

f.

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

-----X
GENERAL PUBLIC UTILITIES CORPORATION, :
JERSEY CENTRAL POWER & LIGHT COMPANY, :
METROPOLITAN EDISON COMPANY and :
PENNSYLVANIA ELECTRIC COMPANY, :

Plaintiffs, :

-against- :

THE BABCOCK & WILCOX COMPANY and :
J. RAY McDERMOTT & CO., INC., :

Defendants. :

Civil Action No.
: 80 Civ. 1683
(R.O.)

-----X

Continued deposition of BABCOCK &
WILCOX by EDGAR ALLEN WOMACK, JR., taken
by Plaintiffs pursuant to adjournment, at
the offices of Kaye, Scholer, Fierman,
Hays & Handler, Esqs., 425 Park Avenue,
New York, New York, on Tuesday, December 9,
1980, at 10:00 o'clock in the forenoon,
before Charles Shapiro, a Certified
Shorthand Reporter and Notary Public within
and for the State of New York.



DOYLE REPORTING, INC.
CERTIFIED STENOGRAPHIC REPORTERS
369 LEXINGTON AVENUE
NEW YORK, N.Y. 10017

8306290768 821209
PDR ADDCK 05000289
T PDR

TELEPHONE 212 - 867-8220

A p p e a r a n c e s :

KAYE, SCHOLER, FIERMAN, HAYS & HANDLER, ESQS.
Attorneys for Plaintiffs
425 Park Avenue
New York, New York

BY: RICHARD C. SELTZER, ESQ.
-and-
ANDREW MacDONALD, ESQ.,

of Counsel

DAVIS, POLK & WARDWELL, ESQS.
Attorneys for Defendants
One Chase Manhattan Plaza
New York, New York

BY: ROBERT B. FISKE, ESQ.
-and-
RODMAN W. BENEDICT, ESQ.,

of Counsel

Also Present:

DAVID TAYLOR

* * *

1
2 EDGAR ALLEN WOMACK, JR.,

3 having been previously duly sworn, resumed
4 and was examined and testified further as
5 follows:

6 MR. SELTZER: I would like to mark
7 for identification as GPU Exhibit 4 the
8 "Interim Report of the TMI-2 Occurrence
9 Technical Review Committee" dated May 25,
10 1979.

11 (Document entitled "Interim Report
12 of the TMI-2 Occurrence Technical Review
13 Committee" dated May 25, 1979 was marked
14 GPU Exhibit 4 for identification, as of this
15 date.)

16 MR. SELTZER: I would like to mark as
17 GPU Exhibit 5 for identification the
18 "Interim Report of the TMI-2 Occurrence
19 Technical Review Committee" dated June 8,
20 1979.

21 (Document entitled. "Interim Report of
22 the TMI-2 Occurrence Technical Review
23 Committee" dated June 8, 1979 was marked
24 GPU Exhibit 5 for identification, as of
25 this date.)

1
2 MR. SELTZER: I would like to mark
3 as GPU Exhibit 6 for identification the
4 "Final Report of the TMI-2 Occurrence
5 Technical Review Committee" dated
6 July 31, 1979.

7 (Document entitled "Final Report of
8 the TMI-2 Occurrence Technical Review
9 Committee" dated July 31, 1979 was marked
10 GPU Exhibit 6 for identification, as of
11 this date.)

12 MR. SELTZER: I would like to mark
13 for identification as GPU Exhibit 7
14 another "Final Report of the TMI-2
15 Occurrence Technical Review Committee"
16 dated October 15, 1979.

17 (Document entitled "Final Report of
18 the TMI-2 Occurrence Technical Review
19 Committee" dated October 15, 1979 was
20 marked GPU Exhibit 7 for identification, as
21 of this date.)

22 EXAMINATION (continued)

23 BY MR. SELTZER:

24 Q Who advised you that you were going
25 to serve on the Technical Review Committee?

2 A Mr. MacMillan, I believe.

3 Q What did he say to you?

4 A He issued a memorandum which I believe is
5 reproduced in this report.

6 Q Is that the so-called charter of
7 the Technical Review Committee?

8 A Yes, sir.

9 Q Did Mr. MacMillan speak to you orally
10 regarding your appointment to the TRC?

11 A I don't recall whether he did or not.

12 Q How do you believe you were advised
13 that you were going to serve on the TRC?

14 A By this memorandum that I told you about,
15 and I also recall being told by Dr. Roy that I
16 would be serving on the TRC.

17 Q What did Dr. Roy say to you, in words
18 or substance?

19 A Essentially, that a Technical Review
20 Committee had been appointed and I was being
21 asked to serve on it.

22 MR. SELTZER: Off the record.

23 (Discussion off the record.)

24 (Recess taken.)

25 MR. SELTZER: We have recessed and

2

started 45 minutes late this morning

3

because we are trying to resolve a

4

scheduling dilemma. I believe it's correct

5

to say that we and Mr. Fiske had originally

6

intended that this deposition would run at

7

least for five days this week. Now,

8

because of personal problems and

9

conflicting business commitments, Dr.

10

Womack expects that he will only be able

11

to appear for his deposition the first

12

three days of this week, and we have

13

agreed to resume the deposition on Friday

14

of next week.

15

If any unforeseen exigencies come up

16

that force a modification, we will certainly

17

work with you, Mr. Fiske, to try and come

18

up with a mutually satisfactory schedule.

19

MR. FISKE: Yes, as long as this is

20

on the record, I think it should be noted

21

that the personal problem that you alluded

22

to was an illness of Mr. Womack's wife and

23

it is that exigency that may mean that he

24

has to leave, go back today. Subject to

25

that, he will be here tomorrow.

1
2 MR. SELTZER: That was certainly my
3 understanding.

4 BY MR. SELTZER:

5 Q The first Interim Report of the
6 Technical Review Committee is dated May 25,
7 1979. Do you have a copy of that in front of
8 you which has been marked as GPU Exhibit 4?

9 A Yes.

10 Q I take it that the members of the
11 Technical Review Committee met sometime prior to
12 the issuance of the May 25th draft GPU Exhibit 4;
13 is that right?

14 A Yes, I believe that's right.

15 Q It is not until you get to GPU
16 Exhibit 5 that a list of members of the committee
17 appears on what's numbered as page 1.

18 Could you take a look at GPU Exhibit
19 5, which is the Interim Report dated June 8, 1979?

20 A Yes.

21 Q Do you see the list of members of the
22 committee?

23 A Yes, I do.

24 Q Could you run down that list and
25 just quickly tell me what department in B&W each

1
2 member of the committee was in?

3 A To the best of my ability, yes. I am
4 sorry, I can't identify Mr. Cannon/Mr. Burgo,
5 who are the first listed.

6 Q Have you ever met Mr. Cannon?

7 A If I have, his identity doesn't come to my
8 mind. I don't recognize him from his name.

9 Q Do you have any mental impression of
10 J. E. Burgo?

11 A No, sir.

12 Q Norm Elliott is the head of Training?

13 A Yes, sir.

14 Q What department is Kubik in?

15 A Mr. Kubik is a member of the staff of
16 Babcock & Wilcox's Lynchburg Research Center
17 and he has since left the company.

18 Q Where did he go, if you know?

19 A I don't offhand know.

20 Q Do you know where he is?

21 A No, sir.

22 Q How long ago did he leave?

23 A My recollection is that he left in the fall
24 of 1979.

25 Q After the Final Report of the

2

Technical Review Committee?

3

A That I am not sure. It seems to me that
it was about the same time or slightly before,
perhaps.

4

5

6

(Continued on following page.)

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

2

Q All right. What position did J. R.

3

Hamilton have?

4

A Mr. Hamilton was a member of the Nuclear Power Generation Division staff. As I recall, he was at that time the Manager of the Development Unit, one of the development units in the R&D Section of the Engineering Department.

8

9

Q Did he report to Dr. Roy?

10

A No, sir. I don't believe he reported directly to Dr. Roy.

11

12

Q But he was in a unit that ultimately reported to Dr. Roy?

13

14

A Yes, sir.

15

Q Where is Hamilton today?

16

A He is still a member of the Nuclear Power Generation Division staff.

17

18

Q Is he still in a development unit in an R&D section of Engineering?

19

20

A I believe that he is, an Advanced Energy Unit.

21

22

Q What was D. W. Montgomery's

23

position at the time that the TRC was operating?

24

A My recollection is that Mr. Montgomery was Manager of an Advanced Energy Systems Department.

25

1

2

Q What is advanced energy systems?

3

A Basically a developmental department looking at systems and providing engineering for systems which are advancements on the basic pressurized water reactor business of the division such as the liquid metal fast breeder reactor projects.

4

5

6

7

8

Q Has Mr. Montgomery changed his

9

position with the company since what you have just described?

10

11

A Yes.

12

Q What is his position now?

13

A He -- his department has become a part of the Business Administration and Integration Department.

14

15

16

Q What do they do?

17

A They encompass several staff functions as well as management of advanced energy system endeavors.

18

19

20

Q Is Montgomery a scientist or an administrator?

21

22

A Montgomery is an engineering manager.

23

Q Were there any people on the TRC or its staff who were more scientist than manager?

24

25

A Yes. In fact --

1

2

Q Who?

3

4

5

6

7

8

9

10

11

12

13

Q Is he still with B&W?

14

A As far as I know, he is.

15

16

Q At the time of the work on the TRC,

was Taylor the Manager of Licensing?

17

A Yes.

18

Q What is he today?

19

A He is the Manager of Licensing.

20

Q What was K. Schroder's position at

21

the time of the report?

22

A I believe he was on the staff of the

23

Manager of Project Management.

24

Q What did that mean he had a

25

background in?

1

2

A Mr. Schroder's background is in engineering management with technical experience especially in the area of control and instrumentation.

3

4

5

6

7

Q The July 31st final report, GPU Exhibit 6, lists N. L. Snidow as a member of the supporting staff.

8

9

Can you tell me what part of B&W Snidow came from?

10

A I don't believe I can.

11

Q Have you ever met Snidow?

12

A Yes, sir, I probably have.

13

14

Q Do you have any idea whatsoever what part of B&W Snidow comes from?

15

A No, sir.

16

Q None whatsoever?

17

MR. FISKE: He just said that,

18

Mr. Seltzer.

19

MR. SELTZER: I am incredulous.

20

MR. FISKE: I really don't think that helps very much.

21

22

MR. SELTZER: Let me press the question one more time.

23

24

Q Is it your testimony as you sit here today under oath that you have absolutely no idea

25

1

2

what area of B&W's endeavors Snidow works in?

3

A That's my testimony, yes, sir.

4

Q He is not in Marketing, is he?

5

A Mr. Seltzer --

6

MR. FISKE: He just said he doesn't

7

know.

8

A -- if I could recollect where Mr. Snidow

9

was, I would certainly tell you. I am not trying

10

to be difficult.

11

Q Each of the TRC reports that we have

12

marked as Exhibits 4 through 7 for identification

13

bear a date. Would it be your recollection that

14

you received copies of these reports on or about

15

the dates printed on the covers?

16

A I would presume that I did.

17

Q Were there offices assigned to the

18

TRC, office space?

19

A Not to my recollection, no. Other than

20

the normal offices of the individuals.

21

Q Did you have a conference room or

22

work room assigned to the TRC?

23

A Not to my knowledge, no.

24

Q Who was the Chairman?

25

A Mr. -- Dr. R. M. Ball was the Chairman.

1

2

Q What was Ball's position?

3

A I believe at the time that Dr. Ball was a Special Assistant reporting to Mr. MacMillan.

4

Q What is he today?

5

A Today Dr. Ball is a Manager of the R&D Management group in the Business and Integration Department.

6

7

Q On the scientist/manager spectrum,

8

where would Ball fit?

9

A Dr. Ball is especially strong in technical areas. I would say he is a good scientist as well as a manager.

10

11

Q Ball's name shows up on the list of

12

TRC members for the first time on GPU Exhibit 6,

13

the final report dated July 31, 1979.

14

Is it correct that he was appointed to the committee after the committee's work was already in progress?

15

16

A Frankly, sir, I don't understand that. I don't -- my recollection was that he was the Chairman of the committee from the beginning but my recollection may be incorrect.

17

18

Q Was there a Secretary of the Technical Review Committee?

19

20

21

22

23

24

25

1

2

A I don't believe so, no.

3

4

5

Q Was there somebody who assumed the responsibility of taking notes at meetings of the Technical Review Committee?

6

7

A I don't believe a single person was given that responsibility on a continuing basis.

8

9

Q What, if any, people took notes from time to time?

10

11

A I would imagine that all members of the committee took notes from time to time.

12

13

14

Q Did you see each of the members taking notes at different times at different meetings? Is that what you are indicating?

15

A No, I can't testify to that.

16

17

Q Did you take notes at some meetings?

A I don't know at this point.

18

19

20

Q Would it be your normal practice to take notes at a meeting of the type that was convened for the TRC?

21

22

23

24

25

MR. FISKE: Well, I will object to that question, Mr. Seltzer, unless there is some evidence that this was a normal practice of the TRC.

Q When you said that you believed that

1
2 the members of the committee would have taken
3 notes, what did you mean by that?

4 MR. FISKE: He said he imagined.

5 MR. SELTZER: All right.

6 Q What did you mean by that?

7 A Simply that it would not be abnormal for
8 an individual -- individuals meeting together for
9 a special purpose such as this one to note something,
10 even if it was only the date of the next scheduled
11 meeting.

12 Q Over the course of time that the
13 Technical Review Committee was functioning,
14 approximately how many meetings did you attend?

15 A My guess would be less than five.

16 Q Do you think you attended four?

17 A Perhaps.

18 Q Did you receive minutes or notes of
19 any of the meetings which you had not attended?

20 A Yes, I believe I received some minutes or
21 notes.

22 Q Who sent those to you, to the best
23 of your recollection?

24 A To the best of my recollection, it would
25 have been Dr. Ball.

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

Q On how many occasions, to the best of your recollection, did you receive notes or minutes of TRC meetings?

A I can't guess at that.

Q More than five?

A No, I don't think so.

Q We have marked for identification four reports of the Technical Review Committee. How many, if any, additional reports do you recall were issued by the Technical Review Committee?

A I couldn't say, sir. In fact, I am not sure that I can recall independently and separately each of these four that you have marked.

Q I would like to ask you to look at GPU Exhibit 7 marked for identification, please, the October final report.

Is it a fact that this is the last report of the Technical Review Committee?

A Yes, I believe so.

Q Would you look at page 2-19 of Exhibit 7. The first item on the page is "Finding." What was the purpose of listing findings?

A To indicate those matters of fact or opinion

1
2 on which the committee was basing its
3 recommendations to Mr. MacMillan.

4 Q The finding on page 2-19 of GPU
5 Exhibit 7 states, "TMI-2 support efforts by B&W,
6 Lynchburg during the post-accident recovery period
7 could have been more effective had an organizational
8 structure and responsibilities been defined prior
9 to the accident to deal with emergency situations."

10 What do you understand the phrase
11 "could have been more effective" means?

12 A I believe that had we had a pre-established
13 relationship for the purpose of emergency response
14 support with the operating utility, with the
15 appropriate communications and designation of
16 functions on both our -- and both in our
17 organization and in the utility's organization,
18 that we could have rendered advice and assistance
19 at an earlier time in the course of this recovery
20 operation.

21 That's what I understand that to
22 mean.

23 Q Your committee --

24 A Excuse me.

25 The fact is that this was a new

1
2 role for us --

3 MR. FISKE: Just a minute, Mr. Womack.

4 I think you are going past the question --

5 THE WITNESS: O.K.

6 MR. FISKE: -- that Mr. Seltzer
7 just asked you, what does that phrase mean.
8 If he wants to ask you another question,
9 he will.

10 Q Proceed. What were you going to
11 say before you were interrupted by Mr. Fiske?

12 A Simply that this was a new role for us.

13 Q Is that all you were going to say?

14 A Yes.

15 Q In the finding it indicates B&W
16 could have been more effective had an organizational
17 structure been defined before the accident. That
18 refers to an organizational structure within B&W,
19 is that right?

20 A I believe that it refers to an
21 organizational structure both at B&W and at the
22 operating utility.

23 Q At the bottom of that page, there
24 is a reference listed. Do you see that?

25 A Yes.

1

2

Q What is the purpose of the reference?

3

4

A Additional information is given in another section of the report relating to that item.

5

6

Q Do the referenced programs refer to implementation of the recommendations?

7

A I believe that was their intent.

8

9

10

Q Looking at the recommendation still on page 2-19, do you see where it says an organizational structure should be established?

11

A Yes.

12

13

Q That is an organizational structure at B&W, right?

14

15

16

17

18

A As I have indicated to you, it would include an organizational structure at B&W but an organizational structure at B&W alone I don't think would accomplish the intention of this recommendation.

19

20

21

Q I would like you to look at the referenced Program 3-1-1 on page 3-29 of GPU Exhibit 7.

22

23

A Excuse me, could you give me the page reference again? 3-29? Thank you.

24

25

Q Is this the program for implementation of the recommendation that we were just referring

2 to on page 2-19?

3 A It is undoubtedly that part of the program
4 which would affect NPGD, yes.

5 Q Was this the Technical Review
6 Committee's program for implementing the
7 recommendations on page 2-19?

8 A Yes.

9 Q Do you see anything in there regarding
10 developing an organizational structure at the
11 utility?

12 A By implication, yes, sir.

13 Q Show me. What do you mean?

14 A Item No. 3, "Provision of a continually
15 available communication link between each control
16 room and Lynchburg," which implies responsible
17 communications by the operating utility on that
18 communication.

19 Item No. 4, "Development of a data
20 retrieval link with each plant to provide the
21 necessary data to make the response team
22 immediately effective," implies appropriate input
23 to the data retrieval.

24 Item No. 5, "Equipment ready for
25 deployment," presumes that there is an agreement

1
2 between The B&W Company and the operating utility
3 with respect to the equipment which might be
4 desired by the operating utility and that the
5 deployment of that equipment could be accommodated
6 at the utility's site.

7 Item No. 6, "Data Bank - current
8 information, drawings," and so forth. Once a
9 contract is completed by B&W, updating of
10 information on data regarding the plant, its
11 operation, its design and its equipment is
12 entirely in the hands of the utility. It is at
13 their option and their option only to provide us
14 with current information. Such current information
15 could not be established by us and maintained by
16 us without the existence of an organization and
17 commitment by the operating utility.

18 Item No. 1, "Improvement of the
19 B&W on-site support," obviously requires a
20 relationship with the utility.

21 Q What is in paren after the words
22 you just read?

23 A Resident Engineer.

24 Q That is a B&W employee, isn't it?

25 A Yes, it is.

1
2 Q The first line on page 3-29 says
3 "Development of a B&W NPGD Emergency Response
4 Plan is in order as an aftermath of the TMI-2
5 incident. The major thrust of the plan would
6 be to improve the timeliness and quality of the
7 support available to our customers in such
8 emergencies."

9 The reference to the "quality of
10 the support available to our customers" refers
11 to support from whom?

12 A From the NPGD.

13 Q Just so that people know what that
14 means, what does NPGD refer to?

15 A Nuclear Power Generation Division.

16 Q That's a B&W entity, right?

17 A Yes.

18 Q Solely; right?

19 A Yes.

20 Q Has B&W developed an emergency
21 response plan?

22 A Yes.

23 Q Was the emergency response plan in
24 place at the time of the Crystal River incident?

25 A I think it was still in development at

1
2 that time.

3 Q Were you involved in any way in any
4 response by B&W to the Crystal River incident?

5 A Yes.

6 Q What was your involvement?

7 A I assisted in providing support from the
8 Engineering Department to our service people who
9 were in communication with operations people at
10 the utility and the resident engineer, the B&W
11 resident engineer at the utility.

12 Q How quickly after the onset of that
13 transient were B&W personnel involved?

14 MR. FISKE: Just a minute, Mr.
15 Seltzer. I don't really see what the
16 answer to that question which, I understand,
17 relates to an incident that occurred a
18 substantial period of time after the
19 accident that is the subject of this case,
20 what the relevance of that is.

21 MR. SELTZER: Because we were talking
22 about the development of an emergency
23 response plan which was in order as an
24 aftermath of the TMI-2 incident.

25 MR. FISKE: I understand.

1
2 MR. SELTZER: And I am trying to find
3 out what B&W does in responding to
4 transient conditions at plants.

5 MR. FISKE: I don't see what B&W
6 is doing today in response to other
7 transients has to do with what they did
8 back on March 28, 1979. I mean you have
9 the recommendation but I really fail to see
10 how the way in which B&W has since
11 implemented it has much to do with it.

12 MR. SELTZER: Well, it is his testimony
13 that they didn't implement it. The plan
14 wasn't in place yet.

15 MR. FISKE: I think he said it was
16 still in development.

17 MR. SELTZER: I would like to proceed
18 with this line of questioning a little
19 bit farther before I will be in any
20 position to make a judgment whether this
21 is going to be fruitful or not.

22 Are you instructing him not to
23 answer?

24 MR. FISKE: Yes, for the time being,
25 yes. I would be glad to discuss this with

2

you later. If you show me why B&W's

3

reaction or response to Crystal River is

4

somehow relevant to something that

5

happened nine months earlier, I will be

6

glad to reconsider that. But for the time

7

being I think I will instruct him not to

8

answer.

9

MR. SELTZER: Mr. Fiske, I don't

10

think that we are going to expect you to

11

explain the relevance of each of your

12

questions when we challenge it. You know

13

that the Federal Rules of Evidence don't

14

empower you to instruct a witness not to

15

answer. All objections are reserved until

16

the time of trial.

17

Your partner yesterday, Mr. Wise,

18

put a stipulation on the record reserving

19

objections until the time of trial. I

20

think it is improper for you to instruct

21

a witness on an issue like this not to

22

answer.

23

I think that it is clearly relevant

24

because it is the transient following the

25

Three Mile Island that is most analogous

1
2 to Three Mile Island. The question of
3 B&W's ability to respond and assist is very
4 much an issue in the technical review plan --
5 I'm sorry -- the Technical Review Committee
6 report on our incident.

7 B&W castigates itself for not having
8 had an effective organizational structure
9 to respond. I am entitled to inquire what
10 B&W's ability to respond was.

11 MR. FISKE: I understand what you are
12 saying, Mr. Seltzer. I think the basic
13 disagreement is that the Crystal River
14 incident, if it occurred before the Three
15 Mile Island, I wouldn't quarrel with you.
16 How they responded to something a year
17 later is getting into an entirely different
18 situation which I really think is really
19 totally irrelevant to this and I think
20 may well get into confidential matters that
21 shouldn't be discussed.

22 So, you know, I am going to tell
23 him, at least absent some more appropriate
24 showing as to the relevance of this, not
25 to answer. I think we have a good reason

1
2 for doing it.

3 MR. SELTZER: You are impelling
4 us seriously to consider, before the
5 resumption of this deposition next week,
6 going to court and seeking a ruling. I
7 think this is the wrong place to pitch
8 that battle, Mr. Fiske, particularly
9 since the question is based precisely on
10 a report investigating the TMI-2
11 occurrence.

12 MR. FISKE: You have asked him a
13 question --

14 MR. SELTZER: I will ask you to
15 reconsider that before we are finished
16 today.

17 BY MR. SELTZER:

18 Q What was the Crystal River incident?

19 MR. FISKE: You can answer it
20 generally.

21 A I assume the incident to which you refer
22 was a control system power failure incident
23 which occurred at the Crystal River-3 nuclear
24 power plant on February 26, 1980.

25 Q What was the control system failure?

2 A The control system failure involved a
3 short in one of the control system power supplies.

4 Q In the course of that transient there
5 was initiation of high pressure injection,
6 wasn't there?

7 MR. FISKE: Yes, that is all right.

8 A Yes.

9 Q What actuated the high pressure
10 injection signal?

11 A The low reactor coolant system pressure.

12 Q That was the signal that actuated
13 high pressure injection at TMI-2 on March 28,
14 1979, wasn't it?

15 A Yes, that's my belief.

16 Q The operators at Crystal River
17 left the high pressure injection on rather
18 than terminating it as the operators at TMI-2
19 had terminated it; right?

20 A Yes.

21 Q To your knowledge, the operators
22 at Crystal River were in touch with B&W
23 engineers during the time that high pressure
24 injection was on, weren't they?

25 A Yes.

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

Q The operators of the Crystal River plant had the benefit of revised procedures from B&W governing termination of high pressure injection which had been issued since the TMI-2 accident, hadn't they?

A That's my belief.

Q You know that revised procedures governing the operation of high pressure injection were issued shortly after the TMI-2 accident, don't you?

A I know that B&W issued an advice to its operating utility customers regarding the operation of high pressure injection.

Q That advice that you refer to was issued shortly after the TMI-2 accident, wasn't it?

A Yes.

Q That advice recommended that operators not terminate high pressure injection unless several conditions were observed; isn't that right?

MR. FISKE: Which advice are you speaking about?

MR. SELTZER: The advice that the

witness was just referring to.

A I think Mr. Fiske raises a good point.
However, the answer to your question is yes.

Q What is the good point that Mr.
Fiske raises?

A That in the course of the time period
after March 28, 1979 several items of advice
from the NRC and the B&W company could cover the
period of time relating to the high pressure
injection operation were issued.

Q Which advice were you referring to
when you answered my question?

A The first.

Q The first advice which came from
B&W?

A The first advice which came from B&W.
That's how I understood your question, yes,
sir, following the accident.

Q Who at B&W has been in charge of the
development of the emergency response plan?

A The over-all responsibility has been with
Mr. Kosiba. The specific task has been with
Mr. Rudy Straub, S-t-r-a-u-b.

Q Why did the Technical Review

2 Committee believe that it was important to
3 develop improved support for operating utilities
4 at the time of the transient?

5 MR. FISKE: Mr. Seltzer, I am going
6 to object to that question as you phrased
7 it. If you want to ask Mr. Womack for
8 his personal understanding, I have no
9 objection to that but I don't think Mr.
10 Womack should be required to --

11 MR. SELTZER: I understand the
12 objection.

13 MR. FISKE: Fine.

14 Q Was it the sense of the Technical
15 Review Committee at the time that it discussed
16 and came up with the findings and recommendations
17 that B&W should be rendering more effective
18 support to operating utilities at the time of
19 a transient or an emergency?

20 A I believe that to the extent that I can
21 speak for the sense of the Committee, I would
22 hesitate to go beyond what is written in this
23 report, but the sense, as I understand what the
24 Committee reported and is here documented, is
25 that B&W has advice and information which could

effectively be used by the utilities if they chose to do so and that to offer such support would be in the interests of the utilities and the industry.

Q It would also be in the interests of B&W, wouldn't it?

A Yes, sir. B&W is interested in the health of the nuclear power industry, yes, sir.

Q It also reflects on B&W's competence and ability as a nuclear vendor, doesn't it?

A Well, it's not my opinion that the absence of the kind of plan described in 3-1-1 reflects on B&W's competence as a nuclear vendor since my best understanding of the relationship between the parties in the industry was that this was in fact a new role, not contemplated previously, for a nuclear steam supply system vendor, either ourselves or anyone else, as indeed the conditions of the accident at TMI were not entirely contemplated previously.

This recommendation goes beyond the traditional role of an NSS vendor.

Q Let me accept your counsel's

suggestion.

Do you believe that it was doing something that was useful and important for B&W to establish a more effective organizational structure to deal with emergency situations at operating utilities?

A Yes.

Q Why?

A I think I have just explained that as well as I could. I believe -- and I will say it again. I believe that the nuclear steam supply system vendor may have assistance in the form of people with certain kind of technical understandings which can help a utility deal with unforeseen or unanticipated situations and that making that assistance available to the utility is an important and reasonable thing to do, as we did in fact try to make it available on March 28th and thereafter.

(Continued on next page)

2

Q What specific type of assistance are

3

you referring to that could be rendered very early

4

in a site emergency?

5

A Consultation with the utility's on-site,

6

technical people regarding their interpretation

7

and diagnosis of conditions and indications that

8

they are seeing in their system, and a consultation

9

with them on any special procedures which they may

10

wish to undertake to respond to those conditions.

11

Q You said consultation with site

12

technical people regarding their interpretation

13

and diagnosis of conditions in the system.

14

Were you referring when you said "their

15

interpretation and diagnosis" to B&W people being

16

able to give their interpretation and their

17

diagnosis during the early stages of a transient?

18

A No, sir. Well, let me explain what I meant

19

in response to your question.

20

Q Let me ask you this: Isn't it a fact

21

that if B&W engineers were in better communication

22

with the site during early stages of an emergency,

23

B&W engineers would be able to render their

24

interpretation and diagnosis of conditions in the

25

reactor system?

2 A Yes, sir. The converse seems to be not true.

3 Q Isn't it a fact that one of the
4 beneficial purposes served by implementing the
5 recommendation on page 2-19 of Exhibit 7 would be
6 that B&W engineers would be able to give assistance
7 by giving their interpretation and diagnosis of
8 site conditions during the early stages of a
9 transient?

10 A Yes.

11 Q How do you perceive the rendering of
12 that assistance in giving B&W's interpretation and
13 diagnosis of system conditions would assist the
14 operators handling an emergency?

15 A Well, without knowing the specific
16 circumstances of an emergency or transient, it is
17 not possible to be specific. However, the
18 expectation might be that if an ongoing transient --
19 if the information regarding the system's
20 performance or conditions during an ongoing
21 transient could be brought in a comprehensive way
22 to the engineering people who had the special
23 design expertise and particularly for a transient
24 which might not have been previously drilled by
25 the utility's operating staff or contemplated by

1
2 them or practiced by them, that the combination
3 of the experience and intelligence there, utility
4 operating and technical people and design people
5 would bring additional diagnostic capability to the
6 event.

7 Q It is a fact, isn't it, that part and
8 parcel of what you are saying is that B&W may have
9 expertise that is broader than the operators at the
10 plant, isn't that correct?

11 A In certain specific areas, yes, but not
12 necessarily in plant operations.

13 Q In diagnosing and dealing with transient
14 conditions not previously anticipated, B&W might
15 have greater expertise, isn't that right?

16 MR. FISKE: By that question, Mr.
17 Seltzer, do you mean that B&W might have
18 greater expertise in certain areas or are you
19 asking --

20 MR. SELTZER: Yes, exactly.

21 MR. FISKE: Well, the question is not
22 clear. It suggests that you are trying to ask
23 Mr. Womack to make an overall generalization.

24 MR. SELTZER: I am trying to probe his
25 last answer where he said that this assistance

2

could be useful in areas where the utility's

3

operating staff hadn't been previously drilled.

4

BY MR. SELTZER:

5

Q That is essentially what you said,

6

isn't it?

7

A Yes.

8

Q For B&W's staff to be useful, they

9

would have to have expertise in these areas where

10

the utility's operating staff had not been drilled,

11

isn't that right?

12

A Not necessarily. In fact, the tools of

13

design which they might have and been able to

14

bring to bear might themselves been useful in

15

interpretation or diagnosis.

16

Q Could you explain that?

17

A For example, design involves extensive tools

18

for system analysis for analysis of system dynamic

19

events. In most cases, the designer's job is to

20

analyze those events which determine the limits

21

and margins of system performance in his area of

22

responsibility.

23

There is still, however, -- there are

24

still, however, other areas which could be

25

investigated with the same tools. That is what I

2 mean. That does not mean that the engineer
3 himself has ever experienced or analyzed a particular
4 set of conditions, but that he may have some tools
5 to do so which are design tools and not immediately
6 available to the operating staff from other means.

7 Q I see. I think I understand.

8 Are you saying that the engineers that
9 have engaged in design have analytic tools at
10 their disposal which may help them solve a problem
11 or contribute to solving a problem that the
12 operating staff might not have at their disposal?

13 A For example, as an example of the kind of
14 specialized assistance that might be available in
15 this hypothetical situation we are discussing.

16 Q There is no question in your mind, is
17 there, that emergency situations do arise at
18 operating utilities?

19 A No.

20 Q When you say "No," what do you mean?

21 A I mean that there is no question in my mind
22 that emergency situations do arise at operating
23 utilities.

24 Q That is not a hypothetical situation,
25 is it?

2 A No.

3 MR. FISKE: I think when Mr. Womack
4 referred to a hypothetical situation, he was
5 making the point that your previous question
6 referred to a hypothetical transient.

7 MR. SELTZER: I understand.

8 MR. FISKE: Yes.

9 MR. SELTZER: I just did not want the
10 record to make it sound like we were talking
11 about some Alice in Wonderland scenario here.

12 BY MR. SELTZER:

13 Q You said that the availability of
14 analytic tools was just one example of how the
15 B&W engineers would have something to contribute
16 that would be of assistance to the utility operating
17 staff dealing with an emergency.

18 What are other areas in which the B&W
19 engineers would be able to render assistance to the
20 utility operating staff?

21 A Well, in one way or another, I --

22 Q I want to focus my question more
23 precisely. What else would the B&W engineers be
24 drawing on in addition to analytic tools or design
25 tools so that they would be able to render

1
2 assistance in areas not previously drilled by the
3 utility's operating staff? You said the availability
4 of design tools was one example. What would others
5 be?

6 A Well, any general experience of the specific
7 engineer which might include knowledge of system
8 performance, specialized knowledge of the ability
9 of equipment to perform in unanticipated conditions.
10 For example, the starting capacitors of the reactor
11 coolant pump motors at TMI-2.

12 Q Starting capacitors?

13 A Yes, sir.

14 Q Would you also say that they might
15 have more experience or knowledge about the ability
16 of the primary coolant pumps to withstand
17 cavitation.

18 MR. FISKE: Mr. Seltzer, I don't think
19 he can answer that question, that is, clearly
20 in the form you have asked it, that is clearly
21 a hypothetical question.

22 You are asking him about some assumed
23 transient without Mr. Womack knowing what
24 utility you are talking about, what the
25 capabilities or training of the particular

2

operators are.

3

4

5

6

7

8

I mean, you are asking him whether the B&W engineers would know more about it than the operators, and I don't see how Mr. Womack can draw that conclusion, that kind of a relative judgment, without knowing the other side of the equation.

9

10

If you want to ask him would they have information --

11

MR. SELTZER: Mr. Fiske, --

12

13

14

MR. FISKE: I don't see how you can ask him to make a comparative judgment when the other side of the equation is unknown.

15

16

17

18

19

20

21

MR. SELTZER: You are a number one, super litigator and my hat is off to you for your litigation capability, but if you keep up these speaking objections we are going to start setting up bleachers in here to teach our associates how to confuse a deposition, how to tip off a witness by objection.

22

23

24

25

There are a lot of ways of stating an objection that states for the record what your objection is without giving the witness three full paragraphs telling him exactly

2

what he should or should not say, and I

3

object strenuously to that technique. I

4

don't think it is proper. I think I have seen

5

it done, I have seen it done many times, but

6

I don't think it is right and I don't think

7

that a court should countenance it.

8

MR. FISKE: Mr. Seltzer, it seems to me

9

in this particular case, it would be important

10

for you to understand what the basis of that

11

objection was because you seem to have had

12

trouble understanding a couple of times before

13

what the objection was all about.

14

If you want me to simply say "Objection"

15

and then discuss it with you outside the

16

presence of Mr. Womack, I will be happy to do

17

that. I don't think Mr. Womack benefits a

18

great deal by listening to the lawyers argue

19

back and forth. He knows more about the

20

subject than you and I will ever begin to

21

know. The idea that I could educate him on

22

anything in this area is flattery to which

23

I am not accustomed.

24

MR. SELTZER: You are very adroit. You

25

know exactly what I am driving at, and I will

2

not make light of it. I think it is seriously

3

compromising my ability to get truthful

4

testimony from this witness, and I am grimly

5

serious about this, and if it continues we

6

are going to have to consider here whether

7

this is the kind of pattern that we are going

8

to put up with for the rest of our depositions

9

in this case. It is a very grave

10

concern that this is the way you are handling

11

the first deposition.

12

MR. FISKE: Well, Mr. Seltzer, you do

13

whatever you have to do, but I think --

14

MR. SELTZER: And will you do whatever

15

you have to do, and I want you to know this

16

is how I feel. I feel strongly about it and

17

if there is any way you can see clear to make

18

your objections more succinctly, I will even

19

accept your offer to step out of the room and

20

we will talk about that.

21

MR. FISKE: Fine. I don't think there

22

is any problem about that. I just think --

23

Q You testified --

24

MR. FISKE: Go ahead.

25

(continued on next page)

2

Q You testified that as one example

3

the specialized knowledge which B&W engineers had

4

would be knowledge about the starting -- what

5

did you say, starting capacitors on the reactor

6

coolant pumps at TMI Unit 2.

7

Could you tell me exactly what the

8

significance is of the starting capacitors on

9

the primary coolant pumps at TMI-2?

10

A Yes. The reason I was able to use that as

11

an example is because that was one of the questions

12

asked by the utility following the TMI accident

13

for which we did some assistance, did investigate

14

it for them.

15

I can't say whether they asked us

16

to do that work for them because they hadn't

17

the capability or simply because they wanted our

18

assistance to supplement the capability they had,

19

but in any case, the matter here was that the

20

primary coolant pumps were operating in an

21

environment which had not been contemplated

22

for their operation, namely, an environment in

23

which a certain amount of radioactive material had

24

been expelled into the containment in which

25

the pumps rest and there was, therefore, around

2 the pumps a radiation field, and the question was
3 since this was an un contemplated environment for
4 the operation of a reactor coolant pump, outside
5 the design basis of the operation of the reactor
6 coolant pump, the utility asked us to research
7 whether there were any known reasons why the pump
8 might not operate or might not be expected to
9 operate in this un contemplated environment.

10 As a result of that research which
11 we did with the pump subvendor we identified
12 only one potential problem area which was the
13 possibility of the radiation field damaging the
14 di-electric of the capacitor which is a part
15 of the startup circuit for the pump motors. It's a
16 rather specialized question.

17 Q Did you conclude that the insulation
18 would be damaged or wouldn't?

19 A Actually I believe that the work was
20 done mostly by the pump vendor, the motor vendor, and
21 I believe his advice was that there was a reasonable
22 chance that the di-electric would fail to maintain
23 its insulating characteristics after a certain
24 period of time in such a high radiation field. It
25 did not ever become an operational problem but

2 it was in fact a concern.

3 Q What unit in the B&W Engineering
4 Department would have as its area of responsibility
5 the reactor coolant pumps?

6 MR. FISKE: You mean at the time of the
7 accident?

8 MR. SELTZER: Yes.

9 A Pumps and Drives.

10 Q To whom did Pumps and Drives report?

11 A My recollection is that it was a unit
12 in the Systems and -- if I could consult yesterday's
13 exhibits. Aren't these those?

14 MR. TAYLOR: Yes.

15 A A unit in the Fluid and Mechanical Systems
16 Section reporting to Mr. Stanek.

17 Q Do you know who was the head of
18 the Pumps and Drives Unit at the time of the
19 Three Mile Island Accident?

20 A Yes. Mr. Robert Kennedy.

21 Q Have you ever spoken to Bob Kennedy
22 about the TMI accident?

23 A Yes.

24 Q More than once?

25 A Probably.

2 Q To the best of your recollection
3 it was more than once?

4 A Probably, yes. To the best of my
5 recollection. I can recollect only once in
6 specifics.

7 Q At some point during the sequence of
8 events following the 4 a.m. trip at TMI, the operators
9 terminated operation of the reactor coolant pumps,
10 right?

11 A That's my understanding.

12 Q What is your understanding of what
13 motivated --

14 MR. SELTZER: I didn't want an
15 objection from Mr. Fiske.

16 Q -- but I am asking you for your
17 understanding. What do you understand impelled
18 the operators to terminate the reactor coolant pump
19 operation at that moment?

20 MR. FISKE: I will object to that,
21 Mr. Seltzer. I don't think he should have
22 to --

23 MR. SELTZER: Do you want to tell me
24 out of the room?

25 MR. FISKE: I think you know the basis

2

for the objection.

3

Q O.K., you may answer.

4

MR. FISKE: No.

5

MR. SELTZER: You will instruct him

6

not to answer on his understanding?

7

MR. FISKE: His understanding of what

8

he thought the operators were doing.

9

MR. SELTZER: Mr. Shapiro, could you

10

please read back my question.

11

(Record read by the reporter.)

12

MR. SELTZER: I would implore you I am

13

entitled to this man's understanding.

14

MR. FISKE: As he sits here now you are

15

asking.

16

MR. SELTZER: That is what I have been

17

getting for the last day, his understanding

18

as he sits here now of everything. I am not

19

asking him to refer to notes that he has

20

brought with him.

21

MR. FISKE: I will object to the form of

22

the question, but I will let him answer.

23

MR. SELTZER: Do you want to have

24

the question reread, or do you understand it?

25

THE WITNESS: No, I think I understand

2

the question. I am trying to factor all the things I have known into a good answer for you.

3

4

5

A My best understanding is that they were concerned about vibration of the pumps.

6

7

8

9

10

11

Q It's your understanding, isn't it, that they were concerned about vibration because they were getting steam and water going through the pumps at the same time, isn't that right?

12

13

A I don't know whether they concluded that as the reason for vibration or not.

14

15

16

17

Q It's a fact, isn't it, that from your knowledge of the sequence of events there was voiding in the core at the time that the pumps were shut off?

18

19

20

21

A From my knowledge of the sequence of events. I believe that at the time the pumps were shut off that there were substantial voids circulating in the system.

22

23

24

25

Q And it is a fact, isn't it, from your knowledge as an engineer that those steam voids circulating in the reactor coolant system would cause vibration in the primary coolant pumps, isn't

2

that a fact?

3

A Yes, I believe I know that now.

4

Q Is that type of pump behaviour known as cavitation?

6

A Technically cavitation is something slightly different but the effect is similar.

8

Q What have I got wrong? Educate me.

9

A Cavitation, as I understand cavitation in pumps occurs when the local pressure behind the impeller goes below the saturation pressure of the liquid which is being pumped through the impeller and it creates local bubbles due to the mechanical action of the impeller as opposed to actually pumping two-phase liquid.

16

Q In other words, merely the mechanical force of the impeller could create localized saturation?

19

A That's right.

20

Q Just so that I can review where we stand now, you have agreed that at the time the pumps were terminated, there were steam voids in the reactor coolant system, and that those steam voids passing through the reactor coolant pumps would cause vibration of the pumps, is that

25

2 right?

3 MR. FISKE: He has agreed that that
4 is his understanding.

5 A Yes.

6 Q That's all I am asking for. I will
7 stipulate all I am asking for at any point
8 in this deposition, until the cows come home, is
9 your understanding.

10 A Yes, I have agreed that that is my
11 understanding.

12 Q I will not ask for anything else but
13 what you understand.

14 Let me just follow this up and conclude
15 this. There are specifications that you are
16 aware of -- and I don't care when you became aware
17 of them, but you are aware there are specifications
18 for the operation of the primary coolant pumps,
19 isn't that right?

20 A Yes, sir.

21 Q Those specifications specify what
22 is the maximum vibration which should be permitted
23 on the pump shafts, isn't that right?

24 A Yes. As I understand it.

25 Q It's also a fact, isn't it, that since

2 the Three Mile Island Unit 2 accident, B&W has
3 issued an advisory or some other written
4 communication to its operators changing the allowable
5 vibration on the primary coolant pump shafts,
6 isn't that right?

7 A I don't have personal knowledge of a
8 general advisory, no, sir.

9 Q Are you aware that there has been any
10 specific advice to any operating utility?

11 A Yes, I believe that that was part of the
12 specialized advice discussed with GPU following
13 the March 28th accident.

14 Q When you say following the accident,
15 what do you mean?

16 A When the pump was restarted in the evening,
17 I believe that we provided the utility with a
18 vibration shutdown, vibration -- my recollection
19 is that provided a shutdown vibration limit for the
20 emergency condition in which we understood that
21 they would be operating.

22 Q It's a fact, isn't it, that the
23 vibration limit that was given to GPU at that time
24 was greater than the vibration limit contained in
25 the specifications previously sent to GPU, isn't

2 that a fact?

3 A I can't testify as to the specification
4 previously sent.

5 My understanding is that the limit was
6 bigger than that, that I had learned was in -- or I
7 have since learned was in their shutdown procedure.

8 Q In other words, B&W was advised
9 some 12 or more hours after the onset of the March 28th
10 transient that it would be permissible to operate
11 the reactor coolant pumps in the emergency with a
12 higher amplitude of vibration on the coolant pump
13 shafts than they had previously been allowed to
14 operate them under their operating procedures?

15 A Did you mean GPU was advised?

16 Q Yes.

17 A I don't believe that was the form of the
18 advice.

19 I think the form of the advice simply was
20 that with respect to concern about pump vibration
21 given the emergency condition under which they were
22 operating B&W provided what the pump specialists
23 felt was an outside limit for that particular -- at
24 that particular time. I don't believe it referred
25 to what may have existed previously.

2

Q Just let me cap it off then. Is it

3

your understanding that the outside limit which

4

the pump specialists gave to GPU on the evening

5

of March 28th was greater than the limits that

6

GPU had previously had?

7

A That I believe was my understanding now,

8

yes.

9

MR. SELTZER: Why don't we take a

10

recess?

11

MR. FISKE: Fine.

12

MR. SELTZER: Off the record.

13

(Discussion off the record.)

14

(Recess.)

15

MR. SELTZER: I would like to mark

16

for identification as GPU Exhibit 8 a letter

17

from James Taylor, Manager of Licensing, to

18

T. M. Novak at the NRC dated May 10, 1979

19

on the subject of operating limits for

20

reactor coolant pump operation.

21

(Letter from James Taylor to T. M.

22

Novak dated May 10, 1979 marked GPU Exhibit

23

8 for identification, as of this date.)

24

BY MR. SELTZER:

25

Q You will notice that you are marked

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

for a copy.

Is GPU Exhibit 8 a copy of a letter which you received in or about mid-May 1979?

A It appears to be.

Q Would you turn to page 2, please. Look at item 2-D. Could you read what it says beginning on the second line, please.

A "(Note: Shaft vibration and frame vibration have been increased for this emergency condition."

Q Thank you.

Would you also look at the first page, the second paragraph where it says that "B&W is in the process of passing this information on to our operating utilities for incorporation of appropriate sections into their operating procedures."

Does this refresh your recollection that after the TMI-2 accident B&W did send an advisory to its operating utilities telling them that the permissible shaft vibration on reactor coolant pumps was being increased?

A Yes, it does.

Q You said that pump specialists at B&W would have knowledge about what the

1
2 permissible vibration on the pump shafts would
3 be under emergency conditions, is that right?

4 A Yes.

5 Q Is it your understanding that the
6 operating limits expressed in GPU Exhibit 8 were
7 developed by pump specialists at B&W?

8 A Yes.

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

1
2 Q To the best of your knowledge, the
3 operators at Three Mile Island Unit 2 had not
4 been advised prior to the time they wanted to
5 restart the pumps in the evening following the
6 trip on March 28th that the shafts on the
7 reactor coolant pumps could withstand higher
8 vibration for emergency operation, isn't that
9 right?

10 A I simply have no knowledge on that subject.

11 Q O.K. Nobody's ever told you that
12 GPU or Met Edison operators had received the type
13 of advice contained in GPU Exhibit 8 prior to
14 the time they shut off the reactor coolant pumps
15 on March 28th?

16 A Not that I can recall, no, sir.

17 Q Do you think that in your judgment
18 it would have been useful if the operators at Met
19 Ed had been able to get in touch with B&W pump
20 specialists prior to their terminating the
21 operation of the reactor coolant pumps on March
22 28th?

23 MR. FISKE: I am going to object to
24 that question, Mr. Seltzer.

25 MR. SELTZER: I am asking for his

current judgment.

MR. FISKE: I understand, but --

MR. SELTZER: Are you instructing him
not to answer?

MR. FISKE: Yes.

BY MR. SELTZER:

Q At the time you received GPU Exhibit
8 -- do you have a copy in front of you?

A Yes, sir.

Q -- did you believe that these were
proper operating instructions for running the
pumps under emergency situations?

A Yes, sir.

Q What is your understanding regarding
why the operators would be given greater limits
of operation for an emergency situation as
contrasted with the permissible levels of
vibration for nonemergency operation?

A To permit them to operate the pumps to a
higher vibration level.

Q Why would that be significant?

A To assure that the instructions recently
issued prior to this May 10th letter regarding
handling small break LOCA with pumps running

could be carried out without interference.

Q How would it interfere if this instruction or operating limit were not given?

A The advice regarding small break LOCA or suspected small break LOCA which had then been given as an interim step and at the instruction of the NRC to the B&W operating plants advised them to continue operation of reactor coolant pumps following low-pressure initiation of high-pressure injection and not to interrupt it.

A question had been raised by the NRC staff regarding the ability of pumps to withstand such operation. This letter was a principal answer to that question.

Q This letter which refreshed your recollection on what had been communicated to operating utilities said that the limits for shaft and frame vibration have been increased; right?

A Yes.

Q That means, does it not, that the prior operating limits which the utilities had specified a lower limit for permissible vibration on shaft and frame; right?

1
2 A I believe that the antecedent to which that
3 sentence referred is normal operating limits,
4 not prior operating limits.

5 Q Well, you see where it says that
6 shaft vibration and frame vibration have been
7 increased for this emergency condition. Doesn't --

8 MR. FISKE: What's the question?

9 MR. SELTZER: I am getting to it.

10 MR. FISKE: Oh, sorry.

11 Q Doesn't that English language that
12 I just read necessarily imply that previously
13 the shaft and frame vibration for this emergency
14 condition was something less and that it was
15 increased to the level being announced in GPU
16 Exhibit 8?

17 A In the context of that sentence where it is
18 preceded by a sentence which says "All other
19 normal operating limits remain in effect," it
20 could be read to mean either the interpretation
21 you are suggesting or the interpretation that
22 these are emergency limits increased or normal
23 operating limits.

24 Q Right.

25 A And I am not in a position to testify

1
2 accurately as to specifically which it means.

3 Q Well, Dr. Womack, don't you understand
4 that previously there were operating limits that
5 made no exception for emergency condition?

6 A I understand, I believe, from what I have
7 been told, that the operating limits at TMI were
8 for vibration limits which were less than these.

9 Now, I frankly have not investigated
10 nor specifically asked the question as to
11 whether there were other operating limits which
12 made exception for emergency condition at Three
13 Mile Island, at the Three Mile Island plant nor
14 whether there might be such procedures in other
15 plants. It's just --

16 Q Is it fair to say you are not aware
17 of any such exception; is that right?

18 A To the best of my recollection, I am not
19 aware of -- one way or the other, really.

20 Q And isn't it a fact that GPU Exhibit
21 8 makes an exception solely for operation of the
22 pumps under emergency conditions?

23 A I think that is fair, yes.

24 Q And if GPU Exhibit 8 is making some
25 change, it is that it is permitting operation of

2 those pumps under emergency conditions with
3 greater vibration?

4 A Yes, if it is making some change, that's
5 correct.

6 Q And you believe it is making a
7 change, don't you?

8 A I believe it might be. I just simply don't
9 know, yes or no, whether it would be a change
10 in every utility's procedures or not. Sometimes
11 instructions are sent out simply to reiterate,
12 and I think I mentioned earlier what was a large
13 factor in prompting this letter.

14 Q You are familiar to some degree with
15 the TMI-2 sequence of events on March 28th, 1979,
16 are you not?

17 A Yes.

18 Q What is your best understanding of
19 when in the course of events the core first
20 became uncovered?

21 A Sometime after the termination of the last
22 two reactor coolant pumps is my best understanding.

23 Q What --

24 A Of the operation.

25 Q What is the relationship physically

1
2 between the termination of the last two reactor
3 coolant pumps and uncovering of the core?

4 MR. FISKE: I am sorry, I just didn't
5 hear that question.

6 Q What is the relationship physically
7 between termination of the last two coolant pumps
8 and uncovering of the core as you understand it?

9 MR. FISKE: Now I have heard it.
10 Maybe you can explain what you mean by
11 "physically."

12 MR. SELTZER: I mean the term that
13 physics uses the same roots as physical.

14 A I think it's useful to talk a bit about
15 uncovering of the core. Uncovering of the core is a
16 concept which in my mind only has a real meaning
17 in the instance in which there is not a forced
18 flow through the system. It simply means that
19 the level of water and froth in the core should
20 drop below the heated regions of the fuel and
21 that would -- that almost automatically implies
22 that you are not circulating the stuff around.
23 So in a sense --

24 Q All right. Now, when did stuff, as
25 you have called it, stop circulating around?

1
2 A Presumably when the last of the main
3 reactor coolant pumps was shut down.

4 Q Therefore, then, it follows that when
5 the last coolant pumps were shut down the stuff,
6 or water, as you call it, or as I think you mean
7 the water mixed with steam, ceased being pumped
8 around, then heated portions of the core ceased
9 being cooled by froth or water, isn't that
10 right?

11 A Basically, yes.

12 Q It's your understanding, isn't it,
13 that if the reactor coolant pumps had not been
14 terminated at that point but had been left on for
15 an additional one minute that adequate cooling
16 of the core would have continued for that additional
17 minute, isn't that right?

18 A That is what I would expect, yes.

19 Q And in fact until there was a further
20 loss of inventory had the pumps been kept on
21 there would have continued to be cooling of the
22 core, isn't that right?

23 A That's what we expect, yes.

24 Q Have you seen any analysis of for
25 how much longer the core could have continued to

1
2 be adequately cooled if the reactor coolant pumps
3 had not been terminated, when the last two pumps
4 were terminated?

5 A Not specifically for TMI.

6 Q Have you seen a simulation for a 177
7 lowered loop plant like TMI or seen the results
8 of such a simulation or analysis?

9 A No, I don't believe so.

10 Q From whatever source you've seen it,
11 heard it, discussed it, are you aware of how much
12 longer any engineer or engineers within B&W believe
13 the core could have continued to remain adequately
14 cooled had the final reactor coolant pumps not
15 been terminated when they were?

16 A Yes.

17 Q How much longer?

18 A The best expectation we have is that
19 reactor coolant pumps force flow can cool a core
20 with a very high void fraction, that would stay
21 essentially indefinitely provided high pressure
22 injection is being supplied.

23 Q At the time that the last two
24 reactor coolant pumps were tripped at TMI-2 there
25 was no high pressure injection, is that right?

1
2 A To the best of my belief there had been no
3 high pressure injection for some hour and 20
4 minutes.

5 Q How much longer would the core have
6 been able to remain adequately cooled if those
7 final two reactor coolant pumps had not been
8 tripped and high pressure injection had remained
9 on?

10 A I can't really answer that question.

11 Q Have you ever seen or heard any
12 discussion or analysis of that?

13 A Not that I specifically recollect.

14 Q Do you generally recall that there
15 has been such analysis performed?

16 A Not specifically for that, to answer that
17 specific question.

18 Q Analytically is that just a variant
19 of the reactor coolant pumps on with high
20 pressure injection on analysis?

21 MR. FISKE: I don't understand what
22 you mean by the question.

23 Q Could you extrapolate the answer to
24 my question from an analysis that showed pumps
25 on high pressure injection?

2

A Yes, I believe I could.

3

Q Could you explain how that would be

4

done?

5

A Well, simply that from analyses done for a

6

different plant we -- I have the expectation

7

from the analytical work that with high pressure

8

injection on and with pumps on, the mixture being

9

circulated would carry heat away from the core

10

even though it may have a very high percentage of

11

steam and I don't know explicitly or specifically

12

what the limits of that might be. There is a

13

substantial degree of uncertainty in my

14

extrapolating an answer to your question which

15

was, if I recall, if I continued to operate the

16

pumps and continued to starve the cooling system

17

with injection how long would it operate without

18

core damage or how long would the core remain

19

undamaged. I believe that was your question.

20

Q That's the question.

21

MR. SELTZER: Do you want to ask a

22

question?

23

MR. FISKE: No, I believe he has

24

answered it.

25

MR. SELTZER: All right. Are you

1
2 trying to indicate to him that he has
3 answered?

4 MR. FISKE: No.

5 BY MR. SELTZER:

6 Q You said that under the analysis
7 that you are aware of which B&W has performed,
8 if the reactor coolant pumps remained running
9 and there is high pressure injection the core
10 can remain adequately cooled with a very high
11 void fraction, that was your testimony, was it
12 not?

13 A Yes.

14 Q In terms of percent of reactor
15 coolant system normal inventory, what percent
16 would constitute very high void fraction as you
17 have used that phrase?

18 A Greater than 90 percent.

19 Q In other words, there would be less
20 than ten percent of the normal reactor coolant
21 system inventory?

22 A Yes.

23 Q Could there be less than five percent
24 under that analysis?

25 A Probably.

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

Q What does that analysis assume about the temperature of the steam and water?

A The analysis assumes that heat removal within the steam generators continues and that it is effective heat transfer and that the heat transfer occurs at a temperature which is at or less than the normal regulation temperature for the generators.

Q The analysis that you are referring to, you said, assumes reactor coolant pumps remain on, that high pressure injection is -- the contribution of high pressure injection simply is that it helps maintain the sufficient void fraction to achieve cooling?

A I don't believe I can accurately quantify for you the contribution of high pressure injection without consulting the analysis or even performing additional analysis which I don't think we have performed.

Q I take it it is consistent with your understanding and with this analysis that the reactor coolant pumps can continue to operate under emergency conditions with the very high void fraction that you have referred to?

1

2

A Yes, it is.

3

4

5

6

7

8

9

Q In a future loss of coolant accident at a B&W plant, is it your understanding of the Technical Review Committee recommendation that we have been looking at that it would be beneficial for the utility to be able to communicate quickly and effectively with B&W engineers?

10

11

12

13

14

15

16

A It is my belief that it could be beneficial.

Q Is it your understanding that if the utility operators reached a point where they were about to terminate operation of the reactor coolant pumps after more than an hour into the transient that it could be useful to communicate with B&W engineers?

16

17

18

19

20

21

A Yes.

Q Specifically, it would be useful for them to communicate with engineers who had done the type of analysis on continued effective cooling of the core with high void fractions, isn't that right?

22

23

24

25

MR. FISKE: I think he said it could be.

MR. SELTZER: That's what I am saying.

A That could be useful, I think the greatest

1
2 benefit would be to understand why it was necessary
3 or might be necessary to terminate the pumps --
4 to even consider the terminating of the pumps.
5 Of course, to me that is hypothetical.

6 MR. FISKE: I think all of these
7 questions are hypothetical questions.

8 MR. SELTZER: You are entitled to your
9 opinion on that. I don't want to really
10 get into a contest with you. I think that
11 we are getting into an area where I am
12 entitled to ask my questions. If you
13 want to say that they are inadmissible when
14 we come to trial, fine, but this is
15 discovery, this is early discovery, and I
16 am trying to find out who knows what about
17 what and I am working from a very solid
18 foundation to be asking these discovery
19 questions.

20 MR. FISKE: Certainly this is
21 discovery, certainly it is early discovery,
22 certainly you are entitled to find out who
23 knows what.

24 I think what you are doing now is
25 asking Mr. Womack a series of hypothetical

1
2 questions as to what might be useful in
3 the future.

4 MR. SELTZER: But I am asking it on
5 work that he has done studying the TMI-2
6 accident, Bob, and that's why I want to
7 find out. They said that they could have
8 been more effective and I am trying to find
9 out how they could have been more effective.

10 THE WITNESS: That is your question,
11 in the course of the TMI sequence?

12 BY MR. SELTZER:

13 Q I am not asking that yet. We will
14 get to that.

15 My question was don't you believe
16 that it would be useful before operators
17 terminated reactor coolant pumps midway through
18 dealing with a transient if those operators could
19 communicate with B&W pump specialists who
20 were familiar with the analysis of core cooling
21 that you and I have just been discussing?

22 A It might be useful.

23 Q Useful in what ways?

24 A Well, as I began to explain to you, I think
25 the first thing one would ask is what system

2 conditions are leading the operators to even
3 contemplate that action in a hypothetical case,
4 of course you know, Mr. Seltzer, that the
5 existing instructions would -- the currently
6 existing instructions would preclude that case.

7 Q Yes. I knew that.

8 The instructions that were in
9 existence on March 28, 1979, however, would not
10 preclude that case, would they?

11 A That's correct.

12 Q And the current instructions that you
13 are referring to are the instructions to go to
14 natural circulation within two minutes of the
15 onset of such a transient, is that right?

16 A Yes.

17 Q The TMI-2 operators had no such
18 instruction from B&W on March 28, 1979, did
19 they?

20 A That's correct.

21 Q In fact, it was consistent with the
22 instructions that the operators did have from
23 B&W on March 28, 1979 to leave the reactor coolant
24 pumps operating after the onset of that loss of
25 normal feedwater transient, right?

2

A I don't believe it was excluded that they should do that.

3

4

Q It was consistent with instructions that they had from B&W to leave the primary coolant pumps on, isn't that right?

5

6

7

A That's my belief.

8

9

Q Has there been any serious dissent from that position at B&W, to your knowledge?

10

A Yes, indeed.

11

12

13

14

15

Q Are there people who believe that there were operating instructions from B&W which should have directed terminating reactor coolant pumps immediately after the onset of the transient on March 28th?

16

17

18

A Please let me clarify the question that I understood you asked and the question I answered a minute ago.

19

20

21

22

23

24

25

When you said has there been -- has there been dissent from that instruction at B&W, I presume that you meant that instruction which advice was given to the operating plants to terminate reactor coolant pump operation within two minutes of low pressure -- of the actuation of the high pressure injection system from low

2 pressure. Is that the question you meant, because
3 that's the question I answered?

4 Q No. That's what I thought you were
5 answering. My question previously had been don't
6 you believe that the operators were acting pursuant
7 to the then existing instructions from B&W when
8 they left the primary coolant pumps on following
9 the onset of their loss of feedwater transient,
10 your answer to that question was yes, that's my
11 belief they were acting in accordance with B&W
12 instructions.

13 A Right. Yes, sir.

14 Q I am saying, have you heard any
15 dissent within B&W from your belief that the
16 operators were operating in accordance with B&W
17 instructions when they left those pumps on?

18 A Not that I can recall, no, sir.

19 Q Don't you believe in light of the
20 analysis that you have seen on cooling the core
21 with high void fraction and the advisability
22 of better communication in emergency situations
23 that it would have been useful for the Met Ed
24 operators to have communicated with B&W
25 engineers regarding the decision to terminate the

primary coolant pumps on March 28th, 1979?

A I believe that it might have been useful. It's based on more than just the factors you have mentioned but I believe that this is about the third time I said it might have been useful.

Q You see, we snuck up on whether it would be useful to the Met Ed operators and I don't think I ever asked you that.

A O.K.

Q And if I asked you that straight out Mr. Fiske probably would have thought of 20 different objections.

A Oh, I doubt it.

Q Isn't it a fact that one of the reasons why it would have been useful is that somewhere within the engineering staff at B&W there were experts who knew that under emergency conditions those reactor coolant pumps can continue to operate with very high void fraction?

MR. FISKE: I will object to the form of the question. If you want to ask him whether there were such experts at B&W, I don't have any problem.

MR. SELTZER: I will ask that as a

preliminary question.

A Yes, as I understand it there were such experts at B&W.

Q And there were such experts on ^{March} May 28, 1979?

A Yes.

Q Isn't it a fact that part of the reason that it would have been useful, as you testified, it would be useful to have communicated with B&W experts before terminating the pumps that those experts could have told GPU operators that it was safe and advisable to continue running the pumps with very high void fraction?

MR. FISKE: Mr. Seltzer, I will object to that question.

MR. SELTZER: He already testified that he believes it would have been useful. I am asking him whether part of his reason for believing it would be useful is what I have just enunciated.

MR. FISKE: He said it might have been useful.

MR. SELTZER: All right, I will take that.

1

2

Q Is part of the reason --

3

4

5

6

7

8

MR. FISKE: Ask your question.

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q When you testified that you believed it would or might be useful for the Met Ed operators to communicate with the specialists at B&W who knew about pump operation and adequate cooling before they terminated operation of the reactor coolant pumps, is it part of your belief that it would have been useful or might have been useful because those specialists at B&W would have told Met Ed that they could continue to operate those pumps with high void fractions and could continue to achieve adequate cooling of the core?

MR. FISKE: This is totally hypothetical, Mr. Seltzer.

MR. SELTZER: I want to find out what he meant when he testified a moment ago. I press the question.

A Well, what I meant when I testified a minute

2 ago is that had such a question been asked, I
3 believe that the B&W engineering staff would have
4 attempted to understand what the conditions were
5 which were leading to this consideration, and I
6 believe that would have been the useful --the
7 most -- might have been the most useful assistance
8 in that particular instance. If secondarily
9 to that question had come up about continued
10 operation it might have been of some value but
11 the primary meaning of my testimony was with
12 regard to find out what the conditions in the
13 system were at that time.

14 Q You are saying that as a secondary
15 matter it would have been useful for the Met Ed
16 operators to find out from the B&W specialists
17 that it was permissible and proper to continue
18 running those pumps with high void fraction?

19 MR. FISKE: Mr. Seltzer, this has gone
20 as far as it is going to go. I don't want
21 to make a speech because -- and tell you
22 why I think this is objectionable because
23 you will object to that. But --

24 MR. SELTZER: Well, the witness
25 indicated he is willing to leave the room.

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

MR. FISKE: Yes, if you want to leave the room -- if you want Mr. Womack to leave the room, he can leave the room, but I am prepared to say why I think this is improper and why I don't think this line of questioning in this area or a lot of other areas if you are planning to do the same sort of thing in other cases should go on and I think we might as well get this resolved. If you think this is so important that you want to get it resolved now we will do it now, but I think you have gone way, way, way beyond any proper scope of this deposition. If you want to think about that over lunch, we will think about it over lunch.

MR. SELTZER: Are you saying that even though the witness testified he believes it would have been useful to have this greater communication and that it would have been useful to have that greater communication at the point where the operators were preparing to shut off the pump, you are not going to permit me to

1
2 ask this witness who was the Manager of
3 the Plant Design Section at the time and a
4 member of the Technical Review Committee
5 why he now believes it would have been
6 useful --

7 MR. FISKE: First of all --

8 MR. SELTZER: -- on the day of the
9 accident at the moment when the core was
10 about to be uncovered for the first time,
11 you will not permit me to ask why he
12 understands it would have been useful?

13 MR. FISKE: First of all, Mr. Seltzer,
14 you persist in misstating his testimony as
15 having been that it would be useful. He
16 has repeatedly said that it might have been
17 useful and he has gone as far as I think
18 he should properly go in answering questions
19 of that type. Indeed, I am not conceding
20 that it was proper to ask that question or
21 that having him answer that question itself
22 was proper, but we, having let him do that,
23 certainly there is no basis for going any
24 further with it, and I will be perfectly
25 prepared to tell you why I think that's

1
2 right.

3 MR. SELTZER: I don't mind saying in
4 front of this witness, because I don't think
5 it's a reflection on him, I think that some
6 of his testimony is a reflection of coaching
7 beforehand. I think that his choice of
8 words on using "would" and "probably" reflects
9 coaching ahead of time.

10 MR. FISKE: Mr. Seltzer, it only
11 reflects the vagueness of your question.

12 MR. SELTZER: Let me finish. Well, that
13 can be your rebuttal. I think "would" and
14 "probably" are questions of degree. I am
15 entitled to find out what the factors are
16 that affect a "perhaps" or a "probably."

17 MR. FISKE: My point, Mr. Seltzer,
18 is you are not entitled to ask the question
19 in most cases that leads to a "probably"
20 answer in the first place. So I think that's
21 what has caused those answers. It's as
22 simple as that. You asked the type of
23 question which I have repeatedly objected to
24 but occasionally have allowed him to answer
25 which by its very nature is speculative and

1
2 he ends up with an answer like well, it
3 might have been or probably would have been
4 or maybe it would have.

5 MR. SELTZER: And then when I try to
6 find out why it might have, you are
7 directing the witness not to answer.

8 MR. FISKE: Because I think that the
9 original question itself was improper and
10 having answered that it is certainly not
11 a basis for going further with an improper
12 line of questioning.

13 (Continued on following page.)
14
15
16
17
18
19
20
21
22
23
24
25

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

MR. SELTZER: I think if there is one thing that is clearly improper it is your direction of the witness not to answer. I don't know Judge Owen very well; you probably know him much better than I do. I know there are some Federal Judges who think it is an outrageous interruption of discovery to direct witnesses not to answer when the Federal Rules clearly preclude instructing not to answer.

MR. FISKE: I think there are an awful lot of Federal Judges who think discovery is greatly abused by people asking questions they have no right to ask and I know of no way of stopping that other than instructing the witness not to answer.

Simply to say, "It is irrelevant; we will sit here for two weeks until it becomes relevant" is not my idea of the way I would like to spend the next two weeks.

MR. SELTZER: Let's adjourn for lunch.

(Whereupon at 12:39 a luncheon recess was taken.)

AFTERNOON SESSION

2:05 p.m.

E D G A R A L L E N W O M A C K, J R.

resumed and testified further as follows:

EXAMINATION (Cont'd.)

BY MR. SELTZER:

Q In GPU Exhibit 7, page 3-29, will you take a look at that (handing to witness)? Page 3-29 contains the program for improving B&W's communication with operating plants during a site emergency; right?

A I would say it contains a partial program. It concentrates rather heavily on the NPGD's.

Q It concentrates heavily on what NPGD can do to improve support and communication?

A It concentrates heavily on those items which would be done within NPGD in development of an effective emergency or improved emergency response plan.

Q Item 1 is "Improvement of the B&W on-site support (resident engineer) to make high quality advice and consultation immediately available to the operating staff."

What kind of improvement of on-site

2 B&W support by the B&W resident engineer did
3 you understand this first recommendation was
4 referring to?

5 A Well, it might include an expansion of
6 his training and area of expertise to include
7 operational matters to a greater degree or
8 emergency operational matters to a greater degree.

9 Q What other items did you understand
10 that first recommendation would include for
11 improving B&W "on-site support (resident
12 engineer)"?

13 A It might also include additional equipment
14 for providing generally higher communications
15 with him.

16 Q What do you mean by that?

17 A By the utility.

18 Q What kind of equipment are you
19 talking about?

20 A For example, a pager.

21 Q Such as a doctor wears when he is
22 on call at the hospital?

23 A It might include such. One could think of
24 that kind of thing, yes, sir.

25 Q I am just trying to make it

2 comprehensible to somebody reading this record.
3 You mean he could walk around with a beeper in
4 his pocket and when the control room wanted to
5 get in touch with him, they could make contact
6 with him by having the beeper in his pocket
7 go off?

8 A That's one possibility for improvement of
9 immediate response contact. Another might
10 simply be to provide operating personnel with
11 his home telephone number or his whereabouts in
12 case he had gone on a leave in an area. See,
13 as we understood it, or certainly -- excuse me,
14 I should not say that because I can't really
15 know how the others felt, but as I understood
16 it, the resident engineer, as then conceived,
17 did not have operation, direct operational
18 support as an intended duty, major duty, in
19 the sense of emergency response operation.

20 Q Did you believe that the B&W on-site
21 resident engineer could improve the quality of
22 his advice and consultation by having direct
23 operational duties in the event of an emergency?

24 A I believe he -- you will have to define what
25 you mean by "direct operational duties" because

1

2

that goes beyond what I have said.

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q No, sir. I believe those were exactly your words. If you want, I will have read back your last answer.

A Please do that because if I used those words I probably --

MR. FISKE: Let's hear what you said.

(Record read by the reporter.)

A Your question is for me to clarify what I meant by "direct operational support"?

MR. SELTZER: No. Why don't you read what my question really was, please.

(Question read by the reporter.)

MR. FISKE: I think this is the problem. If you were intending to play back his previous answer, you changed it.

MR. SELTZER: He can just say "no" if he wants to, Bob. I really don't want to quibble with you any more.

THE WITNESS: Well --

MR. FISKE: I mean the problem is that to the extent that your second question purports to be a restatement of

1
2 his answer --

3 MR. SELTZER: No. I am trying to
4 get a little bit further down the road. I
5 am trying to have a progression.

6 MR. FISKE: O.K. Read the question,
7 please.

8 (Question read by the reporter.)

9 A I believe that the operational -- the
10 resident engineer could contribute to emergency
11 response by having an understood, or perhaps
12 better defined, support role which, of course,
13 would require the affirmative action on a
14 utility's part in an emergency response
15 organization.

16 Q In what specific ways are you saying
17 that the resident engineer could contribute by
18 having a better defined support role?

19 A I believe a contribution he could make is
20 to act as the focal point for contact and
21 communications provided that he has facilities to
22 do that with the emergency response center in
23 Lynchburg.

24 He may also, within the limits of
25 his training, be able to render direct counsel

2 in response to questions from the utility's
3 operating staff.

4 Q Direct counsel on what subjects?

5 A On any subject for which he was
6 appropriately trained.

7 Q You had previously said that you
8 thought one of the things that could be done
9 was improve the training of the resident
10 engineer to deal with operation. In what ways
11 did you think the training of the resident
12 engineer could be improved?

13 A Well, my understanding of the resident
14 engineer program was to provide a better day-to-
15 day contact on the routine operations and
16 particularly matters of perhaps equivalent
17 performance, maintenance, between B&W and the
18 utility. It had been a program undertaken,
19 really, at B&W's initiative and my recollection
20 is that it is supported by B&W as opposed to the
21 utilities themselves and therefore it was not
22 the intent nor, to the best of my knowledge,
23 had the utility requested that this man be
24 specially trained to assist in emergency -- in
25 response to emergency conditions which might

2 develop on the site, and so if he were to be --
3 if he were to have this kind of a role added to
4 his responsibility, it would be advisable to
5 train him for it.

6 Q What additional training would he
7 need?

8 A It would depend upon the individual and
9 the circumstances of agreement with the utility
10 with regard to the kind of communication and
11 help that they wished to have.

12 Q Who was the resident engineer for
13 B&W assigned to TMI-2 on May 28, 1979?

14 A I believe that was Lee Rogers.

15 Q What additional training do you
16 think Lee Rogers would have needed to be able
17 to contribute in the fuller way that you have
18 been suggesting?

19 MR. FISKE: Well --

20 MR. SELTZER: Are you going to
21 instruct him not to answer again?

22 MR. FISKE: No.

23 A Well, I can't really competently answer
24 that question because I don't know Lee Rogers'
25 background and experience and training that well.

1
2 Also another reason I really can't competently
3 answer that question is that I think that that
4 would be an issue that would have to be discussed
5 between our services people and the utility's
6 services people. Again, there would be factors
7 other than his experience.

8 Q I understand the second part. What
9 I am saying is I want to accept for the moment
10 what you are saying, that this B&W resident
11 engineer should be equipped by training to
12 contribute more during a site emergency. That's
13 the thrust of what you and the Technical Review
14 Committee were saying, isn't that right?

15 A That's one element of a plan to provide
16 additional emergency support.

17 Q That's exactly what I am focussing
18 on now. That's all I am focussing on right now.

19 You are familiar to a considerable
20 extent with the transient that took place on
21 March 28, 1979, you are part of the Technical
22 Review Committee that reviewed it, you had
23 ongoing responsibilities during the 28th and
24 the 29th with regard to the accident, didn't
25 you?

2

A Yes.

3

Q Were you directly in touch with

4

Leland Rogers during the events of the 28th,

5

the 29th, 30th?

6

A I don't think I was directly in touch

7

with Lee Rogers, at least not until possibly

8

the early evening or the middle of the evening,

9

no, sir. Your question, though, extended to

10

the 29th, 30th. Certainly, at some point during

11

those three days, I had contact with Lee Rogers,

12

yes, sir.

13

Q Are there areas in which you believe

14

Lee Rogers' performance during the TMI-2

15

accident would have been improved if he had had

16

different training?

17

MR. FISKE: I am going to suggest,

18

Mr. Seltzer, that that question be put in

19

the context of the TRC report and not

20

asked of Mr. Womack as he is sitting

21

here today. If that subject was a part

22

of the TRC review, discussions, I have no

23

objection to it.

24

MR. SELTZER: I am going to press

25

my question as framed.

1
2 MR. FISKE: Then I will object to
3 it. I don't think you have a right to ask
4 that question of Mr. Womack as he sits
5 here today any more than you would anybody
6 else. You do have a right to inquire
7 into the TRC. You are asking him what
8 his present -- you are asking for what his
9 present belief is and I am saying he doesn't
10 have to answer that question.

11 If it was part of the TRC review --

12 MR. SELTZER: He may have also formed
13 an impression from being directly involved
14 in dealing with the accident on March
15 28th, 29th and 30th and being in direct
16 contact with Leland Rogers by his own
17 testimony one minute ago at the height of
18 the accident.

19 I don't think your objection is
20 proper. I have laid a foundation.

21 MR. FISKE: Well, I still believe
22 that it is an objectionable question.

23 MR. SELTZER: You have stated your
24 objection. The Court can rule on it.

25 MR. FISKE: O.K.

2

MR. SELTZER: Are you instructing

3

the witness not to answer the question?

4

MR. FISKE: Yes, other than in the

5

context of the TRC report (indicating)

6

which I have already said I will let him

7

answer.

8

BY MR. SELTZER:

9

Q From your involvement in dealing

10

with the accident at the time the accident was

11

transpiring, did you believe that B&W's

12

efforts in rendering high quality advice and

13

consultation would have been assisted -- could

14

have been assisted more by a better trained

15

B&W resident engineer?

16

A From my direct involvement with Mr. Rogers,

17

in my contact with him, I didn't come to that

18

specific conclusion.

19

Q From your analysis done after the

20

accident and as part of the Technical Review

21

Committee, is it your belief that B&W could

22

have rendered better assistance and consultation

23

with a better trained or -- and I don't mean

24

to deprecate the training that Mr. Rogers had --

25

but more fully trained resident engineer?

1
2 A I would not go farther in stating a
3 conclusion in response to that question than
4 simply to say that I consider these
5 recommendations to be of a piece and I don't
6 believe that I would consent to conclude that
7 any one of these recommendations taken singly
8 or alone would necessarily give the support or
9 additional support we intended to offer by this
10 recommendation.

11 The key issue in that day, it seems
12 to me, was one of communication and timeliness of
13 communication.

14 Q It is a fact, is it not, that Mr.
15 Rogers was in communication with the control
16 room on the morning of March 28th?

17 A As I have understood it, someone at
18 Metropolitan Edison contacted Mr. Rogers on
19 the morning of March 28th, yes, sir.

20 Q And it was somebody who had contact
21 with or was in the control room, isn't that
22 right?

23 A That I don't know for sure.

24 Q Don't you know for sure that Mr.
25 Rogers was being advised of conditions that were

1
2 being read out in the control room?

3 A I know that some information, or I have
4 the understanding that some information which
5 would have been read out in the control room
6 was passed by Mr. Rogers between approximately
7 7:30 and 8 o'clock on the morning of the 28th
8 to his contact in Lynchburg. That information
9 was very partial so it is impossible for me,
10 from that, to form the conclusion that he was --
11 that he had a full picture of what was going
12 on in the TMI control room.

13 Q Was Rogers a licensed control room
14 operator?

15 A I don't know that. I don't know the
16 answer to that question.

17 Q Had Rogers received training on
18 the B&W simulator?

19 A I don't know, sir.

20 Q Had Rogers received instruction
21 from Elliott's training department?

22 A I don't know, sir.

23 Q Was it your understanding of the
24 Technical Review Committee's recommendation with
25 regard to improving B&W on-site support that

2 somebody in Mr. Rogers' position would receive
3 simulator training and other training in the
4 operation of a nuclear plant?

5 A That was what I had in mind, in part.

6 Q You mean you had that in mind and
7 more; is that right?

8 A Yes. I think I have already testified
9 to what was behind that recommendation in my
10 mind and I included training and certainly I
11 would not exclude, but if you wish I will
12 specifically include, simulator training.

13 Q Why did you believe that simulator
14 training would be useful for somebody in Mr.
15 Rogers' position?

16 A Because I believe that simulator training
17 generally is useful for operationally visualizing
18 transient events in a control room and responding
19 to them.

20 Q Item 2 on page 3-29 of GPU Exhibit
21 7 marked for identification is: "Establishment
22 of a well-trained response team drawn from
23 across the division to be constantly on call
24 with appropriate procedures in place."

25 When you say "across the division,"

2

that's the Nuclear Power Generation Division of
B&W; is that right?

3

4

A Yes. That's what I understand the meaning
of that statement to be. I would amend it today
but that's all right.

5

6

7

Q What would you amend it to read?

8

9

10

11

A I think -- I think that it would really
be read by those following up on this as "from
across the company," not intended to exclude
expertise from outside the division.

12

13

14

Q Who outside the division would you
want to call on as part of the well-trained
response team constantly on call?

15

16

17

18

19

20

21

22

23

A Well, in particular in this particular
instance the -- my recollection was the request
from the utility was for additional assistance
in radio chemistry and radiation technology,
as I recall, and we have such expertise both
within the Nuclear Power Generation Division
and also at the Lynchburg Research Center
which is not a part of the Nuclear Power
Generation Division.

24

25

Q What did you understand the
phrase "constantly on call" to mean?

1
2 A To be reachable with relative promptness;
3 in other words, someone in a central communications
4 position has home phone numbers and the like
5 and on the part of the individual selected,
6 that he has given his consent to be reached
7 under such conditions outside normal working
8 hours should it be necessary to do so.

9 Q How promptly after the onset of a
10 transient did you believe the well-trained
11 response team should be able to be contacted?

12 A I don't know that I have reached a
13 conclusion as explicit and specific as that.

14 Q That's pretty important, though,
15 isn't it, to think of how quickly?

16 MR. FISKE: Mr. Seltzer, he just
17 said he didn't do it.

18 MR. SELTZER: Now I am asking him
19 whether that's an important component of
20 being constantly on call.

21 MR. FISKE: Well, the question
22 that you asked him was whether he considered
23 that in, I assume, reaching the conclusion
24 expressed by the words "constantly on
25 call." He said he didn't.

Now, you may think it is important but the fact is he didn't. So I don't see there is any point in pursuing it, and I don't think this is the place to debate back and forth whether it is or isn't important. He said he didn't specify to that degree at the time.

BY MR. SELTZER:

Q Why did you think that the operator should have the telephone numbers of each of the people on the response team?

THE WITNESS: Could you --

Q Why did you think that B&W operators should have the telephone numbers for reaching each person on the response team?

A Oh, excuse me.

Because, since nuclear plants are operated 24 hours a day, it might be necessary to initiate steps in response at some time when the people on the response team were not in their normal office quarters.

Q Why couldn't they wait until they showed up at the office?

A In some instances it might be perfectly

1

2

appropriate for them to do so.

3

4

Q In other instances would it be inappropriate to wait?

5

A It might.

6

Q In what types of instances?

7

8

A In an instance in which the utility asked for help as quickly as possible.

9

10

11

Q As you understand the need for getting in touch with people quickly, would a loss of coolant accident be such a circumstance?

12

13

14

15

MR. FISKE: I will object to this, Mr. Seltzer, unless it is limited to what was considered at the time of the TRC report, not in terms of present questioning.

16

17

18

19

20

21

22

23

24

25

MR. SELTZER: Unless I am allowed to discuss particular operations in a nuclear plant, I am not going to be able to understand when you would apply this "constantly on call, well-trained response team." It doesn't exist in a vacuum. It has to respond to some transient and I am trying to find out what transients the well-trained response team constantly on call would respond to.

1
2 MR. FISKE: And that's fine if the
3 question is in terms of what was considered
4 by the Committee, but my simple point is --

5 MR. SELTZER: Wait a second. When
6 I asked him was it considered by the
7 Committee you interrupted and said, "Oh,
8 no, you have to ask what the witness was
9 thinking, you can't ask what the Committee
10 was thinking."

11 Now I am supposed to ask what the
12 Committee was thinking, not what the
13 witness thinks.

14 MR. FISKE: You can ask him what he
15 understood it to mean at the time and you
16 can ask him if it was discussed with other
17 members of the Committee at the time.

18 MR. SELTZER: I am also entitled
19 to ask him what he understands it to mean
20 today. These are words he participated
21 in writing.

22 MR. FISKE: That I disagree on.

23 MR. SELTZER: Let me make the record
24 clear for Judge Owen. Are you saying
25 that I can't ask this witness whether one

2

of the circumstances in which he envisioned
a well-trained response team should be on
constant call is in the event of a loss
of coolant accident?

3

4

5

6

MR. FISKE: If you put it the way
you just did, I wouldn't object to it
because I understood that to mean --

7

8

9

MR. SELTZER: Why don't I just
proceed then?

10

11

MR. FISKE: -- envisioned at the
time of the review.

12

13

If you are making a record, I think
my position ought to also be clear. Mr.
Womack is not here to engage in answers
to a lot of conclusory questions which
may or may not be ultimate issues in this
case, and that's what you have been doing
repeatedly during this deposition.

14

15

16

17

18

19

20

Now, if it is based on something
that occurred in an actual event that he
participated in, then it's a fact and he
will testify about the fact.

21

22

23

24

But you and I have a basic
disagreement if you think that, because

25

1
2 Mr. Womack is sitting here now, you can
3 ask him a whole series of what are
4 ultimately going to be conclusory questions
5 for someone to decide in this case and
6 get his opinion on them. That's where
7 we differ.

8 MR. SELTZER: I think you and I
9 were both trained in the modern school of
10 law that doesn't see a very distinct
11 wall between ultimate questions. I think
12 in the twenties and thirties witnesses
13 couldn't testify to ultimate questions but
14 now witnesses such as Dr. Womack are
15 constantly being permitted to testify, if
16 it is within their competence, to ultimate
17 questions particularly if he has
18 experience, relevant experience, that he
19 can bring to bear on it.

20 But I am not sure we are at that
21 stage in my questioning today anyway. I
22 am asking him whether the words they have
23 used here would apply to responding to a
24 loss of coolant accident and I am trying
25 to ask it in the best way I know how.

2

MR. FISKE: I will let him answer
this one just so we can move along.

3

4

MR. SELTZER: If I have to engage in
a 20-minute negotiation with you over every
question, it's not letting it move along.

5

6

7

MR. FISKE: I am letting him answer
the question.

8

9

A Yes.

10

Q Yes what? What are you answering
"yes" to?

11

12

A That among the transients that were
envisioned on which -- during which a utility
might call upon us for such a response, that a
loss of coolant accident might be included. In
fact, we didn't intend to exclude any situation.

13

14

15

16

17

Q Are you saying that you intended
that the well-trained response team should be
able to be contacted and give a response when
a utility had a loss of coolant accident in
progress?

21

22

A If the utility chose to call on us.

23

Q The answer is yes?

24

A Yes, if the utility chose to call on it.

25

Q Just let me make clear. You left

2 the word out, "yes." I don't think it was clear
3 that you were saying the word "yes" when you
4 said "if the utility chose to call on us."

5 Since you are testifying that if
6 there were a loss of coolant accident in progress
7 and a utility wanted or needed B&W's advice
8 it would be appropriate for the well-trained
9 response team to be constantly on call, I want
10 to ask you: How soon after the onset of a
11 loss of coolant accident do you believe the
12 well-trained response team would have to be able
13 to be contacted in order to function in the way
14 that is envisioned by this Technical Review
15 Committee program?

16 MR. FISKE: I think you asked him
17 that question once before and he answered
18 it.

19 MR. SELTZER: I didn't get an answer.

20 THE WITNESS: Would you like me to
21 answer again?

22 MR. FISKE: Yes.

23 A Again, that would depend on the particular
24 circumstances of any of a number of range of
25 accidents. As I said before, I think I said

2

that I didn't, you know, try to pin it down

3

in my own mind, certainly in the sense that we

4

are trying to provide additional support or offer

5

additional support above and beyond that which

6

should be necessary to handle almost -- well,

7

maybe all transients.

8

It is going to be a matter of

9

judgment in any case, what the answer is.

10

(Continued on next page)

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

2 Q Dr. Womack, you have testified that
3 at the time that these recommendations for the
4 creation of a response team were developed, it
5 was your understanding that the response team
6 would be able to respond to the full range of
7 transients you have told me, is that right?

8 A I said we didn't intend to exclude any.

9 Q O.K. In not excluding any, you would
10 be including some transients that would require
11 fairly prompt response, isn't that right?

12 A I would certainly include transients which
13 would require some prompt response from the plant
14 operator staff as we understand the transients,
15 but we were not, to the best of my knowledge,
16 and certainly I was not thinking that this kind
17 of response and this kind of support should
18 become a part of the fixed and expected response
19 to a specific or particular transient from the
20 point of view of a utility's operational approach.
21 That's not what was intended.

22 And so we are talking here about
23 something which is an addition for contingencies,
24 whatever they might be; an addition for
25 contingencies could be made at any time.

1
2 Q Would it be correct to say that if
3 an unanticipated contingency arose in the course
4 of a transient, that that would be a situation
5 in which you envisioned the well-trained response
6 team should be available for consultation?

7 A Yes.

8 Q The situation that existed at Three
9 Mile Island Unit 2, where the pressurizer water
10 level was rising at the same time that the
11 reactor coolant system pressure was dropping,
12 was an unforeseen contingency, wasn't it?

13 MR. FISKE: I object. Unforeseen
14 by whom?

15 I object to that. I don't know how
16 Dr. Womack can know what the answer to
17 that is.

18 MR. SELTZER: O.K.

19 Q Prior to March 28th, 1979 were you
20 aware of the fact that in response to a small
21 break loss of coolant accident the B&W NSS could
22 respond with pressurizer water level rising
23 while reactor coolant pressure dropped?

24 A No, I don't think I was consciously aware
25 of that particular set of circumstances.

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

Q So for you on March 28th, 1979 that would have been an unforeseen circumstance, wouldn't it?

A Yes. That of course doesn't single it out from a lot of operational transients, since I am not an operator.

Q You were somebody who was the head of the Design Section at that time; right?

A That's correct.

Q And reporting to you were people whose job it was to analyze small break accidents, isn't that right?

A That's correct.

Q Yet you say you were unaware of the possibility that the system could respond with the pressurizer water level rising and reactor coolant water level pressure dropping in the aftermath of the small break water cooling accident, is that right?

A To the best of my knowledge, yes, I was.

Q Is that the type of condition occurring in a plant that you believed a B&W response team should be able to render advice on to an operating utility?

1

2

A Believed at what time?

3

4

5

Q At the time that you were
formulating the programs and recommendations for
the Technical Review Committee.

6

A Yes.

7

8

9

Q What type of advice in consultation
did you envision a B&W response team could give
under those specific transient conditions?

10

A At the time that this was being formulated?

11

Q Yes.

12

13

14

15

16

17

18

19

20

A In that case the response team might have
been able to consult with the operational staff
on other information present and assemble an
operational picture leading to the correct
understanding of what was going on in the reactor
system, and advise the operational staff of one
of the actions that could have been taken to
restore the reactor coolant system to a more
normal and satisfactory state.

21

22

23

24

Q What information would the B&W
well-trained response team try to assemble? You
said they would try to assemble an operating
picture.

25

MR. FISKE: You are asking him what

1
2 he had in mind at the time of this report?

3 MR. SELTZER: What he meant when he
4 just said that.

5 MR. FISKE: Which is what he had in
6 mind when he wrote this report.

7 A Certainly the information that I would,
8 at the time that I wrote this report, want to have
9 at least accessible to the response team would
10 include concurrent information on reactor
11 pressure, temperatures within the reactor
12 system, temperatures -- information regarding
13 the pilot operated relief valve, and perhaps the
14 pressurizer valves generally, and their
15 discharge temperature couples, information
16 regarding any change in the condition of the
17 containment such as water, increased pressure or
18 in the condition of the reactor coolant drain
19 tank, as an example, but perhaps that's been
20 colored somewhat by the knowledge of the
21 specific transient.

22 Generally the information we would
23 want available would be the general information
24 about the condition of the system, primary and
25 secondary pressures and temperatures concurrently,

the status of the flow, the status of the pumps, the status of other system operation, high-pressure injection flow if the high-pressure injection system had been initiated.

Q Was any consideration given by the Technical Review Committee to whether the B&W response team should keep itself well-informed on operating experience at a broad spectrum of B&W plants?

Let me modify that to say transient operating condition, like Davis-Besse.

A Let me just say that I believe that the Technical Review Committee contemplated a well-trained response team being knowledgeable of operating experiences which might be applicable to the counsel or advice that they might render.

Q Would that include being knowledgeable about an event such as the September 1977 transient at Davis-Besse?

A Yes.

Q How would their knowledge of that transient help them deal with future transients, since you said that you would want them to be aware of that one?

1
2 MR. FISKE: You mean you are asking
3 him again in terms of the work that the
4 committee did?

5 MR. SELTZER: Absolutely.

6 MR. FISKE: Whether --

7 A Well, I don't know how a specific transient
8 might help the team. However, I believe--and now
9 I am speaking for myself, and I have tried to
10 answer your question a little bit more broadly
11 than you asked it. You asked if the Technical
12 Review Committee considered it and I am really
13 speaking for myself.

14 I think that the Technical Review
15 Committee had this in mind, I had it in mind, not
16 the specific transient per se, but the
17 importance in rendering this kind of potentially
18 new kind of support of being knowledgeable, more
19 knowledgeable than we presently were really with
20 regard to operating experiences not only in
21 Babcock & Wilcox plants, but in other plants,
22 and it's very difficult at the time that one
23 studies a single experience, in most cases it is
24 very difficult in time; one studies a single
25 experience to know how that will help you in the

1

2

future.

3

Q O.K. The Davis-Besse September 1977

4

transient is something that you have thought

5

about before today, isn't it?

6

A Yes.

7

Q The initiating event was a loss of

8

feed water rate?

9

A I am not sure that I know the transient

10

well enough to say that. My understanding is

11

there were some sort of upset in the feed water

12

system.

13

Q You also know that the pilot operator

14

relief valve opened and failed to close at the

15

Davis-Besse plant; right?

16

A I believe that that was one of the outcomes,

17

yes.

18

Q You believe it?

19

A Yes, I know that it did fail to close.

20

Q Thank you.

21

A It opened a number of times, I gather.

22

Q It cycled open and closed several

23

times and failed to open?

24

A That's what I understand. Whether the valve

25

was responsible for the failure or the

2

instrumentation, I am not sure I know. It ended

3

up open, as I understand it.

4

Q A falling reactor coolant system

5

pressure automatically actuated high-pressure

6

injection at Davis-Besse, isn't that right?

7

A I believe so.

8

Q Following the automatic actuation of

9

high-pressure injection, the operators, to the

10

best of your knowledge, observed the level of

11

water in the pressurizer rising to within a

12

normal range, isn't that right?

13

MR. FISKE: Can I hear that question

14

again, please?

15

(Question read by the reporter.)

16

A As I understand the transient, the

17

pressurizer level did stay or come into the

18

normal range, but I don't know the details well

19

enough to know what the sequence was.

20

Q You also understand, don't you, that

21

the operators at the Davis-Besse plant terminated

22

high-pressure injection manually, isn't that

23

right?

24

A I have been told that that happened, yes.

25

Q You don't have any reason to doubt

1
2 that, do you?

3 A No, no.

4 Q You weren't at the Davis-Besse
5 plant when the transient occurred, were you?

6 A No, sir.

7 Q All right. I would assume then that
8 what you know is what you have been told or read.

9 The high-pressure injection was
10 terminated by the Davis-Besse operators while
11 the pilot operator relief valve was stuck in the
12 open position, isn't that your understanding?

13 A Yes.

14 Q A loss --

15 A Or the flow reduced. I don't know whether
16 terminated is exactly right.

17 Q I think they terminated and TMI
18 operators reduced the flow.

19 A As I said, I don't know for sure.

20 Q Did you just tell me that you did know
21 that they either terminated or substantially
22 reduced high-pressure injection flow while a loss
23 of coolant accident was in progress?

24 A I said that I do know that, yes, or I do
25 understand that.

2 Q And you also understand, do you not,
3 that after they terminated high-pressure
4 injection, the water level in the pressurizer
5 continued to rise?

6 A Yes, I understand that it stayed a normal
7 range or rose or it stayed in range, yes.

8 Q Didn't it continue to rise?

9 A I really am not absolutely sure whether it
10 rose or not, but I suspect -- well, I don't know.
11 I just don't know. I am not excluding it. I am
12 not making a point of it.

13 Q I am making a point of it. I want
14 to find out what your understanding was.

15 MR. FISKE: Well --

16 MR. SELTZER: Let me proceed. I am
17 not asking any improper questions, I am
18 not harassing or badgering the witness.

19 MR. FISKE: I just think he answered
20 the question.

21 MR. SELTZER: Maybe I have another
22 question.

23 MR. FISKE: Fine, ask the next one.

24 MR. SELTZER: I didn't say I was
25 finished.

2

MR. FISKE: Fine. Ask the next one.

3

That's all I was about to suggest.

4

BY MR. SELTZER:

5

Q The Davis-Besse operators didn't

6

shut the block valve until approximately 24

7

minutes after the start of their transient; right?

8

As you understand it?

9

A My understanding was about 20 minutes. You

10

are a bit more precise than my understanding.

11

Q Prior to their closing the block

12

valve, saturation occurred in the reactor coolant,

13

isn't that right?

14

A I believe that's right.

15

Q It's your understanding that under

16

the circumstances where there is a loss of

17

coolant accident caused by a small break at the

18

top of the steam space in the pressurizer and

19

ensuing saturation in the reactor coolant system,

20

the phenomenon that occurs in the B&W reactors

21

is that the pressurizer level rises while reactor

22

coolant system pressure drops, isn't that right?

23

A That's the phenomenon that I understand

24

occurs in all pressurizer water reactors.

25

Q Including B&W's?

2 A Yes.

3 Q And it's your understanding that that
4 phenomenon would occur in the 20 or 24 minutes
5 before the block valve was closed at Davis-Besse;
6 right?

7 A Yes, I would expect it.

8 Q It's a fact, isn't it, that
9 knowledge of that experience from Davis-Besse
10 would have been useful in rendering advice or
11 consultation to the TMI-2 operators on May 28,
12 1979?

13 MR. FISKE: I am going to object to
14 that.

15 MR. SELTZER: Let me ask you this.

16 Q Has it ever occurred to you that
17 knowledge of precisely what we have just
18 discussed about the Davis-Besse transient would
19 have been useful to the operators at Met Ed on
20 March 28, 1979?

21 MR. FISKE: Mr. Seltzer, I don't
22 think it helps the question if you preface
23 by "has it ever occurred to you."

24 MR. SELTZER: I am asking whether
25 prior to today he ever thought of that and

2

reached that conclusion.

3

4

5

MR. FISKE: That's exactly my point, that what you are asking him for again is an ultimate conclusion.

6

7

MR. SELTZER: Good. That's exactly what I want.

8

9

MR. FISKE: Sure. I mean, we understand each other.

10

11

12

MR. SELTZER: O.K.

MR. FISKE: And that's what I am objecting to.

13

14

MR. SELTZER: Are you directing him not to answer that very basic question?

15

16

MR. FISKE: Yes.

17

18

19

20

MR. FISKE: I think I have stated that this -- you are asking him to express an opinion on what is essentially one of the issues in the case.

21

22

23

24

25

MR. SELTZER: What if I asked him, "Did you see Mrs. Harris shoot Dr. Tarnower?" That's clearly one of the key issues in a murder trial that is proceeding now. It may be a jugular issue. Certainly witnesses are

2

allowed to be called to give testimony on
an ultimate issue.

3

4

MR. FISKE: Certainly, if he saw it.
If you asked him, sitting here today, did
he think she did it, I don't think he
should have to answer that question.

5

6

7

8

MR. SELTZER: Maybe it's just the
nature of our mutual practice of law that
the issues aren't quite as stark as that
in the cases we handle, but I think that
this is no less nor more an ultimate
question than "Did you see Mrs. Harris
shoot Dr. Tarnower?" And I think that
just saying, "Well, it's an ultimate
issue," Bob, really is not a sufficient
basis for objecting.

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

MR. FISKE: Well, for the time being,
I am going to object. I will give it some
more thought.

You are basically asking him to sit
here and look back and say, "Would it have
been helpful if this had happened or that
happened; what would have happened if this
happened?" It seems to me those are -- he

2

is just -- I mean --

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

MR. SELTZER: I disagree. I am not asking those questions. I am asking him about whether he has ever thought about something previously and what his thoughts were, I am not putting him on the stand as an expert witness to consider something that he has never thought about before. I think that if he has thought about this question, it would be as an employee of B&W. I think that if he has thought about it as a B&W employee, it might have been directly as the Manager of the Design Section or as a member of the Technical Review Committee studying the TMI-2 accident or it might have been on the day or the day after the accident when he was trying to help solve the problems at the plant.

I think this is one of the people most intimately involved in dealing with the accident, analyzing the accident, and if I am not allowed to ask him a question like "Have you ever thought of whether such-and-

1
2 such would have helped the operators?" and
3 then "Why did you think that, who told you
4 that, what analyses is it based on?" I
5 think you are just trying to cut my arms
6 off. I don't have to play baseball by
7 those rules.

8 MR. FISKE: I think it's the end of
9 your fingernails, not your arm in any
10 kind of relative term.

11 MR. SELTZER: When you look at the
12 questions on which you have directed this
13 witness not to answer, it's always when I
14 get to the nub of the issue.

15 MR. FISKE: I have not instructed him
16 not to answer any question that calls for
17 a fact. The only time that I have objected
18 is when you have put these questions which
19 ask him to express an opinion on what is,
20 I think, an ultimate issue in the case.

21 MR. SELTZER: You are a more
22 experienced lawyer than I am by far and I
23 take my hat off to you in many regards and
24 I think five years ago I would have been
25 intimidated by what you are trying to pull

1
2 on me. Now I am consternated by it.

3 Let me finish what I am saying and
4 you can say everything you want.

5 I have given you the floor for as
6 much time as you want. I remember from law
7 school reading that some great British
8 Lord Chancellor ruled that the state of a
9 man's mind is as much a state of fact as the
10 state of his digestion, and I never
11 understood that in law school, but I
12 understand it now, and what I understand
13 now is that if somebody prior to his
14 deposition had a state of mind, had
15 concluded something, I am allowed to find
16 out what his state of mind was before he
17 sat in here today just as much as I would
18 be allowed to find out on March 28th, "Did
19 you have an upset stomach, did you have
20 a stuffy nose that inhibited your thinking?"

21 MR. FISKE: I think that's a helpful
22 statement because I think it clarifies the
23 difference, and I might just say that I
24 think I have been anything but intimidating
25 in expressing these objections and I

1
2 haven't noticed --

3 MR. SELTZER: I said five years ago
4 I would have been intimidated.

5 MR. FISKE: His state of mind is
6 clearly relevant fact during a period of
7 time that is relevant to the case and his
8 state of mind at any time up till March
9 28, '79 or the conclusion of the accident
10 with respect to relevance is clearly
11 relevant, and I have let him answer those
12 questions.

13 His state of mind today as he sits
14 here or yesterday when he was here, at the
15 end of the deposition or the week before, I
16 don't think is.

17 MR. SELTZER: His state of mind as he
18 sits here today is not perhaps relevant,
19 but I am just going to say one more thing
20 and then we are going to go to Court on
21 this, because I will not argue with you any
22 more about it.

23 If a year ago Dr. Womack had written
24 a memorandum in which he said the Davis-
25 Besse transient was a substantial precursor

1
2 to what happened at Three Mile Island
3 Unit 2 on March 28th, 1979, they had feed
4 water transient, the PORV failed to close,
5 reactor coolant pressure went down while
6 pressurizer level rose; furthermore, if
7 the knowledge of those facts at Davis-
8 Besse had been well communicated to the
9 Met Ed operating staff, it would have been
10 a substantial assistance to them in
11 handling the March 28th transient; if he
12 had written that down, there is no question,
13 first, that that memorandum would have had
14 to be produced in this litigation; second,
15 there is no doubt in my mind that that
16 memorandum would be admissible in evidence;
17 three, there is no doubt in my mind that I
18 would be able to cross-examine him until
19 I had run out of questions on what the
20 implications of that memorandum were.

21 Now, Mr. Fiske, I think that you are
22 drawing a distinction between something that
23 he wrote down and something that he may
24 have merely had in his mind but did in fact
25 think about one year ago.

1
2 I don't think that that distinction
3 makes any difference in terms of whether
4 I should be allowed to examine him.

5 MR. FISKE: And I don't think whether
6 he thought about it a week ago as opposed
7 to for the first time today makes a
8 difference either. I think the question
9 is, is this a question that goes to the
10 state of mind during a period of time when
11 events were occurring that were relevant
12 to this case.

13 MR. SELTZER: I think admissions
14 against interest can be made the day of an
15 accident, a week after an accident or a
16 year after an accident, and that's what we
17 are talking about right now.

18 MR. FISKE: You are suggesting that
19 what someone thinks in his mind and
20 doesn't express is an admission?

21 MR. SELTZER: The state of a man's
22 mind is as much a state of fact as the
23 state of his digestion, yes. I think that
24 if he has crystallized a thought in his mind
25 but not written it down, it is a fact, just

1
2 as writing it down is a fact.

3 MR. FISKE: O.K. Well, I think we
4 have elucidated --

5 MR. SELTZER: I take it you disagree
6 with that?

7 MR. FISKE: Yes, sir.

8 MR. SELTZER: Why don't we take a
9 break?

10 MR. FISKE: Sure.

11 (Recess taken.)

12 (Continued on next page.)
13
14
15
16
17
18
19
20
21
22
23
24
25

1
2 BY MR. SELTZER:

3 Q Let's take a look at GPU Exhibit 7 for
4 identification. I would like you to look at page
5 2-23. I would like to call your attention to the
6 paragraph that begins just under the middle of the
7 page where the heading is "Organization."

8 Have you had a chance to read the first
9 paragraph that appears under the heading
10 "Organization"?

11 A Yes.

12 Q The Technical Review Committee makes
13 the statement there that "The responsibility for
14 plant safety and the oversight of safety issues
15 within NPGD is not as clearly defined as it should
16 be."

17 Now, NPGD refers to the Nuclear Power
18 Generation Division of Babcock & Wilcox?

19 A Yes.

20 Q When you said "not as clearly defined
21 as it should be," what did that mean?

22 A I think I understand it to mean that, perhaps,
23 in practice, a more advisable focus for the home
24 for such issues within the organization needed to
25 be established and advertised.

1
2 MR. SELTZER: Could you read that
3 back, please?

4 (Record read)

5 Q What does "for the home" mean? What
6 did you mean by "for the home"?

7 A Well, let me say that within NPGD, every
8 person feels a responsibility for safety issues.
9 However, safety issues can be raised which go
10 outside the responsibility of individuals and even
11 outside the responsibility or customary area of
12 knowledge of the organization as a whole. In that
13 case, it is useful to have some sort of a central
14 clearinghouse or central oversight area for the
15 follow-up on such issues. That is what I meant by
16 "home."

17 Q How would that lead to a clearer
18 definition of "oversight of safety issues within
19 B&W?

20 A Definition may be a matter of having the
21 home defined and making sure that everybody knows
22 about it and knows -- having the central ..
23 clearinghouse defined and making sure that everyone
24 knows about how it can be used.

25 Q So you are saying that B&W would have

1
2 better oversight of safety issues if there was a
3 central clearinghouse for the consideration of
4 safety issues?

5 A Well, there was, in fact, and is, in fact,
6 and has been since I have been there a central
7 area for the consideration of safety issues, for
8 the oversight of the consideration of safety
9 issues.

10 Q Then what are you adding with this
11 sentence?

12 A Here we were suggesting that that function
13 be strengthened and more broadly -- more broadly
14 reinforced, its function, its function be
15 reinforced with all the members of division staff.

16 Q Has that been done?

17 A Yes, sir.

18 Q The next sentence on page 2-23 of
19 GPU Exhibit 7 marked for identification states as
20 a fact that "The resolution of safety issues has,
21 at times, taken too long and the completion of
22 resolution action, particularly where customer
23 action is required, is not assured."

24 MR. FISKE: Excuse me.

25 MR. SELTZER: Did I read that correctly?

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

MR. FISKE: You read it beautifully.
I would just take exception to your preface
where, I think, you referred to it as a
statement of fact, and I would just --

MR. SELTZER: Let's see if there is
fiction involved here.

MR. FISKE: No, no, I just referred
to the phrase immediately before the word
"organization." "TRC recommends considering:"

MR. SELTZER: Well --

MR. FISKE: I don't know whether what
the impact of that is or --

MR. SELTZER: I think that is very useful
for you to point that out to the witness.

MR. FISKE: It may or may not be an
appropriate direction.

MR. SELTZER: What I was focusing on
was "The resolution of safety issues has, at
times, taken too long..."

BY MR. SELTZER:

Q Do you see that?

A Yes.

Q At the time the Review Committee wrote
that "The resolution of safety issues has, at times,

1
2 taken too long..." will you tell me what specific
3 safety issues had taken too long to resolve?

4 A At the time that the committee wrote that,
5 I am not sure I can give you a complete list, but
6 let me try to answer your question as best I can,
7 if I may.

8 The B&W Company, the NPGD in its role
9 as a nuclear steam system supplier, was primarily
10 engaged in building new reactor plants and
11 delivering them to the point where their op- --
12 where the responsibility for their operation was
13 assumed by the plant customer. At this point, to
14 an even larger degree than before, the role of the
15 B&W Company became much more an option for
16 whatever the customer asked us to do. He could
17 choose not to involve us or even to inform us on
18 issues.

19 Now, the reason for saying this whole
20 sentence, in my mind, --

21 Q Wait a second.

22 MR. FISKE: He is answering your
23 question.

24 A I am trying to --

25 MR. SELTZER: You can proceed with that

2

answer if you want, after I tell you I am
really interested in what specific safety
issues had taken too long to resolve.

3

4

5

MR. FISKE: I think he is about to tell
you.

6

7

MR. SELTZER: I would be happy if he
is about to tell me, but it didn't sound like
it.

8

9

10

MR. FISKE: I would like him to be able
to finish his answer.

11

12

THE WITNESS: I would like to be able to
finish my answer.

13

14

MR. SELTZER: I move to strike what you
said so far. I want to know what specific
safety issues had taken too long to resolve.

15

16

17

MR. FISKE: You can move to strike it,
but I don't see how you can conclude that it
is not responsive until he finishes giving it,
which is what he is about to do.

18

19

20

21

MR. SELTZER: I am being engaged in
filibuster by you, Mr. Fiske, and to a lesser
extent by the witness.

22

23

24

You unilaterally told me after we agreed
on having a week, because of business

25

1
2 commitments and personal problems, we are
3 only going to get three days, and one day
4 next week, and you are taking up more of my
5 time with objections, and now he is taking up
6 my time with a long-winded answer.

7 I am going to be a little bit concerned
8 that we are never going to finish.

9 MR. FISKE: I won't prolong this by
10 responding to that because I think it has
11 already been responded to numerous times, but
12 I do think he was answering your question.
13 If you want to put another one, go ahead.

14 MR. SELTZER: All I was trying to do
15 was reconstruct what was in his mind. If he
16 wants to continue with that answer, he still
17 can. I said that at the outset.

18 A I will try to shorten it for you, Mr. Seltzer.
19 Simply focusing on the words "too long," too long"
20 are -- "too long" is a matter of subjective
21 judgment. I believe the committee felt that because
22 of our role and past practice and because of our
23 responsibilities as an NSS vendor, the resolution
24 of safety issues followed a phase which was more
25 complex rather with the kind of deliberate design

2 phase for a 12-year-long reactor construction
3 project.

4 From time to time, we became aware of
5 safety issues that might be important to reactors
6 currently in operation, and we saw a need to,
7 perhaps, change the definition of what is the right
8 length of time to try to deal with those safety
9 issues. We also now saw, and that is the reason
10 for the conjunctive clause in that sentence, that
11 to follow through on those actions simply depends
12 on the customer and cannot be assured unilaterally
13 by us.

14 MR. SELTZER: I move to strike all
15 that. I want now examples of safety issues
16 which took too long to resolve. I don't think
17 you said a word about that yet. Give me a
18 specific safety issue that took too long to
19 resolve that you are referring to here.

20 MR. FISKE: As long as it is one
21 referred to by Dr. Womack at the time he wrote
22 that report, I have no objection.

23 A I am sure I could cut through this to some
24 extent for you, Mr. Seltzer, and say it was -- it
25 was among the issues in my mind was the issue with

1
2 respect to pressurizer level that we have
3 earlier discussed.

4 Q What other safety issues had taken too
5 long to resolve?

6 A I am not sure I can recall further, additional
7 issues at this point in time.

8 Q O.K.

9 A I would be glad to review the -- I would be
10 glad to review, but I don't have things in front of
11 my mind.

12 Q What would you review that is in writing
13 that would help you? Are there any backup papers?

14 A I don't know. If I could find any -- if I
15 could find any notes that might have been made by
16 myself or others in the course of this, that might
17 help me review, or I might talk to others on this
18 committee that contributed.

19 Q You said that one instance was the
20 pressurizer question, pressurizer level, right?

21 A Yes.

22 Q In what way is that a safety issue?

23 A Well, it had been suggested by Mr. Dunn that
24 in his memorandum that that might lead to an unsafe
25 condition.

1

2

Q You are referring to his February 1978 memoranda?

3

4

A Yes, I believe that is the right memorandum. I don't know the date from knowledge, but I presume it is the one.

5

6

7

Q You are also aware, aren't you, that Mr. Kelly wrote a memorandum on the same subject in November of '77?

8

9

10

A I am now aware of that, yes, sir.

11

12

Q That raises the same safety issue, right?

13

A I believe that is correct, yes, sir.

14

15

Q The safety issue, to put it very precisely, is that it was known that the operators at the Davis-Besse plant had terminated high-pressure injection prematurely in response to pressurizer level, right?

16

17

18

19

A In the issue that those operators may have acted in a way that was counter to our expectations.

20

21

Q It is a safety issue because if there is a loss of coolant accident in progress, the operators ideally should not be terminating high-pressure injection, right?

22

23

24

25

A That is correct.

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

Q Kelly and Dunn had proposed in November '77 and February of '78 that an advisory be sent by B&W to the operators at B&W nuclear plants on the subject of terminating high-pressure injection that had actuated automatically, isn't that right?

A I think that is right, yes, sir. I would like to have the documents in front of me if you are going to question me on the details of the documents.

Q I am not going to question you any further than you have already conceded knowledge.

It is a fact, isn't it, that B&W did not send an advisory out to the operators of its plants regarding termination of high-pressure injection in response to pressurizer level until after the Three Mile Island accident, isn't that correct?

A To the best of my belief, that is correct.

Q The Three Mile Island accident was at the end of March and the B&W advisory on the subject of high-pressure injection termination was not sent out until early April 1979, right?

A Yes.

Q So even though Kelly had first suggested sending out such an advisory in November of '77,

1
2 B&W did not send out the advisory until April
3 1979, right?

4 A Yes.

5 Q You would agree that that took, that it
6 took too long to resolve that safety issue, is that
7 correct?

8 A In retrospect, I could have wished that that
9 had been resolved earlier.

10 Q It is a fact, isn't it, that you believe
11 that that safety issue took too long to resolve?

12 A I think that is a fair interpretation of what
13 I said.

14 MR. FISKE: Yes.

15 Q Did the Technical Review Committee
16 discuss the Kelly-Dunn recommendation and the fact
17 that it took 16 months before an advisory was
18 issued on this question of high-pressure injection
19 termination?

20 A I don't remember such discussions, but I can't
21 deny that they took place.

22 Q Without asking you to recall verbatim
23 what was discussed, do you recall that the Technical
24 Review Committee did discuss the length of time
25 that it had taken to resolve the issue of sending

1
2 an advisory to customers on high-pressure injection
3 termination?

4 A No, as I said, I can't recall such discussions
5 and the reason that I said I could not conclusively
6 answer your question was because, as you might have
7 guessed from my earlier answers, I certainly did not
8 attend all the meetings of the Technical Review
9 Committee.

10 Q Are you testifying that at no meeting
11 that you attended did they discuss the long period
12 of time that it took for B&W to send out an advisory
13 on terminating high-pressure injection?

14 A I am testifying I can't recall those
15 discussions to the extent to be able to answer the
16 kind of question that you just asked.

17 Q I am trying to hone it down a little
18 further. I am not asking you to recall the substance
19 of the discussion. I am just asking you whether
20 you recall that it was discussed.

21 A I don't recall that it was discussed when I
22 was present, Mr. Seltzer. It has been some many
23 months since those meetings took place, and you have
24 already demonstrated the defects in my memory.

25 Q You feel you have a defective memory?

1

2

A Yes, sir.

3

Q In what respects?

4

5

A Well, I don't remember everything I have ever read and everything I discussed as to exactly the time, chronology and extent.

6

7

MR. FISKE: Which makes his memory just about as defective as everybody else in this room.

8

9

10

MR. SELTZER: Right, I wanted to make sure he hadn't any special genetic defect.

11

12

THE WITNESS: It might not be genetic.

13

BY MR. SELTZER:

14

15

16

17

18

19

20

21

Q The Technical Review Committee suggested, in fact they recommended in the next paragraph "...forming a safety review group comprised of management personnel to oversee and audit the processing of safety-related issues through to complete resolution. The purpose of this group would be to assure timely and appropriate action on safety matters."

22

23

Has such a management review group been formed?

24

A Yes, I believe it has.

25

Q It is also a fact, isn't it, that B&W

2 has instituted special procedures for the
3 processing of safety-related issues?

4 A Yes, it would be, perhaps, more correct to
5 say that the procedures which are in place have
6 been emphasized and somewhat changed.

7 Q Some of the changes that have been
8 made are changes to attempt to insure prompter and
9 more complete resolution of safety issues, isn't
10 that right?

11 A That certainly is among the priority
12 intentions of those changes, yes, sir.

13 Q What has been done to assure prompter
14 and more complete resolution?

15 A Expectations of processing times have been
16 set, reviews have been put in place, as this
17 suggests, for issues that after which certain
18 periods of time passed, based on the potential
19 impact as assessed in a preliminary assessment of
20 an identified concern and the responsibility focus
21 has been made... Retraining and additional
22 training for all members of the division in these
23 procedures has been done.

24 Q Is it the intent that if those
25 procedures had been in place at the time that Kelly

1
2 and Dunn were writing their memoranda, the
3 particular safety issue involved there regarding
4 high-pressure injection following rising pressurizer
5 level would be resolved more promptly?

6 A What assumption do you wish for me to make
7 in connection with that issue?

8 Q If the procedures that have now been
9 created were in effect when Dunn and Kelly were
10 writing their memorandum.

11 A Those procedures, I think, alone could not
12 guarantee that, no, sir.

13 Q If the safety issues raised by Dunn and
14 Kelly had been resolved on the time schedule set
15 forth in the new procedures, wouldn't the issue have
16 been resolved more quickly?

17 A Yes, I believe that is fair to say.

18 Q It would have been resolved before the
19 Three Mile Island accident occurred, wouldn't it?

20 A I am not sure I can assure you of that.

21 MR. FISKE: I think --

22 A There were issues of substance being
23 discussed and, as I understand the history of that
24 discussion and I cannot assure you that those
25 issues of substance might not have taken a fair

1
2 amount of time, perhaps even as much time as
3 actually transpired to resolve it in a new system.

4 Q Are you testifying that you believe the
5 issues that were raised by the Dunn-Kelly memorandum
6 realistically could take 16 months to resolve?

7 MR. FISKE: Just a minute, Mr. Seltzer.
8 I am going to object to that question on the
9 same grounds that we have been objecting to
10 before.

11 What you are asking now is did he take
12 some procedures that are in effect today and
13 speculate as to what would have happened to
14 an internal discussion at B&W if those
15 procedures had been in effect before, and
16 that is a conclusion that it seems to me --
17 I am not even sure that is going to be an
18 ultimate question in the case, but in any
19 event, it certainly falls within the framework,
20 the principle that I have asserted before,
21 so...

22 (continued on next page)
23
24
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

Q Let me ask you, Dr. Womack, in enunciating the recommendations and procedures for resolving safety issues more promptly, have you ever been in a discussion at B&W where somebody said to you that they thought that B&W was locking the barn door after the horses were out?

A No, I can't recall having heard that statement made.

Q Have you ever heard anything said of substance like that? Not using those exact words.

A No, sir. I think that...

MR. FISKE: No is fine. We will accept that answer.

Q When, to the best of your knowledge, were the different concerns raised by the Kelly-Dunn safety issue resolved?

MR. FISKE: Could you clarify what you mean by "resolved"?

MR. SELTZER: I mean resolved in the same sense that the word resolution appears three times in Dr. Womack's recommendations on page 2-23.

MR. FISKE: O.K. Just a second.

Go ahead and answer.

THE WITNESS: You are not objecting?

MR. FISKE: No.

A In that the complete resolution of those concerns required customer follow-up, I would have to consult the NRC's records on that follow-up and training and testing to give you the date.

Q B&W resolved that issue by sending out an advisory to customers, didn't it?

A We resolved our internal position with respect to that issue by sending out an advisory to customers on April the 4th, I believe, 1979.

Q When prior to April 4, 1979 did B&W resolve the safety issue internally?

A I suspect --

MR. FISKE: Just -- that's all right, you can answer that.

A I believe that the discussions which, you know, finally came, brought on the conclusion, were in the days just preceded to April the 4th that resulted in the advisory.

MR. FISKE: I think, Mr. Seltzer, I

1
2 don't object to this but since we are now
3 getting into an area where conceivably the
4 form of the question could be important
5 later on, I think it would be important,
6 if you are going to pursue this, to identify
7 what the sources of Dr. Womack's information
8 are.

9 You asked him a question when did
10 B&W resolve it and he tried to give you
11 his best answer but I think the record
12 should reflect what the basis for that
13 answer is.

14 MR. SELTZER: I have a lot more
15 questions on this later on and we will
16 explore it in excruciating detail.

17 MR. FISKE: I am sure.

18 MR. SELTZER: I am just trying to
19 find out generally what the witness knows.

20 MR. FISKE: I understand but for
21 the purpose --

22 MR. SELTZER: Why don't I ask the
23 questions and I don't mind if you suggest
24 a few questions now and then. Do you
25 want to ask him a question? Go ahead.

1
2 MR. FISKE: It's just --

3 MR. SELTZER: If you would like to
4 ask him a question, ask him.

5 MR. FISKE: It's a perfectly
6 proper question for discovery. It's an
7 improper question if you are going to use
8 it later on at the trial, so I will object
9 to the form.

10 Q Were you consulted on the resolution?

11 A Yes.

12 Q By whom?

13 A My recollection is that Dr. Roy asked me
14 to work out and release an advisory on this or
15 get such an advisory released.

16 Q So you were responsible for the
17 ultimate resolution, is that right?

18 A Yes. As I recall, I was given the assignment
19 of seeing that it happened.

20 Q Did you then pull together for the
21 first time for yourself the Kelly, Dunn and Hallman
22 memoranda?

23 A No. That was not the manner in which I
24 chose to pursue the matter.

25 Q Are you testifying that prior to

1
2 issuing the advisory on April 4th, you did not
3 see any of the Kelly, Dunn or Hallman memoranda?

4 A No, I am not testifying to that.

5 Q Which of those did you see before
6 April 4th?

7 A I'm not sure. I am simply testifying that
8 the approach I took was not -- did not rely on
9 pulling those memoranda together.

10 Q I didn't ask you whether you relied
11 on it. I just asked you whether you did do it.

12 MR. FISKE: No, I think you asked
13 him. Anyway, go ahead.

14 A In any event, I don't recall having done
15 that as a step. I don't know that I had not seen
16 one or all of those memoranda at that time. My
17 best recollection, if you wish to have that,
18 Mr. Seltzer, is that I hadn't although I may have
19 seen --

20 Q Whom did you speak to?

21 A With regard to resolving this issue? My
22 best recollection is that the people that I asked
23 to work to prepare an advice were Mr. Dunn,
24 Mr. Hallman and Mr. Elliott. I may also have
25 asked Mr. Karrasch but I can't recall specifically

1

2

whether he was one.

3

4

5

Q Did you bring Dunn, Kelly and Hallman together in one room and Elliott to talk about this?

6

A I don't think I mentioned Mr. Kelly.

7

8

9

10

Q I'm sorry, I mentioned him. You said you pulled together Elliott, Dunn and Hallman and possibly somebody else, right? Karrasch?

11

12

A Yes. I think those were the people who were primarily involved.

13

14

Q Did you bring those people together in one room?

15

16

A I don't recall bringing them together in one room.

17

18

Q Did you bring any of them together?

19

20

Q Did you speak to any of them individually?

21

22

A My best recollection is that I spoke to each of them individually.

23

24

25

Q Who prepared the advisory?

A That group of people. I don't know which one. Probably Dunn. I may have exaggerated my

1
2 own role. I believe Mr. Kosiba was involved in
3 this.

4 Q It is a fact, isn't it, that Dr. Roy
5 asked you to take charge of this and resolve it
6 after the TMI accident?

7 A That's right.

8 Q Who advised you that there was any
9 issue to be resolved?

10 A I believe, to the best of my recall, it
11 was Dr. Roy. It might have been Mr. Kosiba.

12 Q What remained for resolution?

13 A The matter of following up on making sure
14 that this kind of advice, without inquiring
15 whether the utilities had this kind of advice
16 already in their instructions, that this kind of
17 advice was in their hands as a result of having
18 understood the TMI accident.

19 Q So you are saying the matter that
20 had to be resolved was whether the utilities
21 already had this advice in their hands?

22 A That was one of the matters. That was
23 the outcome of the resolution, the product of
24 the resolution. Among the matters to be resolved,
25 of course, was the question of exactly what advice

2 to give.

3 Q What was the issue there?

4 A What were issues there?

5 Q Yes.

6 A Well, they included exactly how long
7 and under what conditions to stipulate HPI running,
8 they included issues about would there be any
9 concern as a result of that for taking the
10 primary coolant system into a condition where the
11 water was flowing out the top of the pressurizers,
12 the system was essentially filled with liquid
13 water and the like.

14 Q At the time you stepped in to
15 resolve the issue at Dr. Roy's request, were there
16 some people who were functioning on the issue
17 who at that time believed the pumps should be shut
18 off?

19 A The HPI pumps should be shut off?

20 Q That's correct.

21 A No, not that I recollect that there were
22 people who said they should be shut off but there
23 were, and I am glad that there were, people who
24 wanted to be sure that in giving this advice, we
25 were not giving advice which in another operational

condition might be detrimental.

Q Who raised that issue?

A I believe that Mr. Hallman raised it.

Certainly it was in my mind that that's a -- that would be a nominal concern in treating any such issue, any such issue.

Q So you are testifying to something that was in your mind. Did you write it down?

A I don't recall writing it down.

Q That was part of your state of mind, is that right?

A To be sure that we were giving the right advice, to the best of my ability, it was very much in my state of mind.

MR. FISKE: What we will consider for this purpose a relevant period of time. For the purpose of discovery, we will allow that question.

Q That particular concern is a concern that had been voiced prior to the Three Mile Island accident, isn't that right?

A I understand that it had been, yes.

Q It had at least been raised as early as August 1978 by Mr. Hallman, hadn't it?

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

MR. FISKE: Now, Mr. Seltzer, are you asking him what he knows now or --

MR. SELTZER: What he knows now, sure.

THE WITNESS: Oh.

A That's my understanding from what I have read or understood about what Mr. Hallman has indicated in various testimony to the Kemeny Commission.

Q What, if anything, are you aware of that B&W was doing between August 1978 when Mr. Hallman enunciated this concern and April 4, 1979 when Dr. Womack resolved the concern?

MR. FISKE: Well, if the question is asking for his present knowledge --

MR. SELTZER: You bet it is. That's exactly what it is.

MR. FISKE: Then I object to the form.

MR. SELTZER: I insist on an answer.

MR. FISKE: You can answer.

THE WITNESS: Could I have the question again, please.

Q What, if anything, are you aware of

2 that B&W did between August 1978 when Hallman
3 first enunciated the concern and April 4, 1979
4 when you resolved the concern to consider review
5 and resolve it?

6 A I believe I am only aware of what I have
7 heard again from such testimony or reports of
8 testimony that I mentioned earlier. My
9 understanding is that Mr. Karrasch and Mr. Hallman
10 had a conversation at some time during that time
11 about Mr. Hallman's concern and if I am correctly
12 reporting this and I am very shaky on this because
13 I haven't read this in detail, but if I am correctly
14 reporting this, I believe that Mr. Karrasch had
15 told Mr. Hallman to go ahead and proceed on the
16 basis of something similar to what we sent out
17 on April the 4th.

18 Q Mr. Karrasch told Mr. Hallman to
19 proceed to issue the advisory that went out on
20 April 4th?

21 A I think that's right.

22 Q O.K. About when, to the best of
23 your recollection, did that conversation between
24 Karrasch and Hallman take place?

25 A I don't know. Sometime during that period,

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

I believe.

Q Are you aware of any analyses that were done by B&W to investigate the Hallman concern?

A During that period of time?

Q Any period of time prior to April 4, 1979.

A Well, their analyses which would go to the question, the relief capability, pilot operated relief valves, which would be applicable by extrapolation to that concern.

Q After the concern was enunciated, the answer is no, is that what you said?

A Please ask the question. I'm sorry for interrupting.

Q Do you know of any analyses that B&W did to resolve Hallman's concern after he had enunciated it?

A I don't believe I do.

Q Other than the conversation with Karrasch, are you aware of any internal conversation at B&W after Hallman had enunciated his concern and discussions to resolve that concern?

Let me rephrase that. Are you aware

1
2 of any discussions which took place other than
3 the Hallman-Karrasch discussion which were directed
4 at resolving Hallman's concern prior to April 4,
5 1979?

6 A No, not to my knowledge.

7 Q If Dr. Roy had asked you to resolve
8 this question in August 1978 when you became head
9 of the Design Section, are you aware of any
10 impediment that would have existed to your
11 resolving it then?

12 MR. FISKE: I will object to that.

13 It is totally hypothetical.

14 MR. SELTZER: I am asking for a
15 fact.

16 Q Are you aware of any impediments
17 that existed in August of 1978 that would have
18 prevented your resolving the Hallman concern
19 then? That is a fact. Do you know of any
20 impediments that existed as of August 1978 that
21 would have prevented solving Hallman's concerns
22 then and there?

23 MR. FISKE: I will object to that,
24 Mr. Seltzer, because he has testified he
25 didn't even know about it in August of '78.

1
2 MR. SELTZER: He now knows for a
3 fact that Hallman enunciated his concerns
4 for the first time in August of 1978.

5 MR. FISKE: Correct.

6 MR. SELTZER: That happens to be
7 the same month in which he became the head
8 of the Design Section.

9 MR. FISKE: Correct.

10 MR. SELTZER: I am asking him does
11 he know of any impediments that existed
12 in August of 1978 that would have prevented
13 the resolution of the Hallman concern in
14 August 1978.

15 MR. FISKE: All right. You can
16 answer that.

17 A The impediments of the normal work
18 priorities and simply getting the people who
19 have the right knowledge together to assure that
20 we put together the best response we could are
21 the only impediments that come to my mind in the
22 hypothetical case you mentioned.

23 (Continued on following page.)
24
25

2

Q Mr. Dunn was not in the hospital

3

in August of 1978, to the best of your

4

recollection, was he?

5

A To the best of my recollection, he wasn't.

6

Q In fact, to the best of your

7

recollection, Mr. Dunn was available for

8

consultation in August of 1978, wasn't he?

9

A Yes.

10

Q Mr. Hallman was available for

11

consultation in August of 1978, wasn't he, to

12

the best of your recollection?

13

A Yes.

14

Q Mr. Elliott was available for

15

consultation in August of 1978, wasn't he?

16

A As far as I know.

17

Q Mr. Karrasch was available for

18

consultation in August of 1978, wasn't he?

19

A As far as I know.

20

Q Between the time that Dr. Roy asked

21

you to resolve the safety issue and August 4th

22

when the safety advisory was issued to B&W

23

customers, how much of your time would you say

24

you spent on the resolution of this issue?

25

A The first statement, your question said

1
2 August 4th. I believe you mean April 4th,
3 do you not?

4 Q Yes. Let me state it again.

5 Roy asked you to resolve this
6 question some time after the accident but
7 before April 4, 1979; right?

8 A Yes.

9 Q I take it he didn't ask you to
10 resolve this on the day that the accident was
11 transpiring, did he?

12 A No.

13 Q Do you recall how long after the
14 day of the accident he asked you to resolve it?

15 A No.

16 Q How much of your time did it
17 consume resolving this question prior to
18 April 4, 1979?

19 MR. FISKE: The total number of
20 hours?

21 A I would guess it consumed a number of
22 hours, perhaps four, eight.

23 Q Four to eight?

24 A Yes.

25 Q Do B&W engineers keep time records?

1

2

A Yes.

3

4

5

Q Would it be possible to look back
in your time records to determine how much
time you spent resolving this safety concern?

6

A No.

7

Q Why not?

8

A Because I don't keep time records.

9

Q Does Bert Dunn?

10

A No.

11

Q Hallman?

12

A No.

13

14

Q How low down do you have to go
or how high up that people keep them?

15

A The people that report to Dunn keep time
records.

16

17

18

19

Q Would you take a look, please, at
GPU Exhibit 6 marked for identification, and
page 4-4, please (handing to witness).

20

Do you see the statement after
"Background"?

21

22

A Yes.

23

24

25

Q It says there: "During the initial
phase of the TMI-2 incident, our lack of
knowledge of the system hardware and method

1
2 of operation was a deterrent to timely
3 response to questions posed by the site team."

4 What does the phrase "system hardware"
5 refer to?

6 A It refers to the entire hardware of the
7 nuclear power plant.

8 Q Does that include the NSS?

9 A Yes. But obviously this is an area in
10 which our knowledge was the greatest. The
11 indictment was not to indict our knowledge of
12 the NSS.

13 Q You were indicting your knowledge of
14 what?

15 MR. FISKE: I think I will object
16 to the form of that question.

17 A The --

18 MR. FISKE: You can answer it.

19 THE WITNESS: O.K.

20 A The point here is that there is a large
21 portion of the nuclear power plant in the
22 so-called quote, balance of plant, close
23 quote, outside the nuclear steam system which
24 is very important to its operation. This
25 includes such systems as electrical power

1
2 supply systems, feed water and heat removal
3 systems, waste disposal and removal systems
4 and many interconnections of those systems to
5 themselves and, in some instances, to the NSS.

6 In my mind that was the thrust,
7 that would be the thrust I would understand
8 of this comment.

9 Q It was your belief at the time
10 the report was being prepared that B&W should
11 gain more knowledge of the balance of the plant;
12 is that right?

13 A It was my belief that such a knowledge
14 would be an important adjunct to the kind of
15 support we had been discussing as recommended
16 in the later and final recommendation.

17 Q Would you look at GPU Exhibit 7,
18 page 2-22, please. Would you take a look at
19 Item 6 at the bottom, the portion that is
20 underlined? It says there that "Internal
21 organizational structure can influence the
22 product design by excessive responsibility
23 subdivision thereby creating the need for
24 excessive interface control in the involvement
25 of too many persons in the resolution of any

1
2 given problem."

3 What does the phrase "excessive
4 responsibility subdivision" mean?

5 A It simply means that if the technical
6 disciplines in which people work are too narrow
7 it is possible that resolving the problem
8 which cuts across a number of technical
9 disciplines may take longer, take longer than
10 you would like it to take.

11 Q Was it your belief at the time
12 that the Technical Review Committee was preparing
13 this report that excessive division of
14 responsibility had slowed down the process for
15 resolving problems at B&W?

16 A No, I don't believe so. I think if we
17 had meant that we would have said it. I
18 believe the question, the comment here simply
19 goes to saying that this can happen and
20 looking to the future that it would be reasonable
21 to follow through on a question of "Do we
22 have the right kind of technical discipline
23 subdivision to be able to deal with these
24 issues quickly?"

25 Q It is a fact, isn't it, that after

1

2

the accident there was internal reorganization
of B&W?

3

4

A Yes, that's a fact.

5

6

Q And the subdivision of
responsibilities was changed; isn't that right?

7

A Some of it was changed, yes, it was.

8

9

Q And it was changed to streamline
work; isn't that right?

10

A That was one of the objectives, yes.

11

12

13

14

Q Was another objective to reduce
interface control in the involvement of too
many people in the resolution of a given
problem?

15

A Yes, I believe so.

16

17

18

19

20

Q If you can you try to reduce
excessive interface and reduce the number of
people involved in the resolution of a problem.
That contributes to the prompt resolution of
the problem?

21

22

A That is a good management principle that
is generally true, yes.

23

24

25

Q In what areas that you can testify
to had the Technical Review Committee observed
excessive interface control?

1

2

MR. FISKE: I will object to the

3

form of that question.

4

Q Where, if anywhere, had the TRC

5

observed excessive interface control?

6

A I don't believe that the TRC had observed

7

excessive interface control anywhere. Does

8

it say excessive interface control?

9

Q Yes, they say that excessive

10

responsibility subdivision creates the need

11

for excessive interface control.

12

A Oh, I see, yes.

13

MR. FISKE: Well, you might as

14

well start from the beginning if you are

15

going to read it.

16

MR. SELTZER: I read the whole thing

17

already.

18

MR. FISKE: As long as Dr. Womack

19

can read it.

20

THE WITNESS: O.K. Let me read

21

it from the beginning.

22

A I don't know that there were specific

23

things in mind here. This is a general and

24

continued concern of technical organizations

25

which are highly discipline-oriented into

1
2 areas of technical specialty. I think in my
3 mind I would treat this as a general adjunct
4 to the discussion we just had. We would like
5 to be able to move faster on issues and this
6 is certainly an area which is reasonable to
7 look at for any technical organization that
8 wishes to move faster on issues.

9 Q O.K. Now, B&W is an organization
10 that wished to move faster; right?

11 A Yes.

12 Q Where did the TRC perceive you could
13 reduce the level of interface control in order
14 to move faster?

15 A I don't know that the TRC perceived such
16 specifics. I don't recall that they did. I
17 feel that if we had such specific perceptions
18 they would have been recorded here.

19 Q Is there anywhere where you
20 perceived there was excessive interface? Let
21 me make a suggestion. In your design section
22 where you had integration under Karrasch and
23 you had several other sections and some of
24 your sections overlapped with other sections
25 reporting to Dr. Roy, did you perceive any

1
2 problems of interface control?

3 A From time to time and on specific issues,
4 I did. The question, of course, was does that
5 mean that the whole organization is wrong, and
6 frequently it doesn't.

7 Q I didn't ask whether the whole
8 organization was wrong. I will save that
9 question for tomorrow.

10 A And even if the organization is wrong,
11 if you understand what I mean.

12 Q Have you perceived at any time that
13 there were too many people involved in the
14 resolution of a given problem at B&W?

15 A Yes.

16 Q With specific reference to problems
17 that were considered by the Technical Review
18 Committee, can you give me any examples?

19 A In a particular period of time?

20 Q That were considered by the TRC,
21 as your counsel would like me to ask.

22 MR. FISKE: I think he answered
23 that, Mr. Seltzer, that there were none.

24 THE WITNESS Well, I believe he
25 has framed the question differently now.

2

He asked if I had personally seen issues
and --

3

4

MR. FISKE: Go ahead and answer it.

5

A I am trying to think of a good example
for you.

6

7

Q Why don't you give me whatever
examples are running through your mind.

8

9

MR. FISKE: He is trying to think
whether there are any, Mr. Seltzer.

10

11

A In the context of perhaps too many people,
B&W's discussions of high-point events, I
don't know whether that was a matter considered
by the Technical Review Committee but it was a
matter stipulated and requested by the Nuclear
Regulatory Commission after TMI, and in the case
of such a design issue there ultimately has to
be a judgment call made, so somebody's judgment
has to be exercised.

12

13

14

15

16

17

18

19

20

21

22

23

24

25

If you get too many people involved,
you are going to have a broad diversity of opinion
which has a great deal of value when you are
exploring issues but in the final analysis
someone has to exercise a judgment, and this
is a case when I felt perhaps we had more

people involved than we needed to have. That

is the kind of thing I had in mind, Mr. Seltzer.

MR. SELTZER: Rather than get

into a new subject, why don't we

suspend and try to start promptly at

9:30 tomorrow and put in a full day.

MR. FISKE: Off the record.

(Discussion off the record.)

(Time noted: 4:45 p.m.)

Edgar Allen Womack, Jr.

Subscribed and sworn to

before me this day

of , 1980

CERTIFICATE

STATE OF NEW YORK)
 : ss.:
COUNTY OF NEW YORK)

I, CHARLES SHAPIRO, a Notary
Public of the State of New York, do hereby
certify that the continued deposition of
EDGAR ALLEN WOMACK, JR. was taken before
me on December 9, 1980 consisting
of pages 185 through 358;

I further certify that the witness had
been previously sworn and that the within
transcript is a true record of said testimony;

That I am not connected by blood or
marriage with any of the said parties nor
interested directly or indirectly in the matter
in controversy, nor am I in the employ of any
of the counsel.

IN WITNESS WHEREOF, I have hereunto set my
hand this 11TH day of DECEMBER, 1980

Charles Shapiro
Charles Shapiro, C.S.R.

I N D E X

WITNESS	PAGE
Edgar Allen Womack, Jr. (Resumed)	188

E X H I B I T S

GPU NO.		FOR IDENT.
4	Document entitled "Interim Report of the TMI-2 Occurrence Technical Review Committee" dated May 25, 1979	187
5	Document entitled "Interim Report of the TMI-2 Occurrence Technical Review Committee" dated June 8, 1979	187
6	Document entitled "Final Report of the TMI-2 Occurrence Technical Review Committee" dated July 31, 1979	188
7	Document entitled "Final Report of the TMI-2 Occurrence Technical Review Committee" dated October 15, 1979	188
8	Letter from James Taylor to T.M. Novak dated May 10, 1979	239

* * *