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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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

Plaintiffs, :

-against-

80 Civ. 1683
(RO)

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

Defendants. :

- - - - -x

Deposition of The Babcock & Wilcox Company
by ROBERT K. KENNEDY, taken by Plaintiffs,
pursuant to Notice, at the offices of Kaye,
Scholer, Fierman, Hays & Handler, Esqs., 425
Park Avenue, New York, New York, on Wednesday,
January 27, 1982, at 10:45 o'clock in the
forenoon, before Joseph R. Danyo, a Shorthand
Reporter and Notary Public within and for the
State of New York.

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

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By: ANDREW MacDONALD, ESQ.,

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12

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By: RODMAN W. BENEDICT, ESQ.,

14

of Counsel

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16

17

Also Present:

18

DAVID TAYLOR

19

* * *

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IT IS HEREBY STIPULATED AND AGREED by
and between the attorneys for the respective
parties hereto that the sealing, filing and
certification of the within deposition be, and
the same hereby are, waived; that the transcript

2 may be signed before any Notary Public with the
3 same force and effect as if signed before the
4 Court.

5 IT IS FURTHER STIPULATED AND AGREED that
6 all objections, except as to the form of the
7 question, are reserved to the time of trial.

8

* * *

9

10 R O B E R T K. K E N N E D Y, having
11 been first duly sworn by the Notary Public,
12 was examined and testified as follows:

13 EXAMINATION BY MR. MacDONALD:

14 Q Have you ever been deposed before?

15 A No.

16 Q Have you ever given testimony of any
17 kind sworn under oath?

18 A No.

19 MR. MacDONALD: I would like to mark as
20 GPU Exhibit 430 a copy of the resume of Robert
21 K. Kennedy which I received from counsel for
22 B&W this morning.

23 (Resume of Robert K. Kennedy marked
24 GPU Exhibit 430 for identification as of this
25 date.)

1
2 Q Is this a copy of your resume which you
3 prepared in preparation of this deposition?

4 A It was prepared some time ago but --

5 Q It is current as to your most recent
6 position?

7 A Yes.

8 There is a statement at the top relative
9 to attending classes at night. That is not really
10 correct at this point.

11 Q Under "Education"?

12 A Yes.

13 Q According to the resume, you came to
14 Babcock & Wilcox in April 1972.

15 A That's correct.

16 Q And at that time you were a senior engineer
17 responsible for technical requirements and application
18 of reactor coolant pumps and drive motors on B&W NSS?

19 A That's correct.

20 Q To whom did you report at that time?

21 A I started out reporting to a B.B. Cardwell
22 and then after several months I reported to W. S.
23 Spangler.

24 Q Both of these gentlemen were the managers
25 of the pumps and drives unit?

1

2

A Yes.

3

4

Q What section of B&W is the pumps and drives unit a part of?

5

6

A Now it is a part of the RCS component engineering section.

7

8

Q Was that different in some point in time in the past?

9

A Yes.

10

11

Q What section was it a part of at some point in time before?

12

13

A It was a part of the fluid and mechanical systems section before the reorganization.

14

15

16

Q At the time you came to B&W into the pumps and drives unit, who was the manager of that section, fluid and mechanical system, do you recall

17

A I don't recall.

18

Q Who is it today?

19

20

A Fluid and mechanical systems no longer exists in that form.

21

Q In the form that it is in today?

22

A F. R. Fahland.

23

24

25

Q Did Mr. Stanek hold a position as section manager of fluid and mechanical systems at some point in time?

1

2

A Yes, he did.

3

Q When was that?

4

A Approximately 1978 to 1980.

5

Q Pumps and drives unit and the fluid and

6

mechanical section in its present-day form is in the

7

engineering department?

8

A Yes, it is.

9

Q Has it always been a part of the

10

engineering department?

11

A Yes.

12

Q Since you have been at the company?

13

A That is right.

14

Q Do you know that you have been designated

15

by B&W as the person most knowledgeable regarding

16

the ability of reactor coolant pumps to function with

17

void fractions in the reactor coolant system?

18

A Yes.

19

Q Have you since the time you came to B&W

20

in April 1972 dealt with reactor coolant pumps and

21

their operation in the B&W NSS and in its reactor

22

coolant system?

23

A Yes, I have.

24

Q According to your resume, you became

25

unit manager of pumps and drives in February 1976?

1

2

A Right.

3

4

5

Q As a unit manager in pumps and drives, did you attend regular meetings of any sort of the fluid and mechanical systems section?

6

Were there such meetings?

7

8

A Yes, there were meetings of various descriptions.

9

10

Q Were they on a regular basis staff meetings?

11

A Yes.

12

Q Was it a regular basis of a month or a week?

13

14

A It varied. Perhaps from one week to a month.

15

16

Q Were there different types of staff meetings that were conducted on a regular basis?

17

A Yes, administrative, technical, basically.

18

Q What was discussed at technical meetings?

19

MR. BENEDICT: You mean what sorts of subjects came up?

21

MR. MacDONALD: Yes, in general as opposed to administrative.

22

23

24

A A lot of the meetings dealt with integration of technical functions at the staff level.

25

Q Among different units or departments?

1

2

A Different units within a section.

3

Q Did you ever attend meetings with other

4

units or other sections outside of fluids and

5

mechanical systems or its present form?

6

A Yes.

7

Q Were these held on a regular basis?

8

A Not a regular basis.

9

Q How often did you attend such meetings

10

that might have been held outside of your section?

11

MR. BENEDICT: You mean how often did he

12

attend such meetings after he became unit

13

manager?

14

MR. MacDONALD: Yes.

15

MR. BENEDICT: What you recollect.

16

A My recollection is it varies again.

17

It could vary from a week to a month.

18

Q Were those meetings held with other

19

sections in the engineering department?

20

A Yes.

21

Q Were individuals who were in the plant

22

design section in attendance at some of those meetings?

23

A Yes, they were.

24

Q Prior to the time of the TMI-2 accident,

25

had you heard of a transient that occurred at

1

2 Davis-Besse nuclear facility in September 1977?

3 A Yes, I had.

4 Q How did you learn of such transient?

5 A I learned I believe the day of the
6 transient.

7 Q From whom did you learn?

8 A Probably from the section manager who
9 was Mr. Stanek at that time.

10 Q Do you recall what was related to you
11 about the event?

12 A I recall that there was a depressurization
13 event and the plant had been shut down.

14 Q Was this an oral conversation between
15 you and Mr. Stanek?

16 A At that point in time, yes.

17 Q Were you the only one present?

18 A I don't recall.

19 Q Subsequent to that conversation, did
20 you learn anything else about that transient at a
21 later point in time, all of this prior to the time
22 of the TMI-2 accident, other than it was a
23 depressurization event?

24 A I don't recall specifically what I
25 learned.

1
2 Mr. MacDONALD: I would like to mark as
3 GPU Exhibit 431 a document whose first page
4 is a memo from J. A. Lauer to distribution,
5 October 11, 1977. There are a number of
6 attachments to it. It is a 21-page exhibit.

7 (21-page exhibit, first page of which is
8 a memo from J. A. Lauer to distribution,
9 October 11, 1977, marked GPU Exhibit 431
10 for identification as of this date.)

11 Q You are noted on distribution on the
12 first page of this document.

13 Could you take a moment to look at it
14 and tell me if this is a copy of a document you
15 received on or about October 11, 1977 in the regular
16 course of business?

17 A Yes, I believe it is.

18 Q This document says in the third line
19 down from the top, "Cust. Toledo Edison Company
20 DB-1. Subj. Report on Depressurization Event."

21 To your understanding at the time you
22 received this document, it was related to the
23 Davis-Besse September 24, 1977 transient?

24 A Yes, it was.

25 Q Did you attend a briefing in the latter

part of September with anywhere from 30 to 50 other B&W unit and section managers and other personnel regarding the Davis-Besse transient?

A I don't recall such a meeting.

Q Do you know whether anyone else in your unit or section attended such a meeting?

A It is possible but I don't recall.

Q Did you ever have any conversations with any individuals in or about this time of September or October 1977 about such a meeting?

A I don't remember that.

Q Do you know a gentleman by the name of Joe Kelly?

A I am acquainted with Joe Kelly, yes.

Q Did you know Joe Kelly prior to the time of the TMI-2 accident?

A I don't remember specifically when I came to know Joe Kelly.

Q You knew he was an employee for B&W?

MR. BENEDICT: Did he know or does he know now?

MR. MacDONALD: Did he know?

MR. BENEDICT: Prior to the time of the Three Mile Island accident?

1

MR. MacDONALD: Yes.

2

3

A No.

4

5

Q Do you know a gentleman by the name of Bert Dunn?

6

A Yes, I do.

7

8

Q Did you know Mr. Bert Dunn prior to the time of the TMI-2 accident?

9

A Yes.

10

11

Q Did you know he was manager of a unit in plant design named ECCS, emergency core cooling system?

12

A Yes.

13

14

15

16

Q Did you have occasion prior to the time of the TMI-2 accident to discuss with Mr. Dunn any matters relating to B&W's business in regard to the nuclear steam supply systems?

17

18

19

MR. BENEDICT: You want to know whether he ever talked to Bert Dunn prior to the Three Mile Island accident about B&W's NSS?

20

21

22

23

24

25

MR. MacDONALD: Generally, did he ever have conversations with Mr. Dunn prior to the time of the TMI-2 accident that involved the B&W NSS or any of its components in the course of his regular business.

A It is possible, but I don't recall.

1

2

Q Are you in the same office building
physically as Bert Dunn?

4

A Yes.

5

Q On the same floor or somewhere else?

6

A Now we aren't on the same floor.

7

Q Were you back in 1977-1978?

8

A We were on the same floor.

9

Q Approximately how close were your offices?

10

A Two to three hundred feet.

11

Q Were all the different sections of the
engineering department and units within the
engineering department located on that floor? Was that
how it was divided up?

15

A No, as I recall, they were not all on that
same floor.

17

Q Did you know a gentleman by the name of
Don Hallman prior to the time of the TMI-2 accident?

19

A Yes, I did.

20

Q Did you know that he was manager of a
unit in customer and nuclear service in 1977 or 1978
or plant performance services?

23

A Yes.

24

Q Did you have contact with Mr. Hallman
regarding B&W's business on the NSS in any capacity

25

1
2 prior to the Three Mile Island accident?

3 A I don't recall specifically.

4 Q Was it part of your job prior to the
5 Three Mile Island accident as unit manager to interact
6 with any other personnel in the customer service
7 department regarding procedures that were sent to
8 B&W's operating plants, nuclear operating plants?

9 A As a matter of routine, we are involved.

10 Q Is it different today than it was prior
11 to the time of the accident, because you used the
12 present tense "is"?

13 A No, it is not different today.

14 Q What was that interaction between
15 yourself and individuals in customer service?

16 A Reviewing, providing consultation on
17 procedures.

18 Q On the technical portions of those
19 procedures as it related to the areas within your
20 bound of expertise?

21 A That is right.

22 Q Which would be the reactor coolant pumps
23 and their operation?

24 A Yes.

25 Q Who in customer service in the period

1
2 1977 to 1978 and prior to the time of the accident
3 did you deal with on that matter?

4 A I don't recall specifically who it was.

5 Q Was it one designated individual or was it
6 more than one?

7 A It was a unit which had the responsibility
8 for providing procedures to the operating plants.

9 Q Was it Don Hallman's plant performance
10 service section?

11 A As I recall, it was not.

12 Q Was the individual Mr. Phinney?

13 A I don't recall who the individual was.

14 Q How often did you meet or discuss or
15 communicate with individuals in customer service
16 regarding procedures and your input to them as to
17 reactor coolant pump operation?

18 MR. BENEDICT: I object. It hasn't been
19 established that is what he was consulting on
20 but if you want to put that as a question to get
21 it in the record --

22 MR. MacDONALD: Prior to the accident
23 I think he said he had discussions with
24 individuals in customer service. I am
25 attempting to find out.

1
2 MR. BENEDICT: That is why I am saying
3 your question states a fact not in evidence
4 or presumes a fact not in evidence.

5 If you want to ask him what the subjects
6 were that he talked about and discuss how
7 often they talked. I don't recall his answer
8 saying what the subject was.

9 MR. MacDONALD: The record reflects what
10 it reflects.

11 I think he said it was regarding reactor
12 coolant pump operation.

13 Q Is that what you were discussing when
14 you spoke with individuals from customer service
15 that part of your job as unit manager of pumps and
16 drives was reactor coolant pump operation?

17 A By virtue of my responsibility, it would
18 have been pertaining to pumps and drives.

19 Q Did you have conversations or communicate
20 with individuals from customer service on a regular
21 basis or was it sort of an ad hoc basis?

22 A It was intermittent as the need arose.

23 Q Directing your attention to GPU Exhibit
24 431, in the second paragraph it states that, "The B&W
25 input to TECO's report should include four separate

1
2 sections. SPR 372 may be used as the source
3 document for information regarding the transient."

4 I show you a copy of SPR 372 which has
5 been previously marked as GPU Exhibit 133.

6 Is this a document that you used as a
7 source document?

8 MR. BENEDICT: If you recall.

9 Q For information regarding the September
10 24, 1977 Davis-Besse transient.

11 A I don't specifically recall.

12 Q So you don't specifically recall not
13 every page of the document but do you generally recall
14 using this document as a source document for information
15 regarding the transient?

16 A No, I can't say that I do.

17 Q Have you ever seen a copy of GPU Exhibit
18 133?

19 MR. BENEDICT: Up until today?

20 MR. MacDONALD: Prior to the time of the
21 accident.

22 A I don't recall. I don't remember that
23 either.

24 Q On the first page of GPU Exhibit 431, down
25 at the bottom it says, "The responsibility and suggested

content of the sections is as follows:" and then it sets out two sections and we come to "Kennedy 3. Evaluation of RC pumps including, a. cavitation damage to impellers; b. damage to bearings; c. damage to seals; d. startup testing."

Do you see that?

A Yes.

Q Was that to be your responsibility in relation to evaluating the Davis-Besse September 24, 1977 transient?

A That would be affirmative, yes.

Q Who gave you that assignment?

A This memo was transmitted by Mr. Lauer.

Q It is your understanding that Mr. Lauer was the one that gave you the assignment by way of this memo?

A Yes.

Q Did you attend any meetings with any of the individuals on the distribution list and Mr. Lauer to discuss the Davis-Besse transient and what your work was to be on that evaluation?

A I don't specifically remember such a meeting.

Q Did you perform work regarding evaluation

1
2 of RC pumps during the Davis-Besse transient of
3 September 24, 1977?

4 MR. BENEDICT: There is a syntactical
5 problem with the question.

6 You mean after did he perform work with
7 respect to the operation of reactor coolant pumps
8 during that time?

9 MR. MacDONALD: Yes.

10 A Yes, I did.

11 Q What did that work consist of?

12 A It consisted of evaluating the data made
13 available to us.

14 Q What was that data?

15 A Performance data made available to us from
16 the transient.

17 Q How did you come to obtain such performance
18 data?

19 A I don't specifically remember how we came
20 on that information.

21 Q Do you recall what the performance data
22 was?

23 A I don't specifically remember what that
24 would consist of.

25 Q You learned, did you not, at some point

1
2 in time after the Davis-Besse transient that during
3 that event the reactor coolant system at Davis-Besse
4 had operated at or near saturated conditions for some
5 period of time?

6 A Yes, I learned that.

7 Q Do you know where you learned that?

8 A I don't recall specifically how I learned
9 it.

10 Q You don't recall whether it was from
11 conversations or evaluating data?

12 A No, I do not.

13 Q Prior to that Davis-Besse transient,
14 had you known of any other transient at any B&W
15 operating nuclear plant at which saturation had occurred
16 in the reactor coolant system of the PWR?

17 A No.

18 Q Prior to Davis-Besse, had you known
19 at any nuclear operating plant, a PWR, that saturation
20 had occurred at any point in time in the reactor
21 coolant system?

22 A I don't recall.

23 Q You don't recall that you knew that?

24 MR. BENEDICT: Whether he knew that?

25 A I don't recall whether I knew that or not.

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Q I would like you to take a look at GPU Exhibit 431 and direct your attention to a memo that is part -- a letter that is part of that exhibit. It begins on page E42881, a letter from J. Lauer to Toledo Edison.

MR. BENEDICT: Is there a reference in the cover memo that this is part of the exhibit? I see there is a reference to the exit interview notes of October 7.

MR. MacDONALD: In the second sentence of the cover page it says, "Based upon the attached B&W letters."

MR. BENEDICT: They are obviously numbered sequentially. I didn't know whether they belonged together or not. Thank you.

Q I note that, Mr. Kennedy, you are also marked for a copy of this letter.

I direct your attention to the second page, the first paragraph, "The reactor coolant pumps were all operated at or near saturation pressure (A2 and B1 for about one minute and A1 and B2 for about 45 minutes)."

After performing your evaluation of the reactor coolant pumps and their operation during the

1
2 Davis-Besse transient, did you transmit conclusions
3 based upon those evaluations to Mr. Lauer?

4 A That would have been the nature of my
5 responsibility.

6 However, I don't recall specifically.

7 Q Were you asked to review a copy of this
8 letter before it was sent out?

9 A I don't remember.

10 Q Relative to its substantive content?

11 A I don't remember.

12 Q Later on in that same paragraph that I just
13 referenced, I direct your attention to the line
14 that says, "We have reviewed these conditions with
15 the pump manufacturer and concluded that the risk of
16 damage is small."

17 Did you undertake such a review in the
18 course of your evaluation of the reactor coolant pumps
19 and their operation during the Davis-Besse transient?

20 A Again, that would have been within the
21 nature of my responsibility.

22 However, I don't remember specifically
23 doing that review.

24 Q Do you remember coming to the conclusion
25 based on that review or evaluation that the risk of

1

2

damage is small?

3

A Yes, I think that that is fair to say.

4

I do remember that.

5

Q And the fact that the risk of damage is

6

small was made with the knowledge that the pumps had

7

operated during the transient for some period of time

8

at or near saturation pressure?

9

A Yes.

10

Of course, there were requalification

11

tests performed during the startup sequence which

12

provided additional evidence that the risk of

13

damage was not great.

14

Q Who performed those tests?

15

A Davis-Besse with the consultation of

16

B&W.

17

Q Were you involved in that?

18

A I was aware of those tests. I was not

19

personally involved.

20

Q Did you have any responsibility with

21

regard to those tests?

22

A One member of my unit did participate in

23

that.

24

Q Who was that?

25

A John Dempsey.

1

2

Q Does he still work for B&W?

3

A No, he does not.

4

Q Do you know where he works today?

5

A I believe he is a consultant.

6

Q Do you know for whom or where?

7

A I don't know.

8

Q The subsequent sentence in that

9

paragraph that begins, "Therefore, we have recommended

10

that the pumps be instrumented to measure shaft

11

vibration, seal cavity pressures, RC pressure, standpipe

12

leakage, and seal injection flow and temperature,"

13

do you see that sentence?

14

What was the recommendation as to the

15

pumps being instrumented to measure shaft vibration?

16

MR. BENEDICT: I'm not sure I understand.

17

Are you asking him to interpret this letter?

18

MR. MacDONALD: I am asking him what his

19

understanding was of a recommendation that the

20

pumps be instrumented to measure shaft vibration.

21

MR. BENEDICT: If you remember what you

22

understood that to mean at the time this letter

23

was written, you may answer.

24

A That means proximity sensing probes on the

25

shaft.

1

2

3

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Q Were there other measures of shaft vibration in existence at the time at Davis-Besse?

A I don't recall.

Q Did you look at data from the Davis-Besse transient that related to shaft vibration?

A I don't remember that either.

Q Or frame vibration?

A It is possible, but I don't remember.

Q In order to come to a conclusion that the risk of damage was small, is it your understanding that you would have looked at shaft and frame vibration to come to that conclusion?

MR. BENEDICT: I object to the question.

He may testify what he looked at or what he knows was looked at, but he doesn't have to testify as to how that conclusion was drawn by somebody else.

MR. MacDONALD: I think he testified it is part of the conclusion that he came to on reviewing the data. I am attempting to ask him whether or not in reaching that conclusion based on his understanding of reactor coolant pump operation that one of the things that he looks at or would look at would be shaft and

1

2

frame vibration.

3

MR. BENEDICT: I object.

4

5

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You may answer the question as to what you recall looking at to reach that conclusion or what you recall -- what data you recall was looked at by whomever it was that reached that conclusion, but you don't have to testify what somebody might have done.

MR. MacDONALD: You instruct him not to answer the question?

MR. BENEDICT: As presently framed, yes, because it is improper.

MR. MacDONALD: I disagree, but let's go on.

Q During the course of your employment at B&W, have you evaluated the performance of reactor coolant pump operation in the B&W NSS at any other time aside from this particular instance relating to the Davis-Besse transient?

A That is part of the nature of my responsibility.

Q Do you do that on an ongoing basis?

A As the need arises, yes.

Q When you make such reviews, what data do you look at to assess the performance of the

1
2 reactor coolant pumps in the B&W NSS?

3 A It includes various performance parameters
4 as it relates to the pump operation.

5 Q What are those parameters?

6 A Shaft seal performance. Those parameters
7 include shaft seal leakage, shaft seal
8 staging pressure. The mechanical performance
9 parameters, shaft and frame vibration.

10 Those are the primary parameters that are
11 evaluated.

12 Q Do you evaluate all those parameters
13 when you evaluate the operation of the reactor coolant
14 pumps?

15 MR. BENEDICT: In every case did he
16 evaluate each and every one of those parameters?

17 MR. MacDONALD: That is not the question.

18 MR. BENEDICT: That is the question I heard.

19 You can answer it -- that is the only
20 way I can understand what you asked.

21 MR. MacDONALD: Let's put it this way:

22 Q Do you recall ever evaluating the
23 performance of reactor coolant pump operation at any
24 time where shaft and frame vibration were not one of
25 the parameters that you evaluated?

1

2 A Yes, I recall such an evaluation.

3 Q When was that made?

4 A We recently evaluated the performance of
5 shaft seals on the Crystal River plant. It did not
6 include the evaluation of shaft and frame vibration.

7 Q Did you do evaluations of the TMI-2 accident
8 of March 28, 1979 as it related to reactor coolant
9 pump operation?

10 A Yes, I did.

11 Q During those evaluations did you
12 evaluate shaft and frame vibrations?

13 A Yes, we did.

14 Q That was a loss of coolant accident,
15 was it not?

16 A Yes.

17 Q The Davis-Besse September 24, 1977
18 accident was a loss of coolant accident, was it not?

19 A Yes.

20 Q Do you have any reason to believe that
21 you did not evaluate shaft and frame vibration in
22 evaluating the Davis-Besse September 24, 1977 transient?

23 A Would you repeat the question?

24 Q Do you have any reason to believe that
25 you did not evaluate shaft and frame vibration in your

analysis and review of the Davis-Besse September 24, 1977 transient?

A I don't remember what I did or didn't do.

Q You have no reason to believe that you didn't, do you?

MR. BENEDICT: He answered the question. I instruct him not to answer. You do it, too. You do it all the time. You got your answer. Live with it. Go on to the next question.

MR. MacDONALD: I am not here to engage in colloquy with counsel.

I am here just to ask questions of the witness and have answers.

MR. BENEDICT: I agree and you got your answer.

As I have sat through your defense of Mr. Faust, I know you have given the same instruction. So let's proceed.

MR. MacDONALD: On the contrary. I have allowed at least four or five repetitive questions before I finally terminated the question after the answer was given four or five times.

My question was:

1
2 "Do you have any reason to doubt that
3 that was part of your evaluation of the
4 Davis-Besse September 24, 1977 loss of
5 coolant accident?"

6 MR. BENEDICT: His answer is he doesn't
7 remember one way or the other. It is on the
8 record.

9 Let's move on to the next question.

10 BY MR. MacDONALD:

11 Q I direct your attention to the October 5,
12 1977 memo from Mr. Lauer to Toledo Edison, specifically
13 to the third paragraph --

14 MR. BENEDICT: It is not a memo. It is a
15 letter.

16 Q The third paragraph reads, "The
17 reactor coolant pumps were exposed to conditions which
18 could have caused cavitation damage to the impellers,
19 damage to the bearings, and seal leakage or failure.
20 None of these things appear to have happened and we
21 feel that the pumps may be operated with only minor
22 risk of additional damage to the pumps. We suggest
23 a series of progressive start-up tests under close
24 observation in order to minimize the risk of furthering
25 any latent damages. This is not considered to be a

1

2

safety concern."

3

You are copied on this memo.

4

Do you see that at the top?

5

A Yes.

6

Q Do you recall why it was not considered

7

to be a safety concern that the reactor coolant pumps

8

were exposed to conditions which would have caused

9

cavitation damage to the impellers, et cetera, as I

10

just read?

11

MR. BENEDICT: I object just for a

12

moment because I am not sure the syntax of this

13

paragraph allows you to take the last sentence

14

in the paragraph and refer back to the first

15

sentence.

16

It goes on to say it "may be

17

operated with only minor risk of additional

18

damage to the pumps. We suggest a series of

19

progressive start-up tests" --

20

MR. MacDONALD: Fine. It can be read in

21

conjunction with the succeeding sentences in the

22

paragraph.

23

MR. BENEDICT: My only point is it is not

24

clear to me that the last sentence refers to the

25

past operation. It could just as well refer to

1
2 the "may be operated" sentence or the "We suggest
3 a series of progressive start-up tests."

4 MR. MacDONALD: Now that you testified,
5 now I would like the witness to answer.

6 MR. BENEDICT: I agree.

7 When your question is clear, I will let
8 him answer.

9 MR. MacDONALD: The question is clear.

10 The answer is what we are here to get.
11 His answer, not yours.

12 MR. BENEDICT: You want to stand by the
13 question you set forth?

14 MR. MacDONALD: Yes.

15 MR. BENEDICT: Could you read it back?

16 (Record read back.)

17 MR. BENEDICT: I state my objection, but
18 you may answer.

19 A I don't recall specifically why that
20 statement was made.

21 Q Did you make a recommendation to Mr. Lauer
22 to that effect?

23 A It is indeed possible, but I don't remember
24 specifically.

25 Q Prior to the time of the TMI-2 accident,

1
2 B&W supplied, did it not, to each utility customer a
3 curve called the net positive suction head curve.

4 A That is possible.

5 MR. BENEDICT: Just give your recollection.

6 A I don't recall that specifically, no.

7 Q Did you ever see a copy of B&W limits
8 and precautions prior to the time of the TMI-2
9 accident?

10 A I believe the answer to that is
11 affirmative.

12 Q In relation to the reactor coolant
13 pumps, what did you understand was the purpose of the
14 limits and precautions?

15 A To provide guidance to the operator
16 relative to the performance of the reactor coolant
17 pump.

18 Q Did those limits and precautions prescribe
19 shaft and frame vibration limits for the operation
20 of the reactor coolant pumps?

21 A Yes, they would have.

22 Q Did you have input as the manager of
23 pumps and drives as to what those limits and
24 precautions for the reactor coolant pump's shaft
25 and frame vibration would be?

1

2

A Yes, I would.

3

4

5

Q How would you make such determination as to what those vibration limits would be that were inserted into the limits and precautions?

6

MR. BENEDICT: How did he make them?

7

8

MR. MacDONALD: Yes, prior to the time of the accident.

9

10

11

12

13

A Those limits were set in concert with the supplier, vendor, with the B&W approval. Those limits are arrived at by extensive experience with this kind of machinery, and they are set to ensure the serviceability of these pumps for the design life.

14

15

16

17

Q Prior to the time of the TMI-2 accident, did you ever make any recommendations to anyone at B&W that those vibration limits for shaft and frame be changed in any way?

18

A I don't recall.

19

20

21

22

Q Is it your understanding that the net positive suction head curve for the reactor coolant pumps is a curve that prescribes the limits for the operation of those pumps?

23

A Yes.

24

25

Q As you understood it in 1977, was operation at saturation in the reactor coolant system

1
2 within the confines of the net positive suction head
3 curve.

4 A Net positive suction head curve is
5 developed on the basis of solid water conditions, per
6 the definition.

7 Q So in other words, operating at
8 saturation is operating outside of that curve?

9 A That is right.

10 Q Based on your knowledge of the Davis-Besse
11 September 24, 1977 transient and the fact that the
12 reactor coolant pumps during that transient were
13 operated in a saturated system, did you make any
14 recommendations to anyone at B&W or any of the
15 operating utilities regarding such operation as
16 being outside the net positive suction head curve?

17 A No, I did not. I believe there was no
18 reason to.

19 Q Why was that?

20 A The characterization of the actual
21 environment of that pump during that incident is not
22 well known.

23 Q Could you explain what you mean by that?

24 A The percent of void fraction, the actual
25 environment that the pumps are, including the percent

1

2

of void fraction, is not quantified.

3

4

5

6

Q Did you attempt after the Davis-Besse accident to look at data so that you would understand what the void fraction was that the pumps were operating under during the Davis-Besse transient?

7

8

9

A No, I did not, and there was no reason to. The pump is not required to perform in such an environment.

10

11

Q But you knew that it did, isn't that correct?

12

13

14

15

16

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19

A No, I did not know that it did.

Q You didn't know that the reactor coolant pumps at Davis-Besse operated during that transient, at least for some period of time, in a saturated system?

20

21

22

23

24

25

A I know that the system was in saturation. I do not know that the pumps operated in a saturated condition.

Q You knew that the pumps were operating in a saturated system?

A In a saturated system, that is right.

Q Did you do any evaluation of the flows through those pumps during that transient?

A No, I did not, and there was no reason to.

1
2 There was no requirement that the pump perform
3 in that situation.

4 Q Regardless of whether there was any
5 requirement, did you do any evaluation or study of
6 that?

7 A No, I did not.

8 MR. BENEDICT: He answered in the negative.

9 Q Prior to Davis-Besse, you had never had
10 any occasion to learn that a reactor coolant pump
11 had operated in a saturated system in a B&W nuclear
12 reactor, had you?

13 MR. BENEDICT: I object to the form but
14 go ahead.

15 A Would you repeat the question.

16 (Record read back.)

17 A The answer is no.

18 Q Did you ever ask anyone at Davis-Besse
19 or B&W or any individual for that matter what the
20 percentage of void fraction was at Davis-Besse during that
21 September 24, 1977 transient?

22 A No. There was no reason to.

23 (Recess taken.)

24 BY MR. MacDONALD:

25 Q As I understand it, you didn't attempt

1

2

3

4

5

to ask anyone at Davis-Besse or evaluate the data from the Davis-Besse transient of September 24, 1977 to determine what the void fraction was during that transient, is that correct?

6

A That is right. There was no reason to.

7

8

Q You weren't interested in the void fraction of the reactor coolant system?

9

10

A The pumps aren't required to operate in that environment.

11

12

13

14

Q Whether or not the pumps are not required to operate in that environment, if they do have to operate in that environment, that was of no interest to you, is that correct?

15

16

17

MR. BENEDICT: I object. What does that mean, "if they do"? In what case did they have to operate in a voided environment?

18

19

20

21

22

23

MR. MacDONALD: He already testified that he knew that the system was saturated at Davis-Besse and that the pumps operated for some period of time when the system was saturated and there was a two-phase mixture. That is the basis of my question.

24

25

MR. BENEDICT: Let me hear the question again.

(Record read back.)

MR. BENEDICT: I object to the form of the question, but if you can understand it, you can answer.

A I at that point had no concern about the operation in that environment.

Q Do I understand you had no concern, no matter what the void fraction was in the reactor coolant system, for a reactor coolant pump operation?

A Let me clarify my concern.

My concern is relative to the need for that pump to operate in that environment. There are concerns relative to the mechanical performance of the pump in that environment.

Q When you say "the need for that pump to operate in that environment," do you mean that because of shaft and frame vibration limits that the pump would be shut down at some point in time before the system reached saturated conditions?

A Again my concern is that, No. 1, the pumps aren't required to operate in that environment, but, secondly, the pumps are not designed for that environment. Therefore, they can sustain damage, and there is no conclusive proof with regard to the

1
2 extent of the damage that the pumps can sustain in that
3 environment.

4 Q In a saturated environment in the reactor
5 coolant system?

6 A Yes.

7 Q Tell me what your understanding was
8 prior to the time of the TMI-2 accident as to what
9 could cause a frame and shaft vibration on a reactor
10 coolant pump.

11 A Out of balance conditions on the rotating
12 system can cause shaft and frame vibrations; operating
13 below the NPSH requirements can cause shaft vibration;
14 and if there are mechanical failures of certain
15 components within the reactor coolant pump and motor,
16 that can result in shaft and frame vibration increases.

17 Q What types of components are you speaking
18 of?

19 A Bearings, for instance.

20 Q Anything else?

21 A The part of the rotating shaft that
22 interfaces with the bearings, the journal.

23 MR. MacDONALD: I would like to mark as
24 GPU Exhibit 432 a copy of a memo, J. D. Dempsey
25 to J. A. Lauer, October 18, 1977. It is a

seven-page exhibit.

(Seven-page exhibit, first page of which is a memo to J. A. Lauer from J. D. Dempsey, dated October 18, 1977, marked GPU Exhibit No. 432 for identification as of this date.)

Q You are marked for a copy of this on the first page.

Is this a copy of a memo you received in or about mid-October 1977 in the regular course of business?

A No, I don't recall it.

Q Is the handwriting on the second page your handwriting?

A No.

Q Who is Mr. Dempsey? Did he work for you in pumps and drives at that time?

A Yes, he did.

Q It says on the second page of this exhibit opposite the time 6:00, "Steam formation, pressure oscillation near PSAT for approximately 30 to 45 min."

Do you see that?

A Yes.

Q Is that something you knew about that transient

1

2 during the time you were performing your evaluation.

3

MR. BENEDICT: If you recall.

4

MR. MACDONALD: Everything is to his
5 recollection.

6

MR. BENEDICT: I know, but this memo he
7 already testified he doesn't recall.

8

I am not going to quibble with you as
9 to whether you are interpreting something
10 in here today. Merely because he reads it here,
11 he shouldn't feel obliged to indicate that
12 that is something he knows. All you care about
13 is what is in his mind.

14

MR. MacDONALD: That is always what we are
15 here for in a deposition.

16

MR. BENEDICT: That is what we try for
17 at least.

18

A I recall the system did in fact go to
19 saturated conditions.

20

Q Did you know that it stayed at or around
21 saturation for approximately 30 to 45 minutes during
22 that transient?

23

A I don't remember the time.

24

Q Did you consider it important at the time
25 as to how long the system stayed at or near saturated

1
2 conditions?

3 A In the context of potential damage to the
4 pump, that would be important.

5 Q It was your conclusion based on your
6 evaluation of that transient there was no permanent
7 damage to the pump during the Davis-Besse event?

8 A The conclusions were that there was the
9 potential for localized cavitation damage in the
10 impeller veins, but there was no apparent significant
11 damage that would reflect on the serviceability of the
12 pump.

13 Q After the Davis-Besse event, did you
14 attempt to do any further evaluations regarding
15 the effect on reactor coolant pumps of saturation
16 in the reactor coolant system, all of this prior to
17 the time of the TMI-2 accident?

18 MR. BENEDICT: By "you" I take it you mean
19 Mr. Kennedy?

20 MR. MacDONALD: Or his unit.

21 A The answer is no. There was no reason to
22 perform such an evaluation, because it is not a
23 requirement of the pump that it operate in such an
24 environment.

25 Q Do you know whether or not anybody else

1
2 at B&W performed such evaluations?

3 A I do not.

4 Q Did you tell any other utilities or
5 utility personnel after the Davis-Besse event that
6 the reactor coolant pumps at Davis-Besse had operated
7 for approximately 30 to 45 minutes in a saturated
8 system?

9 A The question is did I personally tell?

10 Q You or any member of your unit.

11 A No. There was no reason that I should
12 tell them.

13 Q On that second page of GPU Exhibit 432,
14 down at the bottom under "Pump 2-2," it says, "4:20,
15 High vibration."

16 Do you recall knowing that there was
17 high vibration in regard to reactor coolant pumps at
18 Davis-Besse?

19 A No, I do not.

20 Q Did you inquire as to whether there was
21 high vibration?

22 A I don't specifically recall.

23 Q Based on your knowledge and expertise
24 in relation to reactor coolant pumps, is that something
25 at that point in time that you would have been concerned

1
2 about?

3 MR. BENEDICT: Could I hear that again?

4 MR. MacDONALD: Based on his knowledge
5 and expertise as unit manager of pumps and
6 drives, in reactor coolant pumps, is that
7 something at that point in time that he would
8 have been concerned about in evaluating that
9 transient, namely, high vibration?

10 MR. BENEDICT: We have been taking
11 depositions in this case, and neither side has
12 allowed the other to ask a witness what might
13 have been in his mind at that time, even if it
14 is based on his expertise at the time.

15 Both sides have limited their testimony
16 and have been limited in the taking of their
17 testimony to the recollection someone has as to
18 what actually occurred, and I think that is
19 an appropriate limitation to have here.

20 We discussed earlier what variables one
21 would look into in a general sense when
22 considering pumps. I allowed you to go into
23 that. I don't think with respect to a document
24 or a specific transient you are entitled to ask
25 for his speculation or what was or could have

1
2 been important to him whether or not it is
3 based on his years of experience, so if you can
4 reformulate the question, I would love it.

5 If not, we are going to come to heads on it.

6 MR. MacDONALD: The question is quite simple.

7 BY MR. MacDONALD:

8 Q In evaluating a transient such as the
9 one in Davis-Besse in 1977, based on your understanding
10 of reactor coolant pump operation, was it something
11 to be concerned about as to the vibration of those
12 pumps?

13 MR. BENEDICT: With respect to the
14 general question that we talked about earlier
15 this morning, I didn't have an objection.

16 When we are talking of a specific instance,
17 I think it is improper, because you are
18 attempting to make an implication that since
19 today he thinks it might have been important
20 then, then in fact he did it.

21 If you want to ask him whether he looked
22 at it, that is fine, but I don't think you are
23 entitled to ask him what he thinks might have
24 been important to him if he can put his mind
25 five years back.

1
2 MR. MacDONALD: In 1977 or 1978 about
3 the time he was evaluating this transient, was
4 vibration on the reactor coolant pumps -- and
5 he is supposedly the most knowledgeable person
6 at B&W about the operations-- something he would
7 be concerned about in evaluating the Davis-Besse
8 transient.

9 MR. BENEDICT: To the extent that
10 question hasn't been asked and answered, I
11 instruct him not to answer. You asked the
12 question that you just asked except for the
13 amendment of "such as the incident at
14 Davis-Besse."

15 I don't think he is required now to
16 narrow it down and look at a document he
17 doesn't remember now.

18 MR. MacDONALD: I am not asking him to
19 look at a document. It has to do with whether
20 or not vibration of shaft and frame would be
21 of concern to him when he evaluated reactor
22 coolant pump operation in a situation such as
23 Davis-Besse.

24 MR. BENEDICT: If we can go on, I will
25 let him answer; but, Mr. Kennedy, limit your

1
2 answer to what you recall was your concern
3 during that time frame in the analysis of
4 reactor coolant pump incidents.

5 You don't have to speculate on what
6 you now know and plug it back in.

7 MR. MacDONALD: I am not asking him to
8 speculate.

9 MR. BENEDICT: I agree.

10 To the extent you are not asking for
11 speculation, then he may answer the question.

12 A One of the symptoms of a pump operating in
13 such an environment is an increase in the shaft and
14 frame vibration.

15 Q So in other words, you are saying that
16 based on your understanding at that time it would
17 have been a concern to you?

18 MR. BENEDICT: I object to your
19 characterization, but just ask another question.

20 MR. MacDONALD: That is my question.

21 MR. BENEDICT: I object.

22 MR. MacDONALD: I said based on his
23 understanding. He can tell me if it is not
24 his understanding.

25 MR. BENEDICT: Fine.

1

2

Answer the question.

3

(Record read back.)

4

MR. BENEDICT: You may answer in whatever words you want.

5

6

A Based on the well-known postulation

7

that one of the symptoms of operating in a saturated environment is an increase in the mechanical vibration

8

9

of the shaft, I would say that, yes, that would have

10

been a concern.

11

Q Did you attempt to look at the limits

12

and precautions in effect, specifically for the

13

Davis-Besse plant during your evaluation of that

14

September 1977 transient?

15

A I don't recall.

16

Q Were the limits and precautions regarding

17

reactor coolant pump operation standardized to

18

such an extent that knowing what the limits were, as

19

to in general, would mean you would know what they

20

were for Davis-Besse specifically?

21

A Limits and precautions vary from plant

22

to plant because in this particular case, the pumps

23

are supplied by a number of different suppliers.

24

They have their own characteristics, so there is no

25

certainty that vibration limits for Davis-Besse

1

2 would be like another plant that you may pick.

3

4

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25

I should say that there would have been no reason to explore what is in the limits and precautions pertaining to that incident, because that particular operating environment is not a part of the design requirements for the pump, nor are they a part of the licensing requirements for the pump.

MR. MacDONALD: I move to strike that.
It is not responsive to the question.

MR. BENEDICT: It is in the question.
We can argue over it later.

Q Did you attempt to evaluate or correlate the data that you obtained from your evaluation of the Davis-Besse transient with any other pump data that you had prior to that time regarding the operation of the reactor coolant pumps?

MR. BENEDICT: You mean regarding actual field experience?

MR. MacDONALD: Let's start with field experience, and I will go to --

MR. BENEDICT: That is all right.

A I don't know.

Q Did you attempt to correlate it with any data that you may have had from tests on various

1
2 models of reactor coolant pumps that were not field
3 data?

4 A I don't remember that either.

5 Q Did you talk to anybody after the
6 Davis-Besse transient regarding the effects of
7 running the reactor coolant pumps when the system is
8 in a saturated state?

9 MR. BENEDICT: Up until the day of the
10 accident or up until today?

11 MR. MacDONALD: Up to the day of the
12 TMI-2 accident.

13 A I don't recall such a conversation.

14 Q Communication of any form is what I meant.

15 A I understand.

16 Q Your answer would be the same?

17 A Yes.

18 Q Did you speak to anyone after the
19 Davis-Besse transient and prior to the TMI-2 transient
20 regarding whether or not the pumps should be run or
21 should be stopped when they are called upon to
22 operate in a saturated environment? And by "you,"
23 I mean you or anyone within your pumps and drive unit.

24 A I don't remember any such communication.

25 Q Do you know whether or not B&W ever

1
2 communicated with Davis-Besse after the September
3 1977 transient regarding whether to maintain reactor
4 coolant pumps in operation or to shut them down whe
5 the RCS system was in saturated condition?

6 A I don't know whether such communication was
7 made.

8 Q You didn't have any yourself?

9 A I did not.

10 Q Or any members of your unit that you know
11 of?

12 A No.

13 (Whereupon, at 12:35 o'clock p.m. a lunch
14 recess was taken.)
15
16
17
18
19
20
21
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23
24
25

AFTERNOON SESSION

(1:35 p.m.)

ROBERT K. KENNEDY, resumed.

EXAMINATION (Continued)

BY MR. MacDONALD:

Q You are aware that your testimony here this afternoon continues under oath, are you not?

A Yes.

Q At any time after the Davis-Besse transient of September 1977 and prior to the TMI-2 accident, did you or anyone that you know of within your unit give any consideration to running tests on full size reactor coolant pumps to determine the effects of void fractions on the operation of those pumps?

A The answer to that is no, we did not, because there was no requirement that that pump operate in that environment.

Q The fact of the matter is, though, that the pumps at Davis-Besse during that transient operated in an RCS that was saturated for some period of time, is that not true?

A Yes, I agree that is true.

MR. MacDONALD: Let me mark a document as GPU Exhibit 433, a two-page document entitled

"Mixed Flow Test - RC Pumps," and also has on the top, "Lead Section Manager: L. J. Stanek."

(Document entitled "Mixed Flow Test - RC Pumps," "Lead Section Manager: L. J. Stanek," marked GPU Exhibit No. 433 for identification as of this date.)

Q Have you seen a copy of this document before?

A I don't recall.

Q It has down under No. 5, "Responsibility, RK Kennedy, Unit Manager."

Did you participate in mixed flow tests on reactor coolant pumps at some point in time during your employment at Babcock & Wilcox?

A No, I did not.

Q Did you participate in any way with a review or analysis to "Prove the capability of the reactor coolant pumps to operate within emergency limits under mixed flow conditions"?

A No, I did not.

Q Do you know whether Mr. Anderson or Mr. Bateman ever did?

A It is my recollection that nobody in B&W has participated in such a test.

Q Was this considered at one point in time

1

2 by individuals at B&W?

3

A To my knowledge, no.

4

5 Mr. Stanek regarding this particular issue?

6

A I don't recall such discussion.

7

Q Or with anyone else at B&W?

8

A Right.

9

10 Did you ever hear anyone express any
11 interest in performing such a project at any point
12 in time during your employment at B&W?

13

A Yes, I have.

14

Q When was that?

15

16 It was in connection with a proposal by
17 B&W to assist and consult with EG&G in Idaho
18 relative to performance of such a test under the
19 sponsorship of the NRC.

20

Q When was that in terms of time?

21

A That was after TMI.

22

23 Did you ever hear anybody express any
24 interest regarding the subject at B&W prior to the
25 time of the TMI-2 accident?

26

A Prior to the time, no.

27

28 Did you yourself have any interest in
29 performing such evaluations prior to the time of the

1
2 TMI-2 accident?

3 A Not prior to the time of the TMI-2 accident.

4 MR. MacDONALD: I would like to mark as
5 GPU Exhibit 434 a document whose first page is a
6 letter from Edward E. Chipman to T. Fernandez
7 dated July 3, 1979.

8 (Seven-page document, the first page of
9 which a letter to T. Fernandez from Edward E.
10 Chipman, dated July 3, 1979, marked GPU
11 Exhibit No. 434 for identification as of this
12 date.)

13 Q Is this a copy of a document you received
14 in or about early July 1979?

15 A I don't remember whether I received it
16 or not.

17 Q You are marked for a carbon copy down at
18 the bottom, are you not?

19 A Yes.

20 Q Do you recall this proposal?

21 A I recall that there was a proposal made
22 to EG&G. I don't recall the proposal to EPRI.

23 Q What was the purpose of it or the reason
24 behind, as you understood it, the proposal to EG&G?

25 A At that point in time after TMI-2, it was

1
2 recognized, I think, by the industry, including B&W,
3 that reactor coolant pumps may be useful in such an
4 incident.

5 Q You say "such an incident."

6 You mean a loss of coolant accident?

7 A Yes.

8 Q Small break loss of coolant accident?

9 A Right.

10 Recognizing that safeguard systems exist
11 in the plant which are designed per the licensing
12 requirements to provide adequate core cooling in such
13 an event, the thinking was that reactor coolant
14 pumps are an asset and perhaps can be useful.

15 Q Was any work ever performed by EG&G resulting
16 in a proposal?

17 A There was a proposal made to the NRC
18 which B&W had a part in. The proposal was not accepted.
19 The proposal to actually do the work was not accepted.
20 The proposal to do a feasibility study was, however,
21 accepted.

22 Q What were the results of that?

23 A The feasibility study suggested that the
24 test could be done on the Bingham test loop in Portland.

25 Q But to date you do not know that that

1

2

test has been performed?

3

A The test has not been performed.

4

Q It is a fact, is it not, that after the

5

TMI-2 accident B&W informed its nuclear customers

6

of changes in operation for its reactor coolant pumps

7

as opposed to procedures that had been in effect

8

prior to the time of the accident?

9

A Would you clarify relative to specific

10

concerns?

11

Q You were aware after TMI-2 that a procedure

12

was sent out by B&W which called for the continuous

13

operation of the reactor coolant pumps if the HPI

14

system had been activated?

15

MR. BENEDICT: "Had been activated"?

16

MR. MacDONALD: Yes.

17

A No, I don't recall such.

18

Q I show you a copy of GPU Exhibit 85 which

19

has been previously marked.

20

Have you seen a copy of this memo before?

21

A I don't recall.

22

Q Have you seen a copy of this instruction

23

to B&W operating plants before?

24

A I don't recall.

25

Q Do you recall whether you were consulted

1
2 in relation to this particular instruction?

3 A No, I don't.

4 Q The last two lines read, "If the HPI system
5 has been activated and if RC pumps are in operation,
6 at least one RCP pump per loop shall be maintained."

7 Do you see that sentence?

8 A Yes.

9 Q Is it your understanding that these were
10 the instructions that B&W sent out to its
11 operating utilities shortly after the TMI-2 accident
12 in March 1979?

13 A I don't know that to be the case.

14 Q Did you know that there were instructions
15 sent out after the accident which in substance reflected
16 that in small breaks or loss of coolant accidents or
17 where you had HPI activated, if the RC pumps were in
18 operation that one should be maintained per loop?

19 MR. BENEDICT: Could I hear it again?

20 Q Had you heard that after the TMI-2 accident
21 that B&W had sent instructions to its operating
22 utilities which stated in substance that once HPI had
23 been activated and if the RC pumps were in operation,
24 that one pump per loop should be maintained?

25 A In the context that the industry recognized

1
2 that the pumps may be useful during such an event,
3 and this is beyond any licensing requirements, I am
4 saying that the need for these pumps to operate
5 per Met Ed's license did not include operation in
6 such an event.

7 In that context, it is reasonable for me
8 to believe that such a recommendation may have gone
9 out.

10 MR. MacDONALD: I will strike that.

11 Q I am asking you whether you were aware
12 that such recommendation went out. That is all.

13 A I don't recall.

14 MR. BENEDICT: That was pretty much asked
15 and answered before, but let's go on.

16 MR. MacDONALD: It wasn't asked.

17 Q In other words, you don't recall being
18 consulted in any way regarding an instruction such as
19 the one in GPU Exhibit 85?

20 A I don't recall one way or the other whether
21 I was or not.

22 MR. BENEDICT: This deposition has been
23 somewhat puzzling to me. Your 30(b)(6) notice
24 for this deposition indicated that you wanted
25 somebody to discuss the ability of the reactor

1
2 coolant pumps to operate effectively in voided
3 conditions in the reactor coolant system.

4 I understood that to mean that you wanted
5 somebody who could talk to the rotodynamic
6 and hydraulic characteristics of the pump in
7 such a condition. That is Mr. Kennedy's
8 field.

9 To the extent that Mr. Kennedy was
10 involved in these events, I have no objection
11 to your going over them with him; but I want
12 you to recognize that neither B&W nor
13 Davis Polk intends to assert Mr. Kennedy is the
14 expert on everything that ever happened with
15 respect to reactor coolant pumps.

16 We are presenting Mr. Kennedy as an engineer
17 who is knowledgeable about the rotodynamic and
18 hydraulic characteristics of the pump. To the
19 extent he was involved in these things, fine, he
20 was a player in them. He is not the only person
21 at B&W who knows about these subjects.

22 MR. MacDONALD: I would hope that he is not
23 the only person at B&W knowledgeable about those
24 subjects.

25 MR. BENEDICT: I wanted to set forth the

1
2 fact that to the extent you feel we read your
3 30(b)(6) notice to provide you with someone
4 who knows everything there is to know about
5 the reactor coolant pumps, including the history
6 and the emergency core cooling aspects of forced
7 flow, Mr. Kennedy is not that person and there
8 is no one person who knows all that.

9 Mr. Kennedy is being provided as someone
10 who is knowledgeable on the subject of the
11 mechanistics and hydraulic characteristics of
12 the pump.

13 MR. MacDONALD: According to 30(b)(6),
14 I would assume as we had testimony to earlier
15 that he is the person most knowledgeable
16 about the operation of the reactor coolant pumps
17 in voided conditions and that basically is what
18 the course of this deposition has talked about,
19 reactor coolant pumps in voided conditions.

20 MR. BENEDICT: I do not --

21 MR. MacDONALD: Obviously that is what we
22 have been speaking about.

23 MR. BENEDICT: I am not quarreling about
24 the propriety of the questions. I am only
25 observing on the fact that Mr. Kennedy's

1
2 presentation here as a 30(b)(6) witness
3 revolved around his choice as an individual at
4 B&W who was knowledgeable about the hydraulic
5 and mechanistic aspects of reactor coolant
6 pump operation including, to the extent there is
7 any knowledge on the subject, what the theoretical
8 effects are in saturated conditions.

9 To the extent Mr. Kennedy is involved in
10 issues relevant to this case, I have no
11 objection to your inquiring into them but I want
12 to set forth that B&W and Davis Polk did not
13 seek to find one person who knows everything
14 there is to know about pumps because we don't
15 think that person exists.

16 MR. MacDONALD: I don't think we asked
17 for that.

18 MR. BENEDICT: I told you the way we were
19 able to interpret your notice and having
20 recognized that we have to find a single person
21 to put forth that Mr. Kennedy's strong suit is
22 what I have articulated, rotodynamic and hydraulic
23 effects.

24 To the extent he was involved in issues
25 or occurrences that are relevant to the lawsuit,

1
2 you are welcome to inquire into them, but to
3 the extent you believe that what you have gotten
4 is the B&W historian on all events and
5 occurrences relating to pump operation, even
6 pump operation in voided conditions, you don't
7 have that person because I doubt if any one person
8 possesses all that knowledge.

9 MR. MacDONALD: I never thought that any
10 one person possesses all the knowledge there is
11 about any one subject, only that Mr. Kennedy is
12 the most knowledgeable person on those particular
13 subjects, as Mr. Hallman was the most knowledgeable
14 person on operating plant experience.

15 MR. BENEDICT: To the extent we were able
16 to find one person who know enough about one
17 subject, we found Mr. Kennedy, because we
18 believed your interest here was mechanistic and
19 hydraulic.

20 I assume you weren't interested in
21 emergency core cooling.

22 These instructions, as you well know,
23 relate to more issues than the hydraulics of the
24 pumps.

25 I am only saying that maybe you need

another person on some of your questions.

I just want to set forth clearly what Mr. Kennedy is here for. I am not objecting --

MR. MacDONALD: I think you have done that clearly.

MR. BENEDICT: I am not objecting to your questions. I am just making an observation.

(Record read back.)

BY MR. MacDONALD:

Q So you don't recall that you were consulted as to whether or not the pumps were capable themselves of operating in such an environment as a saturated environment within the reactor coolant system?

A I don't believe anybody can say that the pumps can in fact operate in a saturated environment. I don't think that technology is known, but I don't recall whether I was consulted or not.

Q Do you know if anybody in your unit was consulted regarding the instructions in GPU Exhibit 85?

A No, I do not.

Q You were aware prior to the TMI-2 accident, were you not, that there were vibration limits for pump operation in the B&W limits and precautions,

1
2 were you not?

3 A Yes.

4 Q After the Davis-Besse event, did you
5 attempt to do any evaluation or investigation of
6 what effects different void fractions would have on
7 reactor coolant pump operation as it pertained
8 to those vibration limits?

9 A No, there was no need to because it was
10 not a design environment.

11 Q Do you know whether anybody else did?

12 A No, I don't know.

13 Q You don't know that anybody else did,
14 to your knowledge?

15 A To my knowledge, I don't know.

16 Q Do you know that after the TMI-2 accident,
17 the shaft and frame vibration limits in the B&W limits
18 and precautions were changed?

19 A Yes.

20 Q Did you have any input into that change?

21 A Yes, I was involved in that change.

22 Q How were you involved?

23 A In developing the recommendation.

24 Q Was it pursuant to a request from some
25 individual or group of people that you developed a

1

2 recommendation?

3

4 A In the context of B&W providing advice and
5 consultation to TMI-2 in managing the situation after
6 the transient, we provided these recommendations.

7

8 Q When you say "these," you mean changes in
9 shaft and frame vibration?

10

11 A Yes.

12

13 Q Did anyone else in your unit work on
14 those changes?

15

16 A Yes.

17

18 Q Who specifically?

19

20 A John Dempsey.

21

22 Q Anyone else?

23

24 A I don't recall specifically.

25

26 Q Were these changes specifically for TMI-2
27 or were there also other changes in the B&W limits
28 and precautions regarding shaft and frame vibrations
29 that were sent to all customers after the TMI-2
30 accident?

31

32 A I don't know.

33

34 Q Were you involved in any way in making
35 changes to the B&W limits and precautions regarding
36 shaft and frame vibrations for the purpose of sending
37 those to B&W operating plants?

38

1
2 MR. BENEDICT: I want to object.

3 Several times, both this morning and this
4 afternoon, you used the expression "B&W limits
5 and precautions."

6 I don't know of any such thing as
7 B&W limits and precautions.

8 I assume what you mean by that is
9 whatever recommendations or instructions were
10 sent along with the operation of the pumps?
11 Is that what we are talking about?

12 MR. MacDONALD: We are talking about GPU
13 Exhibit 349 which is labeled "Technical Document,"
14 this type of document.

15 Q What recommendations did you generate
16 with regard to the changes in shaft and frame vibrations
17 for TMI-2 after the accident?

18 A Recommendations include what you already
19 alluded to, that is, shaft and frame vibration changes.

20 Q Were they changes to increase the shaft
21 and frame vibration limits?

22 A Yes, the changes were made to increase.
23 Only in an emergency situation.

24 As I mentioned before, the limits are set
25 based on the operating experience and production test

1
2 loop experience, and those limits are set with the
3 view in mind that the pump will in fact operate for
4 the designed life of the plant, so there is margin
5 inherently in those limits; and engineers experienced
6 in this discipline will, I think, vouch for that.

7 Q It was your understanding prior to the
8 TMI-2 accident that if those limits were exceeded
9 that the pumps were required to be shut down, the shaft
10 and frame vibration.

11 It was your understanding prior to the
12 TMI-2 accident that if the prescribed limits in the
13 B&W limits and precautions for shaft and frame
14 vibration were exceeded, that the requirement was
15 that the pumps be shut down?

16 A Yes.

17 Q I show you a copy of GPU Exhibit 116
18 which was previously marked, a memo from Bert Dunn to
19 E. R. Kane dated May 29, 1979.

20 Have you ever seen a copy of this document
21 before?

22 A No.

23 Q I direct your attention to the second
24 page. The second sentence reads, "As an overriding
25 concern, I pointed out there is no intention within

2 the operating guidelines to cause an RC trip during
3 the transient, and that this is true regardless of
4 pump performance variables. In other words, I restated
5 our position that at least one pump per loop will run
6 until it dies. I confirmed that my experience with
7 RC pumps running in high void systems has shown no
8 problems with their performance and that our pump
9 experts indicate no concern in pumping a two-phase
10 fluid."

11 Did you ever have any conversations with
12 Mr. Dunn after the time of the TMI-2 accident?

13 A I don't recall.

14 Q Regarding this particular subject?

15 A No, I don't recall.

16 Q Did you ever have any conversations
17 with Mr. Dunn or any of his ECCS people, either before
18 or after the accident, regarding this particular
19 portion of the paragraph I read?

20 A I don't recall such a conversation.

21 Q Do you know whether or not Mr. Dunn ever
22 spoke to anyone in your unit regarding this subject?

23 A I don't know one way or the other.

24 Q Do you have any idea who Mr. Dunn is
25 referencing when he references pump experts?

1
2 MR. BENEDICT: I object. He never saw
3 this document before. If you want to ask him
4 who the pump experts were at that time, who he
5 considered expert in the operation of pumps, fine,
6 but let's not do this.

7 MR. MacDONALD: Your instruction is for
8 him not to answer?

9 MR. BENEDICT: Absolutely.

10 Q Aside from yourself, who B&W designated
11 the most knowledgeable person within the company
12 regarding RC pump operation in voided conditions
13 in the reactor coolant system --

14 MR. BENEDICT: Within the confines of
15 what I spoke earlier?

16 MR. MacDONALD: Within the confines of what
17 that position is all about.

18 Q -- is there anyone else in B&W in or
19 around May 1979 that you know of that would have
20 your knowledge or experience regarding that subject?

21 MR. BENEDICT: I object until I understand
22 what you mean by "your knowledge and experience."

23 How is the witness -- if you can answer
24 that question, go ahead.

25 I think that is totally unintelligible.

1

2

A I don't think I know.

3

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Q Do you know whether or not, at or around the time of the TMI-2 accident, whether there is anybody else within B&W with your background and experience in reactor coolant pump operation in voided conditions in the reactor coolant system?

MR. BENEDICT: I object to the form, but go ahead.

A Could you repeat that?

Q At or about the time of the TMI-2 accident, do you know of anyone else within B&W who had your background and experience with respect to reactor coolant pumps and their operation within a voided reactor coolant system?

MR. BENEDICT: I object to the form, but you may answer.

A I don't recall.

Q You don't recall knowing of anyone?

A Right.

Q Did you ever speak to Bert Dunn after the TMI-2 accident?

MR. BENEDICT: Up to today you mean?

MR. MacDONALD: Yes.

A Yes, I have talked to Bert Dunn.

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Q Have you talked to him about business matters relating to B&W business in the nuclear steam supply system area?

A I don't remember specifically.

Q Do you remember any conversations with Mr. Dunn after the time of the TMI-2 accident that related to reactor coolant pump operation?

A No, I don't remember.

Q Were you aware prior to the time of the TMI-2 accident of any analyses that were performed at B&W that related to the continuous operation of reactor coolant pumps?

MR. BENEDICT: Continuous operation of reactor coolant pumps?

MR. MacDONALD: In a transient situation.

A There were some B&W test programs sponsored by EPRI which were conducted relative to the performance of a model of the reactor coolant pump in a solid phase and a two-phase environment.

Q When were those tests performed?

A My estimate is somewhere in the time frame between 1975 and 1977.

Q B&W contracted with EPRI for those tests to be run?

1

2

A Yes, it did.

3

Q Were you involved at all in that testing

4

procedure or evaluation of the results?

5

A I don't recall specifically.

6

Q Do you recall generally?

7

A No.

8

Q Aside from that were you aware of any

9

other evaluations that have been performed by or for

10

B&W regarding the continuous operation of

11

reactor coolant pumps in transient conditions?

12

A No, I am not aware of any such analysis.

13

Q I take it you are not aware of any analysis

14

performed by B&W prior to the time of the TMI-2

15

accident relating to the ability of the reactor

16

coolant pumps to effectively cool the core if operated

17

continuously during a transient, specifically, a loss

18

of coolant accident?

19

A No, I am not aware of any such analysis.

20

Q Did either you or your unit have any input

21

into the formulation of the small break operating

22

guidelines, specifically, reactor coolant pump operation

23

section of those guidelines?

24

A I don't recall.

25

Q I show you a copy of GPU Exhibit 108

1
2 previously marked, a memorandum from Don Hallman to
3 K. R. Ellison, May 7, 1979, subject: "Operating
4 Guidelines for Small Breaks."

5 Have you ever seen this document before?

6 A I don't remember.

7 Q I direct your attention to part 2 which
8 is on Bates numbered page D733 entitled "Operating
9 Guidelines for Small Break."

10 Would you take a moment or so to look at
11 that section?

12 MR. BENEDICT: All of part 2?

13 MR. MacDONALD: Yes. I am not going to
14 reference the whole thing. I want him to look
15 at it.

16 I will ask him if he has ever seen those
17 guidelines before.

18 MR. BENEDICT: O.K. Go ahead and do that,
19 but I think we will get farther if you do it more
20 precisely. We are talking of ten pages here.

21 Q My specific question is:

22 As a group have you seen this set of
23 guidelines any time prior to today?

24 A I don't remember whether I have or not.

25 Q Would you look at page 3 of the guidelines

1

2

under 4.2. It says, "Actions with feedwater

3

available to one or both generators. 4.21, Maintain

4

1 RC running per loop."

5

6

Do you know whether or not you ever

consulted or participated in the formulation of

7

that particular guideline?

8

A I don't remember.

9

Q Was anyone in your group consulted?

10

A I don't know.

11

Q On page 9 of the guidelines, "4.3, Actions

12

if feedwater is not available. 4.32, If RCPs are

13

operating, go to one pump per loop. If RCPs are not

14

available, go to step 4.3.6 below."

15

16

Did you participate or were you in any

way involved or consulted in the formulation of that

17

guideline?

18

A I don't know whether I was or not.

19

Q Do you know a gentleman by the name of

20

Joe Cudlin?

21

A Yes, I do.

22

Q Who is he?

23

A He is a unit manager at B&W in the

24

engineering department.

25

Q Do you know what unit?

1

2

A I don't recall the name of the unit.

3

Q What in substance does the unit do?

4

A It is to develop methods.

5

Q Is it within your section or some

6

other section of --

7

A It is in plant engineering.

8

Q Did that used to be plant design?

9

A Yes.

10

Q Have you at any time ever spoken either

11

prior or after the accident to Mr. Cudlin regarding

12

his knowledge about reactor coolant pump operation

13

in a two-phase state?

14

A I spoke to him in preparation for this

15

trip in the context of obtaining a report that he was

16

involved in.

17

MR. BENEDICT: That was at my request,

18

and I will consider the conversation work product

19

because we were preparing for this deposition

20

and it was done at my direction.

21

Other than that direction, he may talk

22

about whatever he talked about with Joe Cudlin

23

but not that.

24

Q What is your understanding of Joe

25

Cudlin's knowledge regarding the operation of

1
2 reactor coolant pumps in a two-phase mixture or in a
3 reactor coolant system in a saturated state?

4 MR. BENEDICT: I am not sure how that
5 question can be answered by bifurcating his
6 knowledge, but exclude what you learned from
7 Mr. Cudlin in conversations that were held at
8 my request, to the extent that you know other
9 things about what he knows or does.

10 Q Before you answer that, have you
11 spoken to Mr. Cudlin before this conversation you
12 just related at any point in time?

13 A I don't remember such a conversation.

14 MR. BENEDICT: Did you mean to limit it
15 to a conversation about his knowledge?

16 You just mean ever about any subject?

17 MR. MacDONALD: Yes.

18 MR. BENEDICT: Have you ever talked to
19 Joe Cudlin about any subject other than the
20 one we just talked about up to today?

21 A Yes, I have talked to Joe Cudlin.

22 Q What is your understanding of the
23 state of Mr. Cudlin's knowledge as to reactor coolant
24 pump operation in a two-phase state?

25 MR. BENEDICT: I object to the question.

1
2 I don't understand what -- unless you
3 can tell me what the relevance is of Mr.
4 Kennedy's knowledge of Mr. Cudlin's knowledge,
5 I am going to direct him not to answer.

6 I can't understand how that is relevant
7 to this litigation.

8 MR. MacDONALD: It is relevant to the
9 extent that I am attempting to find out what
10 Mr. Kennedy understands is a fellow employee's
11 knowledge on the reactor coolant pump operation
12 in a two-phase state.

13 MR. BENEDICT: I understand that is what
14 you are asking and I can't imagine how that is
15 relevant.

16 If you want to ask him what Mr. Cudlin
17 has said to him about that subject, that is
18 fine.

19 What Mr. Kennedy's divination of Mr.
20 Cudlin's knowledge is is irrelevant.

21 MR. MacDONALD: We started on that tack.

22 MR. BENEDICT: One conversation I directed
23 him not to go into because it is work product.
24 I didn't limit you on any other conversation.

25 Q Have you talked to Joe Cudlin about his

1

2

3

4

5

knowledge or about the subject of reactor coolant pump operation in a two-phase state at any point in time prior to today other than the conversation that you mentioned earlier?

6

A I don't recall one way or the other.

7

8

9

MR. MacDONALD: I would like to mark as GPU 435 a copy of a memo from J. J. Cudlin to B. M. Dunn dated 5/4/79.

10

11

12

(Copy of a memorandum to B. M. Dunn from J. J. Cudlin dated 5/4/79 marked GPU Exhibit No. 435 for identification as of this date.)

13

14

Q Have you seen a copy of this document before?

15

16

17

MR. BENEDICT: Outside of the presence of counsel, and I might add that I have seen this document before and it didn't have anything attached to it.

18

19

20

MR. MacDONALD: I didn't staple or unstaple anything. I am just presenting it how it was given to me.

21

22

23

MR. BENEDICT: The microfilm numbers are in order, but that doesn't mean it is one document.

24

25

MR. MacDONALD: I am just marking it as an exhibit.

1

2

A I have seen the first page in preparation
3 for this.

4

Q Other than that, you have not seen it?

5

A No.

6

Q In the second paragraph Mr. Cudlin states,
7 "I discussed the subject with R. K. Kennedy (Fluid and
8 Mechanical Systems), and he cited the TMI-2 and
9 Davis-Besse transients as instances where the RCPs
10 have been subjected to two-phase flow without apparent
11 effect."

12

Do you recall a conversation with
13 Mr. Cudlin regarding this particular subject?

14

A I don't recall such a conversation, no.

15

MR. MacDONALD: I would like to mark as
16 GPU Exhibit 436 a document entitled "B&W
17 Comments" to L. Rogers, TMI site, subject:
18 "B&W Review of TMI's Operating Procedure."

19

(Document entitled "B&W Comments" to
20 L. Rogers, TMI Site, subject: "B&W Review
21 of TMI's Operating Procedure" marked GPU
22 Exhibit No. 436 for identification as of this
23 date.)

24

Q Have you ever seen a copy of this document
25 before?

2 A Yes, I have.

3 Q Is that your signature on page 2 next
4 to the preparer?

5 A Yes.

6 Q Is this one of the procedures you were
7 referencing earlier in your testimony regarding
8 operational limits for shaft and frame vibration
9 that were changed with regard to TMI-2 after the
10 accident?

11 A Yes.

12 Q On page 2 it says, "2.0 E. The
13 recommended operational limits for the last remaining
14 pump are: Shaft vibration greater than 70 Mils."

15 How was that arrived at, that figure, 70
16 mils?

17 A Again, that was arrived at on the basis
18 of the experience in the field with pumps similar to the
19 TMI-2 pumps. That number recognizes the possibility
20 of damage to the pump but in the context that it is
21 important that the pumps operate -- and I am talking
22 subsequent to the TMI-2 incident -- it was considered
23 important that the pumps operate to maintain flow
24 through the core.

25 Again, I would like to point out that there

1
2 were safety systems there per the design requirements
3 and licensing requirements of the plant which were
4 totally adequate to provide core cooling.

5 MR. MacDONALD: I move to strike the last
6 part because it wasn't responsive to how it
7 was arrived at.

8 MR. BENEDICT: We have been through
9 this before. It is in the record. We can
10 fight about it later.

11 Q You never made any recommendation, did you,
12 after the Davis-Besse transient of September 1977
13 regarding changes in Davis-Besse's or B&W's limits
14 and precautions with respect to shaft or frame
15 vibration?

16 MR. BENEDICT: By "you," do you mean
17 himself?

18 MR. MacDONALD: Mr. Kennedy or his unit.

19 A No, I would not have made any such
20 recommendation.

21 Q Do you know whether or not anybody else
22 at B&W did?

23 A I don't know.

24 Q Based on your review of the data at
25 TMI-2, do you know whether or not during that

1
2 accident that the pump vibration, either the shaft
3 or frame, exceeded 70 mils?

4 MR. BENEDICT: Can I have that back.

5 Q Based on your knowledge of the TMI-2
6 accident, do you know whether or not the shaft
7 vibration during that accident exceeded 70 mils?

8 A I don't know.

9 Q Did you look during your evaluation
10 of that transient and of the reactor coolant pumps'
11 performance during that transient at the shaft
12 vibration that occurred during the transient?

13 A We know that an alarm was received, the
14 magnitude of which I am not sure.

15 Q Did you or anybody in your unit ever
16 consider making a recommendation regarding the
17 operational limits of the pumps with respect to shaft
18 vibration prior to the time of the TMI-2 accident
19 such as the one in E on page 2 of GPU Exhibit 436?

20 MR. BENEDICT: I object to the form, and
21 also it is asked and answered; but if he can
22 answer it.

23 (Record read back.)

24 A You are talking in context of "operational"
25 a two-phase environment?

1
2 Q I am talking of the general recommendation
3 that shaft vibration not exceed 70 mils just as a
4 an operating limit. I am asking you whether or not
5 you or anybody else in your unit ever considered
6 making that recommendation prior to the time of the
7 TMI-2 accident.

8 A The answer is I don't recall.

9 MR. MacDONALD: I would like to mark as
10 GPU Exhibit 437 a memo from R. K. Kennedy and
11 G. G. Anderson to L. J. Stanek dated August 28,
12 1979.

13 (Memorandum from R. K. Kennedy and
14 G. G. Anderson to L. J. Stanek dated August 28,
15 1979 marked GPU Exhibit No. 437 for identification
16 as of this date.)

17 Q Have you ever seen a copy of this memo?

18 A Yes, I have.

19 Q Is this a memo that you and Mr. Anderson
20 wrote to Mr. Stanek in or about late August 1979?

21 A Yes.

22 Q The second page of this document, the
23 paragraph reads, "If the above services and
24 instrumentation are provided and proper emergency
25 limits adopted, we see no reason why the RC pumps

1
2 should be automatically tripped. During any
3 emergency condition, we believe the pumps, or at least
4 one pump per loop, should be kept operational until
5 the operator has had adequate time to evaluate the
6 cause of the transient and has established the best
7 method of correcting the situation."

8 In those two sentences, what was your
9 understanding of the term "transient"? Were you
10 including all transients?

11 MR. BENEDICT: Your recollection of what
12 you meant when you wrote that.

13 A We were talking in context of the TMI-2
14 transient.

15 Q Specifically the LOCA?

16 A Yes.

17 Q Small break LOCA.

18 Prior to the time of the TMI-2 accident,
19 did you or anyone in your unit make any such
20 recommendation as reflected in those two sentences?

21 A No, we did not. That recommendation came
22 as a consequence of the TMI-2 incident and was a view
23 adopted by the industry that pumps, RC pumps, may be
24 effective in providing some core cooling, the magnitude
25 of which is not well known.

1
2 Again, it was in the context of this is
3 an asset that may be available. As such, perhaps this
4 asset ought to be used but the pumps are not required.

5 Q You didn't know prior to the time of the
6 TMI-2 accident that the reactor coolant pumps were
7 an important factor in contributing to effective
8 core cooling?

9 MR. BENEDICT: I object to the form, but
10 you may answer.

11 A It had never been considered because
12 reactor coolant pumps were not required to operate
13 in such an environment.

14 Q So you had never considered prior to the
15 time of the TMI-2 accident whether or not the
16 reactor coolant pumps were necessary in order to
17 effectively cool the reactor core?

18 A In my view, the reactor coolant pumps
19 were not considered necessary both before or after
20 TMI-2.

21 (Recess taken.)

22 MR. MacDONALD: I would like to mark as
23 GPU Exhibit 438 a copy of a memo from B. A.
24 Karrasch and R. K. Kennedy to R. E. Ham,
25 January 21st, 1980.

(Copy of a memorandum from B. A. Karrasch and R. K. Kennedy to R. E. Ham dated January 21, 1980 marked GPU Exhibit 438 for identification as of this date.)

Q Have you seen prior to today a copy of this document?

A Yes, I have.

Q Is this a document that you and Mr. Karrasch wrote to Mr. Ham in or about mid-January 1980?

A Yes.

Q In paragraph 2 you say, "A set of emergency limits has never been generated for use during accident conditions."

I take it you meant prior to the time of the TMI-2 accident no such emergency limits had been generated for use at B&W operating plants, is that correct?

A That's correct, nor was there a need for such units.

MR. BENEDICT: I might point out that the paragraph goes on to explain that there was something done for TMI-2, and in the last sentence it says, "These emergency limits need

1
2 to be made into a generic set applicable
3 to all operation plants."

4 MR. MacDONALD: The document states what
5 it states.

6 MR. BENEDICT: I agree.

7 MR. MacDONALD: Basically --

8 MR. BENEDICT: Taking a sentence out of
9 context --

10 MR. MacDONALD: It is not out of context.
11 You don't have to provide answers by reading
12 other portions of the document. The witness
13 is perfectly capable of answering the question.

14 Q Are some of those emergency limits reflected
15 on page C9 7220, the page entitled "TMI-2 Experience
16 RC Pumps"?

17 A Yes, they are.

18 Q Were these sent to all B&W operating
19 plants after the TMI-2 accident?

20 A I don't know whether they were or not.

21 Q You were involved, were you not, in the
22 drawing up of some of these limits?

23 MR. BENEDICT: Asked and answered.

24 Go ahead.

25 A Yes, I was.

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Q Prior to the time of the TMI-2 accident, you knew, did you not, that vibration levels for the reactor coolant pumps would increase as reactor coolant system void fraction increased?

A I knew that pumps in general respond to saturating conditions or saturation conditions often times by increased shaft vibration.

Q So I take it the answer to the question is yes?

MR. BENEDICT: I object. His answer is what he stated.

MR. MacDONALD: I think his answer is ambiguous.

MR. BENEDICT: Then you can ask him questions about it.

MR. MacDONALD: That is exactly what I did.

MR. BENEDICT: I object. The question has been asked and answered and I have heard that directly from you in other depositions, so if you want to look for precedent, look to yourself.

MR. MacDONALD: I won't engage in colloquy with you.

I am asking a very simple question.

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2 MR. BENEDICT: You are simply asking
3 the question again.

4 If you want to ask him something about
5 his answer, you may.

6 MR. MacDONALD: If you obstruct the
7 deposition, that is your choice.

8 Q I take it you understood prior to the time
9 of the TMI-2 accident that reactor coolant pump
10 vibration levels could increase as the void fraction
11 in the reactor coolant system increased?

12 MR. BENEDICT: I object as asked and
13 answered.

14 If you can answer it again, go ahead.

15 A Reactor coolant pump is a pump, and as
16 I stated before, being a pump, one of the symptoms
17 of void fraction is shaft vibration.

18 Q Prior to the time of the TMI-2 accident,
19 was it your understanding that vibration levels of
20 the reactor coolant pumps would decrease as the
21 void fraction in the reactor coolant system increased?

22 A No, I did not have that understanding.

23 Q Would the vibration levels stay the same
24 based on your experience and understanding irrespective
25 of what the void fraction was in the reactor coolant

1
2 system?

3 A As I stated, one of the symptoms is
4 increased shaft vibration. Normally that is what
5 you would expect.

6 I can't say absolutely that that would
7 always occur.

8 Q Did you know, based on your experience
9 prior to the time of the TMI-2 accident, what void
10 fractions in the reactor coolant system would produce
11 vibration levels on the frame of the reactor
12 coolant pumps greater than three mils?

13 A No, I do not know what void fraction
14 would produce vibration greater than three mils.

15 I would add that there has been no testing
16 on reactor coolant pumps, control testing, which
17 would demonstrate the mechanical performance of the
18 pump in a void fraction environment.

19 MR. MacDONALD: I move to strike the
20 second half of the answer.

21 Q Did you know based on your knowledge
22 and experience prior to the time of the TMI-2 accident
23 what void fractions would produce vibration levels on
24 the shaft greater than 25 mils?

25 MR. BENEDICT: 25 mils?

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MR. MacDONALD: Yes.

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A No evidence existed which would cause me to believe what void fraction would cause vibration in excess of 25 mils, either test or analysis.

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Q I take it prior to the time of the TMI-2 accident, you didn't know what vibration level on the reactor coolant pump would be for either shaft or frame at a void fraction of ten percent in the reactor coolant system?

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MR. BENEDICT: Do you have any specific plant? Does it matter to you?

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MR. MacDONALD: No.

MR. BENEDICT: Just a reactor coolant

pump in a B&W plant?

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MR. MacDONALD: Yes.

A That's correct.

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Q And the same would be true for void fraction of 95 percent?

21

A Yes.

22

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Q I take it for 60 percent void fraction, you wouldn't know what the vibration level would be for either shaft or frame either, is that correct?

25

A The answer would be the same.

(Recess taken.)

MR. MacDONALD: I would like to mark as GPU Exhibit 439 a copy of a document from R. K. Kennedy to L. J. Stanek, November 27, 1979.

(Copy of a memorandum to L. J. Stanek from R. K. Kennedy dated November 27, 1979 marked GPU Exhibit No. 439 for identification as of this date.)

BY MR. MacDONALD:

Q Is this a copy of a document that you wrote to Mr. Stanek in or about late November 1979?

A Yes.

Q Did you have any input into this document from any other source aside from yourself?

A I don't recall.

Q Did you speak to any of your employees in the pumps and drives unit to obtain input into this document?

A I don't recall.

Q Let me refer to item I, "Management of Resources. It appears that the engineering department is not oriented toward the development of solutions to problems which require swift and complete response. There is no 'traffic cop' to ensure that

1
2 the right disciplines are working on the right
3 problems at the right time. A good example is the
4 development of the small break guidelines for which
5 RC pump and motor limitations were not considered
6 until after initial versions of the guidelines had
7 been issued. The result was wasted effort and,
8 presumably, less than maximum responsiveness."

9 Who were you referring to when you said
10 "not considered"? By whom?

11 A My recollection would be the members of
12 the pumps and drives group.

13 Q Is that because you were not asked?

14 A As the heading of this paragraph indicates,
15 I am talking about the effective use of resources,
16 and implied there is that we were eventually asked.

17 Q But not until after the initial versions
18 of the guidelines had been issued?

19 A I am saying that we would have been more
20 efficient had we been involved at the front end.
21 That was my opinion.

22 Perhaps the people involved in drafting
23 the initial version didn't think so.

24 Q Under No. II, "Product Responsibility.

25 It appears that in some instances B&W tends not to

1
2 face up to correcting operating problems (hardware
3 or software) if the proposed corrective actions are
4 perceived to have little market potential. For
5 example, the funding required for the RC pump seal
6 failure analysis was initially considered an appropriate
7 product for sale to the utilities. This thinking
8 was followed by extensive discussions on whether the
9 funding for this effort should come from G-order or
10 in-house R&D. The result was an extended delay in
11 initiating this important engineering effort."

12 How long was the extended delay to which
13 you refer?

14 MR. BENEDICT: I object unless you can
15 indicate to me some relevance of this RC pump
16 failure analysis to the lawsuit at hand.

17 MR. MacDONALD: I think it is relevant
18 in that it goes to the ability of B&W to
19 properly manage itself, as does No. I, and I am
20 just asking whether or not he recalls what the
21 extended delay was that he referenced in
22 the last sentence.

23 MR. BENEDICT: I object to this question
24 and whatever questions follow on this subject
25 because they are beyond the designation of the

30(b)(6) deposition and because they are not relevant.

We can go on this line for a while and see how we are doing, and if things get completely out of hand, I will start instructing him not to answer, but you may answer this question.

Q The question was what was or how long was the extended delay that you were referencing in the last sentence?

A I don't remember.

Q No. III, "Inter-Department Coordination," reads, "There is a perception that the resolution of operating plant problems is pursued with different levels of intensity within NPGD. That is, the task engineer may identify a problem, develop and transmit the resolution to the project management function for implementation only to realize that the problem is not perceived to be a problem by the receiving organization. An example is the seal test fixture proposal which was developed by engineering and transmitted to the project management function in September 1978 for which no action has been taken to date. There should be front-end management control which will assure consistency in priority assignments

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throughout NPGD."

Has any action, to the best of your knowledge, been taken on that matter since November 27, 1979?

MR. BENEDICT: I object to this as beyond the scope -- management operations within the engineering department are beyond the scope of this deposition, and this is also beyond the pale in terms of relevance.

This memo is written after the accident. I can't imagine what relevance it has.

MR. MacDONALD: He is speaking of a problem here which existed prior to the accident.

I am just asking whether he knows as of today whether any action was taken.

MR. BENEDICT: I am not convinced this memo is speaking of anything prior to the accident. I don't know. It is beyond the deposition.

(Record read back.)

MR. BENEDICT: I object.

You may answer, but this is the last question on this subject.

A I would simply point out that this is in

1
2 the context of engineers trying to solve problems,
3 and whether or not they get to solve problems is a
4 function of the will of the management.

5 Q I am just asking whether or not you
6 know that item III has been solved as of today.

7 A I don't know.

8 (Time noted: 4:00 p.m.)

9
10 ROBERT K. KENNEDY

11 Subscribed and sworn to
12 before me this day
13 of , 1982.
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C E R T I F I C A T E

STATE OF NEW YORK)
: ss.:
COUNTY OF NEW YORK)

I, JOSEPH R. DANYO, a
Notary Public within and for the State of New York,
do hereby certify that the foregoing deposition
of ROBERT K. KENNEDY was taken before
me on January 27, 1982;

That the said witness was duly sworn
before the commencement of his testimony 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 parties herein 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 18 day of February 1982.

Joseph R. Danyo
JOSEPH R. DANYO

I N D E X

WITNESS

PAGE

Robert K. Kennedy

3

E X H I B I T S

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FOR IDENT.

430	Resume of Robert K. Kennedy	3
431	21-page exhibit, first page [#] of which is a memo from J. A. Lauer to distribution, October 11, 1977	10
432	Seven-page document, first page of which is a memo to J. A. Lauer from J. D. Dempsey, dated October 18, 1977	41
433	Document entitled "Mixed Flow Test - RC Pumps," "Lead Section Manager: L. J. Stanek"	54
434	Seven-page document, the first page of which is a letter to T. Fernandez from Edward E. Chipman, dated July 3, 1979	56
435	Copy of a memorandum to B. M. Dunn from J. J. Cudlin dated 5/4/79	80
436	Document entitled "B&W Comments" to L. Rogers, TMI Site, subject: "B&W Review of TMI's Operating Procedure"	81
437	Memorandum from R. K. Kennedy and G. G. Anderson to L. J. Stanek dated August 28, 1979	85

E X H I B I T S

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(Continued)

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| 438 | Copy of a memorandum from B. A. Karrasch and R. K. Kennedy to R. E. Ham dated January 21, 1980 | 88 |
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