be impermissible in the United States.

12 Q Is it not correct, Dr. Hanauer, that in the
13 period 1972 through approximately 1974 the Wurgassen event
14 was discounted in the U. S. nuclear industry, including the
15 nuclear regulators, because of the many differences between
16 those circumstances at that plant and the United States
17 operating or proposed BWR facilities?

18 A I wouldn't use the word discounted to characterize
19 it. It was the Wurgassen event which served as the reason
20 for undertaking the Browns Ferry tests. However, no
21 immediate regulatory change was made by the NRC -- the
22 Atomic Energy Commission as it then was -- as a result of
23 the Wurgassen event.

24 Q And by that do you mean that the NRC neither
25 revised operating procedures at U. S. operating BWRs nor

1 required any additional changes in plant design or
2 construction to account for these perceived phenomenon?

3 A. I know that no plant design changes were
4 required. I no longer recall whether operating procedure
5 changes were either required or offered by the industry.
6 I simply don't recall.

7 Q. And in fact, Dr. Hanauer, is it not correct that
8 after discovery of the hydrodynamic loads both at Wurgassen
9 and through the testing at the Mark III test facility
10 that the NRC did not shut down any operating BWR reactors
11 because of concerns over safety?

12 A. That's not quite correct. At least one Mark I
13 boiling water reactor, the Vermont Yankee plant, was found
14 to have inadequacies in its containment design and was
15 shut down for a short time for some short-term strengthening.
16 There may have been others but that's the one I recall.

17 Q. And that is one out of over 20 plants, is it
18 not?

19 A. Yes. There may have been others that I don't
20 recall.

21 Q. Now, you have mentioned here certain tests at
22 the Browns Ferry plant; is that not correct?

23 A. That's correct.

24 Q. Now, at Browns Ferry there were SRV injections
25 into the suppression pool and as a result of those

1 injections there was vibration experienced in the contain-
2 ment; is that not correct?

3 A. That is certainly correct. It has been described
4 to me more graphically by a TVA employee who was in the
5 basement at the time that the whole suppression pool, which
6 at Browns Ferry holds a million pounds of water, jumped
7 several inches during the last test which they dared to
8 run.

9 Q. Dr. Hanauer, is that the principal basis of your
10 information about the Browns Ferry tests, your conversations
11 with TVA employees?

12 A. No, sir. That was also a report.

13 Q. Do you have a copy of that report at this time?

14 A. No, sir.

15 Q. Was this a General Electric report?

16 A. I don't recall.

17 Q. You don't recall who put out the report?

18 A. No, sir.

19 Q. Dr. Hanauer, I believe you state in your testimony
20 that the tests were terminated over concern with the
21 vibrations. What is the basis for that statement?

22 A. That's hard to recall. I no longer recall
23 whether there was a report that said here's how far we went
24 and we didn't finish the test sequence, or whether that was
25 done in an oral briefing. During that period I was technical

1 advisor to the Director of Regulation of the Atomic Energy
2 Commission and then after the transition I held the same
3 job with a slightly different title. And so if there had
4 been an oral briefing, which I don't specifically recall but
5 which is very probable, I would have gone. And if there
6 had been a written report, which I recall imperfectly, I
7 would have had a copy. So which avenue I learned of this
8 I no longer know.

9 Q. If you know, Dr. Hanauer, is it not correct that
10 the vibration problem at Browns Ferry was caused by the
11 fact that the torus of that reactor was not properly anchored
12 during the initial plant construction and that after
13 anchoring the torus further tests showed that the vibration
14 ended?

15 A. Half of that comports with my understanding and
16 the other half doesn't. It is my understanding that indeed
17 the torus had not been properly supported during the initial
18 construction at Browns Ferry Unit 1, that these supports
19 were changed and that the measured forces and other
20 phenomena were less spectacular as a result. I think it's
21 clear that the forces did not disappear as a result.

22 Q. But they were reduced, were they not, levels that
23 were considered acceptable and even minimal?

24 A. I don't think that's true. If it were I don't
25 think Browns Ferry and other plants would have had to replace

1 their ramshead quenchers that you described earlier with
2 other quenchers that produced smaller forces. It is
3 possible that -- it is surely true that the tests were
4 constrained so that the tests actually performed did not
5 overstress the containment structure since they didn't
6 want to ruin the plant. But that does not mean that the
7 design basis forces from the things that had to be designed
8 against would also have been within the allowable.

9 Q. Dr. Hanauer --

10 A. I didn't explain that very well. Let me try
11 that one again.

12 Q. That would be helpful.

13 A. Yes. They did a series of tests at Browns Ferry.
14 Browns Ferry is an operating-- or was at that time -- an
15 operating nuclear power. You must not do tests on an
16 operating nuclear power plant that could break it. For
17 one you would lose your investment and for another there is
18 a public safety question. Therefore, the tests were
19 intentionally made not severe enough to endanger the plant
20 and they were done in a sequence of increasing severity with
21 hotter water and longer steam times and things like that.

22 Now, the vibrations and so on that were experienced
23 in the tests were okay. They didn't break the Browns Ferry
24 Unit 1 plant. And they stopped or restricted or constrained
25 the testing to make sure that that was so.

1 That does not mean that the quencher in the Browns
2 Ferry plant was sufficient to quench that steam that could
3 have happened if they hadn't restrained it and that could
4 happen in certain types of transients when valves stick
5 open. And therefore in Browns Ferry and other plants the
6 quenchers have now been replaced or are to be replaced.
7 Browns Ferry is shut down at the moment.

8 Q. That is an element and a requirement, is it not,
9 Dr. Hanauer, that was adopted following all of the extensive
10 testing that was done relative to the pressure containment
11 concept by the Nuclear Regulatory Commission and the
12 industry in the late 1970s; is that not correct?

13 A. That's correct.

14 Q. That is not a conclusion that was reached or
15 adopted as a result of the Browns Ferry tests that you
16 describe in your testimony; is that not correct?

17 A. That is correct. The Browns Ferry tests that I
18 describe were instrumented as to forces and pressures to
19 some extent, to the extent possible in an operating plant,
20 and the result was to confirm that the forces and pressures
21 from hydrodynamic effects were a problem that had to be
22 investigated further.

23 Q. In fact, is it not correct, Dr. Hanauer, that
24 many of the loads that are now referred to as hydrodynamic
25 loads which have resulted in the needs to replace ramsheads

1 were not even known at the time of the Browns Ferry tests
2 and it was not the purpose of those tests to investigate
3 those loads?

4 A. I don't know. The purpose of the tests -- you
5 have asked two different questions. The purpose of the
6 tests was to find out whether there was a significant
7 problem as suggested by the Wurgassen event, and the answer
8 was yes there was a significant problem.

9 The loads that were known -- I don't quite know how
10 to characterize them. There are various hydrodynamic loads
11 that arise from loss of coolant accidents or other kinds of
12 accidents through the downcomers and from safety relief
13 valves through the quencher, whatever it is. These loads
14 are now much better understood than they were when the Browns
15 Ferry tests were run.

16 I don't know if that answers your question or not.

17 Q. Well, isn't it correct, Dr. Hanauer, that one
18 of the principal loads which has led to the decision by the
19 industry and the Nuclear Regulatory Commission to replace the
20 ramshead device with a different type of quencher device
21 is a load known as chugging?

22 A. I frankly don't recall whether chugging takes
23 place in the SVRs or only in the downcomers. It has been a
24 while since I've reviewed that.

25 My impression is that chugging is principally a loss

of coolant accident load and that condensation oscillation
1 is the principal safety relief valve load, but I preface
2 that with the statement that this is based on some
3 recollections from some months back.

4 Q. Whichever those two loads it was, it was not the
5 purpose of the Browns Ferry test to investigate those
6 particular loads; is that not correct?

7 A. Only in the general sense to investigate whether
8 significant and potentially serious loads of whatever
9 nature result from the quenching process of safety relief
10 valves.

11 Q. I think you're agreeing with me, and let me
12 ask one other question to see. It was not when the Browns
13 Ferry test was established the purpose of the individuals
14 who established that test to review something or a
15 phenomenon known as chugging or condensation oscillation?
16 The sole purpose of that test was to do, in essence, a
17 structural test to see what happens when you blew the steam
18 down the SRV line and left it open for a certain period?

19 A. The test was exploratory. Whether the words
20 "condensation oscillation" were included I can't tell you,
21 whether the listing of possible phenomena to be encounter.
22 The tests were certainly not instrumented in such a way
23 that condensation oscillation could have been studied in
24 any detail.
25

1 Q And, Dr. Hanauer, you at one point were the
2 supervising manager responsible for Mark II containment
3 problems at the Nuclear Regulatory Commission; is that
4 correct?

5 A That's correct. There were actually two periods
6 during my tenure there when I was responsible for Mark II.

7 Q And would you state what those periods were?

8 A Yes. The first started in 1979, a few months
9 after the Three Mile Island accident, and lasted until
10 mid-1980. And the second started in 1981 and ran over
11 until I left the NRC in 1982.

12 Q Now, during the period of time that you were the
13 managing supervisor for the Mark II containment problems
14 at the NRC did you review and approve the issuance of
15 NUREG-0487 and its supplements?

16 A I don't think so. I think it's the wrong time
17 frame. I think I approved the issuance of one of the later
18 documents. Let me check.

19 (Witness perusing documents.)

20 A I'm looking in my exhibit SHH-4 on page three.
21 Supplement 1 to NUREG-0487 was issued in September, 1980, and
22 I may or may not have approved that.

23 Supplement 2 to NUREG-0487 was issued in February,
24 1981, and I probably did approve that -- I'm sorry. I've
25 lost track of time. Supplement 2 I probably did not approve

2192
1 it. I no longer remember which months I was in this job.

2 NUREG-0808, issued in August of 1981, would have
3 been marginal as to whether I was in the approval chain
4 for that or not.

5 The NUREG-0783 I almost surely did approve.

6 And NUREG-0802 I remember approving.

7 Now, that's the crop.

8 Q. Very good. Thank you, Dr. Hanauer.

9 Dr. Hanauer, I have had passed out what is
10 identified in the right-hand corner as PECO Exhibit 10
11 a five page document. This document is the beginning of
12 the introduce of the problem definitions section from
13 NUREG-0487. Could you review that document for me and
14 tell me whether or not you can recall whether this is a
15 correct copy of that initial portion of that document?

16 A. We have here a copy of NUREG-0487, which I will
17 pull out and look at.

18 Q. Very good.

19 (Witness perusing documents.)

20 A. My copy does not have the underlines.

21 Q. I do apologize for that. It's the only copy I
22 have.

23 A. And my copy has a page of I-2, which is missing
24 from PECO Exhibit 10. It's a table of the plants to which
25 this applies.

(Witness perusing documents.)

1 A. Yes, those are copies of pages of that report.

2 Q. And I take it from your testimony here today you
3 cannot recall whether you were the managing director of
4 Mark II problems for the NRC at the time this document was
5 issued?

6 A. No, sir. This one I'm sure of. I was not the
7 manager at that time because this is before my tenure in
8 that post.

9 Q. Now, Dr. Hanauer, at page I-1 of this document
10 the NRC staff describes the nature -- provides a description
11 of a part of the nature of the Mark II containment design
12 load problem. I would like to quote that for you and ask
13 you if you agree or disagree with that comment.

14 The NRC staff says, "The original design of the Mark
15 II containment system considered only those loads tradition-
16 ally associated with design basis accidents. These included
17 pressure and temperature loads associated with a loss of
18 coolant accident, seismic loads, dead loads, jet impingement
19 loads, hydrostatic loads due to water in the suppression
20 chamber, overload pressure test loads and construction loads.
21 However, since the establishment of the original design
22 criteria, additional loading conditions have been identified
23 that must be considered for the pressure suppression
24 containment system design."
25

1 Do you agree with that as a statement of the events
2 that occurred relative to the Mark II containment problem?

3 A. Yes, sir. It's a true statement as far as I
4 know.

5 Q. On page I-4 of this document the NRC staff, at
6 the end of the middle paragraph, states that, and I
7 quote, "More sophisticated instrumentation was available for
8 the Mark III tests as well as computerized methods for data
9 processing."

10 Do you see that reference, Dr. Hanauer?

11 A. Yes, sir.

12 Q. Do you agree that in fact in the Mark III tests,
13 which identified the hydrodynamic loads relative to LOCA
14 concerns, that more sophisticated instrumentation was
15 available and more sophisticated computerized methods which
16 permitted the determination of those loads?

17 A. I agreed with it until you got to your last
18 phrase. Indeed, more sophisticated instrumentation and
19 computerized data reduction methods were available. It's
20 my contention that the loads could have been identified with
21 the less sophisticated instrumentation which was available
22 earlier.

23 Q. Can you describe for me, Dr. Hanauer, the nature
24 of the instrumentation and computerized systems that were
25 available at the time of the Mark III test? And I would like

as complete a description as you can give me.

1
2 A. In general the instrumentation is based on
3 the strain gauge and the electrical networks that are used
4 to energize them. A strain gauge is a network of very fine
5 electrical conductors. The old ones were made out of wires
6 and some of the new ones are made out of more sophisticated
7 circuits: thin films on various kinds of substrates.

8 These are fastened, usually by gluing. If one wishes
9 to measure forces and loads one glues them to the part or
10 the actual structural member which it is designed to measure.
11 If one wishes to measure pressure one assembles them,
12 sometimes in a fairly sophisticated way, to gadgets to
13 which the pressure is made to distort. The traditional
14 strain gauge/pressure gauge has a chamber with a flexible
15 diaphragm or other other member to it. As the pressure
16 increases it distorts the diaphragm, stresses the strain
17 gauge and you get an electrical signal which is proportional
18 to the pressure.

19 More sophisticated instrumentation can be used. One
20 can use accelerometers, which measure the actual acceleration
21 from forces or motions on small bodies which are mounted in
22 order to measure this.

23 These electrical signals which come from these various
24 transducers are, in the more sophisticated scheme, applied
25 to electronic devices which digitize the signals so that

1 instead of an electrical current or voltage that is
2 transformed into a series of numbers which is more easily
3 understood and manipulated by the computer.

4 Q. Is that it?

5 A. Yes.

6 Q. Thank you.

7 And is it not correct that that equipment that you
8 just described was, in fact, not available back in the
9 late 1950s and early 1960s for use in developing the testing
10 data upon which the Mark I and Mark II concepts were
11 initially developed?

12 A. In fact equipment in some respects was available.
13 I remember very well in 1948 --

14 Q. My question, Dr. Hanauer, is whether or not
15 the specific equipment that you have just described was
16 available. Was it or was it not?

17 A. The strain gauges were available. The strain
18 gauges pressure gauges were available. The digitizing
19 equipment and the on-line computers were not. And some of
20 the more sophisticated and miniaturized assemblies of
21 strain gauges were not available in the early '60s.

22 Q. And is it not correct, Dr. Hanauer, that it is
23 the digitizing equipment and the computers that is needed
24 in order to properly record the data and evaluate it to
25 appreciate the effects of hydrodynamic loads?

1 A. No, sir, that is certainly not true. That makes
2 it much easier and less expensive to do it, but my colleagues
3 and I were using high-speed recorders -- we were doing
4 nuclear experiments at the time -- and strain gauge
5 instruments were available in the '40s, in the late '40s,
6 and high-speed recorders. I saw such things at the time in
7 some work I can describe if you want.

8 It was simply a whole lot harder to take the
9 photographically preserved traces of these high-speed
10 recorders and measure up tediously the information rather
11 than on the on-line computer do it for you. But technical
12 work was done with this less sophisticated equipment and
13 these measurements could have been made -- adequate
14 measurements of these forces and loads could have been made
15 in the early '60s.

16 Q. But would we agree that it was a very, very
17 substantial high order of magnitude of greater difficulty
18 to attempt to use that earlier equipment in the manner
19 you are suggesting in place of the computer systems?

20 A. No. You have too many superlatives in the
21 question. It was more difficult, more tedious, took more
22 time and took more manpower, but it was done by many people
23 making these measurements during that period.

24 MR. HALL: Your Honor, we have approximately, I would
25 guess, an hour more of cross-examination. I'm wondering if

1 this would be an appropriate time to take a break.

2 JUDGE MATUSCHAK: If it's the concensus of Counsel.

3 MR. HALL: We are happy to go ahead and finish.

4 JUDGE MATUSCHAK: Well, we will break before that if
5 you are going to go that long. This might be an appropriate
6 time to recess. It's about quarter after 12. Suppose we
7 adjourn until 1:15.

8 MR. HALL: That would be fine, Your Honor.

9 Before we break, Your Honor, I don't recall whether
10 I asked the admission of PECO Exhibits 6 and 7. I would
11 also ask at this time the admission and identification of
12 PECO Exhibits 8 and 10. I would ask that you admit all
13 four exhibits.

14 JUDGE MATUSCHAK: I think 6 and 7 we had admitted.
15 But before we rule on the others we will ask Counsel if
16 they have any objections.

17 MR. WERSAN: Your Honor, on PECO Exhibit 8 Dr.
18 Hanauer was not able to authenticate this document so I
19 would object to its admission and if the company wants to
20 move it in through one of their witnesses they can do that.

21 MR. HALL: That will be fine.

22 JUDGE MATUSCHAK: We will defer ruling until you
23 authenticate that.

24 And Exhibit 10? Did you offer 10 too?

25 MR. HALL: Yes, I did, simply to show the document

2199
1 and the language which we were cross-examining Dr.
2 Hanauer on.

3 MR. WERSAN: And I assume on Exhibit 10 if there
4 are additional pages from that document that we deem
5 relevant that we can move those in at a later date since
6 that is a much more length document than what is in the
7 exhibit.

8 And then finally I take it that there is no number
9 nine?

10 MR. HALL: There may be later.

11 JUDGE MATUSCHAK: Well, do you object to the
12 admission of PECO Exhibit No. 10?

13 MR. WERSAN: No. I do not object. I just request
14 that if after review of the entire document there are
15 supplemental pages --

16 JUDGE MATUSCHAK: Yes. The witness indicated that
17 he had the whole document.

18 We will admit it into evidence subject to any
19 objections or corrections you may have to it.

20 MR. WERSAN: Thank you.

21
22 (Whereupon, the document was
23 marked as PECO Exhibit No. 10
24 for identification, and was
25 received in evidence.)

26 JUDGE MATUSCHAK: Very well. We will recess until 1:15.

(Whereupon, at 12:15 p.m., the hearing was adjourned,
to be reconvened at 1:15 p.m., this same day.)

AFTERNOON SESSION

(1:20 p.m.)

JUDGE MATUSCHAK: You may proceed, Mr. Hall.

MR. HALL: Thank you, Your Honor.

Whereupon,

STEPHEN H. HANAUER

having previously been duly sworn, testified further as follows:

CROSS-EXAMINATION (Continued)

BY MR. HALL:

Q Dr. Hanauer, in our discussions this morning you had mentioned the shutdown of the Vermont Yankee facility relative to hydrodynamic load phenomena. I simply wanted to go over some additional information related to that.

Is it not correct that that facility was shut down in 1976, not in the 1972 to 1973 time frame that we had talked about?

A It certainly was after 1972/1973. I will accept 1976. I really don't know.

Q And would I be correct that the shutdown there was of a very limited time frame, lasting only approximately a week?

A I don't remember.

Q Dr. Hanauer, could you describe for me the major hydrodynamic loads and give their correct terms which

1 occur as a result of the LOCA problem with the Mark II
2 containment?

3 A. Yes. I can do some of it from memory or I can
4 consult materials. Are you asking how much I know in my
5 mind or --

6 Q. Yes. That would be fine.

7 A. All right. I will assume that there has been a
8 large loss of coolant accident in the primary system. This
9 fills the drywell with a mixture of high pressure steam and
10 water and increases its pressure. Previous to the accident
11 in a Mark II containment the downcomers have water in them
12 up to the water level in the suppression pool. So the
13 bottom few feet of the downcomers have water in them and
14 above them is air.

15 The pressure in the drywell increase very quickly
16 and so the water in the bottom of the downcomer is ejected
17 and that leads to the jet impingement load, which was already
18 included in the design. Then the air which was in the top
19 half of the downcomer and some of the air that was already in
20 the drywell is pushed rapidly down the downcomer, forms
21 bubbles and is -- of course, the bubbles of air don't
22 condense and so the air rises in the water of the suppression
23 pool and causes the level of the suppression pool to rise,
24 and this is called swell, the swell phenomenon.

25 If there are any objects, which there are, like

1 braces or catwalks in the upper part of the suppression
2 pool then the mixture of air and water hits them and you
3 get loads which are impingement loads of this water being
4 thrown upwards.

5 This is followed by the steam, which is then pushed
6 from the drywell down into the water and instead of air
7 bubbles there are steam bubbles pushed into the water at
8 the bottom of the downcomer. At the edge of this steam
9 bubble there is a place where cool water in the suppression
10 pool and warm steam -- its not hot anymore because it's
11 mixed with the air and the cooler gases in the drywell --
12 nitrogen, actually -- and this steam is condensed.

13 If the steam is condensed very quickly and there
14 are large volumes of the steam, as is the case in a large
15 accident, there is a vibration, oscillatory phenomenon,
16 called condensation oscillation because the condensation
17 moves, or can move, faster than the speed of sound in this
18 material and this leads to pressure waves like shock waves
19 when a high tech fighter plane goes overhead, and this
20 leads to loads and pressure pulses.

21 Following this the rate at which steam is pushed into
22 the suppression pool is decreased because the accident slows
23 down, the primary system has now been depressurized, and
24 the interface between the water and the steam gets closer
25 and closer to the bottom of the downcomer and finally as

1 the steam rate decreases it can actually go into the down-
2 comer.

3 And then it is pushed out of the downcomer and there
4 is a series of these in and out motions which leads to a
5 phenomenon called chugging in which you actually experience
6 it and if you're anywhere in the vicinity you would hear it.
7 The thing goes chug-chug-chug at a rate comparable to one
8 or a few times per second.

9 Following this things pretty much quiet down and
10 the dynamic phenomena are over. I don't know if I left
11 anything out or not.

12 Q. Thank you, Dr. Hanauer.

13 And these loads that you have just described are the
14 loads that were first discovered as a result of the 1974
15 Mark III tests and were further defined by extensive testing
16 as required by the NRC in the late 1970s, 1978 to I believe
17 around 1980; is that not correct?

18 A. Not completely. They certainly were discovered
19 or revealed in the Mark III tests, but I believe that the
20 existence of hydrodynamic loads, in particular condensation
21 oscillation, was also revealed in the Wurgassen incident and
22 the Browns Ferry tests.

23 Q. Now, it's correct that the Wurgassen and Browns
24 Ferry tests did not involve LOCA but only SRV phenomena; is
25 that correct?

1 A. That's correct.

2 Q. Now, would you define for me what a LOCA is?

3 A. LOCA is L-O-C-A, loss of coolant accident. This
4 is one of the design basis accidents in a nuclear power
5 plant where a break or leak is assumed to occur in the
6 reactor primary system. The reactor is contained in a large
7 pressure vessel which is not assumed to break because it's
8 a lot stronger than anything else. Connected to this vessel
9 is a series of large pipes and pumps and other components
10 which contain the primary water and steam of the reactor
11 under high pressure -- in Limerick about 1,000 pounds per
12 square inch.

13 The accident postulated is a leak or break of any
14 size up to the complete severance of the largest pipe in
15 the system. When we talk about a large loss of coolant
16 accident the limiting case is the very largest one that can
17 occur. It's not required by the NRC to assume more than one
18 break at the same time.

19 It's also required to consider smaller and smaller
20 breaks because breaks of different sizes require different
21 measures to make sure that the plant is maintained safe.

22 Q. And this analysis process that you just
23 described with regard to the measurement and evaluation of
24 the effects of LOCAs, is it not correct that that process
25 was substantially developed in the early 1970s, that is,

1 when the NRC became extremely concerned with this
2 phenomenon and developed means and methods of seeking to
3 analyze its occurrence and effects.

4 THE WITNESS: Could I have that question repeated,
5 please?

6 (Whereupon, the reporter read from the record as
7 requested.)

8 A. I'm sorry. I don't understand the question.
9 Which analysis process are you talking about?

10 Q. Isn't it true, Dr. Hanauer, that the NRC has been
11 developing the bases and ways of analyzing events such as
12 LOCA for safety purposes over time, has altered its
13 methods and indeed there was a major development process in
14 the early 1970s on that subject?

15 A. Well, the methods of analyzing loss of coolant
16 accidents have been developed by the industry and the NRC
17 has indeed developed some of its own methods to do some
18 checks and to understand it themselves.

19 The methods for defining the loads to be applied to
20 containments, which is what I think we are talking about,
21 were developed starting in the late 1950s and early 1960s
22 with the tests intended for Humboldt and Bodega, and the
23 development of ways to define these hydrodynamic loads
24 really started in about 1975 and was completed in the early
25 1980s by the industry and, again, the NRC did develop some

on its own.

1 Q Dr. Hanauer, referring you to PECO Exhibit 5,
2 Interrogatory 4-5, you make a statement that "PECO would
3 have had to make many, if not all, of the same changes that
4 were required in the other plans as additional load definition
5 information became available."
6

7 Do you have that statement before you?

8 A Yes, sir.

9 Q Could you explain to me what do you mean by that
10 statement?

11 A All right. The question was what actions would
12 PECO have needed to have taken earlier in order to achieve
13 Mark II problem resolution by early to mid-1982.

14 The response was they would have had to do many if
15 not all of the things LaSalle and Susquehanna had to do
16 to receive their approvals to have achieved, in the words
17 of the question, Mark II problem resolution by early to
18 mid-1982.

19 The other plants in this sentence is LaSalle and
20 Susquehanna.

21 Q And would it not be correct, Dr. Hanauer, that
22 LaSalle and Susquehanna likely had to do a good deal more
23 rework than did PECO because of their earlier construction
24 in an effort to resolve the Mark II problem?

25 A The direct answer is yes, this is likely. But

1 I would like to say that I have not analyzed in sufficient
2 detail exactly how much rework there was in order to give a
3 definitive answer on this.

4 Q. And simply so that the record is clear on this
5 concept, what we are referring to is the fact, as you
6 testified in your testimony, the NRC revised the load
7 definitions several times as it went through the late 1970s
8 and even the early 1980s and therefore plants that attempted
9 to implement those load definitions at an earlier date were
10 at times required to come back and to revise their earlier
11 solutions and to change their plant configurations?

12 A. That's okay except for your very first premise.
13 The load definitions were revised primary by the boiling
14 water reactor industry on the basis of new information
15 obtained during that period, and the NRC did require them
16 to do so.

17 Q. Now, referring to Item 4-6 in PECO Exhibit 5,
18 you respond to an interrogatory request which asks you
19 for the bases and all data which you have which supports
20 your view that certain regulatory requirements could have
21 been resolved for Limerick by early to mid-1982, and I
22 want to call your attention specifically to Item (e) in
23 your response to that.

24 You there note that due to high population density
25 and the fact that emergency response was an issue at the

1 operating license hearings for Limerick, the issuance of
2 the Limerick operating license was delayed by the need to
3 address the emergency response facility issue.

4 Is that a fair reading of what you're saying?

5 A. No, sir. What I said is that the full power
6 operating license was delayed. There were two operating
7 licenses, at least, or one license and one amendment. I
8 don't remember which the NRC did in this case. The first one
9 was limited to operations no greater than five percent power
10 and this was later amended to allow full power operation.
11 It was this amendment or reissue or whatever they did
12 procedurally that was delayed.

13 Q. Would you agree with me, Dr. Hanauer, as your
14 answer indicates, that high population density is a factor
15 that can affect the difficulty of licensing and the amount
16 of safety features that are required at a plant?

17 A. It has a strong influence on the difficulty of
18 licensing the emergency response capability. It has little
19 or no influence on the difficulty of licensing many plant
20 features. Some other plant features -- the difficulty of
21 licensing, then, indeed affected by the population density
22 surrounding a plant site.

23 Q. And would one such additional feature include
24 the ATWS modifications?

25 A. No, sir, I don't believe that's the case. I have

1 quoted the Limerick safety evaluation report to the point
2 that as far as the NRC write-off of this in their safety
3 evaluation report it was written off in the same way as for
4 other boiling water reactors.

5 The company chose -- with I don't know what urging
6 from the NRC staff -- to install before other plants of this
7 vintage modifications to enhance protection against
8 anticipated transients without scram, which is ATWS, but
9 according to the NRC safety evaluation report their review
10 was based on the same criteria as for other plants.

11 Q. If you know, Dr. Hanauer, is it not correct that
12 the ATWS additions directly respond and substantially reduce
13 the risks associated with Limerick's operation as demonstrated
14 in the probabilistic risk assessment?

15 A. That's my general understanding although I can't
16 say that I have analyzed the subject sufficiently recently
17 to recall it.

18 Q. Would you agree, Dr. Hanauer, that the ATWS
19 modifications certainly make Limerick a substantially safer
20 operating plant?

21 A. I don't know about substantially. They are in
22 that direction. Having not seen the numbers for a long time
23 I don't know the increment.

24 (Pause.)

25 A. My own view many times stated is that those

modifications should have been made and I'm glad they were.

1 Q Now, Dr. Hanauer, would you agree today to a
2 position that you have taken on several other occasions --
3 at least one other occasion -- particularly in the case
4 in re: Delmarva Power & Light Company, Docket No. 8245,
5 that you are not knowledgeable and an expert on all aspects
6 of reactor design, including especially seismic design?
7 And I have here a copy of your statements on that subject
8 from the Delmarva proceeding.

9 A. What is the status of this piece of paper?

10 Q. I'm going to seek to introduce it into the
11 record, so why don't you go ahead and read it?

12 MR. WERSAN: Do you want him to read it to himself
13 or to read it out loud?

14 MR. HALL: He can read it to himself.

15 MR. WERSAN: Do you have the rest of the transcript?

16 MR. HALL: Yes.

17 (Witness perusing document.)

18 MR. WERSAN: Do you have a question outstanding?

19 MR. HALL: Yes. I would like him to confirm for this
20 record that indeed he is not knowledgeable and an expert on
21 all aspects of reactor design and especially not seismic
22 design.

23 A. Well, perhaps I should read what I actually said.

24
25

1 "Question: Now, as a high official in the NRC,
2 do you feel that you are an expert on all issues that are
3 determined by the NRC?

4 "Answer: Obviously not. Nobody is an expert on all
5 issues.

6 I have a very broad knowledge and understanding of
7 the design and operation of power plants and many issues
8 which come up I can supplement my knowledge, if needed, and
9 be sufficiently expert for the purposes required, and that
10 varies from issue to issue and topic to topic."

11 Now I'm skipping to the bottom of page 897.

12 "Question: Would you consider that you are know-
13 ledgeable and expert on all aspects of reactor design;
14 for example, the seismic and structural and metallurgical
15 questions?

16 "Answer: No, sir. I think I already described that I
17 know many things about reactor designs, but in many detailed
18 specialities, of which seismic structural design is one, I
19 am not a hands-on expert. I can answer some questions in
20 that area but there is a limit to the depth of my knowledge."

21 That describes what I think today.

22 BY MR. HALL:

23 Q. Very good, Dr. Hanauer.

24 Dr. Hanauer, would you describe for me the major
25 differences between the Limerick and Susquehanna seismic

1 design criteria?

2 A. The major difference is the criterion for the
3 seismic design earthquake used for design of safety-related
4 structures, systems and components. The requirements are
5 in fact a spectrum of earthquake shaking. By this I mean
6 a graph of the intensity of earthquake shaking at
7 different frequencies as might happen from the same or
8 different earthquakes.

9 Each site is evaluated in accordance with the earth-
10 quakes that can be postulated to occur, and this depends on
11 where they are and so on and where the earthquake crevices
12 or faults are located, and is different for each site. Then
13 there is developed a spectrum which is different for near
14 earthquakes and far earthquakes, is different for the
15 shaking of bedrock and structures that are not mounted on
16 bedrock.

17 The results were for simplicity characterized as a
18 single acceleration at so-called zero frequency, which
19 doesn't really happen but is the endpoint of a line and it's
20 a convenient way to describe this more complicated affair.

21 For Susquehanna it's 0.01 times the acceleration of
22 gravity, which is 32 feet per second/per second. For Limerick
23 it's 50 percent higher: it's 0.15 times the acceleration of
24 gravity.

25 Q. And if you know, Dr. Hanauer, is it not correct

1 that the band of the response, the spectrum, for Limerick
2 is broader than it is for Susquehanna?

3 A. I don't know.

4 Q. And then I take it you would also not know
5 whether that fact, the broader Limerick response spectrum
6 band, would have a significantly greater effect on Limerick
7 in terms of designing to respond to the Mark II environment
8 than it does on Susquehanna?

9 A. That's a different question entirely. The narrow
10 answer is you would have to know how much broader the
11 spectrum is and whether the components would impose
12 significant loads to know whether it made a significant
13 difference.

14 But then you related it to the Mark II question. Now,
15 the safety-related components of the systems in a nuclear
16 power plant have to withstand earthquakes and accidents,
17 and some accidents which can be caused by earthquakes the
18 plant must withstand and combination of the earthquake and
19 the accident.

20 When the Mark II loads were found to be much higher
21 than they have previously been supposed to be, the dynamic
22 loads recorded, this then had to be combined with the earth-
23 quake loads and it is my understanding that the Mark II
24 imposed loads were in fact very substantial compared to the
25 earthquake loads. And so such being the case, I am even

1 less able to answer whether the broader spectrum made
2 any difference given the high Mark II loads.

3 Q. Is the answer that you don't know the relative
4 difficulty of responding to Mark II or even seismic loads
5 faced at Limerick versus Susquehanna based on this difference
6 in the spectrum?

7 A. Well, the Mark II loads should have been
8 comparable --

9 Q. Dr. Hanauer, could you give me a yes or no answer
10 and then explain?

11 A. The answer is I know some things about it but I
12 don't know any numbers. The Mark II loads actually imposed
13 in an accident would have been more or less the same at
14 Susquehanna and Limerick, but since Susquehanna used different
15 load generations, different load design bases, as I have
16 explained in my testimony, then Susquehanna had to be
17 designed, or was designed, for bigger Mark II loads than
18 Limerick, which clouds even more the significance of earth-
19 quake loads and Mark II loads.

20 Q. If you know, Dr. Hanauer, is it not correct that
21 LaSalle is situated on a soil base whereas Limerick is
22 situated on a rock foundation?

23 A. That's my understanding.

24 Q. And is it not correct that because of that
25 fact the effect upon LaSalle of the Mark II phenomenon would

1 be less than the effect upon Limerick?

2 A. No, that doesn't follow at all. The effect of
3 the Mark II is relatively independent of the soil or rock
4 foundation, although there is some secondary effect. It's
5 the seismic which is strongly affected by the foundation.

6 Q. So in your understanding the seismic -- the needs
7 at LaSalle to meet seismic conditions would in fact be
8 less than they are at Limerick?

9 A. I don't think I said that at all.

10 Q. Do you know the answer to that question?

11 A. No, I don't know the answer and I did not say
12 that the seismic would be less at LaSalle. The acceleration
13 is higher but the fact that it's founded on soil instead of
14 rock makes the spectrum different and I don't know how
15 it came out.

16 Q. Now, Dr. Hanauer, referring to page six of your
17 testimony you there state in Item 9 that in your opinion,
18 "The Mark II cost that would not have had to be spent if the
19 plant had been designed correctly to start with, was
20 unreasonably and imprudently spent and should be disallowed."

21 Do you have that reference before you, sir?

22 A. Yes, sir.

23 Q. Now, in PECO Exhibit 5, Interrogatory Response
24 No. 4-4, the company asks you the following question:
25 "Has Dr. Hanauer quantified in his testimony the cost 'that

1 would not have had to be spent if the plant had been
2 designed correctly to start with'," and then they ask you
3 to provide that analysis if you had done it.

4 And is it not correct that you answered that you had
5 not done any such quantification or analysis?

6 A. That's correct; I took the company's number.

7 Q. Is it not correct that what you took was the
8 number simply of complying entirely with the Mark II
9 phenomenon, i. e., the total cost of building or resolving
10 the hydrodynamics load problem at Limerick?

11 A. Well, it's your number. In the first place it
12 was not the total cost because you allocated it between
13 Unit 1 and Unit 2 at Limerick.

14 Q. It was the total cost for Limerick 1 and common,
15 was it not?

16 A. I want to make sure of this. What you said was --
17 I'm in Exhibit SHH-7 attached to my testimony -- "Quantitative
18 cost documentation supporting the cost allocation of \$136.1
19 million to Mark II changes," and then later on, "The costs
20 associated with Mark II are attributable to the following
21 items," and they add up to \$136.1 million. So that's the
22 information I had and that's what I used.

23 Q. And am I correct that you made no analysis to
24 determine whether a portion of those costs would have been
25 incurred in any event, even had Mark II been known at the

2017
1 time of the initiation of Limerick's design and construction?

2 A. I made no such analysis. These are the additional
3 costs. You put in your definitive estimate a sunk cost to
4 design and build the containments at Limerick 1 and 2, and
5 these are, I presume, what you said they are.

6 Q. Well, this, as far as you are concerned, is a
7 cost number associated with Mark II that the company has
8 provided to you. I take it you do not know whether the
9 company has developed this number as an incremental cost
10 of Mark II changes or a total cost.

11 A. I know what the company has told me, that these
12 costs are not actual costs but they are determined from
13 prospective cost estimates in trends and forecasts which
14 you provided us, the attached material to this exhibit
15 which I did not provide because it's voluminous, and that
16 these are changes in the estimated cost of the containments
17 from the definitive estimate.

18 Q. But you do not know whether or not those costs
19 which are changes from the containment would have been
20 required anyway to meet Mark II phenomena even had the
21 Mark II loads been known back in the early 1970s?

22 A. The short answer is I don't know. Some of them
23 would not have been. One of your witnesses described on
24 another day the crowding, congestion and low productivity
25 in such activities. The repeated analyses that were in fact

1 performed would not have had to have been performed if
2 the thing had been done correctly to start with.

3 Q So to the best of your knowledge some would
4 have been and some would not have been incremental?

5 A I don't know the second. I just don't know.

6 Q Dr. Hanauer, is it not correct that you have not
7 had any experience -- let me rephrase this question to make
8 it a little clearer. Dr. Hanauer, you have not had any
9 experience in the scheduling of construction of a nuclear
10 power plant; is that not correct?

11 A That's correct.

12 Q And you have similarly not ever had the
13 responsibility for the formulation of the actual design
14 of a nuclear power plant or a major structure at a nuclear
15 power plant; is that not correct?

16 A That's correct.

17 Q Would you agree, Dr. Hanauer, and I believe you
18 have previously testified to this fact in other proceedings,
19 that site-related aspects of plants may contribute
20 significantly to the plant's cost and its scheduled performance
21 as compared to other plants?

22 A As a general proposition I do believe that.

23 Q And similarly I believe, as you have also
24 testified in other proceedings, that a plant in a high
25 population density zone would experience greater costs and

1 quite possibly greater schedules than a plant located in
2 a lower population density zone?

3 A. I don't really know that. If we are talking
4 now about construction costs it would cost more only if it
5 had different design features, and I have testified that
6 this plant did not end up with significantly different
7 design features as far as I know due to its high population
8 density.

9 The cost of the licensing procedure, which is small
10 but not insignificant, might be more in a highly populated
11 plant. And the cost of analysis, the example, the
12 probabilistic risk assessment, would be higher.

13 I don't know any reason for the construction schedule
14 to be affected by the high population density.

15 Q. Would you not expect, Dr. Hanauer, that the
16 Nuclear Regulatory Commission would require a plant
17 located in a high population density area to install
18 greater safety features of an engineering and construction
19 nature than in a plant not located in such a zone?

20 A. I feel that this is not the case and it used to
21 be a very strongly held position of the Atomic Energy
22 Commission and the later NRC that they would not do this.
23 In more recent times at, for example, the Indian Point
24 plant, some fairly modest changes were required based on the
25 fact that it was in a more highly populated zone.

1 The Limerick plant, I don't know of any design
2 changes except the ones which were found to be cost-
3 effective as a result of the probablistic risk assessment,
4 which would not have been done, or might not have been
5 done, if the plant was not in a high risk area.

6 Q. Is it not in fact the case, Dr. Hanauer,
7 that the Nuclear Regulatory Commission required Limerick,
8 Zion and Indian Point to do PRAs specifically because they
9 were high population density plants?

10 A. Yes, sir. I thought that's just what I was
11 talking about.

12 Q. And is it not true that the purpose of the PRAs
13 was to identify the risks associated with operating those
14 plants and to determine if additional hardware should be
15 added in order to improve that safety, given their
16 population density zones?

17 A. Hardware and operating procedures or additional
18 operating features as well as hardware.

19 Q. If you know, Dr. Hanauer, when did the NRC act
20 to impose a PRA requirement on Limerick?

21 A. It was shortly after the Three Mile Island
22 accident in early 1979.

23 Q. In fact, it was more than a year after that,
24 was it not?

25 A. I don't know. It was an item in the action plan

1 developed after Three Mile Island. When the letters went
2 out, I don't know.

3 Q. Is it not correct that Limerick is the only
4 BWR plant -- or was the only BWR plant at that time --
5 required to prepare a PRA?

6 A. If you use the word "required" that's correct
7 to the best of my knowledge. But I do not have the full
8 list of plants well in mind.

9 Q. I meant plants under construction.

10 And thus is it not correct that Limerick's development
11 of a PRA was the initial effort at development of such an
12 analysis by both the NRC and the company?

13 A. No, sir, by no means. There had been a
14 substantial number of probablistic risk assessments of
15 boiling water reactors before the Limerick one was developed.
16 The first was done in the NRC reactor study in 1974 -- the
17 Atomic Energy Commission, actually, which in fact used the
18 Peach Bottom 2 and 3 plant as its example plant, which is a
19 boiling water reactor.

20 There have in the meantime before the Limerick been
21 several others.

22 Q. Have you had the occasion, Dr. Hanauer, to
23 review the Limerick PRA against the WASH-1400 study to
24 determine whether or not there are substantial differences
25 in those two studies?

1 A. I have done this in a cursory way, using not
2 the study itself, which is a multiple volume study which
3 I don't have a copy of, but using the NRC review of the
4 study to get some idea of what's in it.

5 Q. Dr. Hanauer, can you explain to me what is the
6 SARA, as that was used in the Limerick operating license
7 proceeding?

8 A. The SARA is the severe accident analysis -- I
9 don't remember what the RA means -- the severe accident
10 analysis which is a supplement to the probabilistic risk
11 assessment of the Limerick station, including severe
12 externally caused events which were not included in the
13 original study as submitted.

14 Q. And do you know when the preparation of the SARA
15 was required by the NRC?

16 A. No, I don't.

17 MR. HALL: Your Honor, at this time that's all the
18 questions that I have of Dr. Hanauer. Mr. McGrail has one
19 additional question that he will pose.

20 I would note that I have reduced the number of questions
21 asked on cross-examination in light of the inclusion of
22 PECO Exhibit 5 in the record. If that is not included in
23 the record I will have additional cross-examination.

24 If I recall, Your Honor has already ruled that it is
25 admitted. But to be sure, since I don't recall the status of

1 that matter, I would ask that PECO Exhibit 5 be admitted
2 into the record.

3 JUDGE MATUSCHAK: I think we admitted 5 before; if
4 we didn't we will now.

5 MR. HALL: Thank you.

6 CROSS-EXAMINATION

7 BY MR. McGRAIL:

8 Q. Dr. Hanauer, if you will refer to your Exhibit
9 SHH-3 attached to your testimony?

10 A. All right.

11 Q. Could you tell us what is the source of the
12 information presented by you in this exhibit, and
13 specifically, the source of those items not designated by
14 E and therefore items that have no source noted on the
15 document?

16 A. The source of all these numbers is the so-called
17 Yellow Book. I think it's NUREG-0030 if I remember the
18 number correctly. It's the construction status report that
19 used to be issued by the Nuclear Regulatory Commission, first
20 monthly and then quarterly and now not at all. It contained
21 information of this kind which the NRC received from the
22 companies.

23 Q. So the source of all this data, both those items
24 with and without the E footnote is the Yellow Book?

25 A. That's correct except for some of the actual

1 operating license dates. I maintain a compendium of
2 operating license dates which I get from various sources
3 as they are announced.

4 MR. McGRAIL: That's all, Your Honor.

5 MR. HALL: Your Honor, I have one more procedural
6 matter. I had distributed and I believe asked Your Honor
7 to identify PECO Exhibit 10, being the document that was
8 the first five pages of NUREG 0408. I find it unnecessary
9 to ask the inclusion of what I had identified as PECO Exhibit
10 9 in the record. Therefore, I would ask that Your Honor
11 permit us to renumber PECO Exhibit 10 to become PECO
12 Exhibit 9 and identify it as that for purposes of this
13 record.

14 JUDGE MATUSCHAK: Very well. We will make the
15 manual change. PECO Exhibit 10 has now become PECO
16 Exhibit 9.

17 MR. HALL: Thank you, Your Honor.

18 JUDGE MATUSCHAK: And you have not offered PECO
19 Exhibit 9, the original PECO Exhibit 9.

20 MR. HALL: That's correct.

(Whereupon, the document marked
as PECO Exhibit No. 10 was
renumbered as PECO Exhibit No.
9.)

23 JUDGE MATUSCHAK: Is there any further cross-
24 examination of this witness?

25 (No audible response.)

1 JUDGE MATUSCHAK: Mr. Wersan?

2 MR. WERSAN: May we have a few minutes to nail
3 down our redirect?

4 JUDGE MATUSCHAK: Very well.

5 (Recess.)

6 JUDGE MATUSCHAK: Mr. Wersan.

7 MR. WERSAN: Thank you, Your Honor.

8 REDIRECT EXAMINATION

9 BY MR. WERSAN:

10 Q. Dr. Hanauer, Mr. Hall identified two PECO
11 Exhibits, Exhibits 6 and 7, which were memos from 1972
12 and 1978 dealing with pressure suppression containments.
13 Could you please tell me the purpose or intent you had in
14 writing those memos?

15 A. Well, I was an NRC employee, official if you
16 like, and my beat was nuclear power plant safety. So in
17 those of these memos I discuss the safety implications and
18 the advantages and disadvantages with respect to public
19 health and safety and nuclear power plant safety of
20 pressure suppression containments.

21 Q. What were your conclusions about the safety of
22 pressure suppression containments?

23 A. I concluded that they were adequately safe.

24 Q. Is that still your opinion today?

25 A. Yes, sir.

1 Q And how do these two memos relate to your
2 conclusions in your testimony today regarding the Mark II
3 containment issue?

4 A Well, the point of these memos was -- or a
5 point of these memos was -- that I felt that pressure
6 suppression containments of all kinds involved many
7 considerations, things like rates and so on, that were
8 not necessary to be considered in the large dry containments
9 to which I contrasted them and that this caused a lot of
10 problems to arise and that they seemed to continue to
11 arise and that it would be simpler and more direct to move
12 away from pressure suppression containments.

13 And I was right. These hydrodynamic forces, which
14 I did not specifically foresee in 1972, were a fine example
15 of the kind of problem that arose in pressure suppression
16 containments and made them cost more and made a lot more
17 trouble for us in the NRC in making sure that the plants
18 were safe.

19 Q Now I would like to ask you a question about the
20 Wurgassen German nuclear reactor where certain pressure
21 suppression events occurred.

22 What does the Wurgassen event tell us about pressure
23 suppression design?

24 A It told us that there were forces that loads
25 which had not been foreseen in the design of Wurgassen and

1 which we very quickly realized had not been foreseen in
2 the design of U. S. containments either, which were large,
3 which could be large, and which had in fact caused
4 structural damage in the Wurgassen plant.

5 The point was not so much that the Wurgassen plant
6 was damaged, which was something to pay attention to, but
7 the point that forces and loads were experienced and had
8 not been foreseen and were not included in designs.

9 Q. Does it matter in your opinion that the Wurgassen
10 plant was not identical to a Mark I and a Mark II reactor in
11 the United States?

12 A. Not for the purpose I said. For the point that
13 here were some loads and forces which were imposed on
14 these structures which hadn't been foreseen, for that it
15 didn't matter.

16 Now, if Wurgassen had been so different that these
17 loads and forces would not be experienced in U. S. plants
18 that would matter. But it turned out they were experienced
19 in U. S. plants.

20 Q. Does it matter in your opinion that the loads
21 experienced at Wurgassen were related to a safety relief
22 valve?

23 A. Well, yes and no. It doesn't matter in that they
24 told us that there were things that we hadn't previously taken
25 into account and that we had better take into account. And

1 then very properly the inquiry was widened to include
2 accidents as well as safety relief valves partly as a
3 result of the GE tests. And so it became apparent that
4 both had to be considered.

5 Q. You were asked a question by Mr. Hall about the
6 changes at Limerick due to the ATWS requirements. In
7 your opinion would the NRC have held up licensing for fuel
8 load in July of 1982 for Limerick Unit 1 based upon the
9 ATWS requirement?

10 A. No, because the safety evaluation report
11 published by the NRC wrote off on ATWS on the old basis-
12 Now, PECO in fact installed the new equipment and I'm
13 very glad they did. But it would not have delayed the
14 licensing in 1982.

15 Q. You were also asked some questions regarding the
16 probabilistic risk assessment and based upon those questions
17 it's my understanding that a letter from the Nuclear
18 Regulatory Commission was issued sometime in 1982 requiring
19 a PRA at Limerick; is that correct?

20 A. No, sir. That letter was issued -- Mr. Hall
21 corrected me -- something over a year after the Three Mile
22 Island accident in 1979, so that would have been in 1980,
23 and the analysis was in fact furnished in 1981.

24 Q. In your opinion would the PRA analysis and/or
25 changes at Limerick have prevented fuel load in July of 1982?

1 A. No, I don't think so. The analysis was furnished
2 in plenty of time. It could have been and was reviewed by
3 the NRC.

4 The additional analysis, the SARA that we discussed,
5 came later. I don't believe the NRC would have delayed the
6 licensing of Limerick. The technology to perform an SARA
7 was brand new. It was seen for the first time in the
8 Indian Point and Zion probabilistic risk assessments, which
9 came in in the 1981 period. I don't know if they were both
10 within that exact year. And there were some problems but
11 it was brand new technology.

12 The NRC if Limerick had been ready for licensing in
13 1982 may well have included as a license condition that an
14 SARA be performed on some time scale, but I don't think
15 they would have made the plant sit there while that was
16 performed.

17 MR. WERSAN: Those are all the questions I have,
18 Your Honor.

19 JUDGE MATUSCHAK: Is there any recross?

20 MR. HALL: Yes, Your Honor. I have three questions.

21 RE-CROSS-EXAMINATION

22 BY MR. HALL:

23 Q. Dr. Hanauer, if you know, were there any
24 contentions in the ASLB hearing process directed by
25 intervenors against the PRA as developed by the company?

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

A. I don't know.

MR. HALL: That's the only question I have, Your Honor.

JUDGE MATUSCHAK: Anything further for this witness?

(No audible response.)

JUDGE MATUSCHAK: If not, that would conclude this session.

(Witness excused.)

JUDGE MATUSCHAK: The next session is scheduled for February 10 in Harrisburg.

MS. CHESTNUT: Your Honor, with respect to the witnesses scheduled next week, we had originally scheduled Mr. Komanoff, Mr. Chernick and the three Staff witnesses for Monday. I have talked to the company about that. We might be overloading that day and we have suggested that Mr. Komanoff and Mr. Chernick be done Monday and that the Staff witnesses be done Tuesday after Mr. O'Brien. To the extent that additional time is needed for them they can be slotted into the remaining hearing dates because they are in Harrisburg and are available.

JUDGE MATUSCHAK: According to the schedule I have here the 12th is open. If we are overloaded on the 10th and 11th we ought to be able to take them on the 12th.

MR. HALL: That would be fine, Your Honor. We could do it on the 12th.

1 MR. WERSAN: Before you move them maybe we could
2 go off the record for discussing the scheduling.

3 JUDGE MATUSCHAK: Fine.

4 (Discussion off the record.)

5 JUDGE MATUSCHAK: We will adjourn at this time until
6 Monday, February 10, at ten o'clock.

7 (Whereupon, at 2:35 p.m., the hearing was concluded,
8 to be reconvened at 10:00 a.m. on Monday, February 10, 1986,
9 in Harrisburg, Pennsylvania.)
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

C E R T I F I C A T E

1 I hereby certify, as the stenographic reporter,
2 that the foregoing proceedings were taken stenographically
3 by me and thereafter reduced to typewriting by me or under
4 my direction; and that this transcript is a true and accurate
5 record to the best of my ability.
6

7
8 COMMONWEALTH REPORTING COMPANY, INC.

9
10 By: Robert J. Stonaker
11 Robert J. Stonaker
12
13
14
15
16
17
18
19
20
21
22
23
24
25