

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

- - - - -x

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

Plaintiffs,

80 CIV. 1683

:(R.O.)

-against-

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

Defendants. :

- - - - -x

Continued deposition of METROPOLITAN  
EDISON COMPANY, by JAMES R. FLOYD, taken by  
Defendants, pursuant to adjournment, at the  
offices of Davis Polk & Wardwell, Esqs., One  
Chase Manhattan Plaza, New York, New York, on  
Friday, April 30, 1982, at 12:05 o'clock in  
the afternoon, before Joseph R. Danyo, a  
Shorthand Reporter and Notary Public within  
and for the State of New York.



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WALTER SHAPIRO, C.S.R.  
CHARLES SHAPIRO, C.S.R.

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369 LEXINGTON AVENUE  
NEW YORK, N.Y. 10017  
TELEPHONE 212 - 867-8220

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

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

By: MYRON KIRSCHBAUM, ESQ.,

of Counsel

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

By: KAREN E. WAGNER, ESQ.

-and-

K. ANN McDONALD, ESQ.,

of Counsel

LeBOEUF, LAMB, LEIBY & MacRAE, ESQS.  
Attorneys for the Witness  
1333 New Hampshire Avenue, N.W.  
Washington, D.C. 20036

By: MICHAEL F. McBRIDE, ESQ.,

of Counsel

## Also Present:

DEBORAH JACOBS

SUSAN HANSON

NINA RUFFINI

\* \* \*

1  
2 J A M E S R. F L O Y D, resumed, having  
3 been previously duly sworn, was examined and  
4 testified further as follows:

5 EXAMINATION (Cont'd.)

6 BY MS. WAGNER:

7 Q You understand that your testimony today  
8 is still under oath?

9 A Yes.

10 MR. KIRSCHBAUM: Before we proceed with  
11 the redirect, I would like to make a suggestion.

12 As the witness testified yesterday, he  
13 understood certain questions that you had asked  
14 on Wednesday concerning allegations of cheating  
15 against TMI-2 operators as applying to control  
16 room operators, shift foremen and shift  
17 supervisors, and I might suggest to you that if  
18 you are interested in further information on  
19 that subject, that you might want to ask the  
20 witness questions concerning other TMI-2  
21 personnel in that regard.

22 MS. WAGNER: All right.

23 Q Did you ever cheat on a requalification  
24 exam?

25 A No.

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Q Did you ever turn in somebody else's exam and represent that it was your own?

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A I handed in another man's work. I did not sign those papers and claim them as my own.

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Q Did you have an understanding that these papers were understood to have been your work by the people to whom you handed them in?

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MR. KIRSCHBAUM: At the time he handed them in or at some later time?

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MS. WAGNER: At any time.

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A It was my understanding that they would be detected as not being my work and would not be accepted by the man they were handed in to.

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Q Why did you hand in the work of another person?

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A We had been working some rather long hours. My priorities dictated that I devote my time to the operation of the plan, the stabilization of the plant, the understanding of the accident, and I gave the completion of that exam a very low priority until I was up against a time clock when it had to be handed in that day, and so that evening, I was writing out the answers to this exam, and I could see where it was going to take much more of the night than I had initially



1 planned on, and I was leaving on vacation in the  
2 morning and it was the first vacation I had had since  
3 the accident. I was tired, uptight, so I asked another  
4 man to fill out some questions for me, some answers.  
5 He did not know that I was going to hand in his work.  
6 He may not have even known it was an exam question he  
7 was filling out. He was a subordinate of mine. He  
8 was on company time. He responded to my request.

9 I then took his papers and at least in one  
10 section as I recall, some of the questions were -- some  
11 of the answers were in my hand and some were in his  
12 hand. I write almost intelligibly. He writes  
13 rather neatly. It would be obvious to the man  
14 receiving this paper that there was not consistency.

15 The reason I did it was I was pressed for  
16 time and I wanted to go on vacation and I made an error  
17 in judgment.

18 Q Was it your understanding that turning in  
19 the work of another person would be a fulfillment of the  
20 training requirement that was being met by this  
21 examination.

22 A No. I fully expected I would have to  
23 requalify on those sections.

24 Q Is it correct that in 1977, you on a  
25 cross-licensing exam scored less than 80 percent on

2 two sections of the exam and so were required by the  
3 FSAR to take additional training under the FSR  
4 program?

5 A I do not recall that happening, but I know  
6 it happened many times. I just don't recall that  
7 specific instance.

8 Q You do recall at one time or another being  
9 assigned to participate in the FSR program?

10 A Yes.

11 Q Did you understand that the requirement  
12 that you attend the FSR program came from the  
13 obligations of Metropolitan Edison which were  
14 delineated in the FSAR?

15 A Yes.

16 Q Is it correct that you did not comply with  
17 the requirement that you attend the FSR program?

18 MR. KIRSCHBAUM: On what occasion are we  
19 talking about?

20 MS. WAGNER: On all such occasions prior  
21 to the accident.

22 MR. KIRSCHBAUM: You are asking if he ever  
23 attended the FSR program?

24 MS. WAGNER: I am asking if he ever  
25 completed the FSR requirement that was imposed

1  
2 on him.

3 MR. KIRSCHBAUM: For a particular year?

4 MS. WAGNER: For any year between 1977 and  
5 1979 before the accident.

6 A My memory is not accurate enough to be  
7 very responsive to your question, but I remember that I  
8 did sufficient amount of work to maintain my license.  
9 If that encompasses your question, then to the best of  
10 my ability I have responded.

11 Q Do you recall in March 1978 being assigned  
12 to four sections of the FSR training cycle because of  
13 having a grade of less than 80 percent on four sections  
14 of a cross-licensing exam?

15 A I do not specifically recall that, but,  
16 again, I could believe that it happened.

17 Q Is it correct that you attended very few  
18 FSR sections in 1978?

19 MR. KIRSCHBAUM: What do you mean by "very  
20 few"?

21 MS. WAGNER: Fewer than was mandated by the  
22 FSR requirement.

23 A I don't recall that specifically.

24 Q Do you recall that you met whatever FSR  
25 requirement was imposed upon you in 1978?

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2           A       I don't recall specifically. I merely  
3 recall that I did sufficient work to keep my license  
4 current. I am already on the record here as putting  
5 a low priority on my personal training and I think  
6 this reflects it very well.

7           Q       Did you understand that it was a violation  
8 of the obligations of your license to fail to participate  
9 in the training you were required to participate in?

10          A       I did not know that then and I do not know  
11 that now. I should think if I were violating our  
12 license, I wouldn't be recertified.

13          Q       Is it correct that after you submitted  
14 the work of another person, that you were suspended  
15 from work for a week?

16          A       Not in the traditional sense of suspension  
17 from work without pay. I was merely put into the  
18 requalification program for a week or two, I don't  
19 remember which, and that was normal in my mode of  
20 training to pass what I could, sight unseen, and then  
21 take a week or two of training to pass the rest of it.

22                   The end result was I spent one or two weeks  
23 a year in training instead of six or eight.

24          Q       Whose work was it that you handed in?

25                   MR. McBRIDE: I object to that for a reason

1  
2 that may not be immediately apparent to you.  
3 There is an outstanding order in the Nuclear  
4 Regulatory Commission Licensing Board put out  
5 by the Appeal Board of the Nuclear Regulatory  
6 Commission that the identity of that individual  
7 and certain other individuals not be disclosed,  
8 and I therefore have to instruct the witness  
9 not to answer the question.

10 MS. WAGNER: Do you have a copy of the  
11 order with you?

12 MR. McBRIDE: This is an order of the  
13 Atomic Safety and Licensing Board of the Nuclear  
14 Regulatory Commission in Docket No. 50-289 in the  
15 matter of Metropolitan Edison Company, Three  
16 Mile Island, Nuclear Station Unit 1, dated  
17 November 17, 1981, signed by Ivan W. Smith,  
18 Administrative Law Judge, Chairman of the Board,  
19 approving a stipulation entered into by the  
20 parties, including me on behalf of Mr. Floyd  
21 and one of the other individuals, and the  
22 stipulation so provides for confidentiality of  
23 the witnesses.

24 MS. WAGNER: Do you have a copy of the  
25 stipulation?

1  
2 MR. McBRIDE: Yes. I have a copy of the  
3 stipulation carrying a cover sheet order signed  
4 by Gary L. Milhollin, Administrative Judge and  
5 Special Master, the Atomic Safety and Licensing  
6 Board, Docket No. 50-289, the same matter as  
7 before.

8 The stipulation was approved by signature  
9 of Judge Milhollin on November 12, 1981.

10 MS. WAGNER: I would like to have both of  
11 these marked as B&W Exhibits 642 and 643.

12 (Stipulation carrying cover sheet order  
13 signed by Gary L. Milnollin, Administrative Judge  
14 and Special Master, the Atomic Safety and  
15 Licensing Board, Docket No. 50-289, approved on  
16 November 12, 1981 marked B&W Exhibit No. 642  
17 for identification, as of this date.)

18 (Order dated November 17, 1981 of the  
19 Atomic Safety and Licensing Board of the Nuclear  
20 Regulatory Commission, Docket No. 50-289, in the  
21 matter of Metropolitan Edison Company, Three  
22 Mile Island, Nuclear Station Unit 1 signed by  
23 Ivan W. Smith, Administrative Law Judge and  
24 Chairman of the Board marked B&W Exhibit No. 643  
25 for identification, as of this date.)

1  
2 MS. WAGNER: I understand you are  
3 representing that your signature on the stipulation,  
4 which is B&W 642, was given in representation of,  
5 among others, Mr. Floyd?

6 MR. McBRIDE: Let me clarify that technically  
7 that is not my signature. It was signed for me  
8 by Ernest L. Blake, Esq., counsel for Metropolitan  
9 Edison Company in that proceeding, because of a  
10 change in the typing of the stipulation after I  
11 had left Harrisburg, but it was signed for me  
12 on my behalf. I signed on behalf of Mr. Floyd  
13 and an individual who is designated in that  
14 proceeding as Mr. O.

15 MS. WAGNER: You are representing both  
16 Mr. Floyd and Mr. O in that proceeding?

17 MR. McBRIDE: Yes.

18 Q Can you tell me by any designation other  
19 than his name who was the person whose work you handed  
20 in?

21 A Mr. O.

22 Q Can you tell me what Mr. O's position was  
23 at the time that this occurred?

24 MR. McBRIDE: The witness may be unsure  
25 of the technicalities of the stipulation, so if



1  
2 you will, let me just give you the answer.

3 Mr. O was a shift supervisor and that is a  
4 matter of public record, the shift supervisor  
5 in Unit 1. You may recall in response to a  
6 question of yours on Wednesday that Mr. Floyd  
7 responded as to a question about allegations of  
8 cheating, that there were two shift supervisors  
9 in Unit 1 that were responsive to your question.  
10 This is one of those two individuals.

11 Q I take it, Mr. Floyd, you don't disagree  
12 with anything your counsel said?

13 A Not yet.

14 Q Is it correct that Mr. O is no longer at  
15 Metropolitan Edison?

16 A The answer is Mr. O is no longer in the  
17 employ of Metropolitan Edison.

18 Q Is it correct Mr. O was terminated by  
19 Metropolitan Edison for cheating?

20 A I believe Mr. O resigned.

21 Q Was he asked to resign?

22 A I don't know.

23 Q Were you aware that the work of Mr. O was  
24 submitted to the NRC as having been your work?

25 MR. KIRSCHBAUM: Objection. I believe

1  
2 the witness has testified that he didn't  
3 understand that at the time he was involved in  
4 handing in that exam.

5 MS. WAGNER: I thought he testified he  
6 did not turn it in as his work.

7 MR. KIRSCHBAUM: Are you asking him as to  
8 what he understood somebody else understood?

9 MS. WAGNER: I am asking whether he knew  
10 that work was later turned in to the NRC by  
11 someone other than Mr. Floyd.

12 MR. McBRIDE: This is the work that was  
13 the subject of your earlier questions of today  
14 in 1979, is that correct?

15 MS. WAGNER: Yes.

16 A It is my understanding that my week or  
17 two in training is what qualified me for recertification,  
18 not the previously submitted work of someone else.

19 Q Do you know if anybody told the NRC that you  
20 had submitted work of somebody else in complying with  
21 a requalification requirement?

22 MR. McBRIDE: At any time or in 1979?

23 MS. WAGNER: At any time since it happened.

24 A I have no firsthand knowledge of such an  
25 event taking place.

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Q Have you heard from anybody else that such an event took place?

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MR. KIRSCHBAUM: When?

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MS. WAGNER: At any time.

6

MR. KIRSCHBAUM: Has he heard at any time?

7

MS. WAGNER: Yes.

8

Q Other than if your counsel told you that,

9

A It is my impression that Mr. Arnold called

this event to the NRC's attention at the time the

"cheating scandal" was first being uncovered on Three

Mile Island.

13

Q Can you tell me when that was?

14

A It was in the spring or early summer of

15

'81.

16

Q Are you saying that at that time Mr. Arnold

told the NRC that you had previously submitted the work

of somebody else in complying with the requalification

requirement?

20

A I am not clear as to what Mr. Arnold said

to the NRC. I am only aware that because the other

person was involved in the Unit 1 episode, Mr. Arnold

remembered he was also involved in this episode, and he

called it to the NRC's attention as probably within

the scope of their investigation.

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Q At any time prior to the time that you testified about, did you ever turn in somebody else's work and represent that it was your own?

A No.

Q Did you ever turn in somebody else's work in fulfillment of a licensing requirement?

A No.

Q And it is your testimony that you did not consider the turning in of Mr. O's work to be cheating?

A That is true, because I had helped design the system's checks and balances internal in the Met Ed organization, so that I was aware that this would not go unnoticed and be accepted. In fact, that is the way the system worked.

Q Was any disciplinary action taken against you by the company for this action?

A I was relieved of licensed responsibility permanently.

Q Is it correct that before the Three Mile Island accident, you did not have respect for the training program at Metropolitan Edison Company?

MR. KIRSCHBAUM: What do you mean by not have any respect for?

MS. WAGNER: I think the witness probably

1  
2 knows what it means to have respect for something  
3 or not.

4 MR. KIRSCHBAUM: You mean in his mind have  
5 respect for? Are you asking about his actions  
6 or state of mind?

7 MS. WAGNER: I am asking if he respected  
8 the Met Ed training program.

9 MR. KIRSCHBAUM: I object.

10 MR. McBRIDE: I would like to have it  
11 clarified. I am not sure whether you are asking  
12 whether he had respect for the program per se  
13 or whether he had respect for the program  
14 insofar as it applied to his subordinates or  
15 as it applied to him.

16 MS. WAGNER: I am asking if he had respect  
17 for it in general.

18 A Was this limited to the time before the  
19 accident?

20 Q Yes. Is it correct that you did not prior  
21 to the Three Mile Island accident have respect for the  
22 Metropolitan Edison training program?

23 A No. I had respect for the Metropolitan  
24 Edison training program as it applied to my operators,  
25 and I felt responsible for my own training.

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Q You do not feel that the Met Ed training department was responsible for your training, is that what you are saying?

A True.

MR. KIRSCHBAUM: Could I have the last question and answer read back.

(Record was read back.)

(Discussion off the record between the witness and his counsel.)

MR. KIRSCHBAUM: I believe the witness would like to make a further statement in answer to that question.

MS. WAGNER: After consultation with his counsel.

A Technically, the training department may have had that responsibility. The fact that I assumed responsibility for my own training with the aid of the training department, I would frequently rely on them to help me with my training, but it was a personal assumption on my part to be responsible for my own training.

Q Did you understand the requalification program which was set forth in Metropolitan Edison FSAR was intended to implement the requirements of

10 CFR Part 50?

A Yes.

Q And 10 CFR 55, Appendix A?

A Yes.

Q Did you understand that compliance with the requirement set forth in the FSAR was voluntary on your part?

A No.

Q I would like to show you what has been marked as B&W 260 which is the training section of the TMI-2 FSAR, and I refer you to page 13.2-6 of the FSAR and in particular to a sentence which indicates "The basis of the requalification program is the need to maintain operator competency and proficiency in the quest for continued safe operation."

Do you see that sentence?

A Yes.

Q Was it your understanding that you were better able to achieve those goals by your own training approach than by attending the training required by the FSAR?

MR. KIRSCHBAUM: Are you asking whether he was better able to achieve those goals for himself in terms of his own training?



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2 MS. WAGNER: Yes.

3 MR. KIRSCHBAUM: You are asking for his  
4 understanding as of some previous time?

5 MS. WAGNER: Yes. At the time before the  
6 accident.

7 MR. KIRSCHBAUM: In general up to the time  
8 of the accident?

9 MS. WAGNER: Yes.

10 (The record was read back as follows:

11 "Question: Was it your understanding that you  
12 were better able to achieve those goals by your  
13 own training approach than by attending the  
14 training required by the FSAR?")

15 A I relied on the training department to  
16 maintain the records that had to be maintained legally  
17 to support my recertification. I relied on them to  
18 provide me information that I needed to make my  
19 knowledge complete.

20 I don't think I ever characterized my  
21 training versus their training.

22 Q Did you think the instructors in the  
23 training program prior to the Three Mile Island  
24 accident were as competent engineers as you are and  
25 were before the accident?

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2 MR. KIRSCHBAUM: Are you asking about all  
3 the training instructors as a group compared to  
4 Mr. Floyd in any and all fields of engineering?

5 MS. WAGNER: You asked Mr. Floyd a lot of  
6 questions yesterday about his own competency, and  
7 I think we have established Mr. Floyd was an  
8 extraordinarily competent operator and engineer.

9 MR. KIRSCHBAUM: I agree.

10 MS. WAGNER: I would like to know if he  
11 thinks the training, the individuals that  
12 administered training to Metropolitan Edison  
13 licensed operators were as competent as he in  
14 those fields.

15 MR. KIRSCHBAUM: As a group as applied to  
16 any and all fields?

17 MS. WAGNER: As a group and as applied  
18 specifically to operating nuclear plants and  
19 engineering involved in the operations of the  
20 nuclear plant.

21 MR. KIRSCHBAUM: I object to the question  
22 on the grounds that it is compounded several  
23 times over.

24 Q I will ask first if he thinks these people  
25 in the training department who trained the TMI licensed

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engineers were as competent as you in engineering?

MR. KIRSCHBAUM: Objection.

A The majority of the instructors for the requalification program at TMI were reactor operators as opposed to engineers. While they were quite competent to teach reactor operators and senior reactor operators, they did not have engineering backgrounds and degrees, and in most cases, I would think they had less nuclear training than I had had.

Q Is that one reason why you chose to rely on your own approach to training rather than to rely on the training department?

MR. KIRSCHBAUM: You are referring specifically now to the witness' statement that they had less nuclear training than he had?

MS. WAGNER: Yes.

A I had been an instructor in the naval nuclear program. I have been active in instructing all the time I have been in the nuclear power industry. I felt I was perfectly capable of maintaining my own level of requalification.

Q Was it your understanding before the accident that the level of requalification training which was being administered to licensed operators at

1  
2 TMI-2 was at a lower level than that you administered  
3 to yourself in terms of engineering?

4 MR. KIRSCHBAUM: Objection. I am not sure  
5 I understand what you mean by "lower level."

6 MS. WAGNER: Could I have the witness' last  
7 answer read back.

8 (Record was read back.)

9 Q Did you think that the level of  
10 requalification being maintained for nuclear operators  
11 at TMI-2 prior to the accident was the same as your  
12 level or different?

13 MR. KIRSCHBAUM: I am confused here about  
14 the use of the term "requalification level."  
15 I am fully aware that the witness used that  
16 phrase in his answer. I am not exactly sure  
17 that it is clear on the record that that is  
18 referring to some level of competency or referring  
19 to some legally mandated level.

20 MS. WAGNER: Let's ask the witness what  
21 he meant by it.

22 MR. KIRSCHBAUM: Fine.

23 A I would say that both the level of  
24 requalification as taught to the control room operators  
25 and senior operators by the training department and my

2 own level of requalification which I maintained were  
3 adequate.

4 Q Would you say they were different?

5 A The levels were both adequate, but I  
6 tended to think about problems differently than the  
7 operators tended to think about them, and that  
8 difference in thinking would tend to make the  
9 requalifications different, even though they were  
10 both approaching a level of adequacy.

11 MR. KIRSCHBAUM: I still don't think it  
12 is clear on the record what the witness means by  
13 requalification level.

14 Off the record.

15 (Discussion off the record.)

16 Q Did you ever discuss with the training  
17 instructors at TMI-2 prior to the accident your own  
18 different approach in terms of thinking about  
19 requalification?

20 A No.

21 Q Did you think your approach was a useful  
22 approach?

23 A For me, it was.

24 Q Did you think it would be useful for anybody  
25 else?

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MR. KIRSCHBAUM: Are you asking whether he thought about this prior to the accident?

MS. WAGNER: Yes.

A No.

Q Given the fact that both you and the operators at that point were required as I understand it to be licensed and to therefore undergo a requalification training session program, can you tell me why it was that you did not think your approach to it would be useful to the operators who were undergoing the same requalification?

A My --

MR. KIRSCHBAUM: Objection. I believe the witness said he didn't think about that issue at all.

MS. WAGNER: I understood him to say that he didn't think it would be useful.

Q But please clarify your answer.

A I thought I was responding as Mr. Kirschbaum expressed it that I hadn't thought about the differentiation.

Q You had not thought prior to the accident one way or another whether it would be useful to disclose to TMI training instructors or licensed

1  
2 operators your thought processes with respect to  
3 requalification training?

4 A That is true.

5 Q Did you think the operators at Three Mile  
6 Island prior to the accident would be incapable of  
7 understanding your approach?

8 MR. KIRSCHBAUM: Did he think this at that  
9 time before the accident?

10 MS. WAGNER: Yes.

11 A Before the accident at Three Mile Island,  
12 I did not try in any way to analyze how I trained  
13 myself, and if I used that parallel technique on the  
14 operators, how it would impact on them.

15 Q Did anyone from the training department  
16 at Three Mile Island prior to the accident ever ask  
17 you why you weren't attending training programs?

18 A Not that I specifically recall.

19 Q I believe you testified yesterday in  
20 response to your counsel's question that the training  
21 instructors at Metropolitan Edison received their  
22 training in a 1969 course offered by B&W concerning  
23 pressurized water reactor technology, as I recall.

24 MR. KIRSCHBAUM: I believe that testimony  
25 was with respect to the first group of TMI



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instructors.

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MS. WAGNER: I believe that is right.

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Q Is it your testimony that you are aware of  
no other source of training for Metropolitan Edison  
instructors?

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MR. KIRSCHBAUM: That first group of  
instructors?

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MS. WAGNER: That first group.

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A I do not remember specifically by name  
who that first group of instructors were, but at that  
point in time, I would have known who they were and  
what their educational backgrounds were, and I would  
think that they had received training at facilities  
other than B&W in addition to the training at B&W.

Q You also testified that Met Ed used  
terminology, ideas, concepts and theories which were  
obtained from B&W in 1969 in that course as the basis  
for all of Met Ed's training programs.

Is it your testimony that there was no  
other source of which you are aware for anything being  
taught by the Metropolitan Edison training department  
between 1969 and 1979?

MR. KIRSCHBAUM: Are you asking now for his  
present understanding or recollection of what was

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used in those courses?

MS. WAGNER: Yes.

A I don't think I testified to that yesterday, and I certainly wouldn't testify that way today. In the B&W scope of supply, the B&W information was very helpful, but we also trained on the turbines and things that weren't in the B&W scope of supply, so we had to use other reference material as well.

Q Is it your testimony that for items within the B&W scope of supply, the only source of training terminology, ideas, concepts and theories was this training course in 1969?

MR. KIRSCHBAUM: Objection. That is a compound question.

Q You can answer.

A No, B&W's information was not the only one. One good example, of course, would be the area of reactor theory which is well within the B&W scope of supply but which there are many valid textbooks on the market which also teach concepts, theories and ideas, and they may or may not have been used.

And the other problem I had with your question is in tying this question to 1979. There were undoubtedly instructors in 1975 until 1979 that were

1  
2 not in the first B&W technology course but have since  
3 had probably similar training, so I can't tie all the  
4 instructors back to that first technology course.

5 Q You believe that there were instructors  
6 who were hired sometime after 1969 in the Metropolitan  
7 Edison training department?

8 A There were people who moved out of the  
9 operations department that were licensed control room  
10 operators or senior reactor operators that were  
11 transferred to the training department to become  
12 instructors, and these may have joined the company  
13 any point in time. Certainly we didn't restrict  
14 instructors to the people who went through the 1969  
15 technology course.

16 Q Do you have any knowledge of the basis of  
17 training of those instructors who did not go through  
18 the 1969 program?

19 MR. KIRSCHBAUM: Any and all instructors  
20 who joined the company after 1969?

21 MS. WAGNER: No, any and all instructors  
22 who became instructors after 1969.

23 MR. KIRSCHBAUM: I object on the grounds  
24 that it is compound.

25 A There have been a lot of instructors in

1  
2 that training department in those ten years, and I  
3 cannot begin to identify each of those people from  
4 memory, let alone their educational backgrounds from  
5 memory.

6 Q So I take it you are not today in a position  
7 to tell me how instructors in the training department  
8 at Metropolitan Edison were trained?

9 MR. KIRSCHBAUM: Objection. I think his  
10 testimony is he is not in a position to tell you  
11 about each and every instructor.

12 A In a general sense they went through an  
13 NRC license exam to become licensed senior operators.  
14 Each senior reactor operator training program is  
15 designed for the individual. You take the man and  
16 wherever you find him, you design a training course to  
17 bring his level of understanding to the requirements  
18 of the law, so each man would have his own individual  
19 training course.

20 Q And that training course was conducted by  
21 Metropolitan Edison?

22 A They may have used contractors or  
23 subcontractors in addition to their own instructors  
24 and engineers.

25 Q But it was your understanding that the

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individual licensed course was set up and designed by Metropolitan Edison, is that right?

A Yes.

Q You testified yesterday that you believed that the most important training for Metropolitan Edison operators on transients was simulator training. I take it you believed that before the accident?

A Yes.

Q Given that belief, what steps did you take, if any, to change the decision to send operators to the simulator only once every two years rather than once every year?

A I do not recall.

Q Do you recall being upset about that decision?

A Only insofar as I thought there was a better way.

Q Was there any training which was implemented at Metropolitan Edison after that decision was made to send operators once every two years which was intended to take the place of the transient training which had been prior to that time obtained at the simulator?

MR. KIRSCHBAUM: Intended by whom?

MS. WAGNER: Metropolitan Edison Company.

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A Not that I can specifically recall.

Q Are you aware that of the four operators on duty on March 28, 1979, three had not been to the simulator for almost two years?

MR. KIRSCHBAUM: You are asking for his present awareness?

MS. WAGNER: Yes.

A I don't recall that.

Q Do you recall whether before the accident you were concerned about the amount or the quality of training operators were receiving in responding to transients?

A I don't recall that specifically.

Q Do you recall generally?

A No.

Q So even though you believed before the accident the simulator was the most important place to train operators about transients, you don't recall having any concern or taking any action with respect to the fact that operators were not going to be going more than once every two years?

A I don't have such a recollection.

(Recess taken.)

Q Do you recall a conversation with a

1  
2 Mr. Don Miller on or about July 9, 1979, concerning  
3 your submission of Mr. O's work as part of your  
4 requalification requirement?

5 A No.

6 Q What was the date at which you were removed  
7 from licensed duties?

8 A I believe it was July or August of 1979.

9 Q You gave some testimony yesterday about  
10 your understanding of what the effect was of simulator  
11 training. Was it your understanding prior to the  
12 accident that every conceivable transient was going to  
13 be shown to the TMI-2 operators on the simulator?

14 MR. KIRSCHBAUM: Conceivable to whom?

15 MS. WAGNER: Every one that could happen.

16 Every transient in the universe of possible  
17 transients, whether or not conceivable.

18 A It was my understanding that the simulator  
19 was there to train the operators on what was expected  
20 from the plant. I had no delusions that any of us  
21 were omniscient.

22 Q Is it your testimony then that you  
23 understood prior to the TMI-2 accident that the  
24 operators were not being shown every transient which  
25 could possibly happen to a nuclear steam supply system?



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2 MR. KIRSCHBAUM: Even if not conceivable?

3 MS. WAGNER: Even if not conceivable on  
4 the simulator.

5 A I don't think that was my understanding of  
6 it at that time. In the light of your question, your  
7 question would bound my thinking at that time.

8 Q Did you have any understanding prior to the  
9 accident as to whether or not the operators were going  
10 to be shown every possible transient on the simulator?  
11 Was it not your understanding that the simulator was  
12 going to show them some transients and not all possible  
13 transients?

14 MR. KIRSCHBAUM: Are you dropping your  
15 statement "whether or not conceivable?"

16 MS. WAGNER: Yes.

17 A In going to the simulator for a week, I  
18 recognized that it was not possible to see all transients  
19 in any one year, but over the course of years, all  
20 conceivable transients would be covered.

21 Q Whether or not they were single failure  
22 or multiple failure?

23 A Multiple failure does not enter into normal  
24 operator training.

25 Q And you understood that prior to the

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accident?

A Yes.

Q So your testimony is that if the operators went to the simulator for a given number of years, they would see every possible single failure transient?

MR. KIRSCHBAUM: By "possible," do you mean conceivable?

MS. WAGNER: Possible. I think the witness and I understand what we are talking about.

MR. KIRSCHBAUM: I don't think the record will reflect that understanding.

A I would agree with that statement if you would add the two words "of significance" at the end of your question. There are many possible single failures which have no bearing whatsoever on the course of the transient, and it would be a waste of time to spend time simulating those, but if in fact the single failure had significance to the course of the transient, then, yes, I would have expected over a given number of years they would be seen.

Q I take it that they would be seen, these transients, in the course of requalification training on the simulator?

MR. KIRSCHBAUM: That his understanding was

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that they would be seeing these transients?

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MS. WAGNER: That's right.

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A Yes.

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Q Do you have any understanding now as to how many years it would have taken to see all of them?

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MR. KIRSCHBAUM: How many years it would have taken for one operator or for the operators running the plants?

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MS. WAGNER: One operator.

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MR. KIRSCHBAUM: As a single individual?

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MS. WAGNER: Yes.

13

Q I take it it would be more than one year?

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A Yes, but probably not more than five years where you have a week of training each year. So I am talking between one and five weeks, in that area.

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Q For the time period in between the one and the five years before the operator had seen all of these transients, did you have any understanding as to whether operators at Metropolitan Edison were being trained on what to do if they saw a transient which was not identical to one they had seen on the simulator?

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A Prior to receiving his NRC license, each licensed person was required to be familiar with all emergency procedures. The fact that he had or had not

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2 seen it on the simulator reflected on his comprehension,  
3 but his actions are governed by the procedures, so in  
4 an attempt to be responsive to your question, I would  
5 have to say the operators were instructed to do by  
6 the procedures.

7 Q You testified yesterday that in your  
8 opinion the accident which occurred at Three Mile  
9 Island on March 28, 1979 was not governed by the loss  
10 of reactor coolant/reactor coolant system pressure  
11 procedure. Is it your position --

12 MR. KIRSCHBAUM: I believe what he  
13 testified was not as to whether it was or was  
14 not governed but rather that the operators  
15 wouldn't be in that procedure.

16 MS. WAGNER: I think I have his testimony.  
17 I believe he indicated it was whether or not the  
18 procedure covered the event.

19 MR. KIRSCHBAUM: If you have the testimony  
20 and you want to refer to it, I suggest you do.  
21 But if you are asking for his present testimony,  
22 fine.

23 Q Is it your position that there was no  
24 procedure in effect on March 28, 1979 which governed  
25 the actions of the operators with respect to the

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transient in which they found themselves on that date?

MR. KIRSCHBAUM: You are asking for his present understanding?

MS. WAGNER: Yes.

MR. KIRSCHBAUM: I don't understand what you mean by the word "governed" in the context of this question.

MS. WAGNER: The witness testified that the operators were taught to follow procedures. I am asking whether he understands now whether or not there was any procedure which they should have been following during the accident.

MR. KIRSCHBAUM: Based on the training they received before the accident?

MS. WAGNER: Based on anything.

MR. KIRSCHBAUM: You are asking him now sitting here in hindsight whether they should have done something differently?

MS. WAGNER: You asked him yesterday whether or not the LOCA procedure covered their actions. I am asking whether any procedure governed their actions.

MR. KIRSCHBAUM: I believe what I asked him was whether or not his understanding at the

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2 time of the accident was such that the operators  
3 would have been trained to follow that particular  
4 procedure on that morning. I don't understand  
5 your question as asking for that same information.

6 Q My question is given the transient which  
7 occurred on that date, was there a procedure in effect  
8 on that date which was intended to govern the actions  
9 of the operators?

10 MR. KIRSCHBAUM: Objection to the form.

11 A In order to be governed by an emergency  
12 procedure, the operator must recognize that he is in  
13 that area. In response to Mr. Kirschbaum's question  
14 yesterday, I was relying on the fact that the symptoms  
15 in that procedure were not descriptive of what occurred  
16 at the island on March 28, 1979.

17 Therefore, I would not have expected the  
18 operators to be in that procedure, because they didn't  
19 recognize the symptoms. Had they recognized that  
20 a LOCA was taking place, then that would have been the  
21 proper procedure for them to be in. But it was the  
22 operator recognition due to the confusion introduced  
23 by the diametrically opposite behavior of pressurizer  
24 pressure and pressurizer level that was so different  
25 than their training that I would have expected them to



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2 not recognize that they were in a LOCA, and therefore  
3 not be in that procedure.

4 Q So what your testimony is, if I can just  
5 understand it, a LOCA was occurring on that day,  
6 therefore, the LOCA procedure was applicable, but  
7 since the operators didn't know it, they didn't apply  
8 it?

9 MR. KIRSCHBAUM: Objection. That is a  
10 mischaracterization of the witness' testimony  
11 which was very clear as to the fact that symptoms  
12 in the procedure were confusing and misleading,  
13 and that is why the operators would not have  
14 recognized that they were in the procedure from  
15 their training.

16 MS. WAGNER: I heard the witness' answer  
17 already. I am trying to get him to clarify it.  
18 I don't think I need another bit of testimony  
19 from you.

20 MR. KIRSCHBAUM: The witness' answer was  
21 perfectly clear, and your question was a  
22 mischaracterization of the testimony, plain  
23 and simple.

24 (Whereupon, the reporter read back the  
25 record as follows: "Question: So what your



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2 testimony is, if I can just understand it, a  
3 LOCA was occurring on that day, therefore, the  
4 LOCA procedure was applicable, but since the  
5 operators didn't know it, they didn't apply it?"

6 A I mean to imply, and I will try to state  
7 clearly, that the operators' training did not apply to  
8 what the plant was doing on the morning of March 28,  
9 1979, and therefore they were in an uncharted region,  
10 a region they had not been prepared to see, nor to  
11 respond to.

12 Q Whether or not the operators had been  
13 trained in this regard, is it your testimony that the  
14 procedure for loss of reactor coolant/reactor coolant  
15 system pressure is or is not applicable to the accident?

16 MR. KIRSCHBAUM: Objection; asked and  
17 answered.

18 Is that in the present tense or are you  
19 asking as of the date of the accident?

20 MS. WAGNER: The present tense.

21 MR. KIRSCHBAUM: The procedure as written  
22 together with the 50 degree subcooling instruction--

23 MS. WAGNER: The procedure in effect on  
24 the day of the accident.

25 MR. KIRSCHBAUM: You are asking the

1  
2 procedure in effect on the day of the accident,  
3 whether or not it would apply today if the same  
4 accident happened today?

5 MS. WAGNER: No, I am asking if the  
6 procedure applied on that day. I am asking  
7 whether the accident was one to which this  
8 procedure applied, whether or not the operators  
9 were trained about that.

10 MR. KIRSCHBAUM: Including the symptoms  
11 as part of the procedure?

12 MS. WAGNER: I think my question couldn't  
13 be clearer. The procedure in effect on the day  
14 of the accident and all of its components.

15 A The symptoms that were in front of the  
16 control room operators on the morning of March 28, 1979  
17 did not put them into any procedure. If we had a  
18 procedure which spoke of pressurizer level going up  
19 while reactor coolant system pressure went down, it  
20 would have looked very much like the LOCA procedure  
21 looks, but such a procedure did not exist on the morning  
22 of March 28, 1979.

23 Q Had the operators at TMI-2 been given any  
24 training prior to the accident with respect to how they  
25 should govern their actions in the event of a transient,

1  
2 the symptoms of which did not fit precisely into any  
3 procedure then extant?

4 MR. KIRSCHBAUM: Any training by whom?

5 MS. WAGNER: Anybody.

6 A I don't know of any training that was given  
7 to the operators at TMI concerning their behavior when  
8 on unchartered waters. That does not mean to imply that  
9 there wasn't any training. Just that I am not aware of  
10 it.

11 Q During the time before the accident and  
12 while you were supervisor of operations, were you aware  
13 that the operators had been trained in the event of a  
14 transient to take the most conservative course of  
15 action in responding to the transient?

16 A Yes.

17 Q Did you understand prior to the accident  
18 while you were supervisor of operations of TMI-2 that  
19 the most conservative course of action in any transient  
20 is to insure that the core is covered with water?

21 MR. KIRSCHBAUM: Most conservative action  
22 as opposed to what?

23 MS. WAGNER: Any other action.

24 MR. KIRSCHBAUM: You are saying that the  
25 most conservative action would be to insure that

1  
2 the core is covered with water as opposed to  
3 not insuring that the core is covered with water?

4 MS. WAGNER: That seems to be the  
5 implication of my question, yes.

6 A I think I am on the record with a statement  
7 very similar to that.

8 Q So you agree with that concept?

9 A Yes.

10 Q Is it correct that the operators were  
11 trained while you were supervisor of operations and  
12 before the accident that in order to follow the most  
13 conservative course and to insure that the core be  
14 covered, the safest and most conservative thing to do  
15 is to let the safety systems run and inject water into  
16 the core to insure core covery?

17 MR. KIRSCHBAUM: In any and all  
18 circumstances?

19 MS. WAGNER: Yes.

20 (Record was read back.)

21 MR. KIRSCHBAUM: Objection; compound.

22 A I do not remember receiving any such  
23 training from B&W or from our own training department  
24 or from anyone else to that effect.

25 Q So it is your testimony that for the time

1  
2 you were supervisor of operations and before the TMI-2  
3 accident, you did not believe the operators had been  
4 trained that in the event that they were not sure of  
5 what was happening to their system, the safest and most  
6 conservative thing to do was to allow for the operation  
7 of automatic safety systems which were designed to  
8 insure core coverery?

9 MR. KIRSCHBAUM: Do you follow that  
10 question?

11 THE WITNESS: I think so.

12 MR. KIRSCHBAUM: Then answer.

13 A I don't remember that the details of  
14 operating in unchartered waters were that explicit.

15 Q You are saying you don't recall the details  
16 of the training?

17 A I didn't recall any training until you  
18 pointed out a few areas here, but I certainly don't  
19 recall anything being that explicit in that training.

20 Q Do you know whether during the time that  
21 you were supervisor of operations for TMI-2 and before  
22 the accident your operators had that notion in mind?  
23 Was it something they understood?

24 MR. KIRSCHBAUM: Does he know what they  
25 understood or does he know what they were told?

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MS. WAGNER: Does he know what they understood.

A I don't believe they understood that prior to the accident at Three Mile Island.

Q Did you have an understanding prior to the Three Mile Island accident as to whether or not they understood this concept?

MR. KIRSCHBAUM: What concept?

Q That the most conservative thing to do if you don't know precisely what the situation your system is in was to allow the automatic safety systems to continue to put water into the core.

MR. KIRSCHBAUM: Under any and all circumstances?

MS. WAGNER: Under the circumstances I described.

MR. KIRSCHBAUM: I don't know that you have specifically described the circumstances.

MS. WAGNER: The circumstances are those in which safety systems have actuated and the operators are not clear what is happening in their system.

MR. KIRSCHBAUM: No matter what else is happening in the plant at the time?



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MS. WAGNER: I think my question is clear

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enough.

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A I don't recall that action, that recommended action, as being an explicit part of the B&W training program nor the Metropolitan Edison training program, and therefore I would think that the operators did not have that concept in their mind at the time of the accident.

Q Do you recall today whether you knew prior to the accident whether or not the operators had that in their mind? I understand you have given me today what you think they had in their mind. I am wondering if you recall whether you knew before the accident what they had in their mind.

A I do not so recall.

Q Prior to the accident and while you were supervisor of operations at TMI-2, did you think this was a concept that was important for them to know?

MR. KIRSCHBAUM: What is the concept again?

Q The concept is that when safety systems have actuated and the operators are not sure what is happening in their system, that they should allow the safety systems to continue to inject water into the system to insure core covery.



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A I don't recall.

Q Had it occurred to you prior to the accident at TMI-2 that a transient might occur which the operators, whoever was in the control room at that point, had not seen before?

MR. KIRSCHBAUM: On the simulator?

MS. WAGNER: Any place. I am asking about a transient occurring at TMI-2, not at the simulator.

MR. KIRSCHBAUM: You are asking him if he had in mind that they might see a transient that they had not seen previously at TMI-2?

MS. WAGNER: I am asking did he think it was possible for a transient to occur at TMI-2 which the operators in the control room at that time had not seen before.

MR. KIRSCHBAUM: At any place?

MS. WAGNER: At any place.

MR. KIRSCHBAUM: And you are asking whether he recalls having that thought in mind before the accident?

MS. WAGNER: That's right.

A My thoughts before the accident were that the plant was bounded by plant procedures.

2 Q Do you mean by that that you thought the  
3 symptoms in the various plant procedures bounded every  
4 conceivable event?

5 A Yes.

6 Q Do you also mean that if the operators  
7 followed one of those procedures, assuming it was the  
8 right one for whatever event was occurring, that the  
9 procedure prescribed whatever course of action would  
10 keep the plant safe?

11 A Yes.

12 Q I believe you testified that one of the  
13 symptoms in the procedure for loss of reactor coolant/  
14 reactor coolant system pressure was decreasing  
15 pressurizer level, is that correct?

16 A Yes.

17 Q I believe you also testified that you  
18 understood that during some loss of coolant accidents  
19 boiling could occur in the reactor coolant system,  
20 is that correct?

21 A Yes.

22 Q And you further testified that you knew  
23 prior to the accident that boiling in the reactor  
24 coolant system could cause a rise in pressurizer level,  
25 is that correct?

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2 MR. KIRSCHBAUM: In the event of a LOCA?

3 MS. WAGNER: My question is what it is.

4 Would you read it again and retype it  
5 into the record.

6 (Whereupon, the reporter read back the  
7 record as follows: "Question: And you further  
8 testified that you knew prior to the accident  
9 that boiling in the reactor coolant system could  
10 cause a rise in pressurizer level, is that  
11 correct?)"

12 A I had this piece of knowledge from the Navy  
13 days from an experiment which involved the intentional  
14 reduction of thermal margin that said if we had boiling  
15 in the reactor coolant system, you would see a rise  
16 in pressurizer level.

17 That experiment did not deal with loss of  
18 coolant accidents nor did it involve ruptures in tops  
19 of pressurizers, but the tie between the two is not  
20 quite as firm as your phrasing of the question would  
21 imply.

22 Q My question was simply whether you knew  
23 prior to the accident that boiling in the reactor  
24 coolant system would cause a rise in pressurizer level,  
25 and I believe you already testified that you did.

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A Yes.

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Q Could you tell me what you mean when you say "thermal margin"?

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A The temperature difference between the pressurizer and the next hottest water in the plant.

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(Recess taken.)

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BY MS. WAGNER:

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Q In your Navy experiment, how did you obtain a reduction in thermal margin?

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A By raising the T-Av and running with a constant delta T across the core. The hot leg temperature went up one degree for every degree rise in T-Av, and since the hot leg water was the next hottest water in the plant outside the pressurizer, the reduction of thermal margin came about because the pressurizer temperature stayed constant and the hot leg was rising in temperature and the thermal margin was thereby reduced.

Q You indicated yesterday that the experimental procedure which governed this experiment caused the operator to be alert for a pressurizer level rise which would be indicative of steam formation in the reactor coolant system other than in the pressurizer.

What is your understanding as to what would

1  
2 cause steam formation in the reactor coolant system  
3 other than in the pressurizer?

4 MR. KIRSCHBAUM: What was his understanding  
5 at the time the experiment was being conducted?

6 MS. WAGNER: His understanding at any time  
7 before the accident.

8 MR. KIRSCHBAUM: I object insofar as there  
9 is an implication in the question that his  
10 understanding was the same at all times leading  
11 up to the accident.

12 MS. WAGNER: I am leaving it open for the  
13 witness to correct me if it wasn't.

14 (Record was read back.)

15 MR. KIRSCHBAUM: His understanding now?

16 MS. WAGNER: I said before the accident.

17 A While it is not the hottest temperature  
18 in the reactor coolant system outside the pressurizer,  
19 the hot leg temperature was the best indicator we had  
20 of that hottest temperature which would be in the hot  
21 channel of the core itself. It would be a higher  
22 temperature than the T hot.

23 Since it is an unmonitored parameter,  
24 its absolute value is therefore calculated. If the  
25 temperature of the water in that hot channel exceeded

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the local saturation pressure in that channel, which is also unmonitored, then boiling would occur and it would probably have been of the nature of nucleate boiling, because of the forced flow in the system.

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Q I take it it was your understanding prior to the Three Mile Island accident that if in any region of the reactor coolant system, temperature exceeded the saturation pressure, you would end up with boiling?

A You left one temperature out of there. If the local temperature exceeds the saturation temperature corresponding to the local saturation pressure, then boiling would occur.

Q I take it it was also your understanding prior to the accident that if in any part of the reactor coolant system water remained at a constant temperature but pressure on the water was reduced, that the water would boil at some stage?

MR. KIRSCHBAUM: That continued happening indefinitely?

MS. WAGNER: That's right.

A Yes.

Q I take it you did know prior to the accident that during a loss of coolant accident, pressure decreases?



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2 A Yes.

3 Q You testified yesterday that on the day  
4 of the accident, March 28, 1979, you were in Lynchburg  
5 attempting to simulate the accident on the simulator and  
6 you were unable to do so.

7 MR. KIRSCHBAUM: He testified that he was  
8 in Lynchburg and he attempted to simulate the  
9 accident. He didn't testify that he was in  
10 Lynchburg for the purpose of attempting to  
11 simulate the accident.

12 MS. WAGNER: I don't think I suggested that.

13 MR. KIRSCHBAUM: It was ambiguous in my  
14 view.

15 A Can you tell me precisely what you did in  
16 order to attempt the simulation?

17 A To the best of my recollection, I instructed  
18 Mr. Smith to actually carry out the simulation, because  
19 I was busy on other things, and my instruction to him,  
20 to the best of my recollection, was to normalize the  
21 simulator at a high power level such as Three Mile  
22 Island was at on that morning, 97 or 98 percent of rated  
23 power, to trip off the feed pumps, which was the  
24 initiator event as far as I knew, and I didn't know that  
25 they had been tripped off simultaneously, so I asked him



1  
2 to run a parametric study based on time intervals for  
3 tripping the boiler feed pumps, to first try the  
4 tripping together and then to try tripping them  
5 30 seconds or a minute or five minutes apart, and to  
6 delay the emergency feedwater coming in for the area  
7 of ten minutes and then to run a parametric study on  
8 it in the region of five to fifteen minutes on  
9 probably one-minute intervals to see if he could  
10 reproduce the pressure that was experienced at the  
11 plant which we knew was below the HPI set point and  
12 was probably down in the region of a thousand to  
13 1200 pounds.

14 Q So you yourself did not actually manipulate  
15 the simulator?

16 A I may have been actively involved in the  
17 first transient, and when that pressure did not come  
18 down on that one to the HPI set point, I then invented  
19 these parametric studies for him to carry out.

20 After the 9:30 phone call when I heard  
21 that the PORV had been stuck open, I then gave him  
22 instructions to let the PORV open in response to the  
23 loss of feed like it should and then to keep it open  
24 to attempt to pull plant pressure down faster.

25 Q Did you keep any notes of what you told

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Mr. Smith to do?

A No.

Q Did you keep any notes of the results of what he did?

A No.

Q I take it you didn't keep any notes of what you might have done apart from what Mr. Smith did either?

A No.

Q Are you aware of any computer printouts or other data reflecting the results of the experiments?

MR. KIRSCHBAUM: In existence today?

MS. WAGNER: Ever in existence.

A We had a small multipoint recorder operating on the 855 which allowed us to track several parameters of interest through the course of each event. The simulations were being run off of the console meters, but we were making a record of what was going on on those meters through this multichart recorder. Multipen recorder, excuse me. Those records were not retained, to the best of my knowledge.

Q Are you aware of any records which were retained?

A No.

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Q Of any kind, written or --

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A I just hesitated there because I was trying to remember if the B&W simulator instructors may have been making notes or keeping a record of what was going on, and I don't recall that any notes were retained or were made by those people.

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Q Do you remember what assumptions you made in running this simulation with respect to decay heat?

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A The initialization of the simulator allows for that to be programmable with the initialization, and so I would have requested that it be at equilibrium fission product inventory since that was most representative of the core at Three Mile Island on that morning.

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Q Do you recall what, if anything, you did with respect to letdown?

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MR. KIRSCHBAUM: At any point during any of the simulations?

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MS. WAGNER: Yes.

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A The reactor trip procedure requires that the letdown be shut off, and so they, the operators, would have shut off the letdown as part of the normal response to the reactor trip.

Q Are you saying that that is what you did at

1  
2 the simulator?

3 A I am saying that is what I would have  
4 expected the operators to do.

5 Q Do you recall now whether that was part of  
6 the simulation?

7 A I don't recall.

8 Q You testified yesterday that you did not  
9 believe that plant operators could understand transient  
10 analyses but that they were interested in the outcome  
11 of transient analyses, as I recall.

12 To the best of your understanding, prior  
13 to the accident, did such a transient analysis  
14 underlie the loss of reactor coolant/reactor coolant  
15 pressure procedure?

16 A Yes.

17 Q It is correct that that procedure describes  
18 the automatic actuation of high pressure injection when  
19 plant pressure is below 1600 psig?

20 MR. KIRSCHBAUM: You say it describes.

21 You mean does it mention that that occurs?

22 MS. WAGNER: Yes.

23 A Yes, as well as a decrease in pressurizer  
24 level.

25 Q Did you have an understanding prior to the

1  
2 accident as to whether or not your operators understood  
3 enough of the transient analysis underlying the loss  
4 of reactor coolant/reactor coolant pressure procedure  
5 to understand why that automatic action occurred?

6 MR. KIRSCHBAUM: Objection because of the  
7 assumption that the automatic action occurred  
8 because of a transient analysis as opposed to  
9 being set to do that.

10 MS. WAGNER: If the witness thinks that  
11 that occurred in some manner that was contrary  
12 to what was required by the transient analysis,  
13 I guess he can tell me that.

14 MR. KIRSCHBAUM: I am not suggesting that.

15 A It is my belief that the operators  
16 understood before the accident at Three Mile Island  
17 that the hole which created the LOCA allowed system  
18 pressure to decrease and that the emergency core  
19 cooling system was called into play at about 1600  
20 pounds in order to protect the fuel from overheating.

21 Q Is it correct that the high pressure  
22 injection was designed to actuate at TMI-2 upon a loss  
23 of pressure to 1600 or below and not on a loss or a  
24 gain of pressurizer level?

25 A That is true, but the operator training

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was not clear on that point.

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Q Do you think the operators believed prior to the accident at TMI-2 that HPI was actuated based on pressurizer level?

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A No. They were just taught that the symptoms of a LOCA was decrease in both pressure and level, and that their follow-up actions were based on pressurizer level, so the controlling parameter for them, although they knew the initiating event was on pressure, the thing they had to take control of was based on pressurizer level.

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Q You have testified previously in this deposition that it was your understanding that if HPI actuated automatically, the operators were not to terminate HPI until LPI was actuated as described by the procedure for loss of reactor coolant/reactor coolant system pressure, B&W 272.

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MR. KIRSCHBAUM: Could you point out where in the prior testimony that is and let the witness see that?

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MS. WAGNER: I will.

Q I will show you the procedure. I would like to read into the record prior questions and answers. What I am going to read you are some



questions and answers which begin at the bottom of page 279.

"Question: Does Part B," and that refers to the loss of coolant procedure, "address circumstances or conditions under which HPI may be terminated after it has automatically actuated?"

"Answer: On page 10 of the procedure under Step 3.5, it gives you permission to throttle the high pressure injection flow and on page 10.2, Step 3.6.3 reads, 'Shut off HPI pumps.'"

"Question: What conditions have to be in effect for Section 3.6.3 to be applicable?"

"Answer: LPI has to be in service with a flow rate above 750 gallons per minute each."

Were you asked those questions and did you give those answers?

A Yes.

Q I would like you to show me any place in Part B of the loss of reactor coolant/reactor coolant system pressure procedure which tells the operator to terminate high pressure injection based upon pressurizer level.

MR. KIRSCHBAUM: Are you asking him to find those words in the procedure?



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2 MS. WAGNER: The words in the procedure.

3 (Record was read back.)

4 A I would not expect to find that instruction  
5 in Part B, because Part B is talking only about leaks  
6 that are greater than the capacity of the HPI system.

7 If you are going to look for that, you have  
8 to look at Part A, which is ruptures of sizes such that  
9 the HPI system can more than make up for the leaking  
10 water. So in fact, that instruction does appear in  
11 Part A, but I wouldn't even look for it in Part B.

12 Q Was it your understanding prior to the  
13 accident that the operators could follow Part A of this  
14 procedure after high pressure injection had automatically  
15 actuated?

16 MR. KIRSCHBAUM: You are assuming that the  
17 operators would have been in Part A and that HPI  
18 would have automatically actuated?

19 MS. WAGNER: No, I am not. I object to  
20 your interjection.

21 MR. KIRSCHBAUM: Would you read back the  
22 question.

23 (Record was read back.)

24 MR. KIRSCHBAUM: If you are refusing to  
25 clarify the question as I have asked, I will

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object to the form.

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A No.

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MR. KIRSCHBAUM: Objection; compound.

A I remember the B&W instruction to be as you have characterized it with the exception of the words "if possible."

Q So you did understand that the reason for this instruction or at least one reason for it was because of the potential for pressure spikes which might cause damage to the system?

A Yes.

Q Did think think that was a valid instruction?

A Yes.

Q You testified yesterday, I believe, that you had been told by a B&W instructor that personnel from Oconee had been criticized for allowing the plant, I guess the simulator, to go solid.

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Do you recall what was the condition of the plant at the time the operators had allowed it to go solid?

A It was critical and power was being increased into the power range.

Q Was the plant suffering a loss of coolant accident?

A No.

Q You testified yesterday in response to your counsel's questions that B&W taught you to use pressurizer level as an indicator of reactor coolant system inventory.

Is it correct that B&W taught you to use pressurizer level as an indicator of reactor coolant system inventory only in conjunction with RCS temperature and pressure?

MR. KIRSCHBAUM: Objection to the form.

MS. WAGNER: What is the basis of the objection?

MR. KIRSCHBAUM: Unclear what you mean in that question by "in conjunction with." Teaching in conjunction with or pressurizer level in conjunction with?

MS. WAGNER: The pressurizer level in

1  
2 conjunction with RCS temperature and pressure.

3 Q Is it correct that B&W taught you that  
4 when you were using pressurizer level as an indication  
5 of system inventory, you were to consider, while you  
6 considered pressurizer level, also, temperature and  
7 pressure of the reactor coolant system?

8 A In a strict interpretation of the word  
9 "inventory" which implies mass, both reactor coolant  
10 system pressure and temperature would have to be  
11 considered in conjunction with pressurizer level. As  
12 a rough indicator of inventory, pressurizer level is  
13 sufficient by itself.

14 MR. KIRSCHBAUM: The question was what  
15 B&W taught you.

16 MS. WAGNER: That's right.

17 Q I would like to clarify whether that was  
18 what B&W said to you.

19 A I don't recall that B&W instructed us in  
20 the simplification, but it follows logically from  
21 knowing the foundation of the word "inventory" and  
22 operating a pressurized water reactor.

23 Q So if I understand your testimony  
24 correctly, B&W did tell you to regard three things,  
25 that is, pressurizer level, RCS temperature and RCS

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pressure in order to determine system inventory?

MR. KIRSCHBAUM: Objection.

Q I am just not clear on your last answer.  
That is the reason for my clarifying question.

A I think B&W instructed us properly in  
how to arrive at an inventory. A result of that  
training is a realization by the operator that  
temperature and pressure make normally minor corrections  
to inventory as indicated by pressurizer level, and  
therefore it would be very natural for the operators  
to equate pressurizer level to inventory without going  
through the minor adjustments necessary for pressure  
and temperature.

Q Did you ever tell anyone at B&W that you  
knew that if bulk boiling occurred in the reactor  
coolant system, pressurizer level would rise and thus  
could be a misleading indicator of reactor coolant  
system inventory if taken alone?

MR. KIRSCHBAUM: Objection. No foundation  
that this witness knew that at any time during  
which he spoke to anyone from B&W.

MS. WAGNER: I object strenuously to your  
objection. It is contrary to the witness'  
testimony several times in this deposition.

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2 MR. KIRSCHBAUM: I don't believe it is.

3 MS. WAGNER: You can believe what you want.  
4 I guess his testimony is on the record.

5 MR. KIRSCHBAUM: I guess it is. I think it  
6 will speak for itself. I don't believe you should  
7 be making assumptions in the question. If you  
8 want to ask the witness a question based on a  
9 piece of testimony, point to that testimony with  
10 any testimony surrounding it and ask him the  
11 question or just ask the question.

12 MS. WAGNER: Could we have the question  
13 read back and typed in the record.

14 (Whereupon, the reporter read back the  
15 record as follows: "Question: Did you ever tell  
16 anyone at B&W that you knew that if bulk boiling  
17 occurred in the reactor coolant system,  
18 pressurizer level would rise and thus could be  
19 a misleading indicator of reactor coolant system  
20 inventory if taken alone?")

21 A I think the record is clear that I knew  
22 that fact when I was in the United States Navy and it  
23 never entered my conscious mind while I was assigned  
24 to TMI which is the totality of the time that I had  
25 been dealing with B&W. Since it was never in my

conscious mind while assigned to TMI, I certainly would think that I did not mention it to anybody at B&W.

Q You testified yesterday that between September 24, 1977 and March 28, 1979, Norm Elliott did not tell you anything about the event at Davis-Besse.

During that same time period, did Gary Miller tell you what he had learned about the event at Davis-Besse?

A I do not recall any such discussions with Gary Miller.

Q Did Jim O'Hanlon tell you what he had learned during that same time period about the event at Davis-Besse?

A I don't recall such conversations with Mr. O'Hanlon.

(Recess taken.)

BY MS. WAGNER:

Q Yesterday you testified at some length about how B&W draft procedures were turned into TMI procedures. I believe you said, among other things, that when Met Ed took the B&W draft procedures for Unit 1 and put them into the TMI format and made them plant specific, the substance of the procedure was not



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changed or was maintained in substance.

Do you recall generally that testimony?

A Yes.

Q I would like to show you now two documents.  
I would like to show you first B&W 418, a document  
entitled "Drawing Submittal Form," and behind that is  
a preliminary draft procedure DP-5120206, "Loss of  
Reactor Coolant/Reactor Coolant System Pressure" for  
Metropolitan Edison Company.

I also would like to show you a document  
which has previously been marked as B&W Exhibit 417  
which is the first draft by the PORC of Unit 1 of  
Emergency Procedure 1202-6, "Loss of RC/RCS Pressure."

I would like you to tell me whether you  
believe that these two procedures are in substance the  
same.

MR. KIRSCHBAUM: Just so I understand, you  
are asking the witness to compare them and based  
on the comparison he is performing today to say  
whether or not he believes they are in substance  
the same?

MS. WAGNER: No, he testified yesterday  
to quite a lot of knowledge of procedures and  
testified that based on that knowledge, he

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2 understood they were the same, and I wanted to  
3 ask him whether seeing the procedures now in  
4 front of him he believes that they are consistent  
5 with that testimony.

6 MR. KIRSCHBAUM: Did he testify concerning  
7 this procedure yesterday?

8 MS. WAGNER: NO, he testified concerning  
9 procedures in general. I will be happy to show  
10 you yesterday's testimony if you want to see it.

11 (Record was read back.)

12 MR. KIRSCHBAUM: Could you show the witness  
13 the testimony that you are referring to?

14 MS. WAGNER: Sure. Pages 495 and 496.

15 MR. KIRSCHBAUM: You are referring to the  
16 question beginning on page 493 and the answer on  
17 pages 495 and 496?

18 MS. WAGNER: I wasn't asking the witness  
19 for a clarification of that. I was drawing my  
20 characterization of his testimony from those  
21 pages, yes. Certainly, if the witness doesn't  
22 agree with that characterization, he should say  
23 so.

24 (Record was read back.)

25 A I believe my testimony yesterday was to the

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2 effect that the substance of the procedure was  
3 maintained in going from the B&W draft to the plant  
4 procedure. The first document I have in front of me,  
5 I believe it is 418, the B&W draft procedure, reflects  
6 that after this procedure was sent to Metropolitan  
7 Edison Company, it was commented on as requested by  
8 B&W and some 17 out of 19 comments that were made by  
9 the Met Ed staff were incorporated into the procedure,  
10 and this carries a date of mid-1970 or it.

11 B&W Exhibit 417, which is the plant  
12 procedure, carries a date of late '73, so in this  
13 particular instance which you called to my attention,  
14 well over three years passed between the time  
15 of the two documents I have in front of me. I don't  
16 know if there were any subsequent iterations between  
17 the two, but there was certainly a lot of knowledge  
18 gained between the time of these two documents, and  
19 while it is true that the B&W draft procedure starts  
20 out with sections labeled "Purpose," "Description,"  
21 "References," "Limits and Precautions" and "Set Points,"  
22 none of those sections are in the format of the Met Ed  
23 procedure, nor were they ever planned to be.

24 It is a section labeled No. 6 commencing  
25 on page 3 of the B&W draft entitled "Procedure" that

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2 I had reference to yesterday as the substance of the  
3 procedure and what should be preserved into our  
4 document. I have not made a line-by-line comparison  
5 but if you want me to, I will.

6 I would probably prefer if you wished to  
7 examine that, if you asked me the questions on the  
8 differences, and I can then respond if that is a  
9 substantive change or not.

10 Q I would like to refer you to the third page  
11 of Exhibit 418 which is the page on which the first  
12 page of the preliminary draft procedure appears.

13 Under the section entitled "Description,"  
14 there is a sentence which indicates, "However, the  
15 operator should assume the cause of the symptoms  
16 described above is a system rupture or leak, unless  
17 another cause can immediately be established."

18 I would like to ask you whether or not that  
19 part of the procedure, that idea, was maintained in the  
20 Met Ed draft which is B&W 417?

21 MR. KIRSCHBAUM: You are asking him for  
22 his present understanding based on a reading  
23 now of these two documents?

24 MS. WAGNER: Present understanding if he  
25 has a recollection. Certainly, any knowlege he

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has now.

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A I do not find that thought carried forward.

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Q You testified yesterday that prior to the accident at TMI-2, it was your understanding that there was a leak in one or both of the code safety valves which was causing the PORV discharge line to register a higher than normal temperature.

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How did you know that it was a code safety and not the PORV that was leaking?

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MR. KIRSCHBAUM: Asked and answered.

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A The highest of the three temperatures would be indicative of the leaking valve. If two of them were at the same temperature, then you could have two leaking valves, but since they have a common tailpipe and hence a common back pressure, the temperature exiting the valve will be the same for more than one leaking valve, and the highest temperature would be the indicator of the leaking valve.

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MS. WAGNER: I would like to have marked as B&W Exhibit 644, a series of four pages, each of which is entitled "Unit 1, Unit 2" and appears to be some type of periodic reporting document.

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(Series of four pages, each entitled "Unit 1, Unit 2" marked B&W Exhibit No. 644 for

1  
2 identification, as of this date.)

3 Q Have you ever seen the documents which are  
4 marked as B&W 644 before?

5 A I am familiar with the form. I have no  
6 recollection of seeing these particular forms.

7 Q When you were supervisor of operations  
8 for Unit 2, would you in the normal course of your  
9 business see these type of forms?

10 A They were filled out daily by the shift  
11 supervisors and sent to Reading as a status report.  
12 I am copied on them, and so I would have expected to  
13 see them on a daily basis.

14 Q The four pages which we have marked  
15 are dated respectively March 27, 1979, March 25, 1979,  
16 March 24, 1979 and March 23, 1979. Each of them  
17 indicates, among other things, under the Unit 2  
18 section, temperatures for RCV-1A, RCV-1B, RCRV-2.

19 Do you know what RCRV-2 is?

20 A The power operated relief valve.

21 Q On Unit 2?

22 A Yes.

23 Q The documents indicate, I believe, in each  
24 case that the temperature for RCRV-2 was in excess of  
25 130 degrees. Is that correct?

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A Yes.

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A That is true.

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A Yes.

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MR. KIRSCHBAUM: Always present when?

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MS. WAGNER: In the few days before the  
accident.

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MR. KIRSCHBAUM: On the days reflected in  
these sheets?



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2 MS. WAGNER: Yes.

3 A With the information that you present me  
4 on the daily status sheets, I would feel perfectly  
5 free to authorize a TCN to be written to the emergency  
6 procedure to remove that symptom, and the reason for  
7 that TCN would be that RCRV-1B was the leaking valve.

8 Q Did you execute such a TCN?

9 A Not to my knowledge.

10 Q In the absence of such a TCN, were the  
11 operators to regard the temperature of the PORV discharge  
12 line which was in excess of 130 degrees Fahrenheit as  
13 a symptom of an open PORV or leaking PORV?

14 A Negative.

15 MR. KIRSCHBAUM: Was your question intended  
16 to deal with the circumstances reflected in these  
17 status sheets?

18 MS. WAGNER: It was intended to reflect  
19 the circumstance which was present during the  
20 time period before the accident about which  
21 Mr. Floyd has testified previously.

22 Q Did it occur to you prior to the accident  
23 during the time period when the discharge line from the  
24 PORV was in excess of 130 degrees Fahrenheit that the  
25 operators could be confused because of the apparent

1  
2 symptom of an open or leaking PORV which was not to be  
3 regarded as such?

4 MR. KIRSCHBAUM: Objection to the form. No  
5 foundation.

6 A No.

7 Q No, it did not occur to you?

8 A It did not occur to me.

9 Q Looking at the pressurizer system failure  
10 procedure, B&W 305, does the procedure indicated under  
11 the section entitled "Symptoms" indicate any time  
12 period during which the discharge line temperature  
13 must exceed the normal temperature before it should  
14 be considered a symptom?

15 A No.

16 Q You testified yesterday that you believed  
17 prior to the accident that the operators at TMI-2 were  
18 able to identify or diagnose a failed open PORV  
19 provided the PORV failure was an isolated failure or  
20 words to that effect.

21 Do you recall that?

22 A Yes.

23 MR. KIRSCHBAUM: I think you might want  
24 to refer to that testimony. I am not sure that  
25 reflects it properly.

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MS. WAGNER: Rather than actually looking

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back --

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Q Did you understand that your operators could identify an open PORV, failed open PORV, prior to the accident?

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A When PORV failure was in isolation, yes.

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Q Was it your understanding prior to the accident that the operators at TMI-2 would only be able to diagnose a failed open PORV if it were to occur in isolation?

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A No.

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Q Did you believe your operators would not be able to diagnose a failed open PORV if, in conjunction with a failed open PORV, the system they were operating suffered a total loss of all main and emergency feedwater?

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MR. KIRSCHBAUM: Are you asking if he thought about this before the accident?

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MS. WAGNER: That is my first question.

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A Before the accident, I felt comfortable that my operators were properly trained, and that includes responding to a transient with a single failure which is what you are proposing in this specific case here.

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2           So in the general sense that I thought  
3 they were properly trained, yes, I would give them  
4 credit for that specific instance.

5           Q     Are you saying you would expect them to  
6 diagnose an open PORV in conjunction with a total loss  
7 of feedwater or you wouldn't have expected that before  
8 the accident?

9           I don't understand your answer.

10          A     I would have expected them to diagnose it  
11 properly.

12          Q     You testified yesterday that for reasons  
13 based upon your work with a radiation monitor at TMI-1  
14 in 1973, I believe you said, and because of the  
15 calculations you performed at that time, you understood  
16 when you heard the readings from HPR-227 on the day  
17 of the accident that some portion of the cladding had  
18 failed at TMI-2.

19               Is that correct?

20          MR. KIRSCHBAUM: Is that correct that was  
21 his testimony?

22          MS. WAGNER: No, is it correct that that  
23 statement reflects --

24          MR. KIRSCHBAUM: My objection is that is  
25 not his testimony.

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2 MS. WAGNER: I am asking if that is correct  
3 apart from what he testified.

4 (Record was read back.)

5 A It was the calculation that I had made on  
6 the Unit 1 on the maximum hypothetical accident which  
7 enabled me to arrive at the conclusion in the morning  
8 of March 28, 1979, that some portion of the cladding  
9 had failed.

10 Q Did you understand prior to the accident  
11 that the procedure for loss of reactor coolant/reactor  
12 coolant pressure at TMI-2 identified as a symptom  
13 unique to a loss of coolant accident the alarming of  
14 HPR-227?

15 MR. KIRSCHBAUM: You mean unique as opposed  
16 to some other event or unique as opposed to all  
17 other events?

18 MS. WAGNER: I mean was it a symptom unique  
19 to a LOCA as opposed to being a symptom of some  
20 other event.

21 MR. KIRSCHBAUM: Some unspecific event?

22 MS. WAGNER: Any other event.

23 A I believe the emergency procedure entitled  
24 "Loss of Reactor Coolant/Reactor Coolant System  
25 Pressure" listed the reactor building high radiation

1  
2 and/or temperature alarm as a possible cause. I would  
3 like to change the word "cause" to "symptom." The last  
4 word "cause" to "symptom."

5 Q Was it your understanding prior to the  
6 accident that persons other than yourself at Metropolitan  
7 Edison understood that if HPR-227 went into an alarm  
8 condition, that was a symptom of a loss of coolant?

9 A I believe that the licensed operators at  
10 TMI-2 before the accident were trained to recognize  
11 a LOCA by observing a decreasing reactor coolant system  
12 pressure and decreasing pressurizer level and that that  
13 event, a combination of those two events, could be  
14 precipitated by any of three transients in the plant,  
15 and that once they saw those two indications, then to  
16 differentiate which of the three events was causing  
17 it, they were directed to look at HPR-227 particulate,  
18 iodine and gaseous radiation monitor.

19 Q I take it it was your understanding before  
20 the accident that should they look at that monitor,  
21 they would understand what it meant, even though they  
22 had not had your particular background with respect  
23 to calculating the maximum accident and the other  
24 things you mentioned in your prior testimony?

25 A I would expect them to respond to an

1  
2 HPR-227 alarm in isolation in the time immediately  
3 prior to the accident as being more symptomatic of  
4 a rupture of a reactor coolant drain tank rupture  
5 disk than a LOCA, especially if they didn't see both  
6 pressure and level in the pressurizer decreasing  
7 together and rapidly.

8 Because of the leaks that we had into the  
9 reactor coolant drain tank, it was full of reactor  
10 coolant, and if that rupture disk would blow, it would  
11 probably give you an alarm on HPR-227.

12 Q Did you think the operators prior to the  
13 accident at TMI-2 understood that an alarm on HPR-227  
14 was an indication of radiation release of some kind  
15 from the reactor coolant system? I am not referring  
16 now to an accident particularly. I am referring to --

17 A It is not quite as firmly connected as you  
18 imply with your question. HPR-227 is looking at the  
19 atmosphere inside the reactor building, so when an  
20 alarm on that channel says there are curies released  
21 in that building, the highest source of curies in that  
22 building is the reactor coolant system, but it does  
23 not disallow some other source for that radiation, such  
24 as a chemist dropping a vial of radioactive material  
25 on the floor.



(Recess taken.)

BY MS. WAGNER:

Q To go back to your testimony about the pressurizer system failure procedure and its application during the period before the accident when a leak was causing the discharge line on the PORV to be above 130 degrees Fahrenheit, is it your testimony here that despite the fact that the temperature on the discharge line was above 130 degrees and despite the fact that there was no temporary change notice in effect with respect to the pressurizer system failure procedure that the operators were free to disregard that procedure?

MR. KIRSCHBAUM: Objection. I don't believe the witness testified whether there was or wasn't a temporary change notice in effect.

A I think the answer to that question is no, but let me put it into my own words and maybe it will be a little clearer. The procedure under question is a procedure that is important to nuclear safety, and therefore changes to it are reviewed by the PORC and signed by the unit superintendent, and even if a two-man TCN was put into effect, it would receive that same review after the fact, so until that paper

1  
2 existed, the operators were not free to respond in a  
3 mode contrary to this procedure.

4           However, the 130 degrees is only one of  
5 the symptoms listed, and as such, it may not justify  
6 entering the procedure based on one symptom.

7           Q       So is it your testimony that this was  
8 in the time period before the accident still a symptom  
9 to be considered a symptom of a failed open PORV or  
10 a leaking PORV whether or not that symptom taken alone  
11 would require you to enter the action statement of  
12 the procedure?

13           MR. KIRSCHBAUM: Objection to the form.

14           I don't understand the question.

15           A       Let me try. The 130 degrees, a  
16 temperature greater than 130 degrees that existed on  
17 the tailpipe of the PORV in the days immediately  
18 preceding the accident at Three Mile Island was not  
19 indicative of a leaking PORV nor should it have been  
20 considered indicative of a leaking PORV by the plant  
21 operators.

22           If for some strange chance they felt so  
23 obligated, that assumption by itself would not justify  
24 entering this procedure.

25           Q       Do you have the procedure in front of you,

1

2 the pressurizer system failure procedure?

3 A Yes.

4 Q Do you see under Section A8.1, "Symptoms,"  
5 that it is indicated that a symptom of a leaking PORV  
6 is relief valve discharge line temperature exceeding  
7 the normal 130 degrees Fahrenheit?

8 A Yes, I see that.

9 Q Is it correct in the time period before  
10 the accident when something was causing the PORV  
11 discharge line to be heated in excess of 130 degrees  
12 Fahrenheit that that was a condition which fell within  
13 this symptom?

14 A That is true. It is a condition that fell  
15 within this symptom, but I am saying that one symptom  
16 by itself is not necessarily justification for  
17 jumping into a procedure.

18 Q I understand that. I am asking whether the  
19 symptom remained a valid symptom in the days prior to  
20 the accident pursuant to this procedure.

21 MR. KIRSCHBAUM: What do you mean "valid  
22 procedure"?

23 MS. WAGNER: That it was not changed by  
24 any TCN.

25 A I don't know if there is a valid TCN on

1  
2 this procedure or not at the time of the accident.

3 Q If there was no valid TCN or TCN of any  
4 kind, and whether or not the presence of the symptom  
5 would cause you to go into this symptom or not, would  
6 it nevertheless still be considered a symptom, or is  
7 there something in your testimony which is telling me  
8 for some reason it was no longer a symptom?

9 MR. KIRSCHBAUM: Objection. Asked and  
10 answered.

11 I think the witness has made very clear --

12 MS. WAGNER: I am not trying to irritate  
13 you or the witness. I guess I don't think it  
14 is clear.

15 MR. KIRSCHBAUM: I am not suggesting you  
16 are trying to irritate anyone. But I am objecting  
17 that the question has been asked and answered  
18 I believe more than once.

19 A I would have to say that in the temperature  
20 range from 130 degrees to whatever temperature was  
21 indicated on RCRV-2 on these data sheets, for instance,  
22 that that would not be a valid symptom for that  
23 temperature range, because it was already at that  
24 temperature as indicated by these data sheets without  
25 it leaking.

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Q Was that fact used to amend the procedure,  
3 to the best of your knowledge?

3

4

MR. KIRSCHBAUM: Asked and answered.

5

A I don't know.

6

Q I am asking you if it was not used to amend  
7 the procedure, as I believe it was not, whether that  
8 simple fact which you testified to is sufficient to  
9 permit the operators to consider that that is no longer  
10 a symptom of a failed open PORV even though this  
11 procedure says that it is a symptom of a failed open  
12 or leaking PORV.

13

MR. KIRSCHBAUM: Objection to the form.

14

To the extent I can understand the question, I  
15 believe it has been asked and answered at least  
16 three times.

16

17

If it is a new question, I don't understand

18

it.

19

(Record was read back.)

20

Q Let me make it clear. You testified, as  
21 I understand, that it was your understanding prior to  
22 the accident that a code safety was leaking and as a  
23 result of that there were high discharge temperatures,  
24 discharge line temperatures on the discharge line from  
25 the PORV. Correct?

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A Yes.

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Q And it was your understanding that the PORV itself was not leaking?

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A True.

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MR. KIRSCHBAUM: Asked and answered.

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Q Assuming all the facts that are in your

answer, for the time period before the TCN was issued,

1  
2 was it your understanding that the operator was  
3 obligated to regard this symptom as still a symptom as  
4 described in this procedure?

5 A It is still a symptom. It is still to be  
6 regarded by him, and even though it is being regarded  
7 by him, it doesn't force him to enter this procedure  
8 based on that single symptom.

9 Q Is it correct that the pressurizer system  
10 failure procedure also addresses the issue of leaking  
11 code relief valves?

12 A Yes, it does.

13 Q Is it correct that one of the follow-up  
14 actions when a leaking code relief valve is diagnosed  
15 is "Place code relief discharge line temperatures on  
16 an analog trend recorder"?

17 A Yes.

18 Q What is an analog trend recorder?

19 A It is a single point recorder-- there are  
20 four of them -- mounted on the left-hand side of the  
21 operator's console for the Bailey 855 digital computer  
22 which can be programmed to accept most recorded  
23 parameters in the nuclear steam supply system.

24 Q Is it correct that that recorder produces  
25 a strip chart?



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A Yes.

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Q And is it correct that the purpose of Step No. C3 to the pressurizer system failure procedure, a step which says "Place code relief discharge line temperatures on analog trend recorder," is to permit the operators to see on a strip chart what is happening to the temperatures at the discharge of the code safety?

A It may have been placed in there to create a continuous record as opposed to make it more visible to the operator.

Q To the best of your knowledge, in the time period prior to the TMI accident when you had diagnosed that a code relief valve was leaking, was the code relief discharge line temperature put on an analog trend recorder?

A I don't know if it was placed on or was not placed on.

Q You do not today have knowledge of any such strip chart?

A Nor have I looked for any such strip chart.

Q Again, to return to the loss of reactor coolant/reactor coolant pressure procedure, do you have that in front of you?

1  
2 A Yes.

3 Q The procedure indicates at page 1.0 that  
4 one of the ways in which an operator may distinguish  
5 between a loss of coolant inside containment, an  
6 OTSG tube rupture, and a steam line break is that if  
7 there is a loss of coolant inside the reactor building,  
8 a particulate, iodine and gas monitor alarm on HPR-227  
9 will exist.

10 Did you understand prior to the accident  
11 that if HPR-227 did alarm, this procedure required  
12 that the operator consider that a symptom of a loss of  
13 coolant inside reactor building?

14 A Yes. In fact, these words are exactly  
15 right in here. It is a loss of coolant inside the  
16 building, not a loss of coolant accident.

17 MS. WAGNER: I have no further questions  
18 today.

19 I would like to reserve the right to recall  
20 Mr. Floyd in the event that the order concerning  
21 the testimony given to the ACRS about the  
22 alleged cheating is changed, but other than that,  
23 I have no further questions.

24 MR. McBRIDE: There is an error in the  
25 acronym in there. This is ASLB, Atomic Safety and

Licensing Board.

MS. WAGNER: Thank you.

MR. KIRSCHBAUM: We would have to take any such request under advisement at the time based on whatever circumstances existed then.

I would like a couple of minutes for possibly asking some brief questions on recross.

(Recess taken.)

BY MR. KIRSCHBAUM:

Q Did you have an understanding before the accident that if an operator were in doubt about the action to take with a transient, he should take action to insure that the core was covered?

A Yes.

Q Before the accident, did you understand that in order to insure that the core was covered in such circumstances, the operators should in all cases allow the engineered safety features to run without interruption?

MS. WAGNER: Objection.

A In all cases except where pressurizer level was visible.

Q Why is that?

1  
2 A That would be indicative that the core  
3 was covered.

4 Q If pressurizer level were full, is it your  
5 understanding that the operators would not have been  
6 required to allow emergency engineered safety features  
7 to run without interruption?

8 MS. WAGNER: Objection.

9 A Yes.

10 Q You were asked several questions on  
11 redirect examination about your understanding of B&W  
12 Exhibit 418 which is a B&W draft procedure for loss of  
13 reactor coolant/reactor coolant system pressure. As  
14 you understand this procedure, under what circumstances  
15 does it apply?

16 A I read from Section 2 of the procedure  
17 called "Description." This procedure describes the  
18 action to be taken "in the event of a sudden and rapid  
19 unexplained decrease in reactor coolant system pressure  
20 and pressurizer level caused by a leak or rupture in the  
21 high pressure envelope of the primary system."

22 Q Ms. Wagner read you the sentence on the  
23 third page of the exhibit which reads as follows:

24 "However, the operator should assume the  
25 cause of the symptoms described above is a system

1  
2 rupture or leak unless another cause can immediately  
3 be established."

4 What do you understand that to mean in  
5 the context of this procedure?

6 MS. WAGNER: Objection.

7 A I understand that to mean if you have a  
8 LOCA, then the statement which you just read would  
9 apply.

10 Q Does B&W Exhibit 418 provide any guidance  
11 as to when you would or would not have a LOCA?

12 MS. WAGNER: Objection. You mean other  
13 than the sentence which you just read?

14 MR. KIRSCHBAUM: Including or other.

15 A The first symptom listed on page 3 of the  
16 procedure says, "Pressurizer level and reactor coolant  
17 system pressure decrease initially," et cetera, et  
18 cetera.

19 Q Would the sentence I quoted to you before  
20 and which Ms. Wagner quoted to you apply in a situation  
21 in which pressurizer level was high while system  
22 pressure was low?

23 A No.

24 MS. WAGNER: Could we get a clarification  
25 here. Are you asking the witness for his

1  
2 interpretation today of this document or his  
3 recollection?

4 MR. KIRSCHBAUM: I am asking for his  
5 interpretation today of this document because I  
6 don't think it has been established by you or me  
7 that he ever saw this document before.

8 Q Is B&W Exhibit 417, which is the TMI-1  
9 Emergency Procedure 1202-6, Revision 0, different in  
10 substance from B&W Exhibit 418 on the issue of the  
11 existence of a LOCA?

12 A No.

13 Q Was it your understanding in the days  
14 leading up to the accident on March 28, 1979 that  
15 Section A of Emergency Procedure 2202-1.5 applied, or  
16 was it your understanding that it did not apply?

17 A It did not apply.

18 Q You testified on redirect examination that  
19 an alarm on HPR-227 was a symptom of a loss of coolant  
20 within the reactor building but not necessarily a loss  
21 of coolant accident.

22 Could you explain what you meant by that  
23 distinction?

24 A If it were indicative of a loss of coolant  
25 accident, you would want to enter the loss of coolant

1  
2 accident procedure. If it is an indication, as it  
3 really is, of a loss of coolant, then you need to  
4 isolate that source of coolant before you enter the  
5 procedure, and that source of coolant could well have  
6 been reactor coolant drain tank which has reactor  
7 coolant in it normally.

8 MR. KIRSCHBAUM: No further questions.

9 (Recess taken.)

10 BY MS. WAGNER:

11 Q Your counsel asked you a couple of questions  
12 about B&W 418, the description section. Is it correct  
13 that the second paragraph of the description section  
14 begins, "These initial symptoms could be caused by a  
15 malfunction of the makeup system or by steam line  
16 rupture as well as by a loss of coolant from the  
17 reactor coolant system. In addition, a dropped control  
18 rod could cause a short but appreciable drop in  
19 RC system pressure"? It goes on to describe actions  
20 to be taken in the event of various other transients  
21 including steam supply system rupture and loss of  
22 reactor coolant makeup.

23 The paragraph ends, "However, the operator  
24 should assume the cause of the symptoms described above  
25 is a system rupture or leak unless another cause can



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be immediately established."

Is that correct?

MR. KIRSCHBAUM: Is that correct that that  
is what it says?

MS. WAGNER: Yes.

A Yes.

Q Was HPR-227 a continuous alarm in the days  
preceding the TMI-2 accident?

A I don't know.

MS. WAGNER: Thank you very much.

(Time noted: 5:05 p.m.)

James R. Floyd

Subscribed and sworn to before me  
this day of 1982.

CERTIFICATE

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

I, JOSEPH R. DANYO, a Notary  
Public of the State of New York, do hereby  
certify that the continued deposition of  
JAMES R. FLOYD was taken before  
me on Friday, April 30, 1982 consisting  
of pages 529 through 626 ;

I further certify that the witness had  
been previously sworn and that the within  
transcript is a true record of said testimony;

That I am not connected by blood or  
marriage with any of the said parties nor  
interested directly or indirectly in the matter  
in controversy, nor am I in the employ of any  
of the counsel.

IN WITNESS WHEREOF, I have hereunto set my  
hand this 15 day of May, 1982.

Joseph R. Danyo  
JOSEPH R. DANYO

## I N D E X

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## E X H I B I T S

B&W NUMBER		FOR IDENT.
642	Stipulation carrying cover sheet order signed by Gary L. Milhollin, Administrative Judge and Special Master, the Atomic Safety and Licensing Board, Docket No. 50-289, approved on November 12, 1981	538
643	Order dated November 17, 1981 of the Atomic Safety and Licensing Board of the Nuclear Regulatory Commission, Docket No. 50-289, in the matter of Metropolitan Edison Company, Three Mile Island, Nuclear Station Unit 1 signed by Ivan W. Smith, Administrative Law Judge and Chairman of the Board	538
644	Series of four pages, each entitled "Unit 1, Unit 2" dated respectively March 27, 1979, March 25, 1979, March 24, 1979 and March 23, 1979	600