UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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

Plaintiffs,

v. 80 Civil 1683 (RO)

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

Defendants.

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November 22, 1982

10:15 a.m.

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(Trial resumed.)

W I L L I A M H. Z E W E, resumed.

THE CLERK: You are still under oath, Mr. Zewe.

DIRECT EXAMINATION (CONTINUED)

BY MR. KLINGSBERG:

Q. Mr. Zewe, I want to pick up, more or less, where we left off in the last session. You testified about -- transcript page 2116 -- about cycling the PORV block valve in order to feed and bleed the primer.

Would you explain for the Court, please, what that process is?

A. At the time the reactor coolant system temperatures were high and natural circulation didn't seem to be taking place. We had tried to start the reactor coolant pump at that point and were not able to do so. So we were concerned about the high temperatures.

We weren't concerned whether the core was covered or not because we had a full pressurizer level at that point or a high pressurizer level at that point, but we were concerned that we may not be cooling sufficiently because of our high temperatures that we had seen at the hot legs.

So we decided to do the feed and bleed operation and put on, as I remember, around 200 gallons per minute of makeup water from the makeup system for the BWST, through the high pressure injection legs, into the RCS, and then to open up the PORV block valve when the pressure rose to around 2,200 pounds and then to reclose the block valve again when the pressure went down under 2,100 pounds, then allow the pressure to build up again to 2,200, open it up again and reclose it at 2,100 pounds.

We did this because we wanted to insure that we had some flow that was going into the reactor coolant system and then bleeding it out of the pressurizer to be sure in our mind that we were having some cooling flow through this system to try to cool down because of the high

temperatures that we had.

THE COURT: This is after 6:20?

THE WITNESS: Yes, it is.

Q. Can you place, as best you recall, the approximate time period during which the feed and bleed operation was taking place?

A. I don't recall the exact time period, except that it was some time after we had declared the general emergency, which would put it somewhere after 7:30.

Q. For about how long did that process take place?

A. As I recall, about a couple of hours.

Q. Who was in the control room during the discussions initiating the feed and bleed operation?

A. Myself, Mr. Scheimann, Mr. Faust, Mr. Frederick, Mr. Ross, Mr. Logan, Mr. Mehler, Mr. Kunder, Mr. Miller. At some point in time during that Mr. Seelinger, Mr. Rogers --

Q. Rogers from Babcock & Wilcox, the site representative?

A. Yes. There were several other people from the emergency planning group now because we were into a general emergency, so there were more people that arrived in order to help with the communications. Mr. Crawford was there and there were several others, though I don't recall exactly when they came in.

Q. Did you have any conversations or were you

present at any conversations in which Mr. Rogers participated during this period of time?

MR. FISKE: Your Honor, I object to this. I don't see what the relevance is to conversations with Mr. Rogers some time after 7:30.

THE COURT: What is the relevance of this?

MR. KLINGSBERG: The relevance, your Honor, is that they would not have initiated this feed and bleed operation if they thought that there was any danger that the core was uncovered or that the pressurizer level was not the accurate indicator of water level.

Mr. Rogers was present and participated in and agreed with these discussions to feed and bleed and agreed with the conclusion that the pressurizer level was the appropriate indication of level in the system.

MR. FISKE: Your Honor, this is long after the core damage had occurred.

THE COURT: Is there any contention that that is not so?

MR. KLINGSBERG: There is going to be testimony, your Honor, as to when the final core damage occurred, and it was not an immediate thing; it was a progressive thing. The experts will testify based on a lot of data as to the progression of core damage. It wasn't an instantaneous thing.

THE COURT: Mr. Fiske, your objection really is one to relevance, is it not?

MR. FISKE: Exactly.

THE COURT: Then I will take it and I will hear hereafter whether it has any relevance or not. Go ahead.

Q. Did you have any conversations with Mr. Rogers during the course of the morning?

A. I did.

Q. Was Mr. Rogers present during the discussion of and the decision to feed and bleed?

A. Yes, he was.

Q. Can you tell us the substance of that discussion concerning the feed and bleed?

A. Throughout the morning after Mr. Miller arrived and relieved me as the emergency director, he formed a group of individuals whereby that group would relay to him information that he requested, and based on the group discussions, then, he would make a decision on what the next course of action was. In that group was myself, Mr. Ross and Mr. Kunder, Mr. Seelinger, Mr. Rogers, Mr. Mehler.

In the process of thinking out loud, making suggestions, having input from everybody, Mr. Rogers was aware and participated in conversations and discussions, and, as I remember, he was in complete agreement with the decision to start the feed and bleed operation as Mr.

Miller had directed.

Q. Did Mr. Rogers say anything else about the status or condition of Three Mile Island Number 2 nuclear system during the course of the morning, that you recall?

A. Throughout the morning and the day he had a lot of inputs and suggestions to me as an individual and to others. I do recall one comment that he made to me about -- that the damage that had occurred wasn't that serious, that he thought that the plant would be able to restart within a couple of weeks.

THE COURT: Rogers was who, again?

THE WITNESS: He was the site B & W representative.

Q. To your recollection, did anyone in the control room in the discussions of the feed and bleed situation suggest any alternative means of core cooling?

A. Yes. Prior to the feed and bleed operation it was recommended that we try to start the reactor coolant pump, which we were unable to do so, and the feed and bleed was the next operation that we tried.

Then after performing that for a couple of hours it was decided to depressurize the plant, have the coolant flood tanks dump in and to try to get down on to decay heat removal flow at a lower pressure.

Q. During the discussion of the feed and bleed, did

anyone suggest that you should leave the HPI on full blast and close the block valve and have the PORV closed so as to fill up the system?

A. No. The direction was to cycle the PORV block valve and to have a flow rate in the neighborhood of 200 gallons per minute during that period of feed and bleed.

Q. Could you explain for the Court the depressurization core flood process that you mentioned in your previous answer?

A. We were trying to get down to a lower pressure at which we could use decay heat removal, and we needed to get down less than 400 pounds in order to satisfy the interlocks on the decay heat system to draw from the reactor coolant system or to try to cool down itself with the decay heat removal.

So in order to do that we needed to depressurize the primary plant, so we opened up the PORV block valve and left the block valve open, which enabled the plant then to depressurize down to below 600 pounds, at which point the core flood tanks would start to transfer their water under the 600 pounds pressure into the RCS, and then we continued to try to depressurize down as low as 420 or 430 pounds. That is as low as we were able to depressurize to. The plant stabilized pretty much around 420 or 430 pounds.

MR. KLINGSBERG: I'd like to mark several

exhibits at this point. Exhibit 2084, which contains the control room computer alarm output.

Exhibit 2082, which is a segment of the report of the Nuclear Regulatory Commissions special inquiry group containing a sequence of events.

Exhibit 2080, which is an investigative report of the United States Nuclear Regulatory Commission, investigation into the March 28, 1979 Three Mile Island accident by the Office of Inspection and Enforcement, sometimes referred to as NUREG 0600; again, the portion containing a sequence of events.

Exhibit 2081, analysis of Three Mile Island accident, Unit Number 2, by the Nuclear Safety Analysis Center, sometimes known as NSAC, again the portion containing a sequence of events.

Finally, Exhibit 2079, which is a GPU nuclear technical data report pertaining to the Three Mile Island accident, again the portion containing the sequence of events.

MR. FISKE: Your Honor, I have no objection to these documents being marked for identification and I may not have objection to certain of them being offered in evidence, but I may have objection to others if they are going to be offered in evidence.

Q. Mr. Zewe, I'd like to direct your attention

first to Exhibit 2084. Can you identify that document, please?

A. Yes, it is a copy of the alarm printouts from the plant computer on 3/28/79.

Q. Did you look at the alarm computer output at any time during the course of the accident on March 28?

A. Yes, I did. I looked at it on a number of occasions to try to ascertain what the status was of the various alarms, but for the most part I did not use it because of the great number of alarms that it had and the fact that it was so far behind actual time.

(Continued on next page.)

Q. Is the alarm printer output commonly used by nuclear plant licensees and operators to reconstruct what occurred?

MR. FISKE: You mean during the accident?

MR. KLINGSBERG: No, after the accident or a transient or the event.

MR. FISKE: I will object to the question unless it is limited to what they did at GPU.

THE COURT: That's sustained.

Q. What did you mean when you said it was so far behind the actual time?

A. There were a very large number of alarms that the computer was printing out and the computer typewriter is only capable of printing so many alarms per second. And the number of alarms occurring at the same time was so large that the computer started to get backlogged.

It was printing alarms at any particular time that where alarms that had occurred 20 minutes before or a half hour before or even an hour before that.

That is the reason why I did not use it very much because I was more interested in what the current data was and not what it was an hour ago.

Q. Would you explain, in general, what is reflected in Exhibit 2084?

A. Well, the computer has many thousands of inputs

and in the course of monitoring these inputs it would then print up certain status conditions of the components that it monitors, whether it was in high alarm, in low alarm, whether the component status was running, whether it had tripped. It just gave an alarm status of what the component was and what the computer monitors for each piece of equipment varied on what the piece of equipment did.

If it was a level alarm, it would indicate if it was a high level or if it was a low level alarm or a normal condition once the high or low cleared.

If it was a pump, for instance, or a motor, it would indicate whether the pump was on or whether it was off. And if it had started automatically or if it hadn't started automatically or if it had tripped manually or had tripped automatically. So it really varied depending on its input for that paramater in that component.

Q. Now, you mentioned -- let me direct your attention to page 71 of Exhibit 2084.

THE COURT: Let me ask you a threshold question.

Apparently, we have established that Exhibit 2068 is way off in terms of its times in certain particulars.

Now, is 2084 accurate in terms of its times or inaccurate in terms of its time?

THE WITNESS: It would be accurate for the time.

As the computer monitored that paramater, it would be accurate, just that in printing information out, it was very backlogged.

THE COURT: In other words, when it says six o'clock, it means six o'clock?

THE WITNESS: Yes, actual clock time. But it may not have printed that out until a quarter after seven or so.

THE COURT: You would be making four-hour adjustments in terms of pressurizer level on this disk chart on 2068, as you understand it?

THE WITNESS: Correct.

THE COURT: Go ahead.

Q. Would you turn to page 71, please.

A. Are the pages marked in the lower right-hand corner?

Q. Marked in the lower right, yes. There is a stamp.

Let me give you another copy.

A. Okay.

THE COURT: Page 71, we're at it.

THE WITNESS: I have that page.

Q. Now, what time would 13:50 be?

A. Ten minutes to two in the afternoon.

Q. Now, you testified from your recollection at

page 2116 on Friday that -- 2115 to 16 -- there was an automatic initiation of the high pressure injection on reactor building pressure when you were cycling the block valve and then the hydrogen burn at ten minutes to two or so in the afternoon was another time.

Could you tell us whether or not there is at ten minutes to two any indication on the computer run, Exhibit 2084, regarding this bit of testimony?

A. It shows that at 13:50:21 contact 3278, 79 and 80 show that the ES building isolation switch actuation B channel one, two and three had tripped. That would indicate that the reactor building had gone above the trip set point for the reactor building pressure switches which are set nominally at four pounds.

That would indicate to me that at that point the reactor building went above four pounds.

Q. What does this indicate concerning the actuation of high pressure injection at full flow?

A. Well, what I just described shows actuation channel B. Underneath that, contact 2833, 2834 and 2835 show that actuation A went.

So you have the A and the B RB isolation and cooling at four pounds. That automatically actuates high pressure injection as part of that logic. It shows that contacts 2218, 19 and 20, show that the emergency injection

groups, one, two and three went on the A side and contact monitor 2852, 53 and 54 show that the -- I'm sorry -- 2843, 44 and 45 show that the B actuation logic for emergency injection actuated.

So that you had both A and B actuations of RB isolation and cooling and also A and B high pressure injection at that point.

Q. And when A and B pumps go on, what, if anything, happens to C pump, make-up pump?

A. The logic is such that when you have the ES actuation, the A and C pumps should automatically start and the B pump, if it is running, will stop.

If the A or the C pump did not start, B would start in its place. But normally you would have just the A and C running after full actuation, just like had occurred at 4:02 or 4:03 in the morning.

Q. This was at ten of two then an automatic actuation of high pressure injection at full flow?

A. Yes, it was.

Q. Was this one of the three full flow automatic HPI actuations that you mentioned in your testimony last week?

A. It was.

Q. Now, you testified at page 2123 about an actuation which you said was about eight o'clock, around

eight o'clock.

Would you turn to page 39 of Exhibit 2084?

A. I have that page.

Q. Could you explain entries at about 7:56 insofar as they relate to that event which you testified last week?

A. Yes.

It is much like the previous example here at 07:56:16 you have the three channels of B actuation for high pressure injection and then you have the three channels of B reactor building cooling and isolation.

Then further on down the page at 07:56:23 you have the A channel logic for the emergency high pressure injection followed by the A channel of RB isolation and cooling.

So, again, you have building isolation and cooling and you have full high pressure injection actuation.

Q. And that came on automatically?

A. Yes, it did.

Q. Now, that was the second of the three automatic actuations about which you testified?

A. Yes. That was two of the three, yes.

Q. And would you turn to page three.

Are there entries on that page which reflect the automatic actuation of high pressure injection at full flow about which you testified at some length right after the

accident started?

A. Yes, there is.

At 04:02:39 it shows that there was three of the A channel followed by three of the B channel emergency high pressure injection.

Q. Now, on the page where it says 04:02:41 2991 MUP PSI motor status. What does that refer to?

A. 2991, okay.

Q. At 04:02:41?

A. That's a contact that monitors the C make-up pump to determine whether the pump was tripped, running or at normal. And here it printed out normal.

Q. Now, I would like to direct your attention to page 31.

Now, you testified last week, did you not, about three automatic full flow actuations and one manual full flow actuation of HPI; is that correct?

A. Yes, that's right.

Q. Do you remember that there was only one full flow manual actuation?

A. That is all that I recall, yes.

Q. Now, is there anything on page 31 which refers to a full flow manual actuation of high pressure injection?

A. Yes.

At 07:20:22 it shows there the ES actuation, and

it goes through three of the A actuation groups and three of the B actuation groups and it is characterized by tests in the far right column. That signifies that the manual push buttons were initiated.

On the other ones it had actuation indicating that it had happened automatically.

Q. Now, I direct your attention to about 7:25, does that indicate anything relating to the high pressure injection?

A. Yes. It shows at 7:25:37 that the operator there and a couple of other lines down that the operator went to bypass on the ES actuation.

Q. As you have explained, bypass does not do anything to the flow, it just enables you to shift from the automatic to the manual; is that correct?

A. Right. It doesn't change any status of the components. It allows operator action to then take manual control.

Q. Now, would you turn, please, to 7:37.

Is there anything there in regard to the operation of the high pressure injection system that's on page 34.

A. I don't have page 34.

THE COURT: I don't have it either.

MR. KLINGSBERG: Is it missing from your Honor's

copy?

THE COURT: Yes.

Q. Why don't you just say what it says and then we'll show the court the entry in your book.

A. You are asking if at 7:37 it shows any ES AS input?

Q. Yes.

A. At 07:37:37 it shows the make-up pump 1-C motor status as tripped, indicating that the pump at that point was off.

Q. Would you show that to his Honor?

THE COURT: All right.

Q. Does that refer to the process which you have referred to as throttling?

A. Yes, it is.

THE COURT: It is included?

THE WITNESS: It is included in that, yes, sir.

Q. It doesn't mean that the whole system was shut off?

A. No, it doesn't.

The operator would first take control of the valves and throttle them back and then when he had a flow within the capability within one operating pump, then he would secure the other pump and then throttle as he needed to.

Q. Now, we've seen three automatic actuations of HPI at full flow and one manual initiation of HPI at full flow. Do you have any recollection of any additional number of HPI actuations at full flow?

A. Not that I remember.

Q. Now, would you look, please, at page 29 of Exhibit 2084?

A. I have that page.

Q. Is there an entry at 7:13 pertaining to the pumps or a pump?

A. Yes, there is.

It shows that at 07:13:30 contact 2965 RCP 2-B pump tripped, status trip.

Q. And what does that mean?

A. That means that at that time the 2-B pump was tripped.

Q. Does that mean that you manually turned it off?

A. Yes. That day there were no automatic trips of the reactor coolant pump so this was a manual trip.

Q. Now, just going back to page 25, 6:54, is there an entry there pertaining to pumps, 6:54:38?

MR. FISKE: What's the time, I'm sorry?

MR. KLINGSBERG: 6:54:38.

A. Yes, it says that the contact 2965 RCP 2-B pump tripped.

Q. Tripped normal?

A. Yes.

Q. What does that mean?

A. In relationship to the reactor coolant pump, I don't remember exactly now when it says tripped and then tripped or in this case if it says tripped and then normal, I don't remember the differentiation between the two, as far as the contact status monitor goes. I don't remember when you get normal and when you get tripped in the N status column. I don't remember.

Q. Do you remember you testified on Friday at 2132 of the transcript that you tried to start a reactor coolant pump; do you remember that?

A. Yes.

Q. Did that occur at about this time, 6:54?

A. I don't remember the exact time but it was very close to the declaration of the site emergency which occurred about five minutes to seven. That would put this timeframe pretty close, yes.

(Continued on next page)

Q. Would you turn to page 17.

A. I have that page.

Q. There are some entries there at 5:14:06, 5:14:19 and then again at 5:41 pertaining to RC pumps. Would you explain those entries?

A. These are a sequence of event review from the utility typer that the operators requested, and it shows the status of the coolant pumps at 05:14:06 and 19, that the 2-B and the 1-B pump were turned off, and it also shows the status of the 2-A pump being off at that time.

Q. Was that the first time that you shut off the pumps?

A. That would be around the time that I came back to the control room and then secured the first group of pumps, though the 2-A pump was not one that was secured. The 1-B and the 2-B were. The status here of the 2-A at this point I believe to be an error.

Then at 05:41:14 it shows that the 2-A and then the 1-A pump were secured.

Q. Would you look, please, at Exhibit 2082, the so-called Rogovin report, page 672.

A. I have that page.

Q. It refers there to 3 hours. Three hours would be 7 o'clock?

A. Yes.

Q. Three hours into the accident --

MR. FISKE: Excuse me, your Honor. I think I am going to object to the Rogovin sequence of events. GPU has their own which has already been marked --

MR. KLINGSBERG: I am going to cover that too, your Honor.

MR. FISKE: This is a government report, your Honor. We don't know exactly what this is based on or what information he had. There is a lot of information in here -- there is a heading that says "information available to operators." There is another thing called "remarks." There is another thing called "post-accident calculations" --

THE COURT: Why isn't this just a determination of another tribunal that is based on the same evidence that I am going to be required to assess? Why don't we go back to basic evidence?

MR. KLINGSBERG: I am not referring to it for that purpose, if your Honor please. Mr. Fiske has, for the purpose of refreshing recollection and as a basis for discussion, previously marked from this very report a document or pages, and your Honor will recall I rose at the time and pointed out whether that was appropriate.

THE COURT: Keep in mind that the two of you are in different postures here. He is cross examining and can use all kinds of things to cross examine, whereas you are

rather substantially limited on your direct examination. So just because he has used something on cross examination doesn't mean that it is available to you on direct.

MR. KLINGSBERG: I understand that, your Honor. I am not putting this in at the moment to establish the truth of these particular events referred to in these documents, although I think being a government document we certainly could do that, nor am I referring to any of the other information there.

I am merely laying a foundation for some examination that I want to conduct of the witness in regard to his understanding of the GPU report.

MR. FISKE: Your Honor, if it is not going in for the truth, there is no other purpose for it.

THE COURT: I don't understand the purpose of this use at all.

MR. KLINGSBERG: It pertains, your Honor, to the matter that we discussed at the outset of the session --

THE COURT: Do you want to step through that door for a minute so we are talking not in your hearing? Just close the door behind you.

(The witness left the courtroom.)

THE COURT: Now, what's all this about?

MR. KLINGSBERG: Your Honor, since we have the documents, if I could summarize it for your Honor and mo

on to the other exhibit, the Nuclear Regulatory Commission special inquiry group has all of the HPI actuations which we have previously shown from the computer report. The NSAC Exhibit 2081 likewise contains the same thing. The NUREG 0600, which is exhibit 2080, contains the same thing.

None of those refer to any 5:41 actuation. They all conform to the computer data and to the fact that there were three automatics and one manual at the times indicated in the computer, as the witness has indicated.

I wanted to lay that as a foundation so that your Honor would understand that when I came to the GPU document which I want to ask the witness a few questions about.

MR. FISKE: Your Honor, that is precisely why I object to the use of these government reports. Apparently what Mr. Klingsberg is trying to do by indirection is suggest that because the HPI resumption at 5:40 does not appear in the Rogovin report or in this NSAC report, that somehow that is evidence that it didn't happen, and that is precisely why I think those reports are inadmissible for that purpose.

The GPU chronology, their own chronology, specifically says that it did happen at 5:41. I might say it also has -- the GPU chronology has three other three HPI initiations in it and also has, based on what Mr. Zewe, Mr.

Frederick and Mr. Faust said right after the accident, also has a fourth initiation at 5:40.

So it isn't a question of whether the 5:40 one is somehow mistakenly confused with one of the others. The GPU report has the others in it. This was an additional HPI initiation, as Mr. Zewe, Mr. Frederick and Mr. Faust told people at GPU and the ACRS right after the accident.

The GPU chronology which contains this HPI initiation at 5:40 is based specifically on comments that were made by Mr. Zewe, Mr. Frederick and Mr. Faust to the people at GPU that were preparing that chronology. That's why it is in there.

To try to somehow bring in some report from NSAC -- we don't know whether Mr. Zewe was interviewed by Mr. NSAC, we don't know whether Mr. Frederick was interviewed by NSAC. This is totally irrelevant, and I object to it very strongly.

What they are trying to suggest is that the fact that this initiation of HPI at 5:40 doesn't appear in the NSAC report is somehow some sort of evidence that it didn't happen. I think that's totally improper.

The best evidence is their own chronology, based on what Zewe, Frederick and Faust told people at GPU consistently in the early weeks after the accident about a fourth initiation of HPI in addition to all the ones that

Mr. Zewe has been talking about here this morning.

THE COURT: And which he testified to Friday.

MR. FISKE: Yes.

MR. KLINGSBERG: No, your Honor. He testified Friday that there were four all together, three automatic and one manual. That conforms precisely to the computer data, to the official United States government report of the Nuclear Regulatory Commission and the analyses of the other two bodies.

MR. FISKE: Your Honor, I might point out just one thing that's important here. According to their computer, there were, as Mr. Klingsberg says, three automatics and one manual, all of which have been accounted for. Their computer was out because of some kind of a power failure from about 5:15 or 5:40, or whatever, to some time after 6:30. So the computer was not functioning during the time when Mr. Zewe, Mr. Frederick and Mr. Faust said after the accident they had reinitiated HPI at 5:40. So you cannot tell from the computer one way or the other whether that happened at 5:40.

What Mr. Zewe, Mr. Frederick and Mr. Faust told people at GPU and told the ACRS after the accident and insisted be put in the Met Ed chronology, the GPU chronology, was that in addition to all of the HPI actuations, the three automatic and the one manual that are

referred to in the computer, there was another one at 5:40 when they initiated HPI at full.

Mr. Zewe even described the details. He said there was a countdown, one operator counted down and when one operator hit the reactor coolant pumps, the other operator turned on the HPI. That was the detail with which they were describing this event within a few weeks after the accident back in 1979.

Now Mr. Zewe is coming in here today three and a half years later and saying he doesn't remember when that occurred, and they are trying to go through these computer run automatic actuations, none of which have anything to do with this. We don't disagree that all of those actuations took place. That's not the issue.

The point is, right after the accident Mr. Zewe said there was an additional one in addition to all the ones that are in the computer, and so did Mr. Frederick and so did Mr. Faust.

The government reports are totally meaningless with respect to that because they are all based on the computer data, and the computer was out during the period of time when this happened.

MR. KLINGSBERG: Your Honor, the purpose of my having the lengthy discussion which we had at the beginning of the last session was to try to avoid this kind of

premature summation of the evidence. Mr. Zewe testified on Friday --

THE COURT: The problem is that you are offering the reports of other inquiring bodies as affirmative evidence of the fact that something didn't exist. That's really what it amounts to. Isn't that what it boils down to?

MR. KLINGSBERG: I said to your Honor that I wanted to use those as background for the questions which I wanted to ask the witness in relation to the GPU report.

The witness testified on Friday in no uncertain terms that according to his recollection, untarnished by any documents or uninfluenced by any documents, there was one manual HPI actuation, that that occurred some time after 5:41 and before 8 o'clock, he didn't remember exactly the time. The computer places that time unequivocally at 7:20. The witness has said that he doesn't recall any others.

The witness testified earlier that some time after 5:40 there was an actuation, and he couldn't recollect the time.

I am merely trying to establish by way of background, which I thought I had permission from your Honor to do, in a couple of questions without any detail, which we can come back to on redirect what the context was

of the post-accident analyses by the four leading bodies who did this -- I want your Honor to understand that three of those bodies, including the United States government, found, just as the witness testified Friday --

THE COURT: No, let's not use the words "United States government." These are people, just like you and me, who were convened to inquire.

MR. KLINGSBERG: I understand that. With that I am prepared to pass on now to get the witness' testimony in regard to the GPU document in which he participated, so I think we have passed the point of the objection and we can move on.

THE COURT: You gentlemen have lived with these facts in preparation for this case for a long, long time, but my memory was that by tying it in to surrounding events, this witness put this injection some substantial time prior to 6:18.

MR. KLINGSBERG: No.

THE COURT: He said it was after they had turned off the pumps, the reactor coolant pumps and --

MR. KLINGSBERG: That's not accurate, your Honor.

THE COURT: This is page 2121: "The time period I mentioned -- I am not sure when the exact time period was. Some time after the pumps were tripped." And going up the page a little bit, "Prior to dispatching an operator to

secure the diesels."

I gathered from what he was saying, all of that was clearly before the block valve was closed.

MR. KLINGSBERG: No, your Honor, that was not the testimony on Friday.

THE COURT: Look at 2121. "I recall that after we initiated it manually, we dispatched an operator there to secure the diesels." Wasn't that pre-6:18 in the morning?

MR. KLINGSBERG: No, your Honor. I asked him, "Is there any" -- page 2122, line 10:

"Is there any far end of the range?"

And he said, "Before the auto actuation which occurred later that morning." That was at 8 o'clock, 5 of 8.

I said, "The auto actuation occurred after the block valve was closed in time, did it not?

"A. Yes, it did.

"Q. Do you know when the block valve was closed?

"A. Yes, I do.

"Q. What time was that?

"A. About 20 after 6.

"Q. What time was the auto actuation that you referred to?"

THE COURT: The third time the HPI came on.

MR. KLINGSBERG: Yes. He said the second one was some time between the time of the securing of the pumps and the time of the third HPI actuation, which was at about 8 o'clock. He testifies to that on the next page. So that just based on his recollection, the time period that he testified to on Friday was some time between 5:40 and 8 o'clock.

THE COURT: Is the first one after the closing of the block valve the one at 8?

MR. KLINGSBERG: No, there is one at 7:20 which was the manual actuation, and he only remembers one manual actuation. He was very clear, he remembers four altogether, three automatic at full flow and one manual at full flow, and that the manual, just based on his uninfluenced recollection, was between 5:40 and 8 o'clock. The computer shows that it was at 7:20.

MR. FISKE: Your Honor, our point is, if you look at their own document which they have marked here as GPU Exhibit 2079, if you look at page 41 at the bottom, this is their chronology, it says, "1:41," that's exactly the time the reactor coolant pumps were turned off, it says "the operator manually initiated the safety injection portions of engineered safety features plans A and B to supply additional cooling water to the reactor core."

That's their chronology, Exhibit 2079.

THE COURT: Mr. Klingsberg, however you get to it, and this testimony in the rereading is obviously a little more amorphous than I had assessed it listening to it Friday, but however you get to it, whether his testimony was so vague as to the time of the manual commencement of HPI as to arguably be before or after closing the block valve, it does seem to me that it is wholly inappropriate for me to consider as evidence of any kind the fact that other investigative bodies may have omitted a reference to its institution in their reports. I don't see how I can consider that as affirmative evidence.

It seems to me I have got to go on the testimony of the witness, on the records of your client and such other pieces of evidentiary material as may be submitted to me. But the fact that other investigative bodies may not have mentioned that doesn't seem to me as something I can consider as affirmative proof of the fact that it didn't happen, background or otherwise.

So I will sustain the objection.

(The witness reentered the courtroom.)

BY MR. KLINGSBERG:

Q. Mr. Zewe, I just want to review a couple of parts of your testimony before we go onto the next exhibit. Do I understand your testimony that you recall four full

flow HPI actuations?

A. Yes.

Q. And three of those were automatic?

A. Yes.

Q. And one of them, which was the second one, was manual?

A. Yes.

Q. You have identified one manual actuation at full flow in the computer data at 20 minutes after 7.

A. Yes, sir.

Q. And the block valve was closed some time earlier, was it not?

A. 20 after 6.

Q. There was also in the computer the shutting down of a pump at 7:13. Do you recall that?

A. Yes, the 2-B pump was shut down.

Q. And there was also shutting down of pumps at 5:41, is that correct?

A. Yes.

Q. When I say pumps, the 5:41 and the 7:13, I mean the reactor coolant pumps. You understood that?

A. Yes, I did.

Q. In your testimony on Friday without the computer data in front of you, from your recollection, just thinking back to the day of the accident without reference to the

computer information, what was the period of time during which you were able to place the manual actuation, the one manual actuation of full HPI that you recollected?

A. Some time after the last two pumps were tripped and the declaration of the general emergency.

Q. Would you look at Exhibit 2079? That's the GPU nuclear technical data report.

A. I have that document.

Q. Would you look at page 60, 7:24. Is that the general emergency declaration that you just referred to in your last answer?

A. Yes, it was.

Q. Who declared that?

A. Mr. Miller.

Q. Would you look at page 75. Do you see the entry for 5:41?

A. Yes, I do.

Q. One second, I think I have the wrong page. I am sorry. Withdrawn.

Page 41. In the retrieval of the computer data, was there a period of time of which you are aware when the computer was not recording or that it had recorded and the recording had been lost?

A. There was a period that morning when the alarm printout was stopped and was reinitialized at a later time.

The computer paper became jammed and it was backlogged, and in the course of trying to repair the paper and to get back the real time data, there was a time frame that that information was suppressed from the alarm printer.

Q. Do you know approximately what period of time that encompassed?

A. I know now in retrospect, but that day I don't recall exactly when that time period was.

Q. Can you tell us from what you know now?

A. As I recall, somewhere around 6:10 to -- I am sorry, 5:10 to 6:15, or in that neighborhood of time.

Q. Would you look at the entry for 5:41 --

THE COURT: Page 21 where it skips from 5:14 to 6:48, is that what you are talking about?

THE WITNESS: Page 21? It references --

THE COURT: It goes from 5:14 to 6:48. That's the period you are talking about?

THE WITNESS: Yes, it is.

Q. The reference is at 5:41 to the stopping of the reactor coolant pumps, is that correct?

A. Yes, it references the stopping of the 2-A and the 1-A pump.

Q. Then after that there is a reference to an operator initiation of safety injection, do you see that?

A. Yes, I do.

Q. Did you play any part in the indication of the initiation of safety injection at that point in time?

A. Yes, I did.

Q. Would you tell the Court what part you played and the basis of your contribution?

A. There were several discussions after the day of the accident with various groups, among the operators, ourselves and with various groups, and we could all recall that we initiated manual high pressure injection, but I for one could not remember exactly when it happened.

One of the operators, as I recall, was pretty sure of the exact time.

MR. FISKE: Your Honor, at this point I object.

THE COURT: Sustained.

MR. KLINGSBERG: This is all going to come out, your Honor --

THE COURT: I know it is, but it has got to come out in normal order. Is there any reason it shouldn't come out in normal order?

Step up to the side bar.

(At the side bar.)

THE COURT: Mr. Fiske is right about this. He doesn't want this witness to be bringing in all sorts of what is on direct examination hearsay, what he is told by other people. You have got to live with that. Mr. Fiske

doesn't, but if he asks those questions, he may not want to, he is bound by the answers. That is the risk he takes as a cross examiner.

On direct examination it seems to me he takes a justifiable position that these ruminations of other people that are input to him are inadmissible.

MR. KLINGSBERG: Perhaps I misunderstood. It was my impression, based on our in chambers discussion, that your Honor would permit some limited exploration of this on direct. If your Honor prefers that I do it on redirect, I will abide --

THE COURT: I kept myself flexible because I appreciated what your problem was. I think I said at the time that one way or another it was all going to be laid out. I think it preferable to do this in the orderly course of trial procedure, so I sustain the objection.

(Continued on next page.)

((In open court).

Q. Mr. --

THE COURT: Do you have much more of this witness?

MR. KLINGSBERG: Of this witness?

THE COURT: Yes.

MR. KLINGSBERG: Yes.

THE COURT: Like how much?

MR. KLINGSBERG: Oh, an hour and a half.

THE COURT: Well, we'll take our morning recess at this point.

(Recess)

(Open court)

DIRECT EXAMINATION (Cont'd)

BY MR. KLINGSBERG:

Q. Mr. Zewe, we've just looked at Exhibit 2079, the GPU Technical Data Report, at what happened at about 5:40 as listed there.

Would you look at page 55, please?

A. I have that page.

Q. At the bottom of the page, 7:13, that refers to stopping a reactor coolant pump. Do you see that?

A. Yes, sir.

Q. And then on page 57, there is a reference at the top at 7:20 to the operator manually initiating the safety

injection portions.

Do you see that?

A. Yes, I see that.

Q. Having reviewed those entries, does that change your testimony in any way that there was only one manual actuation of HPI during that period of time?

A. That morning I only remember ordering one manual actuation.

Q. Now, in the computer report at page 81 -- 31, I'm sorry, 32, 33 and 34, which we've just reviewed -- the indication is that the HPI was manually actuated at 7:20, the bypass was at 7:25:37 at page 32; is that correct?

A. That's where it was first started to bypass the one group of the A channel, yes.

Q. And then that continued through -- that activity continued through about 7:27?

A. The bypass you are referring to?

Q. Yes.

A. It should have concluded --

Q. I'm sorry, at 7:25.

A. At 07:25:39.

Q. And then at 7:27 was manually reset?

A. Yes.

Q. And at 7:33 on the next page, on page 33, 07:33:05 there was -- what does that indicate, P level RC

pressurizer level; that a high level pressurizer alarm?

A. What timeframe was that?

Q. Page 33, 07:33:05.

A. That was a high level alarm.

Q. Yes. High level in the pressurizer?

A. Yes, that is true.

Q. And then at 7:37 on page 34 was the --

A. I don't have that page again, sir.

Q. That was where the C pump was finally tripped which you have pointed out?

A. Yes, sir.

Q. So that, according to this document, at the time from the time of the manual actuation at 7:20 to the tripping of the C pump at 7:37, it is up to 17 minutes, is that correct?

A. Yes.

Q. Now, you testified on Friday that when there was the manual actuation of the HPI during the course of the morning that it was on for a considerable period of time; do you remember that? You testified to that.

A. Yes, I did. That the --

Q. Did you want to say something?

A. Just that it may not have been at full thousand gallons per minute but it was on, meaning, at some throttle flow rates of substantially above which we had had prior to

that.

Q. Now, does the 17-minute period, which is indicated in the computer, accord with your recollection of the "considerable period of time"?

MR. FISKE: I will object to this, your Honor.

THE COURT: Sustained.

Q. Can you be any more precise than the "considerable period of time"?

MR. FISKE: Your Honor, I think all that's going on here is that Mr. Klingsberg has been reading from a lot of computer alarms that Mr. Zewe didn't even look at during the accident.

THE COURT: Sustained.

What's your best recollection as to how long it was on?

THE WITNESS: I don't recall how long except that it was not for two or three or five minutes. I would say somewhere greater than ten minutes but I don't really know whether it was a half hour or 20 minutes, I really don't recall.

Q. Now, I'd like to show you what has been previously marked as Exhibit 78 and 79.

Referring to the second page of Exhibit 78 and to item number 2 on Exhibit 79, would you take a moment, please, to read that.

Prior to the Three Mile Island accident, had you ever received instructions regarding the operation of the high pressure injection system as reflected in these two documents?

A. No, sir.

Q. What actions, if any, would you have taken on the morning of March 28 if you had had the instructions reflected in these exhibits pertaining to the high pressure injection system?

MR. FISKE: I object to that, your Honor. It is totally hypothetical.

MR. KLINGSBERG: No it isn't. This is the way we prove proximate cause.

THE COURT: Well, I think I'll permit him to testify to it. I'll overrule the objection.

Q. Do you want the question read back?

THE COURT: What would you have done -- the question is -- if you had this before you?

Q. On the morning of March 28, if you had had these instructions before you, what would you have done?

A. I would have followed the instructions.

Q. And done what?

A. Well, the morning of the accident the instructions then were to look at pressurizer level as your indicator for throttling high pressure injection.

These are clearly much different and they reflect certain definite criteria that you must have before you can throttle the high pressure injection.

And in the course of the event and the following days' instructions, I would have left high pressure injection on until I met the criteria put forth here.

Q. Now, during your testimony last week you mentioned a large volume of control room alarms which actuated on the morning of March 28.

Prior to the Three Mile Island accident, were you aware of any work that was in progress regarding the control room alarms at unit number 2?

A. Yes, I was.

There were several discussions on the alarms in Unit 2 from the point that there were a lot of alarms that were in error and that there were others that were nuisance alarms and those that were of no value whatsoever to the operator in operating the plant.

So there was a review process that was under way a few months before the accident that involved several people. The I&C department, engineering and at least two engineers that were working on reviewing the alarms and trying to eliminate the problems that the alarms had, either they were at the wrong set point, they weren't meaningful or they occurred when they should not have.

That started, I believe, in or around November of 78 and, as I recall it, they were able to reduce the normal alarms that we had while operating from over 100 to about 55 alarms at the time of the accident.

Q. Did the operators perform any surveillance work in connection with this effort in addition to what the engineers were doing?

A. Yes.

We had a weekly surveillance procedure that the control room operator would perform whereby he would look at each and every alarm that we had, write them down and indicate what the reason was for each of the alarms.

Then from a day-to-day standpoint, we would review those alarms to compare them with any new alarms and to see how the status on the alarms were changing.

MR. KLINGSBERG: I would like to mark as Exhibit 2067 for identification a handwritten document.

Q. Did you identify Exhibit 2067?

A. Yes.

It is a copy of a letter to Ivan Porter from Jim Seelinger concerning some work that my shift and I had done in relationship to the tech spec alarm review for the overhead enunciators in Unit 2.

(Continued on next page)

Q. Does it contain any of your writing?

A. Yes, it does. On the last six pages my handwriting appears to the right of the various alarm procedure points.

Q. What do those initialed items represent? Not in detail, but what were you purporting to do by signing off?

A. Mr. Scheimann had researched all the alarms and he had written down all the various parameters that surrounded that alarm, what it said, what it is in the alarm response book, what the instrument book is, and everything else, and he wrote it down for my review and comments.

I reviewed them and marked down those ones which I felt were correct as they were and the other ones that needed to have some further work I so indicated.

MR. KLINGSBERG: I offer GPU 2067 in evidence.

MR. FISKE: What's the purpose of this offer?

MR. KLINGSBERG: The purpose of the offer is, this is a regular business record of the company and shows that they had made an effort well in advance of the Three Mile Island accident to deal with the --

THE COURT: Is there anything charged to legally flow from this exhibit or its subject? That's what Mr. Fiske is asking. Because, if not, he has an objection to relevance.

MR. KLINGSBERG: Yes, it is to demonstrate that the company was careful in having the appropriate number of alarms prior to the day of the accident and to have eliminated any unnecessary alarms.

MR. FISKE: Your Honor, I think this is of marginal probative value to say the least, but I don't object to it as a business record. If your Honor wants to receive it, I don't really care.

THE COURT: I will receive it.

(Plaintiffs' Exhibit 2067 for identification was received in evidence.)

Q. Prior to the Three Mile Island accident, Mr. Zewe, what information did you receive about operating experience on TMI units numbers 1 and 2?

A. There were several ways that I gained such information. One of them was that in our course of recycle training, various events would be brought up as part of that requal training program. Another one was station superintendent memos from Mr. Miller; operation memos from Mr. Floyd.

There were licensee event reports which were distributed in the control room of Unit-2 and maintained for operator review, and there was a Unit-1 correspondence Unit-2 applicability book which I maintained on all information that went to Unit-2 that Mr. Seelinger reviewed,

and then he would direct it to one of the department personnel in Unit-2 to put out to that particular department, and I was that contact in Unit-2.

Q. Did you have any procedure in regard to the operators under your supervision concerning a review of that information?

A. Which information, sir?

Q. The correspondence book.

A. Applicability?

Q. Yes, applicability.

A. Oh, I see. Yes, I had a logbook that I maintained on each of the events that was given to me for Mr. Seelinger, and I would then xerox it off and route it to all of the shifts, and I had an attached sign-off for each of the items once it was reviewed by the -- all the shifts. Then it would be returned to me and I filed this to make sure that all the correspondence had been seen by all the licensed operators.

Q. What is a superintendent event report?

A. It is a report that Mr. Miller instituted that would cover all of the events that were not reportable under another document, one that was more of an informational tool used by the plant. If it was covered by a reactor trip report or an LER or some other type of formal correspondence, this would not apply. But this

would apply in case there were no others, but yet the event was worthy of note.

Q. What is a reactor trip report?

A. These are reports that are compiled after a reactor trip that goes in to what caused it, indications, actions, recommendations, it would include charts and graphs, any other information that was related to the event, and then these were made available also to all of the operators to review and to obtain whatever information and guidance and training that they could gain from it.

Q. Prior to the Three Mile Island accident when you went to B & W for simulator sessions in Lynchburg, did you receive any instructions relating to transients which had occurred either at Three Mile Island or other B & W nuclear plants?

A. As I recall, there were times when events at other plants were covered at Lynchburg. They had I believe it was a weekly plant newsletter that they had available at the simulator that would cover all the B & W plants for the previous week, and they would indicate if they were operating at power or if they were refueling, if they had any trips or any other events.

Also, if there was any transients that occurred at other B & W plants that they could show us there, they did that. That was, though, on an infrequent basis.

Q. Did there come a time in or about late 1978 or early 1979 when one of the valves at the top of the pressurizer on Unit-2 was identified as having some leakage?

A. Yes, sir.

Q. Which one of the valves was that?

A. As I recall, we suspected that one of the code safety valves was leaking by.

Q. How did that leakage compare with your technical specification limits?

A. It was clearly within our leakage specification for identified leakage of 10 gallons a minute. The valve was monitored every day and it was also discussed at outage planning meetings, and I know that it was planned that at the next outage opportunity that the valve would be repaired.

MR. FISKE: Your Honor, I just want to be clear, is Mr. Zewe testifying that that is something that he participated in before the accident?

THE COURT: Put that to him.

Q. Can you answer that question?

A. Yes, it was, because the outage planning meetings, I received a copy of the planning meetings and I attended them when I was there on the relief shift and on the day shift, and I was aware of it, yes.

Q. When you say that this identified leakage from

the code safety valve was less than the permissible limit or within the specification of 10 gallons per minute, did that mean that you were allowed under the specification to operate the plant?

MR. FISKE: Your Honor, I object. The question is a little leading.

MR. KLINGSBERG: All right, I will reframe it. I am trying to move along a little faster.

Q. Can you tell us what is meant by the leakage from this code safety valve being within the specification of 10 gallons per minute?

A. Our unit technical specifications specified the amount of leakage that could exist from the primary under varying conditions. One of those is identified leakage from the reactor coolant system itself, and since we were aware that the code safety valve was leaking by from the indications we had, we would do in the normal course of our surveillance every day and even shiftly -- we would calculate what our leakage was from the reactor coolant system, and at all times we were well within that leakage spec.

Q. What did that mean to you in terms of what you did about it and when?

A. What it meant was that we would continue to monitor it and that as long as we were within our technical

specifications and our procedures, that we would continue to operate?

A. What led you to suspect that it was the code safety valve at the top of the pressurizer that was leaking by?

A. The data on the tailpipe temperatures indicated that the code safety valves were at higher temperatures.

Q. Higher than what?

A. Higher than the PORV. You only have three tailpipe temperatures. You have two code safeties and one PORV. So you can only compare one against the other two.

Q. What is a morning report?

A. Morning report is a status sheet of Unit-1 and Unit-2 that the 11 to 7 shift supervisor would fill out. It would have the operational type data of power level, temperature, pressure, leakage rates, anything that was going on in the way of maintenance work or surveillance work, and anything that would relate to upper management what the status was of Unit-1 or Unit-2.

This would then be submitted by that shift supervisor to the distribution list there at the site and also to our main office in Reading.

Q. Did the B & W site representative regularly get a copy of that?

A. As I recall, I did, yes.

Q. Had you previously had any experience on Unit-1 relating to discharge temperatures and possible leaking valves at the top of the pressurizer?

A. Yes, I had.

Q. What was that experience?

A. Throughout most of the initial cycling of Unit-1, we had a leaky relief valve at the top of the pressurizer which resulted in monitoring the tailpipe temperature on a daily basis and also keeping the reactor coolant drain tank cool with inventory low throughout that cycle.

Q. We previously marked Exhibit 2064, which is the Unit-2 technical specifications. I direct your attention to pages 4-15 and ask you if that contains the 10 GPM identified leakage standard to which you just referred in your testimony?

A. Yes, it does. It is item D under 3.4.6.2, "10 gallons per minute identified leakage from the reactor coolant system."

Q. In addition to Met Ed personnel and Babcock & Wilcox, was the NRC also aware of the leakage from the valve in the pressurizer?

MR. FISKE: Your Honor, I am going to object to this. First of all, I object to it as a matter of competence, unless Mr. Zewe was personally present when someone from the NRC was informed. Secondly, even if that

happened, I would like to know what the relevance is of the fact --

THE COURT: I will sustain it on the former ground at this point.

Q. Mr. Zewe, do you have any knowledge of whether the NRC was informed of the pressurizer valve leakage?

MR. FISKE: I object to that, your Honor --

THE COURT: That gets us back to the hearsay argument. I will sustain that.

Q. Mr. Zewe, do you have any knowledge as to whether or not Metropolitan Edison -- personal knowledge -- whether Metropolitan Edison made known to the NRC whether or not this pressurizer valve was leaking in this period of time?

MR. FISKE: Same objection, your Honor.

THE COURT: Let's go at this in a different way. Did you participate in any notification to the NRC about this fact?

THE WITNESS: I did not, your Honor.

Q. Did the NRC have plant inspectors during this period of time inspecting the plant?

MR. FISKE: Your Honor, I object to that. If someone told the NRC, let's bring the person in.

THE COURT: Sustained.

Q. What is a plan of the day meeting?

A. That was a meeting at around 9 a.m. each day where the shift supervisor, the unit superintendent, unit superintendent technical support, the maintenance supervisor, B & W site personnel and other people were involved in a meeting to discuss the daily plans for Unit-2 on a day-to-day basis and also for long time scheduled work.

Q. Was the leaky code safety valve ever discussed at these meetings?

A. Yes, they were.

Q. Did Mr. Rogers attend these meetings regularly?

A. As I recall, he did, though I would only attend if I was on the day shift or if I was on the relief crew. So I used to attend two weeks out of six.

MR. FISKE: Your Honor, I object to any of this unless Mr. Zewe was present at a meeting where Mr. Rogers was present where this subject was discussed.

MR. KLINGSBERG: I'd like to mark as Exhibit 2086 a document entitled "Unit-2 no-name outage list."

Q. Can you identify this document, Mr. Zewe?

A. Yes, sir. It is a copy of the Unit-2 no-name outage list dated 2/9/79, revision 1.

Q. Indicated in the lefthand column, among others, it says "shift supervisors." Does that include you?

A. Yes.

Q. Did you receive documents like this in the

regular course of business?

A. Yes, I did.

Q. Can you tell the Court what is a no-name outage list?

A. This is a list of work requests on plant equipment that required a plant outage in order to perform them. So we routinely would keep a list for all the departments on items that they needed to have ready to be worked on. If in fact the plant would undergo an outage or a trip for whatever reason, we could then institute repairs on the items that were ready to be worked, that we had parts and procedures for, and what have you.

Q. Why is it called no-name?

A. These were items that needed to be repaired at some time, but it did not mean that the plant had to be shut down in order to perform them. So we would not shut down just to perform any of these items. If we were forced to shut down, say, for instance, if we had a failure of one or both of the main feed pumps that caused us to go down, it would then be called main feed pump outage, and then these items then would be worked as time and parts submitted during that outage. It would receive a name once we did shut down based on whatever it was that caused us to shut down.

Q. Could you turn to page 6, which is the next to

last page. Do you see the reference there to "M18C-1137R-R-1-A leaks by"?

A. Yes, I do.

Q. Would you explain that entry?

A. That indicates that there was a maintenance work request with that number that identified that the one code safety valve was to be worked on because it leaked by.

Q. On the first page of this document it has the list in the lefthand corner. Is there any reference there to anybody from Babcock & Wilcox?

A. I am sorry, would you repeat --

Q. On the first page here, the cover.

A. Yes, there is. There is initials there for Lee Rogers of B & W.

MR. KLINGSBERG: I offer Exhibit 2086 in evidence.

MR. FISKE: Your Honor, I am going to object. I don't know whether this was ever sent to Mr. Rogers or not. I have no doubt that the "LR" refers to him --

MR. KLINGSBERG: That's not the only purpose of the offer, your Honor. It is a regular business record. It shows that the code safety was leaking. The witness has testified that he received copies. Mr. Rogers is indicated for a copy, which is some circumstantial evidence. He is going to be a witness. If he wants to testify he never got

a copy, he can do so.

THE COURT: No, no, it is the other way around. You have the burden, it seems to me --

MR. KLINGSBERG: My point is not simply to prove that Mr. Rogers got a copy. We are also proving that there was a leaky code safety valve --

THE COURT: I will permit it as a regular business entry, but at this point I do not have evidence from the cover sheet here that Mr. Rogers in fact got a copy.

Q. Was it the practice of the company, Mr. Zewe, to send copies to people who were indicated?

MR. FISKE: I object to that, your Honor.

THE COURT: Yes, sustained. He is not in the mail department.

MR. KLINGSBERG: I'd like to now mark as Exhibit 2072 a work ticket for the code safety valve.

Q. Mr. Zewe, are you familiar with the form of Exhibit 2072?

A. Yes, sir.

Q. Would you tell the Court what it is?

A. It is a standard work request job ticket form whereby whoever found an item that needed to be repaired, he would fill out the proper blocks and indicate the problem, and then he would sign it that he was the one, and

that would be reviewed by his superiors, and it would then go to the maintenance planning group where they would schedule the maintenance to be repaired.

MR. KLINGSBERG: I offer Exhibit 2072 in evidence.

MR. FISKE: Your Honor, I object to this, unless Mr. Zewe saw this before the accident.

MR. KLINGSBERG: It is a regular business record. If you want me to call Mr. Showalter to identify it --

THE COURT: I will permit it.

MR. FISK: I would like to know, maybe we could clear that up, if Mr. Zewe did in fact see this before the accident. I don't object to the document itself as a business record.

MR. KLINGSBERG: Okay.

THE COURT: It will be received.

(Plaintiffs' Exhibit 2072 for identification was received in evidence.)

Q. I'd like to now refer you to an event in the fall of 1977. What was the operational status of TMI Unit-2 at that time?

A. We were involved in hot functional testing.

Q. What is hot functional testing?

A. That's the point of testing whereby the primary plant is heated up and all the components that could be

checked out prior to fuel load are tested and accepted and any problems that are noted are repaired.

Q. What was your involvement in the hot functional testing program on Unit-2?

A. As a station shift supervisor, I was involved in the day by day, minute by minute activities of the hot functional testing program.

Q. Did you have any conversations with Mr. Rogers in the course of the hot functional testing program?

A. Yes, I did. There were a lot of different groups and people that were involved in the hot functional testing program. We had a GPU group of hot functional test engineers, Met Ed engineers, operators, and that included B & W personnel, which included Mr. Rogers.

Q. During hot functional testing, how, if at all, were operating or emergency procedures utilized to run the plant?

A. During hot functional testing the controlling procedure was a hot functional test procedure which referenced our various procedures, our operating procedures as well as our emergency procedures, and they were modified, but we still followed our existing procedures, which included the emergency procedures within the scope of the hot functional testing procedure.

Q. I'd like to show you a document which we'll mark as Exhibit 2070 which is a memorandum from Mr. Brummer to Mr. Miller and Mr. Seelinger with a copy to the shift supervisor dated November 14, 1977.

Can you identify this document?

A. Yes.

It is a document to Mr. Miller and Mr. Seelinger from Mr. Ross and Mr. Brummer concerning the water in the instrument air lines with regard to the condensate polishers.

Q. What is the reference to "Zewe" in the upper right-hand corner?

A. It is a reference to me.

Q. Did you receive this document in or about November 1977 in the regular course of business?

A. Yes, I did.

MR. KLINGSBERG: I offer Exhibit 2070 in evidence.

MR. FISKE: No objection.

(Plaintiff's Exhibit 2070 for identification was received in evidence)

Q. Who is Mr. -- who are Messrs. Ross and Brummer?

A. Mr. Ross was a station shift supervisor at the time and Mr. Brummer was the lead in I & C engineering.

Q. What did you understand was the purpose of this

memo when you received it?

A. My understanding was that they were assigned to investigate the water that was in the instrument air lines of the condensate polisher and to recommend what should be done to try to alleviate that condition.

Q. Did you have discussions with Messrs. Ross and Brummer in regard to their recommendations?

A. Yes, I did.

Q. Where in the memo were the recommendations indicated?

A. Their conclusions are on page two. There are eight of them listed. As a matter of fact, there are nine. There is another one on the next page.

Q. What actions, if any, were taken on those recommendations?

MR. FISKE: At what time?

MR. KLINGSBERG: After the recommendations were made and before the Three Mile Island.

A. As I recall, all of them were accomplished or in progress at the time.

Q. In your view, did the actions taken on the basis of the recommendations completely solve the problem of water in the instrument air lines affecting the condensate polishers?

MR. FISKE: At what point in time?

MR. KLINGSBERG: Before the Three Mile Island accident.

MR. FISKE: You just said some of them were still in --

THE COURT: He said some of them hadn't been completed.

MR. KLINGSBERG: Well, insofar as they were completed, yes.

THE COURT: I know, but the problem is you don't get an answer that means anything to me.

MR. KLINGSBERG: I'll reframe the question.

Q. To what extent did you conclude, based on your knowledge of what actions were taken, as to the status of the problem concerning water in the instrument air lines prior to the Three Mile Island accident?

A. Could you read that back, please?

THE COURT: Read it back.

(Record read)

A. The work that was done as a result of this memo I completely agreed with and they certainly helped the problem. But between this time and the time of the accident, I felt that there was still other problems or other things that could be done in order to go one step further.

During this time here, we were going through the

hot functional testing and trying to work out the bugs in the plant and these had identified a course of action to try to solve the problems that were identified and, as we went further on into the next year, there were other things which I felt could also be done to try to alleviate this same problem.

Q. Did there come a time in or about the spring of 1978 when some water entered into the instrument air lines of the condensate polishers?

A. Yes, there was.

Q. And what was the consequence of that?

A. As I recall, there was an isolation of the condensate polishers resulting in a loss of feed.

The plant was not operating at the time but we did have a loss of condensate feed to the steam generators.

Q. I'd like to show you a document which I believe has been previously marked as B & W 166 for identification.

Can you identify this document?

A. Yes, I can.

It is a letter from myself to Mr. Seelinger talking about some other things that could be done to alleviate the problem of water in the air systems.

Q. Could you explain to the court what in this period of time was your assessment of the significance of the water in the instrument air line problem?

A. I thought it was very significant because the water transient that would result from isolating the condensate polishers at a high power level is very severe.

The plant is designed to handle a feedwater transient, but I felt if there is anything that we could do to try to minimize that the better off we were.

Q. What understanding or expectations did you have regarding the ability of the primary part of the plant, the nuclear part, to handle safely a loss of feedwater from a secondary side upset?

A. I had complete confidence that the primary plant would handle that design transient without a problem.

The only problem that I thought there was was really to the feedwater side. The abruptly isolating of total feedwater flow in a very short period of time is a very severe upset to the condensate and it could result in damage to the piping, to instruments and the components.

Q. Was there any danger to any personnel?

A. There is always that danger that the operating personnel or the maintenance crews could be around the condensate and feedwater as it abruptly gets isolated and the pipes move a great deal on an isolation like that.

I have seen pipes move three, four, five feet horizontally and breaking hangers, breaking instrument lines and if there are any personnel near that piece of

equipment as it happened they could certainly become injured.

Q. Could you explain to the court the three things which you indicated in the memo might be done, as you said, to alleviate the problem?

A. Well, the three recommendations I had was a lot based on experience I had gained in Unit 1 and the first one is to have an automatic bypass around the polishers.

We had a manually operated bypass valve in Unit 2 and it was automatically operated on high DP in Unit 1 and I felt that this should be done in Unit 2 to afford the overpressure protection so we would not have a loss of feedwater on an isolation of the polishers.

As the DP went up, then the valve would open up. It would not prevent a trip on a complete and sudden isolation, but it would on a gradual change in DP.

Item two, again, from my experience in Unit 1 was that it was better to have service air and instrument air completely isolated. Because instrument air was a lot more important than service air and the placement of an isolation valve in this case, SAV 356 could be moved and afford the isolation between two service air compressors and three instrument air compressors.

Item three which was installed in Unit Number 1 was they have an in-line dew cell instrument with an alarm

indicating that if there was a moisture problem, that the instrument air driers and dessicant used at the air driers weren't sufficient, that this would alert the operators to take some action to either blowdown the lines or alleviate the condition of the water.

Q. Now, with respect to item number 2, the valve to keep the water out of the instrument and service air lines, were you proposing that a new valve be installed?

A. No.

If you turn to the next page here, on this rough sketch it shows where the valve is at and I just wanted to move it so that I could divide three air compressors from two air compressors and then have three dedicated to instrument air service and two dedicated to service air. It just required moving that valve a matter of about four or five feet.

Q. Now, as to the third suggestion, were you proposing a new instrument?

A. Yes, I was.

This instrument would be in addition to what was already there. They already had water traps that would automatically relief water that was in the lines. They also had instrument air driers that would dry out the air and there was also some dessecant which was a medium that would dry out the air and indicate if the air had any

amount of moisture in it.

This would be in addition to those.

Q. Do I understand you to say that you already had devices which measured the moisture but you wanted an additional monitor?

A. Yes.

This was more accurate and it would assist the operator in determining when he had a moisture problem.

Q. Was any action taken in regard to your recommendations?

A. As far as I knew, all three of them are being considered because I received after this a memo to me from Jim Seelinger indicating that some further action would be taken.

Q. I'd like to show you a document which has been marked B & W 167 for identification.

Can you identify that document?

A. Yes.

This is the document that I just mentioned that was to Don Brummer from Jim Seelinger but he gave me a copy of it. It indicated that Mr. Brummer should take action based on these three recommendations that I had made in my previous letter.

Q. Now, you indicated in your previous answer that your recommendation would not prevent a trip on complete

and sudden isolation.

What, in your understanding, if any --

MR. FISKE: Which recommendation are you referring to?

MR. KLINGSBERG: He was talking about the first one.

Q. What, if any, difference in your understanding would the implementation of your three suggestions have made on the course of the Three Mile Island 2 accident?

MR. FISKE: I object to that. He's not here as some expert witness.

THE COURT: Can I ask another question?

MR. KLINGSBERG: Yes, your Honor.

THE COURT: This equipment was manufactured by somebody else?

MR. KLINGSBERG: Yes.

THE COURT: And installed by somebody else. I don't understand -- and to continue, this is the initial malfunction?

MR. KLINGSBERG: That's right.

THE COURT: Why are you getting into this testimony in all of this detail? I don't understand why you are doing all of this.

I can understand modest detail to show an attention to the plant and an attention to the problems of

the plant but we have gone into this now for 10 or 15 minutes and I don't really understand.

MR. KLINGSBERG: Number one, this is my last question on the subject.

Number 2, it is my understanding of Mr. Fiske's position, which he said in his opening statement and what he stated in his questions to another witness, this failure to adopt Mr. Zewe's recommendation had something to do with the initiation of the accident. If he is not so contending, we'll be happy to drop the whole issue but that's my understanding of one of the defendant's principal contentions in the case.

So far as Mr. Zewe -- I'm sorry.

THE COURT: Well, what you are, in effect, asking him is if they had done what he asked here, would there have been a failure at the condensate polisher on March 28, 1979?

MR. KLINGSBERG: Right.

THE COURT: Now, does he know that?

MR. KLINGSBERG: I think he knows how to go about it. I think his opinion is valued.

THE COURT: But the question to him was, if they had done what you said, would you have had the accident?

MR. KLINGSBERG: Right.

THE COURT: Is he prepared to testify as an

expert on the fact that there would have been no trouble with the polisher?

MR. KLINGSBERG: I know he has some views on it which the court ought to have.

THE COURT: I know you and Mr. Fiske have views on it but that doesn't make you an expert witness.

MR. KLINGSBERG: Every time I put somebody on the stand, Mr. Fiske says "call an expert".

These people who live with the plants, I think, have input which your Honor ought to hear in addition to some college professor who Mr. Fiske and I can call.

THE COURT: I will let you do so if you have some foundation. I don't know that if this gentleman, who is a control room operator and is, obviously, experienced in the nuclear side, is prepared to say what you want him to say with any authoritativeness.

MR. KLINGSBERG: Let's see.

MR. FISKE: I think we ought to have some foundation examination as to the experience he has had, did he write any reports --

THE COURT: I will sustain an objection absent a foundation, but I'll let you see if you can establish one.

Q. Mr. Zewe, one of the items that you recommended was an automatic bypass; is that correct?

A. Yes, sir.

Q. And you have testified, have you not, that -- well, you have already testified that according to your understanding of the way the system operates that would not prevent a trip on complete and sudden isolation?

THE COURT: Wait a minute. I see where you are going. Do we need an expert to tell us that?

If the condensate polisher closes and you have a bypass valve, the water is going to go around the condensate polisher. So the question is: Is the circulation in the secondary side going to continue as usual?

That's really all that it amounts to, isn't it?

MR. KLINGSBERG: The fact is, your Honor -- and I don't want to anticipate the testimony -- that the witness said it would not prevent a trip on complete and sudden isolation and my understanding is that the water could still have formed in the instrument air system sufficient to cause a polisher valve to shut and to have insufficient feedwater flow, even if you had the bypass. That's, I think, what the witness understands and that's what I want to establish.

THE COURT: Tell us why, as far as you know.

MR. FISKE: I would move to strike it in any event on the same ground that Mr. Zewe hasn't been qualified as a witness on that subject at all.

THE COURT: I will permit it to be answered and we'll see what weight is assigned to it.

If your condensate polisher had closed up and you had a bypass valve, what would have happened March 28, 1979?

THE WITNESS: I think that we would have still had a loss of feedwater because I don't believe that the bypass valve could react fast enough to restore feed on a very sudden and abrupt isolation of the polisher because Unit 2 has some feedwater pump trips that Unit 1 does not have.

All of my experience there with the automatic operation of a bypass valve for the polishers /ERS is in Unit 1.

Unit 2 has low suction pressure trips on the condensate booster pumps and low suction pressure trips on the feedwater pumps which Unit 1 does not.

It has been my observation that whenever the Unit 1 polisher valve bypass valve opens up, that there is some time lag there and the suction to the booster pump and the feed pumps goes down sharply but recovers.

In Unit 2, we were operating the plant very close to our low suction pressure trips and it wouldn't take very much of an upset in order to institute the low suction pressure trips on the booster pumps and on the feed

pumps.

So I feel that if it was a transient that allowed time for the valve to open up to maintain flow, it would have gone on uninterrupted. But it happened so abruptly that we still would have lost condensate booster pumps and feed pumps and still had a loss of feed.

Q. I'd like to now show you a document which has been marked for identification as B & W 741, which is a reactor trip report of December 2, 1978.

Can you identify B & W 741?

A. Yes.

It is a reactor trip safety injection report to Mr. Miller from Mr. Hilbish about a reactor trip on December 2, 1978.

Q. In the third column there is a list of copyees. Is that you at the top there?

A. Yes, sir.

Q. Did you receive a copy of this in the regular course of your duties?

A. Yes, I did.

Q. Could you describe to the court what your understanding was of the nature of the December 1978 event?

A. As I recall the reactor was at about 22 percent power and they were at the point in power escalation to where they would go from the startup feed reg. valve to the

main feed reg. valves, at which point the block valve for the main feed reg. valve would come open automatically when the startup valve got so far open which would then allow control of the main feed regulating valve to take control of feedwater to the OTSGs.

In this particular case, whenever the block valve opened up, the main feed regulating valves were manually full open. This resulted in an overfeeding event of the OTSGs and resulted in a severe cooldown, which caused the reactor trip.

Q. Did the high pressure injection actuate?

A. Yes, it did.

Q. What significance, if any, did you attribute to the actuation of the high pressure injection when you reviewed this event after it occurred?

A. The significance was an overcooling event resulted in the reactor trip turbine trip and the ES actuation.

Q. Did you receive any information or instructions from anybody at Met Ed or B & W with regard to operator action relating to the high pressure injection system during this event?

A. As I recall, the only comments were that the operators had operated correctly during the event. They had -- the overcooling event had resulted in pressurizer

level going down and pressure came down, the ES actuated and the operators took the proper response from that point to bypass and to throttle high pressure injection.

MR. FISKE: Could we have identified the people who made the comments?

THE COURT: You may.

Who made those comments to you?

THE WITNESS: In the course of training on this document that each shift did, we talked about what the actions were and the actions, as based in this report, were that the operator's actions were correct.

Q. Now, I'd like to show you Exhibit 191 for identification, which is a report concerning a November 78 event.

Did you receive a copy of this report in the regular course of your duties at or about the time it was written?

A. Yes, I did.

Q. And could you describe briefly for the court the nature of this event as you understood it at the time?

A. In was a reactor trip-turbine trip while they were doing reactivity coefficient testing at 92 percent power at which time they had an elevated T average as part of the test.

There was a problem with the heater drain system

that resulted in a condensate booster pump tripping and a feed pump trip.

The plant started to run back in response to this and it tripped on varietal temperature and pressure.

Once the plant tripped there was a cooldown and depressurization caused by failure of the turbine bypass valve which resulted in a cooldown because of that steam leak of the bypass valve.

Q. What understanding, if any, did you have in relation to the operation of high pressure injection in this event?

A. That it was initiated because of the overcooling event reducing pressure below the ES actuation set point.

Q. What happened to the pressurizer level in this event?

A. It decreased below zero indicated level.

Q. Did that mean that the pressurizer emptied completely?

A. It means it went below the level of indication that the operator has in the control room which is 0 to 400 inches. There is a volume left below that and also in the surge line that connects the pressurizer to the hot leg.

Q. Were you involved in any training on this event?

A. Yes, I was.

Q. And what was emphasized, if anything, in regard

to the results of this transient?

MR. FISKE: Your Honor, same objection.

THE COURT: I'll sustain that as to form.

Q. What was the nature of the review of this event?

MR. FISKE: Could we have it clarified where this review was done?

Q. Where and who, et cetera.

A. As I recall, this review was conducted on-shift by myself and the operating crew, the shift foreman and the control room operators on-shift by reviewing the information and talking about what had happened.

THE COURT: In other words, you reviewed it?

THE WITNESS: Yes, sir.

Q. And what were the important aspects, if any, of the event as they were reviewed?

THE COURT: What did he regard as important?

MR. KLINGSBERG: Yes, your Honor.

THE COURT: That's what it amounts to. Apparently he got this and talked to his colleagues about it.

MR. KLINGSBERG: Yes, that's right.

THE COURT: What did you regard as important here?

THE WITNESS: I don't believe that I attached any particular importance to anything that happened here

other than to recognize the fact that on a condensate booster pump-turbine feed pump trip that if the plant starts to run back, that if you don't get back, if your T ave was a little high to begin with, you could trip on varietal temperature-pressure and you have to be alert for steam pressures in the steam generators to alert you if you would have the same turbine valve failure, turbine bypass failure.

Other than that, there was no other thing that I could recall stressing.

Q. Did there come a time when you became aware of whether B & W had modeled this transient and produced any results?

A. I was aware of training that they gave on turbine bypass valve failures in the course of their training scenarios, but I don't recall information modeled after this exact one with the elevated T average.

Q. Now, were there any other transients that you recall --

THE COURT: You are going onto another subject?

MR. KLINGSBERG: Yes. I have just one or two more of these things to cover. It will take a few minutes.

THE COURT: Are you almost through with the witness.

MR. KLINGSBERG: Yes.

THE COURT: It is five past one. We'll be in recess until twenty minutes after two.

(Luncheon recess)

(Continued on next page)

Afternoon session.

2:25 p.m.

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MR. KLINGSBERG: Your Honor, if I may take a moment for some housekeeping before my final couple of questions, I conferred with Mr. Fiske during the lunch recess on a few documents which we skipped over, and I'd like at this point to offer them in evidence:

B & W 261, the reactor coolant pump operation operating procedure;

B & W 167, memo to Mr. Brummer, copy to Mr. Zewe, dated May 16, 1978;

B & W 741, the reactor trip report dated December 2, 1978;

B & W 191, the reactor trip report dated 11/16/78;

The strip charts, GPU 2086;

The computer data from the day of the accident, Exhibit 2084;

Exhibits 3017, 3018, 3019, 3020 and 3021, which were the charts on the operation of the various high pressure injection pumps;

And for the limited purpose that your Honor ruled as a regular business record, Exhibit 2068.

MR. FISKE: No objection.

THE COURT: All right, they will be received.

(Plaintiffs' Exhibits 2017, 2018, 2019, 2020, 2021, 2068, 2084 and 2086 for identification were received in evidence.)

(Defendants' Exhibit 167, 191, 261 and 741 for identification were received in evidence.)

THE COURT: I take it they are keeping their original numbers, even though you are offering them?

MR. KLINGSBERG: Yes, your Honor.

BY MR. KLINGSBERG:

Q. I'd like to show you what has been marked as Exhibit 246, which is a reactor trip report of an incident April 23, 1978. Mr. Zewe, can you identify exhibit B & W 246?

A. This is a copy of the reactor trip incident report of 4/23/78 to Mr. Miller from Mr. Seelinger, May 4, 1978.

Q. Did you receive a copy of that in the regular course of your duties?

A. Yes, I did.

Q. Would you describe for the Court, please, the event which is described in the report?

A. Unit-2 was at 30 percent power and they were in the process of escalating power when they had a noise spike on one of the power range channels, NI-8. Since they already had -- one of the RPS channels was in trip because

of the other power indicator, NI-7, that resulted in a reactor trip, because now we had trip indications on two of the four RPS, which results in a reactor trip, the turbine also tripped as a result of the reactor trip, and there was a rapid overcooldown and depressurization caused by the failure of the main steam relief valves to reseat after they initially lifted to relieve the steam pressure, they did not reseat properly and they resulted in an overcooling condition, the result was an ES actuation on low pressure because of the overcooling condition.

Q. ES is reference to the high pressure injection?

A. Yes, it is.

Q. How was that handled in this event?

A. In this event the operators bypassed the high pressure actuation signal and they took manual control and throttled the high pressure injection based on the recovery of pressurizer level.

Q. What if any was the main concern that arose from this event?

A. The main concern dealt with the reliability of the main steam safety valves. There was a series of tests done after that showing that the safety valves that were installed at Unit-2 could not prove their reliability, and there was an extensive outage then to replace all of the installed valves and replace them with another type of

safety relief valve.

Q. After this April 23, 1978 event, did you receive or participate in any on shift training in regard to it?

A. Yes, I did. As I recalled, we had both training as part of our requal training and also on shift again. As a shift supervisor I went over this transient with my shift,, and in this particular event both of the control room operators that were on duty that day were the control room operators of my normal shift.

Q. Who was that?

A. Mr. Faust and Mr. Frederick.

Q. Did you both receive training and provide training on this event?

A. Yes, we did. We talked about it at great length because they were there for the event and they had a lot of insight into it, and we talked about it a great deal, yes.

Q. Was there any review of the HPI aspects of the event?

A. As I recall the review of the HPI aspects were normal because they had had the ES actuation on low pressure, and when they recovered level, then they throttled back. At the time that was deemed the appropriate action.

Q. Looking at the document B & W 246, first of all, referring specifically to page 32, were you aware when you

received this of any Babcock & Wilcox input into the post transient situation?

A. I was aware that the trip report contained a section that described how that upset had affected the primary plant components, though I didn't recall who had written it, but that it was from B & W, but not that it was Lee Rogers that it shows here.

Q. Looking at page 2, is there any indication on that page of any operator error?

A. There is a reference in the third paragraph. It states that the operator failed to initially recognize that the feed pump was in manual and did not run back feed pump until approximately 1 minute 20 seconds had elapsed. Prior to that it states that operator took proper immediate action.

MR. FISKE: Just so we can be clear what's going on here, is Mr. Zewe testifying that he read all of this at the time or is Mr. Klingsberg just asking him to read it now?

THE COURT: I think he read this at the time. That is my understanding.

THE WITNESS: I did at the time, yes. The fact that both of my control room operators were the ones here that were told that they had failed to recognize the feed pump was in manual and that they had taken proper action on

the immediate action was well established to me at that time that we reviewed it.

Q. Did you have any understanding in or about this period of time of any practice at Metropolitan Edison in regard to indicating operator error or not in reactor trip analyses or reports?

A. It was my understanding that they would present as clear a picture as they could, and if the operator action was inappropriate or if it was good, that they would mention it, and that all the other operators then could learn from that experience.

Q. On the third page is there any indication of what was happening in the pressurizer and what was happening in regard to the high pressure injection?

A. On page 3, did you say?

Q. Yes, sir.

A. Yes, it has that the pressurizer was emptied and it was below the text spec limit. It talks about the core remaining covered at all times and that the bubble had left the pressurizer and it went into the hot legs.

Q. What is indicated, if anything, about the high pressure injection operation?

A. Well, it has that the SFAS signal was immediately bypassed and cooldown proceeded normally from that point.

Q. What understanding did you have of whether the operators properly or erroneously operated the high pressure injection system in this event?

A. My understanding was that they had followed proper procedures and had bypassed it and had throttled back high pressure injection based on pressurizer level recovery.

MR. KLINGSBERG: I offer Exhibit 246 in evidence.

MR. FISKE: I think it is already in evidence, your Honor. We don't object to it, anyway.

Q. Is there any indication on the first page of a copy to any B & W person, the cover page?

A. Yes, sir, L. C. Rogers, B & W representative at the site.

MR. KLINGSBERG: I'd like to mark as Exhibit 181 for identification a document with attachments from Mr. Seelinger, dated April 14, 1978.

Q. Can you identify this document?

A. It is a copy of the Unit-2 licensee event report to Mr. Troffer from Mr. Seelinger on April 14, 1978.

Q. Are you familiar with the event on which it reports?

A. Yes, I was.

Q. You were familiar with it at the time?

A. Yes.

Q. Would you describe it to the Court, please?

A. It was the day after the initial Unit-2 criticality, and they were at very low power levels with the reactor critical. They had lost a vital bus because of an inverter malfunction, and that resulted in losing some primary plant instrumentation, and the result also was that the PORV had failed open because the loss of power affected a pressure switch that controls the PORV high pressure set point, and when it failed it indicated that there was an actual high pressure.

So the PORV had opened in response to that erroneous high pressure, and whenever they had reenergized the vital bus, everything was restored to normal. The PORV then shut.

Q. Am I correct that when you used the term failed open, that's different from stuck open which happened on March 28, 1979, is that right?

A. Yes. My actual understanding is that as far as the PORV went, it did exactly what it was -- what the indication was, high pressure. It didn't know the difference between a failed signal to the pressure switch indicating a high pressure or if it was a real high pressure. The valve responded to its voltage signal.

Q. What significance did this event have?

A. As I remember, it had two significant parts.

One was that we should not have lost the vital bus like we did, and they did some research into why the inverter had failed in the free running mode; and the other thing was with the PORV that -- they installed an indicating light in the control room for when the valve was supposed to be open, there was a red indicating light and the red light would be lit. When the valve was supposed to be closed, the light would be out, indicating the position of the valve.

Also they rewired the pressure switch that on a loss of power it would not give a false high pressure indication and have the valve go open on that false signal.

Q. Did you know at the time the indicator light was put in that it was an indirect indication?

A. I believe I did, yes.

Q. Are there other indirect indications on your control panel?

A. Yes, there are. There are a lot of them.

Q. Could you step to the panel and point those out to the Court?

A. A lot of the indication for our various plant systems are of a demand type indirect, like the turbine bypass valves. The controls for them as read on the indicator is just what the demand signal is.

That's also true for the emergency feed regulating valves, the startup and the main feed regulating

valves. The rod control system for if the rods are being moved out of the core or into the core, that signal is strictly on demand.

The position indication up here behind this board on the relative position indication is only on demand. The pressurizer level control station for the control of pressurizer level through its normal makeup valve is a demand indication. The pressurizer pressure control station for the status of the heaters is a demand signal.

Those are a few of the ones.

(Continued on next page.)

MR. KLINGSBERG: I offer Exhibit 181 in evidence.

MR. FISKE: No objection.

(Plaintiff's Exhibit 181 for identification was received in evidence)

MR. KLINGSBERG: No further questions, your Honor.

CROSS-EXAMINATION

BY MR. FISKE:

Q. Mr. Zewe, in the period of time through the rest of 1979 after the Three Mile Island accident, you were asked questions by a number of different groups investigating the Three Mile Island accident, were you not?

A. Yes, I was.

Q. You were asked questions by people at GPU?

A. Yes.

Q. By people from the NRC?

A. Yes.

Q. By people from the ACRS?

A. Yes.

Q. By people in the President's Commission, the so-called Kemeny Commission?

A. Yes.

Q. You were also asked questions by two separate committees of Congress, isn't that correct? The so-called Hart Committee and the so-called Udall Committee?

A. Yes, I was.

Q. Were you also asked questions by the NRC special inquiry group, Mr. Rogovin's Commission?

A. Yes.

Q. Now, at any time in responding to questions that were put to you in any of those investigations, did you ever give an answer that you did not believe was the truth?

A. I did not.

Q. So that your answer is that every answer you gave to every question in those investigations was the truth at that time; is that correct?

A. Yes, it was.

Q. You also gave a deposition in this case, do you remember that, back in June?

A. Back in May, yes.

Q. May and June, this year?

A. May. Yes, sir.

Q. Is it also your testimony that every answer you gave in response to every question in that deposition was the truth?

A. Yes, it was.

MR. FISKE: Your Honor, at this time in preparation for the testimony that is about to follow or the questions that we're going to ask, I would like to hand up some additional pages from the book that we gave you in

the beginning which are replicas of those exhibits we will be showing Mr. Zewe for cross-examination. We also would like to put charts up on the easels.

Your Honor, these are marked tabs 15 through 25 and we have a revised index which takes it from number one right through.

Q. Directing your attention, Mr. Zewe, to the schematic just put up on the easel there which is entitled TMI-2 Control Room Layout.

Could you just look at that for a second or as long as you need and tell the court whether you accept that as an accurate representation of the TMI-2 control room as it existed in March of 1979? I don't mean by that to suggest that every single piece of instrumentation is marked there, but to the extent that instrumentation is marked on that schematic, I'd like to have you verify that it is done accurately.

(Pause)

A. They appear to be pretty close to the actual place on the console, yes.

Q. Now, back at the very beginning of your testimony Mr. Klingsberg asked you to go down through the control room and indicate where different pieces of instrumentation were.

I think you came to a point where you referred

to instrumentation that indicated RCS pressure and RCS temperature; do you remember that?

A. Yes, sir.

Q. Would you mind going back and pointing out to the court on the large blowup of the control room exactly where that instrumentation was?

A. On your blowup here?

Q. On the matter of sequence take the TMI-2 control room layout schematic and just point where in which panel is that?

A. Pressurizer level is located right here at the corner between panel three and panel four and the pressurizer pressure is right next to that and over here is the temperature.

Q. That's enough.

If you will keep a walking down through the large blowup of the control room, could you just show the court where those instruments appear on the large one and if you want to move ours for a minute, that's perfectly all right.

A. Right here you have the pressurizer level which I went over earlier and here is the pressures and the temperatures. Right across here you have TH and TC and delta T and here is the average coolant temperature right here.

Q. Now, if you just turn around behind you and look at the schematic that says Section of TMI-2 Control Room Panel Four (Actual Size). If you wouldn't mind turning it a little bit so the court can also look at that.

Do you recognize that as a life-size blowup of that section of the control room panel?

A. It appears to be a little larger, but I don't know if I can tell the difference this close to it because normally you have the extension of the console and you would have to lean over to get that close, but if you say it is the actual size, it probably is pretty close.

Q. So that an operator standing in front of that panel would be able to, my moving his eyes from one side to the other, see all of those instruments without really even having to move his feet, correct?

A. Correct.

Q. Now, just so we can go through this quickly one more time.

Could you indicate to the court what the instrumentation is on that panel that shows RCS pressure?

A. You have three recorders, one wide range, and two narrow range. The narrow range is one in each loop. Wide range is only for the one loop A.

Q. Those are the strip charts that you referred to earlier, that sort of write with a pen through the course

of the event?

A. That is true. There is a pen that has ink on it that actually marks the chart in ink.

Q. Now, where is the instrumentation that shows you what the RCS temperature is?

A. You have various meters. You have your outlet temperature and you also have your inlet temperature in each of the loops. You have an outlet recorder and then you have your average temperature displayed here on the digital.

Q. And the average temperature on the digital is what has been referred to as T ave?

A. Yes, it is.

The average temperature displayed here on the recorder and the digital here is the coolant system average temperature.

Q. So you have a digital reading for T ave. You also have a temperature strip chart, correct?

A. Yes, we do. Right here.

Q. That shows your T ave, right?

A. Yes, it does.

Q. So that at any moment in time you can look at that panel and you can see the RCS pressure and the T ave, is that right, on those strip charts?

A. The operator at any point in time could look at

whatever instrumentation he wanted to, yes.

Q. Then there is, on the left there is an instrumentation for the pressurizer level?

A. Right here, yes.

Q. Is that also a strip chart?

A. Yes, it is.

Q. Now, I'd like to just take a second and go back over something that you mentioned briefly in your direct examination so we all understand it, which is how the calculation of the pressurizer level actually works.

Now, I think you referred to something called a reference leg?

A. Yes.

Q. And am I correct that that is a tube of water which is attached to the pressurizer?

A. Yes, it is.

Q. And is that just a tube of solid water? No steam in the reference leg?

A. Well, the reference leg is exposed to steam. The reference leg taps high off the pressurizer itself at the 400-inch point and then that instrument tap comes out and forms a column down to the differential pressure cell that's in the basement and then we -- the other side of that instrument then connects to the lower level reference tap and it is that pressurizer level, the reference leg,

that is full of water and it is maintained full because of the condensing action. Steam would get in there and then it would then condense to water to insure that the reference leg is always full. You always have some kind of constant reference.

Q. The column of water in the reference leg actually produces itself pressure down on the bottom, correct?

A. That's what you are looking at to create the delta pressure. It is that height of water versus the height of water that's actually varying within the pressurizer itself.

Q. So you have the reference leg on the one hand and you have the pressurizer on the other and in each of them there is water putting a pressure downwards and then you measure the difference between the pressure that's being exerted in the reference leg and the pressure that's being exerted in the pressurizer in order to calculate the pressurizer level; is that correct?

A. Basically, that's true.

Q. Now, the pressurizer itself is a combination of water and steam; isn't that correct?

A. That is correct.

Q. And it is correct that as -- you can sit down, Mr. Zewe. We have one more piece of instrumentation but

I'm sure you can deal with it from up there.

Is it correct that the solid column of water in the reference leg produces a greater pressure than is produced by the mixture in the pressurizer which is a mixture of water and steam?

A. No, sir.

It depends on what the water level is inside the pressurizer. If it is as high as the reference leg, it would have a zero delta P and it would indicate a maximum level.

Q. But between the measuring points which we're talking about, to the extent that the pressurizer becomes a mixture of water and steam, it produces less pressure than does the reference leg, isn't that correct?

A. It is only because of the height of water that is in the pressurizer. The steam pressure that is in the pressurizer, that force is felt on the reference leg as well as the pressurizer. So it sees that same pressure.

So the difference in the pressure is the difference of the height of water that's in the reference leg as opposed to the height of water that is physically inside the pressurizer. And it is that difference.

Q. But don't you understand that what is being measured is a combination of the height of the water and the density?

A. Yes.

Q. So as water -- if part of the water turns to steam, that will create less density and the level will go down; correct?

A. Would you restate that, please?

Q. If part of the water in the pressurizer turns to steam, then the result will be that you have less density and the pressurizer level instrumentation will go down; isn't that correct?

(Pause)

A. Yes, but it depends on how much flashing of the water that you are talking about to really see an appreciable change. You are really looking at the weight of the mass.

Q. Okay.

But to the extent that that mass becomes more steam and less water, it produces less weight and therefore the level goes down, isn't that right?

A. As long as you didn't change the pressure in the pressurizer, the mass of the steam or the weight of the water that is now steam is still there exerting force.

So, as I am thinking about it, I wouldn't change.

Q. I'm asking you to just look at a situation where for whatever reason you have a certain amount of water and a certain amount of steam in the pressurizer, right, that

is exerting a certain amount of pressure down which is reflected in the pressurizer level.

All I am asking you is: When anything happens, whatever it is in the pressurizer so that there becomes less water and more steam, then the pressurizer level will go down, isn't that right?

A. It will indicate the water level -- yes, but you had to either add energy in order to heat the water to steam or you had to remove some energy and condense the steam into water either way, but you had to change something. But if you just take that same mass or that same amount of water and if you would change that to steam even though it will occupy a larger volume, it will still have the same weight.

Q. Now, there is one more piece of instrumentation on the Control Room Panel Four that I don't think has been discussed up till now which is on the far left. Would you tell us what that is?

A. On the far left beside pressurizer level?

Q. Yes.

A. Pressurizer temperature.

Q. What does that indicate to you when you are in the control room?

A. That indicates the pressurizer temperature.

Q. And during normal operations that's supposed to

be 647 degrees?

A. Yes.

Q. And what is the hot leg temperature during normal operations?

A. 603 degrees, 604 degrees.

Q. And the cold leg is about 556?

A. 555, 556.

Q. And the T ave would be 582, correct?

A. That is correct.

Q. Now, I think you referred earlier to the instrumentation that measures RCS pressure.

Is it correct that that's supposed to be 2155 during normal operations?

A. That is the desired set point, yes.

Q. And was it your understanding right up through the Three Mile Island accident that when you look at the instrumentation that shows you what RCS pressure is that, give or take a few pounds, that would tell you what the pressure is at all points throughout the reactor coolant system including pressure in the pressurizer itself?

A. That would be indicative of primary pressure at various points though there are differences with the delta Ps across the pumps and throughout the core and through the steam generator.

Q. Generally speaking, looking at RCS pressure, if

you saw 2155, that would indicate to you that you had 2155 in the pressurizer as well as in whatever point in the reactor coolant system the instrumentation is measured, correct?

A. Within 50, 60 pounds, yes.

Q. And the reason that the pressurizer temperature is hotter than the temperature in the hot leg is because you want to maintain saturation conditions in the pressurizer, correct?

A. That is correct.

Q. And you do not want saturation conditions in the hot leg; is that correct?

A. I don't believe that I've ever thought about that I maintain saturation conditions in the pressurizer so I don't have them in the hot leg.

THE COURT: No, sir, he didn't say that. He said you don't want them in the hot leg, that's what I understood him to say.

Q. You understood you didn't want the hot leg temperature to get to the same temperature as the pressurizer temperature because then if that happened you would have saturation not only in the pressurizer but also in the hot leg; isn't that right?

A. From a theoretical standpoint, yes.

Q. One other preliminary thing, Mr. Zewe.

Mr. Klingsberg introduced in evidence a document called GPU 2066, which was entitled Compendium of TMI-2 Procedures. Do you remember that, this booklet here? Do you have that before you?

A. I believe I remember it but I don't have it before me.

I have it now.

Q. And contained in this booklet there are 21 separate emergency procedures and 14 separate abnormal procedures; is that correct?

A. I'm not sure that's the right numbers, but I am assuming you are right.

Q. Let's go through these quickly.

What I would like to do is just go through these and have you tell us whether in the first 45 minutes of the accident on March 28, 1979, before you left to go down to the turbine room you had seen symptoms in any one of these procedures that I am going to go through? Do you understand the basic question?

I am going to ask you about a procedure and then I want you to tell me whether or not before you went to the turbine room you had seen any symptoms of that particular procedure?

A. You want me to just open up and read down --

Q. No. I will take them one at a time and then you

can just answer as I go through.

We'll start with 21, which is the last emergency procedure, which is "earthquake".

I take it you hadn't seen any of those symptoms?

A. I had not.

Q. Number 20 is "flood"? Had you seen any of those?

A. I had not.

Q. 19 is "fire". Had you seen any symptoms of fire?

A. I had not.

Q. 18 is "plant response to penetration of the protected area".

Did you see any symptoms of that procedure?

A. I had not.

Q. 17 is "loss of one auxiliary transformer". Had you seen any of those symptoms?

A. I had not.

Q. 16 is "high cation conductivity and/or sodium in the condensate and/or feedwater system". Had you seen any of those symptoms?

A. Yes, I did.

Q. In the first 45 minutes?

A. Yes. We had a condensate polisher trouble alarm.

Q. 15 is "OTSG tube rupture"; first 45 minutes, did you see any of those symptoms? The first 45 minutes?

A. A symptom, we had variation of the A symptom.

Q. 14 is "station blackout and loss of both diesel generators". You didn't have that in the first 45 minutes, did you?

A. We did not.

Q. 13 is "loss of instrument air and service air"? Did you have that?

A. Not that I remember, no.

Q. Number 12 is "Loss of steam generator feed". Did you have that?

A. Yes, sir.

Q. That's loss of feedwater?

A. Yes, it is.

Q. Number 11 is "station blackout". Did you have that in the first 45 minutes?

A. We had one symptom there, yes.

Q. Which symptom?

A. 1.12 that the generator breakers were open.

Q. But you knew you didn't have the station blackout, did you, right?

A. That is correct.

Q. Number 10, "shutdown from outside the control room". Was that a problem in the first 45 minutes?

A. It was not.

Q. Nine is "loss of intermediate close cooling water". Was that a problem in the first 45 minutes?

A. One symptom was, yes.

Q. Which symptom is that?

A. 1.8.

Q. Did you think you had a problem with the loss of intermediate close cooling water symptom?

A. I did not. But the operator, once we initiated maximum letdown, we started to receive high temperatures in the letdown system which affects MEV 376.

Q. But you ruled that out, so to speak, right?

A. We ruled it out for loss of intermediate close cooling water system, yes.

Q. Number eight, "loss of decay heat removal".

Did you have any problem with that in the first 45 minutes?

A. Here again, one symptom, 1.5 of the pressurizer level high/low is an indication here.

Q. In the first 45 minutes, did you think you were having a problem with the decay heat removal?

A. I did not.

Q. Number 7 is "excessive radiation levels".

Did you see any of the symptoms for excessive radiation levels in the first 45 minutes?

A. No, I did not.

Q. Number six is "high activity in reactor coolant".

Did you think you had a problem with high

activity in the reactor coolant in the first 45 minutes?

MR. KLINGSBERG: Objection. You are changing the question now to whether there were symptoms as to whether he thought there was a problem or are you still asking about the symptoms.

MR. FISKE: I am trying to find out which one of these procedures that he could basically rule out as not being a problem so we can get it down to one or two that might apply.

MR. KLINGSBERG: I think if we are changing the groundrules, the witness ought to be alerted to it.

MR. FISKE: The questions are perfectly clear.

THE COURT: I don't think we are. Go ahead.

Q. Did you think you had a problem with high activity in your reactor coolant in the first 45 minutes?

A. I did not.

Q. Number 5 is the "pressurizer system failure procedure", and we'll come back to that in a few minutes.

Number four, "loss of RC flow, RC pump trip".

Did you think that procedure was -- that you had a problem under that procedure in the first 45 minutes before you went down to the turbine room?

A. I did not.

Q. Number three is the "loss of reactor coolant system pressure procedure".

I take it you did know that you had some of the symptoms of that procedure in the first 45 minutes?

A. Yes, I did.

Q. Number two is "unanticipated criticality". Was that a problem in the first 45 minutes?

A. No, it was not.

Q. Then number one is a reactor trip procedure, which you discussed earlier in your testimony.

MR. KLINGSBERG: Is there a question?

MR. FISKE: Yes. There is about to be.

Q. There is also the 14 abnormal procedures compendium that we have before us, which one is the turbine trip procedure; is that correct?

A. That is correct.

(Continued on next page)

Q. Just looking through, to save time, tabs 22 through the last tab D, do you think you had a problem in the first 45 minutes of the accident relating to any of those other abnormal procedures?

A. After reviewing 22 through 30, they were not in effect, as I remember.

Q. So we have identified as possibly applicable during the first 45 minutes the reactor trip procedure, the LOCA -- the loss of reactor coolant/loss of reactor coolant system pressure procedure, the loss of feedwater procedure, is that right?

MR. KLINGSBERG: I object to that question. I think it is a totally inaccurate summary of the testimony.

THE COURT: I am sorry, let's let the witness deal with that, Mr. Klingsberg. Either he accepts it or he doesn't.

Q. Were there any emergency procedures that you felt were applicable to the problems you were seeing in the first 45 minutes, other than possibly the reactor trip procedure, the loss of reactor coolant/loss of reactor coolant system pressure procedure, the pressurizer system failure procedure or the loss of feedwater procedure --

MR. KLINGSBERG: I object to the question.

THE COURT: No.

Q. -- in terms of procedures that might possibly be

applicable to the problems you were seeing in the first 45 minutes?

A. I just reviewed the remainder of the abnormal procedures in tabs A through G, and they weren't applicable, that I could tell. In reference to your latest question, for the first 45 minutes the two applicable procedures or the three applicable procedures that I felt that we were into was the turbine trip, reactor trip, loss of feed.

Q. And you didn't consider the possibility in the first 45 minutes that the loss of reactor coolant/reactor coolant system procedure might be applicable?

A. Would you ask that again, please?

(Record read)

Q. It is loss of reactor coolant/loss of reactor coolant system pressure procedure.

A. Yes, I did, but only briefly in relationship to the auto actuation of high pressure injection, not that it was applicable or that the conclusions that I would reach from my indication would lead me to say that I was in that procedure, to use it; that I did not conclude.

Q. That's what you testified to earlier in your direct examination?

A. I believe it was, yes.

Q. Is it your testimony that you didn't consider during the first 45 minutes the possibility that the

pressurizer system failure procedure might be applicable?

A. I did not. The indications that I had --

Q. That's an answer, Mr. Zewe.

A. I was just trying to be complete, that's all.

MR. FISKE: Your Honor, I think we will move a lot faster if we --

THE COURT: Put another question.

MR. KLINGSBERG: I think it is important that the witness be able to explain, if he has an explanation.

THE COURT: No, he said he didn't. He was asked whether he did or not and he said he didn't. Let's just go on. You may deal with that on redirect, as appropriate.

MR. KLINGSBERG: Thank you.

Q. Let's turn, Mr. Zewe, to the pressurizer system failure procedure, which is tab 5 in this book. I'd like to have you look at section A which is entitled "leaking, pilot operated electromatic relief valve."

With reference to the period of time before the Three Mile Island accident that Mr. Klingsberg was questioning you about this morning, symptom number one in that procedure is, A-1, paragraph 1, relief valve discharge line temperature exceeding the normal 130.

You understood that the temperature that's referred to there is the temperature for the pilot operated relief valve, correct?

A. That's the temperature of the discharge thermocouple downstream with the pilot operated relief valve, yes.

Q. And you understood that there were separate thermocouples that measured the pipe leading from the PORV and the pipe leading from each of the two code safeties, correct?

A. Yes.

MR. FISKE: Your Honor, to refresh your Honor's recollection, I believe it is tab 5 in the material that we gave you at the very beginning of the case that has a diagram at the top of the system showing the location of those thermocouples.

Q. Mr. Zewe, it is a fact, is it not, that you had been seeing temperatures on the PORV thermocouple in excess of 130 degrees for several weeks before the Three Mile Island accident, right?

A. Yes, that's true.

Q. It is correct that you had seen temperatures up as high as 190 or 195 degrees?

A. In that neighborhood, yes.

Q. And you had been seeing those temperatures back into 1978, had you not?

A. I don't recall exactly when it was that high, how far back, but I think that was true, yes.

Q. There was a shut down of TMI-2 for about two weeks, wasn't there, in January, from January 17 to January 31?

A. I remember that we had a bellows rupture on the atmospheric dump valves in January. I don't recall how long that was.

Q. We showed earlier witnesses an excerpt from the Rogovin report for various reactor trips at TMI-2 which indicated that the reactor had been shut down from about January 16 to January 31. If I showed you that, would that help refresh your recollection as to whether there had been a shutdown of about two weeks in the second half of January, 1979?

A. Yes, it would.

Q. Would you like to see it or --

A. I am at a point here where I know that we had a bellows rupture failure in January and I know that we did shut down. It is just that I don't know if it lasted for two weeks. But I don't have any reason to doubt that it did not, either.

Q. Was anything done during the shutdown in January by anyone at Met Ed to determine whether or not there was a leak from a PORV or whether there was a leak from either of the code safeties and, if so, to fix it?

A. Did I know at that time?

Q. Yes.

A. Not that I was aware of, no.

Q. In other words, even though these temperatures had been elevated even before the shutdown, a symptom of a leaking valve, nothing was done during the shutdown to determine whether there was a leak or to fix it, is that right?

A. No. As I recall, we had determined, "we" being Met Ed, and it was my understanding that we suspected, that one of the code safety valves was leaking and that that was going to be repaired as the parts were available at some later date, and that that was the reason why the RC-RV 2 discharge thermocouple read above 130 degrees at the time as you explained it.

They do tie together downstream, and a leakage on one reflects on the other one. So, as I recall, I felt that we were addressing the problem with the leakage.

Q. Let's just back up a little bit. Is it your testimony that you knew before the shutdown in January that there was a leaking code safety valve?

A. As I recall -- again, I don't know exactly when I was aware of the code safety valve leakage, whether it had started in November or December or in January or prior to that time, but up until the time of the accident, which included the period in January, my understanding was that a

code safety valve leak had been considered and had been planned.

Q. No, Mr. Zewe, please. I am asking you about the period of time before this shutdown occurred in the second half of January. I am asking you whether it is your testimony that Met Ed had determined before then that there was a leak in a code safety? Yes or no.

MR. KLINGSBERG: I think he just answered that, your Honor.

THE COURT: I am not quite sure. Go ahead.

A. It was my understanding, as I remember, that they had determined that a code safety valve was the problem in the leak. I just don't remember that time frame for sure.

Q. I want to ask you, Mr. Zewe, about the time period before the shutdown in January. Just tell us yes or no, to your recollection, had Met Ed determined before that shutdown that there was a leak in a code safety?

A. I don't know if the time frame was right.

Q. But you did know that there were temperatures for the PORV that were up around 200 degrees before this shutdown, right?

A. I have already stated that I knew that there was elevated temperatures before the accident for a couple months. I am just not sure of the time frame when I became

aware of the high temperature. It just wasn't something that stood in my mind saying that before January whatever it was that I had that knowledge.

Q. Don't you know, Mr. Zewe, that the elevated temperatures on the PORV went all the way back to October and November of 1978?

A. If I reviewed the data, I'd say yes. But I remember data that went back -- I operated both units, and we marked down the tailpipe temperatures for Unit-1 and Unit-2 every day for all three of the relief valves, and I am sorry, but I can't separate November from January from February.

Q. But it is your testimony now that you don't remember any work being done during this shutdown in January by Met Ed to try to determine whether any valve was leaking, and, if so, to fix it; that's correct?

A. I don't remember.

Q. All right. Last week, referring to page 2019 of the transcript, the Court asked you with respect to this pressurizer system failure procedure, section A that you have just been looking at, question on 2019, and I'd like to read the question and the answer -- I'd like to read the answer that you gave to the Court, reading from page 2019:

"The Court: Basically I had asked you why didn't you close the block valve when you had the symptoms

of a leaking PORV as set forth in the pressurizer system failure procedure."

Your answer at page 2019 was, "At the time, your Honor, we already knew that we had a leaky -- a suspected leaky code safety valve at the time before the transient happened, and the discharge line temperatures were very close to 200 degrees at the start.

"The Court: A fortiori, if you had that recollection, why didn't you say 'let's isolate the top of this tank' just to be on the safe side?"

You said, "The code safety valve, the isolation valves, only isolates the PORV and not the code safety valve."

The Court asked you whether there was an isolation valve for the code safety and you said, "No, sir, the code safety valve is by code law not allowed to be isolatable. They don't have any isolation valve in it. We already had been looking at the discharge temperatures and other related information, and it was my understanding from interface with other plant people that we suspected that there was a code safety valve, from all our indications which was leaking. We knew that from the beginning. That is one reason why we were monitoring it closely. So we were already at an elevated temperature in the lines from that leak, and closing the block valve wouldn't have any

effect."

Do you remember giving those answers to the Court last week?

A. Yes, I do.

Q. Then Mr. Klingsberg asked you some questions this morning in which you again said that you thought before the accident that you had a code safety leaking, and you said that you thought that was perfectly all right because the amount of the leakage was less than 10 gallons a minute within your technical specifications. Do you remember that?

A. Yes, I do.

Q. Isn't it a fact, Mr. Zewe, that you and others at Met Ed thought before March 28, 1979 that the pilot operated relief valve might be leaking?

A. I don't remember thinking that, no.

Q. Do you remember participating in an interview at Met Ed on the 25th of May which Mr. Miller, the station superintendent, was conducting which included as among those present you and a Mr. Porter and Mr. Seelinger?

A. I recall several meetings with those individuals, yes.

Q. What I would like to do, Mr. Zewe, is play you a tape recording of that interview, I will give you a transcript, and ask you whether or not after listening to

this tape recording that refreshes your recollection that you and others at Met Ed thought before the accident that you might have a leaking PORV.

MR. FISKE: I might say, your Honor, procedurally, what we would like to do is mark -- we would be willing to mark the full tape as Exhibit 5000, the excerpt that we are going to play as 5000-A and the transcript of the excerpt as 5000-AA.

MR. KLINGSBERG: What page are you starting on? Do you know what page this is?

MR. FISKE: 16 and 17.

Q. Do you have a copy of this transcript, Mr. Zewe, this excerpt, in front of you?

A. Yes, I do.

MR. KLINGSBERG: Can we just have located where this is?

MR. FISKE: Sure.

(Defendants' Exhibit 5,000 for identification was played.)

MR. FISKE: The tape was turned off at that point, your Honor.

Q. Having listened to that, Mr. Zewe, is it still your testimony that before the accident on March 28, 1979 you and others at Met Ed did not think that it was a possibility that the PORV was leaking?

A. As I recall, my testimony is the same, that I -- I recall going back to that day and the days prior to the accident thinking that the problem was a code relief valve and --

THE COURT: No, listen to his question. Read the question back, please.

(Record read.)

MR. KLINGSBERG: It isn't fair to ask him what others were thinking. I think he can be asked what he was thinking and what others were said. I don't think he should be asked what others were thinking, unless they said something.

THE COURT: No, please. That's overruled. Read the question back, please.

(Record read.)

A. I am afraid I don't know how to answer that because I -- just listening to that tape, I think that the possibility was there, but as I remember, we were thinking code and not pilot operated relief valve leakage.

THE COURT: No, you are confusing it. All Mr. Fiske is asking is what you knew about that valve beforehand. Forget what you knew about the code or otherwise beforehand, just that valve. What did you know about the valve, the PORV?

He has played here this tape which is Exhibit

5000 where Mr. Miller appears to say, "We knew the valve was leaking, I thought," to which you say, "Oh, yes."

His question in effect to you is, based on that in its total context, did you have an awareness before the accident at Three Mile Island that you had a leaking PORV?

THE WITNESS: I am sorry, your Honor, but I remember that we -- that I thought that we had a leaky code safety valve and not the PORV, and in the course of this conversation where he says "a leaking valve or an inoperable electromatic, operating with a valve that's leaking in accordance with our procedures" --

Q. Mr. Zewe, did you participate --

MR. KLINGSBERG: Excuse me, but I have a different transcript of this which has been used at all the depositions and so forth up to now and marked by the defendants and where Mr. Fiske now says --

THE COURT: Wait, wait. If you are going to get into this, I think in fairness to Mr. Fiske, the witness should not be here.

MR. KLINGSBERG: Fine.

THE COURT: Do you want to step through that door again, please.

(The witness left the courtroom.)

THE COURT: I would say as a preface to any colloquy that we may have that obviously the tape is the

evidence and the transcript is not the evidence. It is what you hear on the tape.

To the extent that a transcript is an accurate reflection or assists the hearer in determining what's on the tape, then it is of value to the Court or anybody else. But it is really what is what you hear there. It isn't --

MR. KLINGSBERG: True. There is a whole lot of people here. In the transcript that I have, and I didn't catch it on the tape, it says "electromatic or code," Mr. Porter.

Then it says Mr. Miller, "electronatic." On the transcript on 5000 it says "simultaneous," meaning all these people joined in simultaneously. I didn't hear that on this tape.

Maybe we could hear it again in trying to make some kind of judgment as to whether there were five people all joining in, as Exhibit 5000-AA purports to say.

THE COURT: I will leave that to Mr. Fiske.

MR. FISKE: We didn't quantify the "simultaneous."

THE COURT: If he wants to do it again, he may.

MR. KLINGSBERG: I think it is very misleading to show the witness "simultaneous" when the previous transcript is different, when I don't know, I didn't hear any simultaneous five people or six people on this --

MR. FISKE: Nobody says this is all six.

MR. KLINGSBERG: Or five or two.

THE COURT: The speakers are whoever is speaking is speaking at the same time.

MR. FISKE: Just more than one person says electromatic at the same time.

MR. KLINGSBERG: Simultaneous to me indicates everybody.

THE COURT: No, it doesn't to me. It means the sound is simultaneous.

MR. KLINGSBERG: Somebody put down "Mr. Miller," so it is not at all clear to me that 5000 is an accurate transcript.

MR. FISKE: Your Honor, just so you understand the origin of this, they gave us a transcript during the course of discovery in which the speakers were identified by GPU. In listening to it, it became clear that there could be an improvement in this particular portion of the transcript as we listened to it, and that's why we prepared this particular excerpt. In any event, I agree with your Honor that the tape is --

THE COURT: The tape is the evidence.

MR. KLINGSBERG: Then I don't think it is fair to give the witness something which says "simultaneous" and lead him to the conclusion that it is something he said when there is no evidence of that or at least it is not

something that's readily apparent.

THE COURT: Mr. Fiske, why don't we, in the interests of "fairness," play it again for the witness. I will instruct him that he is to listen to what's on the tape and that 5000-AA is only an aid to him.

MR. FISKE: I'd be happy to have that explained to him not only for this tape but for all the ones we are going to play later.

(The witness reentered the courtroom.)

THE COURT: Mr. Zewe, you have had a certain tape played here for you and you had before you a transcript which is marked 5000-AA, which is somebody's listening to it and assigning words to what they hear and speakers to what they hear.

I gather, if my experience is any guide, you have looked at an earlier transcript of this made by people at GPU. Am I correct in that? I gather there is a transcript that was made by GPU and that may very well have been shown to you at some time.

THE WITNESS: I believe it was. I have at least heard it before.

THE COURT: What I wanted to say to you is these transcripts are not the evidence in the case. They are only aids to all of us to better understand what is on the tape. The tape is the evidence because that records what

people actually say.

Just by way of explanation, sometimes one can hear from these tapes little different shades that change a word somewhat. So to the extent that this transcript is an aid to you and makes you hear what you hear, enables you to bring out what you hear, it is an aid. To the extent that it doesn't do that or you are in disagreement with it, it is not binding upon you. What is important here is what is heard on that tape, and we are going to play it again. You listen to it --

THE WITNESS: Your Honor, I was following that with what was here, and I didn't have any problem that this wasn't accurate. I was listening to the tape as Mr. Miller was talking --

THE COURT: 5000-AA is what you are talking about?

THE WITNESS: Yes. I couldn't detect anything that was there that wasn't hear or vice versa, other than pauses and other things. That is what I thought.

THE COURT: All right, very good. Mr. Fiske, you either play it or not, depending upon --

MR. FISKE: I think if Mr. Zewe agrees with the transcript, there is no need to play it again, unless you would like to hear it again, Mr. Zewe.

MR. KLINGSBERG: I would like to hear that one

portion.

THE COURT: No, it is the witness' -- you can listen to it hereafter during some recess.

BY MR. FISKE:

Q. Do you recall, Mr. Zewe, being at a meeting on May 25 at GPU in which there was a discussion of whether you and others at Met Ed had thought before the accident that the pilot operated relief valve might be leaking?

A. Yes, sir.

Q. Do you remember Mr. Miller stating at that meeting that "I think we thought it was leaking, whether we were right or wrong"?

A. I recall --

MR. KLINGSBERG: Where is that statement?

THE COURT: He is putting a question to him --

MR. FISKE: It is the second to last statement in the transcript, or third.

A. Yes, I see that, yes, and that's what I heard him say, and it sounds accurate from that day, as I think back, yes.

Q. So you knew back in May that Mr. Miller thought before the accident that the PORV was leaking?

A. That's the point there, all right. There were discussions about the PORV leaking and about the code safety valve leaking. I am not sure if it is on that tape

or not. But, as I recall, again, I thought we had concluded that it was the code safety valve. But there were discussions with the possibility that some had thought that the PORV was leaking, yes.

Q. Do you remember Mr. Miller saying, "Symptoms of a leaking valve are given there," referring to the pressurizer system failure procedure, "We knew the valve was leaking, I thought," and you said, "Oh, yes," do you remember that?

A. As well as I can, yes.

Q. And you knew Mr. Miller was talking about the electromatic when he said that, didn't you?

A. Reading this here, yes, but I don't remember thinking back to that day, putting myself there, that I differentiated between the electromatic or the code safety valve, but in this context I must have.

Q. You knew this whole discussion that's reflected in this transcript was about a leaking PORV, didn't you?

A. In this transcript here?

Q. Yes.

A. Now I do, yes, that my recollection is refreshed with this and hearing the tape.

Q. And your testimony is you didn't understand that's what they were talking about while you were sitting there participating in this discussion?

A. No, sir, I didn't say that.

Q. Well, is that your testimony?

A. I am saying that at the time that I was participating in this I knew what we were talking about. There were a lot of other discussions other than this one that dealt with the PORV and the codes, and that is why I can't differentiate. You can put this before me now today and play me that tape and then say, "Well, this was about the PORV," and obviously it is; it is just that I don't remember it like that.

Q. All I am talking about, Mr. Zewe, we have to take them one at a time, is this particular tape where you are clearly talking about the PORV, right?

A. As I can determine from this, yes.

Q. If Mr. Klingsberg later wants to play all the rest of the tapes and there is any other discussion any other place on this subject, he is perfectly free to do that. But we are playing you now the one about the PORV. Okay?

I just want to get it clear for the Court, is it your testimony now, having listened to this tape and thinking back to that discussion, is it still your testimony that before the March 28, 1979 accident you did not think that there was a possibility that the PORV was leaking in addition to or instead of the code safety?

A. I don't remember thinking that the PORV and/or a code safety valve was leaking prior to the accident. I remember thinking that the leakage was from a code.

Q. All right, let me take you, Mr. Zewe, forward a couple of months to the time you were testifying in the deposition for the Kemeny Commission. Let me show you a transcript which has been marked as Defendants' Exhibit 4006.

MR. KLINGSBERG: What is this?

Q. This is testimony in a deposition to the Kemeny Commission on July 26, 1979. I'd like to direct your attention to pages 144, 145, of that transcript. You let me know when you have found page 144.

A. I have it.

Q. Directing your attention to line 16, were you asked the following question and did you give the following answer:

"Q. Was there any leakage from the PORV valve that was known prior to March 28?

"A. We knew that we had leakage from one of the valves on the pressurizer. In my own mind I was not certain that it was the PORV that was the leaky valve. It could have been a combination of that valve plus either or both of the code safety valves that also leaked."

Do you remember being asked that question and

giving that answer in that deposition to the President's Commission back in July of 1979?

A. Yes, I believe I did, yes.

Q. Was that the truth at the time?

A. Yes, it was.

Q. It is a fact, is it not, that prior to the accident you did have reason to believe and did believe that the PORV might be leaking in addition to one or more of the codes?

A. As I remember from now looking back prior to the accident, it isn't any clearer, all right. I remember thinking that it was a code safety valve, and in an awful lot of the testimony there they addressed the PORV. You could always consider the possibility that another valve leaks, but I was still thinking for the most part that it was the code safety valve.

Q. My question is very simple, Mr. Zewe. Whether or not you may have thought that there may have been leakage from a code safety, isn't it a fact that you also thought that there was a possibility that there might be leakage from the PORV as well?

A. I don't remember thinking that. It may have been true, but I don't remember that.

Q. When you say it may have been true, you mean it may be true that you did think of it?

A. I am saying that I don't remember thinking other than that a code leaking was the reason for the elevated temperatures prior to the accident, and I remember a lot of discussion about the PORV and about the codes. But trying to restrict myself just to that time period and focus on just before the accident did I really suspect the PORV or the codes, trying to divorce myself of everything else, as I remember, I was thinking that a code was the problem.

From the daily reports prior to the accident and otherwise, I remember the leakage from the code safety valve as being the problem.

Q. Let me read you a question and answer from your deposition in this case, Mr. Zewe. Reading from page 214:

"Q. It is correct, isn't it, Mr. Zewe, that for a period of several weeks before the accident you had been seeing temperatures on the thermocouples for all three of the pressurizer relief valves up in the range of 190 degrees?

"A. Yes.

"Q. Is it correct also, Mr. Zewe, that prior to the accident you really did not have any reason to believe that the leaking was coming from one of these valves any more than another?

"A. As I recall, I knew that one of the code safety valves, I believe it was the B valve, had a little

bit higher temperature, and I leaned in that direction thinking that possibly it might be a code safety valve more so than the A valve on the PORV, but not with any conclusive -- if you understand what I am trying to convey.

"Q. Right.

"A. I thought that it might be that one more because it was the highest, but nothing conclusive about that. It very well could have been any of them.

"Q. You were not aware prior to the accident of any investigation that had been made that had determined that the leak was not coming from the PORV, isn't that correct?

"A. I was unaware of any conclusions from any group saying that conclusively it was not coming from there, that is true. I was not aware of anything like that."

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

A. What testimony was that? I am sorry.

Q. In your deposition on --

A. Oh, in May?

Q. On May 21.

A. As far as I can remember, that's what I said, yes. That's what I remembered.

Q. You say, Mr. Zewe, that you determined that the amount of leakage that was coming from the top of the

pressurizer was less than 10 gallons per minute, correct?

A. Yes.

Q. And you said that that was allowable within the technical specifications?

A. For identified leakage, yes.

Q. I'd like you to turn to the pressurizer system failure procedure again. I direct you to section C. This is tab 5. It says "leaking code relief valve." It says under C-3, "Followup action. 1. If RC system identified leakage is in excess of 10 GPM, reduce the leakage rate to limits within four hours or be in hot standby." Do you see that?

A. Yes, I do.

THE COURT: Where are you?

MR. FISKE: Page 4.0 of the pressurizer system.

THE COURT: I am there, but I don't see it.

MR. FISKE: It is under C-3, followup action number 1.

THE WITNESS: The bottom, sir.

THE COURT: Very good.

Q. So that is it your testimony, Mr. Zewe, that under that procedure you were allowed to continue to operate with a leaking code safety valve, as long as the identified leakage was less than 10 GPM?

A. That is true, that you were allowed by the

technical specifications and by the procedure. There were other things that were considered.

Q. Now I'd like you to go back to section A, which is on page 1, which deals with a leaking pilot operated relief valve. You see the symptoms at the top, A-1, including the discharge line temperatures in excess of 130?

A. Yes, sir.

Q. Then you see under that, under A-2, "Immediate actions. B. Manual action, close the electromatic relief isolation valve, RC-V 2," correct?

A. Yes, sir.

Q. There is nothing in the section A of this procedure that says if you have symptoms of a leaking pilot operated relief valve you are allowed to continue to operate without closing the block valve, as long as the leakage is less than 10 GPM, is there?

A. That is true.

THE COURT: When you come to a good place to break for our mid-afternoon recess, you tell me.

MR. FISKE: This is probably as good as any, your Honor.

(Recess.)

(Continued on next page.)

(Open court)

CROSS-EXAMINATION (Cont'd)

BY MR. FISKE:

Q. Mr. Zewe, you knew, did you not -- withdrawn.

It is a fact, is it not, that during this period of time in March 1 and March 28, 1979, despite the elevated temperatures on the PORV thermocouple, the block valve was not closed?

A. To my knowledge, the block valve was not closed.

Q. On the morning of the accident, the block valve was open, right?

A. Yes, that's true.

Q. Now, you knew, did you not, that one way to tell whether a leak was coming from the PORV as opposed to a code safety was to close the block valve and see whether the temperatures came down; isn't that right?

A. That could be used, yes.

Q. And the fact is you didn't close the block valve even for that purpose prior to the accident, correct?

A. I did not because I felt the elevated temperatures were from another source and that wouldn't do any good.

Q. But didn't you just say, Mr. Zewe, in the testimony that was read to you before the recess that at the very least it was unclear which valve the leaking was

coming from and that you thought it might have been the PORV in addition to one of the code safeties or instead of one of the code safeties; isn't that what you said in the testimony we just read before the recess?

A. That is the testimony that you read back to me. I'm saying what I remember is the code safety valve.

Another point that --

THE COURT: Wait a moment.

You see, the thing is you'll have a chance on redirect to deal with these other problems. But for now we have got to deal with the questions that counsel is asking you on cross-examination.

THE WITNESS: Yes, sir.

Q. So the short answer, Mr. Zewe, is that you knew that closing the block valve was one way that you could determine whether or not the leakage was coming from the PORV as opposed to a code safety and you did not take that step before the accident, right?

A. That is correct, I did not.

Q. Now, isn't it also correct, Mr. Zewe, that you knew before the accident that a leaking -- leakage through a valve can cause the valve to stick?

A. As I recall, leakage through a valve could cause a valve seat to erode to where the valve would not seat tightly and it would leak and get worse. Not necessarily

that it would stick, that it would continue to be a larger leak as the steam cut eroded the seat.

Q. And did you consider that possibility as a reason why you should close the block valve to see whether the PORV was leaking?

A. No, sir, I didn't.

Q. And isn't it a fact that you also knew that in addition to the problem that you just described that leakage through a valve could actually cause the valve to stick?

A. I don't remember thinking that it would cause the valve to stick.

Q. Let me -- you testified, did you not, in November of 1979 before the senate committee known as the Hart Committee?

A. Yes, I did.

Q. And you had an interview with members of that -- the staff of that committee, did you not?

A. Yes, I did.

Q. I'd like to direct your attention to page 33 and 34 of the exhibit which I just gave you which has been marked Exhibit 4007, which is a transcript of an interview held with you on November 15, 1979.

I would like to direct your attention to a question and answer that occurs at page nine, I mean line 9

at page 33 by Mr. Becktenwald -- Mr. Recktenwald, I guess. Do you have page 33 in front of you?

A. Yes, sir.

Q. "Mr. Recognize: And at that time were you aware of the possibility that leakage through a valve could indicate or could increase the potential for that valve failing?

"Mr. Zewe: Yes.

"Mr. Recktenwald: And did you ever yourself think about the potential for one of those valves failing. Or first let me ask that.

"Mr. Zewe: Did I ever think about potential for the valve failing?

"Mr. Recktenwald: As a result of that leakage.

"Mr. Zewe: I believe it crossed my mind, yes."

Now, were you asked those questions and did you give those answers?

A. As I remember, I did, yes.

Q. Now, let's go to the next page, Mr. Zewe, page 34, line 17. Another question by Mr. Recktenwald:

"Mr. Recktenwald: But you don't recall anyone explicitly saying to you be careful or be aware that one of these valves might stick?

"Mr. Zewe: I think it is generically expected that if you do have leakage that the possibility exists but

not specifically with those particular valves, no."

Do you remember being asked those questions and giving those answers?

A. I believe I did, now that I am reading it, yes.

Q. Was there anything you knew about the pilot-operated relief valve in March 1979 that made this generic possibility of a valve sticking because of leakage inapplicable to the pilot-operated relief valve?

A. As I recall, I was talking more about the valve failing and eroding the seat. That's the relationship that I remember.

Q. Well, Mr. Zewe, that wasn't my question.

MR. FISKE: Could I have it read back, please.

THE COURT: You may. Read it back.

(Record read)

A. Not that I recall, no.

Q. So notwithstanding that knowledge of the generic possibility of a valve sticking because of leakage, you still didn't close the block valve, right?

A. I did not close the block valve.

Q. Now, one last question on this, Mr. Zewe.

You said you thought the leaking was coming from a code safety?

A. Yes, I did.

Q. Would you turn to Section C, again, of the

leaking code relief valve procedure, which is page 4 of the pressurizer system failure procedure.

Do you have that in front of you?

A. Yes, I do.

Q. Page 4, your Honor.

Directing your attention to the follow-up action section under C.3.

Do you see what number three says?

A. Yes, I do.

Q. Would you read that to the court, please.

A. "Place code relief discharge line temperatures on analogue trend recorder."

Q. You knew that was something you were supposed to do if you thought you had a leaking code, right?

A. That was part of the follow-up action to that procedure, yes.

Q. Did you do that?

A. We did not. We were monitoring it daily.

MR. FISKE: I move to strike the last part of the answer

THE COURT: Yes, strike it out.

MR. KLINGSBERG: Your Honor, I object to that. If the witness adds a bit of explanation, what's the point of striking it out and making me come back and ask that question on redirect? It certainly adds to the total of

the picture. There is no jury that is going to be prejudiced by it.

THE COURT: No. Let's go along each in his turn here and deal with this in that fashion.

Q. Now, Mr. Zewe, looking at the diagram of the control room one more time as soon as we remove panel four, there is a picture of a computer, correct? There in the last panel down to the left?

A. Yes.

Q. Can you show the court where that appears on the schematic?

THE COURT: I can see it from here. Computer console?

MR. FISKE: Fine.

Q. Those four windows on the left, what are those?

A. Analogue trend recorders.

Q. And if you put the temperature of a discharge line on an analogue trend recorder, what happens?

A. It records exactly like the other recorders in the control room that you would then ask for the scale and the particular point and then it would printout on the ink recorder there what that value was.

Q. So that if you had had that on the morning of March 28, 1979, if the temperatures had been on an analogue trend recorder, you would have had a moving, flowing line

showing you whether the temperatures were going up or going down or staying constant during the course of the accident, right?

A. Yes, I would have.

Q. Now, I'd like to --

THE COURT: I gather what you are saying there or hypothesizing that all three were leaking if the PORV had been stuck it would have elevated above the other two; that's what you are urging upon the court by that?

MR. FISKE: Well, I think, your Honor, that is what the temperature fact had shown.

THE COURT: That's what the recorder would have shown had it been in operation. Is that what would have happened, if that's what Mr. Fiske is getting at?

Can you put all three of the valves on this recorder? If you had all three of the valves on this recorder and they were all leaking but then one stuck open, that one would go higher than the other two, right?

THE WITNESS: It should have, yes, your Honor.

THE COURT: Okay.

Q. Now, let's go back to this pressurizer system failure procedure.

THE COURT: Needless to say, you would have recognized it would have gone higher than the other two and we would have spotted the culprit, if we could put it that

way?

THE WITNESS: I would hope so, yes.

Q. Let's go back, Mr. Zewe, to this pressurizer system failure procedure and, first of all, if I could just take a minute and have you look at the cover of the first page.

There are some signatures on the front page in the lower right-hand corner.

Could you tell us who those gentlemen are? It says Unit 2 PORC recommends approval and then there is a signature. Who is that?

A. John Hilbish.

Q. And underneath that Unit 2 superintendent approval and there is a signature there. Who is that?

A. James Seelinger.

Q. Then there is a date for each one, September 28th and 29th, 1978? Right?

A. Yes.

Q. And that indicates the date upon which this particular revision of the procedure became effective, right?

A. Yes, sir.

Q. And there is no question that this procedure is the utility's procedure, is there? Met Ed's procedure, right?

A. Yes, sir.

Q. Now, it is also true, isn't it, that if you look at each particular page, as you go through this procedure, that tells you the date upon which that particular page of the procedure had been most recently revised; isn't that right?

A. Yes, sir.

Q. So if we look at Section A, which is the leaking pilot-operated relief valve section and Section B, which is the inoperative pilot-operated relief valve, on each you see the date June 22nd, 1977, right?

A. Yes.

Q. That demonstrates, does it not, that as of September 1978 the last revision to either one of those two pages was June of 77?

A. Yes.

Q. Now, I think Mr. Klingsberg went over with you briefly the methodology by which these procedures were put together at Met Ed and I'd just like to go back over one aspect of that for a moment.

It is true, is it not, that it was part of the methodology for putting these procedures together that the operators, including yourself, were given a draft of the proposed procedure in order to give you an opportunity to review it and be sure that you were satisfied with it, am I

right?

A. We were given a draft procedure for us to look over it to insure that it had the right nomenclature and that it fit our plant, yes.

Q. I am going beyond whether they had the right numbers for the valves, Mr. Zewe. I am asking you about the substance of the procedure.

You understood, did you not, that these were the procedures that you and the other operators were going to have to use in running the plant in the case of an emergency, right?

A. Yes, sir.

Q. And you knew that you were being given these procedures so that you would have an opportunity to make comments before they became final on any aspect of the procedure which when you read it you felt could be improved so that it would be more useful to the operators in dealing with an emergency, right?

A. Based on our experience, yes.

Q. Now, going to this period of time before June of 1977, when these two sections of this procedure became final, you knew then, did you not, that Section B of this was designed, among other things, to tell the operators what the symptoms would be for a stuck open or a failed open pilot-operated relief valve?

A. This was designed for that purpose, yes.

Q. And was it important to you in this period of time before June 1977 that you be able to properly diagnose an open PORV if that event occurred?

A. Yes, it was.

Q. Was it important to you at that time to be able to tell the difference between a PORV that had stuck open and a PORV that had opened and closed in the normal manner?

A. Would you read that back, please?

THE COURT: Read it back.

(Record read)

A. It was important for me to reach that conclusion to apply the procedure, yes.

Q. Did you ever tell anybody at Met Ed at any time before June of 1977 that this procedure was no good because you couldn't tell the difference from these symptoms between a PORV that had stuck open and a PORV that had opened and closed in the normal manner?

A. I did not.

Q. Now, there was the first -- under Section B which is the inoperative pilot-operated relief valve, B-1, symptoms, number three says, "RCR2 discharge line temperature is above the 200 degree Fahrenheit alarm".

Do you see that?

A. Yes, I do.

Q. And you knew that was in that procedure as a symptom of a pilot-operated relief valve that had opened and failed to close, right?

A. Yes.

Q. You knew that for several weeks, months, whatever, before the accident the PORV temperatures had been elevated and instead of being what is referred to in the procedure as the normal 130 degrees, they had been up around 195 or 200 during normal operations, right? You knew that?

A. 190, 195, yes.

Q. Did you tell anybody at Met Ed at any time before the accident that they should revise this symptom to change that 200 degree number in light of the fact that the temperatures had been elevated very close to that number during normal operations because of leakage from some valve?

A. I did not.

Q. Now, I think you said in response to one of Mr. Klingsberg's questions that on the morning of the accident you would have expected the temperatures in the discharge line from a stuck open PORV to be 400 degrees; do you remember that?

A. Yes, I do.

Q. Did you ever tell anybody at any time before the accident that they ought to change that 200 degree number

and make it 400 degrees?

A. I did not.

Q. Now, you know today, do you not, Mr. Zewe, that on the morning of the accident, March 28, 1979, there in fact was a stuck open PORV for a period of approximately two hours and 20 minutes?

A. That the valve was stuck partially open or full open, I don't know that, yes.

Q. Now, directing your attention to the GPU chronology which Mr. Klingsberg marked as Exhibit 2079, do you have that in front of you?

A. No, I don't.

Q. Maybe one of Mr. Klingsberg's faithful assistants can give you that back. 2079.

A. I have that document.

Q. And this is the official GPU chronology, right?

A. Yes, sir, that's my understanding.

Q. I would like to direct your attention to page 32, the first item that appears there at 4:24:58, do you see that?

A. Yes, I do.

Q. "The Unit 1 supervisor requested the computer to print the outlet temperatures of the PORV and the two codes. Respective valves 285.4, 263.9 and 2.75 were indicated".

Do you see that?

A. You said 2. --

THE COURT: 2.75 -- 275.1.

Q. 275.1. Do you see that?

A. Yes, sir.

Q. Those were the numbers that the computer printed out the first time, correct, about 4:24, 4:25?

A. Yes, sir.

Q. Directing your attention to page 39, the last item there, which is 5:20:31. Do you see that? Do you see that item at the bottom, Mr. Zewe?

A. Yes, I do.

Q. The Unit 1 shift supervisor requested the computer print the outlet temperatures again of the three valves. The recorded values were 283.0 Fahrenheit, that's for the PORV, right?

A. Yes.

Q. 211.3 Fahrenheit and 218.6 Fahrenheit, respectively. Do you see that, Mr. Zewe?

A. Yes, sir, I do.

Q. And that's what the computer printed out the second time at about 5:20, according to the GPU chronology, right?

A. Yes.

Q. So according to the GPU chronology the two temperatures printed on the computer at 4:24 and 5:20 were

285 and 283 for the PORV, right?

A. Yes, sir.

Q. And the number that was printed out the third time after Mr. Mehler arrived in the control room and asked for the temperatures was no higher than 283 or 285, was it?

A. I don't recall what the temperature was. I don't think that it was any higher but I don't recall what it was.

MR. FISKE: Your Honor, for your information on tab 5, the diagram of the pressurizer system discharge piping, we have the temperatures for each of the three valves on each of the three occasions, which comes from the chronology in the computer printout.

Q. Are you looking for the third temperature, Mr. Zewe, in the chronology?

A. Yes, sir.

Q. I think you'll find it is 229 for the PORV -- 239 -- 229 for the PORV, 190 for code 1-A and 194 for code 1-B.

A. Thank you.

Q. So it is correct, is it not, Mr. Zewe, that the official GPU chronology reflects after the fact that for an event in which there was a stuck open PORV the highest temperature recorded at any time on the computer it was asked for by an operator was 285 degrees?

A. Yes.

Q. Now, it is also true, is it not, Mr. Zewe, that prior to March 28, 1979, you'd never seen a temperature at TMI-2 on the discharge line of 400 degrees for a stuck open PORV, had you?

A. I had not.

Q. Now, let's go back again to these symptoms in the inoperative pilot-operated relief valve section of the pressurizer system failure procedure. I direct your attention to symptoms three and four.

Symptom three is when a discharge line temperature is above the 200 degree Fahrenheit alarm, do you see that?

A. Section B-1-3?

Q. Yes.

A. Yes, I do.

Q. You have already testified that you understood that that was a symptom of an open PORV rather than a closed PORV, correct?

A. Yes.

Q. I think you testified that you thought before the accident that if there was a normal opening and closing of the PORV the temperature in the discharge line would go up to 400 degrees and then would cooldown after the valve closed, correct?

A. That's what I expected, yes.

Q. Now, you hadn't seen that, had you, on any incident at TMI-2 before the accident?

A. No, I hadn't.

Q. Now, you were aware, were you not, before the accident that a way that you could tell the difference between how the system would react or the temperatures would react for a stuck open PORV and a PORV that opened and closed in the normal fashion would be to actually determine what the temperatures were for a normal opening and closing of the PORV, how high they went and how quickly they cooled down again below the alarm point, you knew that was possible to do, didn't you, before the accident?

A. Yes. I believed that it was possible, yes.

Q. Now, there were incidents right there at TMI-2 in the year before the accident in which you had had normal openings and closings of the PORV, right?

A. Yes.

Q. And the capability existed to determine how high the temperatures went and how quickly they came down, correct?

A. That existed, yes.

Q. Did anyone in the Met Ed training department or Mr. Floyd or anyone else in the operations department tell you that on April 19, 1978, there had been a PORV opening

and closing in which the first temperature and alarm registered was 212.9 degrees Fahrenheit and that within 37 minutes after the PORV closed there had been a reading of 192.6?

A. I was not aware of that information, no.

Q. Did anyone in the Met Ed training department or Mr. Floyd or anyone in the operations department tell you that there was an incident in October 14, 1978, right there at TMI-2 in which there had been a normal opening and closing of the PORV in which the first temperature and alarm was 201.3 and that within 36 minutes after the PORV closed the temperature had dropped to 192.3 Fahrenheit?

A. No.

Q. Did anybody tell you in the Met Ed training department or in the Operations Department that on January 15th, 1979, that in the normal opening and closing of the PORV the first temperature and alarm had been 214 degrees Fahrenheit and that within five minutes the temperature had fallen to 192.3?

MR. KLINGSBERG: Within five minutes of what?

MR. FISKE: Within five minutes at the time that the temperature was at 214.

THE COURT: 214.

MR. KLINGSBERG: After it closed?

MR. FISKE: You can have it close any time you

want in those five minutes. I don't think it makes any difference.

Q. Did anybody ever tell you that, Mr. Zewe, that on January 15th, 1979, in a third situation at Met Ed where there had been a normal opening and closing of the PORV that within five minutes after the temperature was 214 it had come down to 192?

A. No.

Q. Now, Mr. Klingsberg asked you whether it would have been helpful to you on the day of the accident to have the Bert Dunn instructions.

Do you think it would have been helpful to you to have this information on the day of the accident?

A. Yes. I believe it would have, yes.

Q. Now, let's go look to the next symptom. B-1, paragraph four.

It says "The RC drain tank pressure and temperature are above normal on the control panel 8-A" --

THE COURT: Mr. Fiske, would you start again, please?

MR. FISKE: Sure.

Q. The next symptom, which is paragraph four under B-1, it says, "The RC drain tank pressure and temperature were above normal on control panel 8-A."

Do you see that, Mr. Zewe?

A. Yes.

Q. That's the panel they had up for a few minutes during your direct examination back here?

A. Yes, it was.

Q. Now, you did know, did you not, before the accident that one way you could tell the difference between whether you had a normal opening and closing of the PORV or whether you had a stuck open PORV was by how high the pressure and temperature went above normal on the control panel?

A. In relationship to the trends, yes, depending on how long it lifted and what a normal lift was and what the temperature and level was in the drain tank, a comparative type analysis, yes.

Q. Now, I think you may or may not have already testified, that the tank under normal operations, the pressure was zero, right?

THE COURT: This is the drain tank?

MR. FISKE: Drain tank, yes, sir.

Q. In the drain tank the pressure was zero?

A. Yes.

Q. And there was a relief valve that was supposed to lift when the pressure reached 150, is that correct, PSIG?

A. That is correct.

Q. And then there was a rupture disc that was supposed to blow if the pressure got higher than 150, right?

A. Yes.

Q. And you knew that -- what was the pressure at which the rupture disc was supposed to blow?

A. 200 pounds.

Q. And so that the tank was designed that the first thing that would happen as pressure went up, is that the relief valve would lift, correct, when you got to 150?

A. Yes.

Q. And then when that wasn't enough, even with the relief valve lifting and the pressure continued to go up and you got up to 200, then the rupture disc would blow, right?

A. That is correct.

Q. And the tank was designed, was it not, so that the rupture disc was the weakest part in the tank so that would go first on this kind of overpressurization?

A. That was designed to protect the rest of the tank, yes.

Q. Now, you knew before the Three Mile Island accident, Mr. Zewe, that you wouldn't have expected the rupture disc on the drain tank to blow every time the PORV opened and closed in a normal manner, right?

A. Yes.

Q. And you wouldn't have expected the relief valve to lift if all that had happened was that the PORV had opened and closed in a normal manner, right?

A. Here, again, normal manner depends. I would not expect that to be the case though, you are right.

Q. Now, one more thing on this procedure, Mr. Zewe.

Look down at the immediate action section, B-2 and paragraph two it talks about a failed open RCR2, do you see that?

A. Yes, I do.

Q. That's the PORV, RCR2, right?

A. Yes, it is.

Q. And the first thing, one automatic action is all pressurizer heater banks go on full when the pressure drops below 2205, that happens automatically, right?

A. Yes, it does.

Q. Number C, that in a case of a failed open PORV, one of the automatic actions that will occur is that high pressure injection will come on at 1600 PSIG, right?

A. That's the -- yes.

Q. So you knew, again, before the Three Mile Island accident that one of the automatic actions you would expect to see after you have a failed open pilot-operated relief valve is high pressure injection coming on if pressure

drops as far as 1600, right?

A. Yes.

Q. Now, Mr. Klingsberg in his direct examination asked you whether after every normal opening and closing of the PORV, isn't it true that the pressure drops down below 2205, do you remember him asking you that?

A. Yes.

Q. And that's the 2205 which is the point at which the PORV is supposed to close, right?

A. Yes.

Q. That happens on virtually every reactor, right?

A. No.

Q. Well --

A. That the PORV opens and closes or that you go below 2205?

Q. After you have had a reactor trip which has opened the PORV, the pressure will come down below 2205 at some point?

A. Yes.

Q. And Mr. Klingsberg said you wouldn't expect to close the block valve every time the pressure drops below 2205, do you remember him asking you that?

A. Yes, I do.

Q. On a normal reactor trip, in a normal opening and closing of the PORV where it opens the way it is

supposed to and closes the way it is supposed to and you don't have a failed open PORV, do you expect pressure to drop to 1600 all the way to the point where HPI comes on?

A. When you say normal reactor trip --

Q. Scratch that.

When I have a normal opening and closing of the PORV, pressure goes up to 2255, the PORV opens, it drops back down below 2205 and the PORV closes. In that situation, you don't expect pressure to keep dropping all the way down to the point where high pressure injection comes on, do you?

A. No, because the reactor is still operating at that point because you have stopped the pressure rise and you never had a reactor trip.

Q. Well, all right, let's do it again with a reactor trip.

The PORV opens, pressure continues to go up, it trips the reactor --

THE COURT: Trips the valve.

MR. FISKE: The reactor shuts down. Maybe I went too fast.

THE COURT: My fault. I thought I didn't understand.

Q. The first thing you have is pressure goes up at 2205 and the PORV opens. Pressure continues to go up to

2355, that's the reactor trip set point, right?

A. Yes.

Q. Now, the reactor trips. Now pressure starts coming down, pressure gets below 2205, the PORV is supposed to close, right?

A. Yes.

Q. The PORV does close, just the way it is supposed to, right? Are you with me so far?

A. I understand what you are saying, yes.

Q. Now, at that point you would not expect with a PORV closed pressure to continue to drop all the way down to 1600 when high pressure injection comes on, would you?

A. As long as there was no other upset that would cause that.

Q. So it is fair to say, isn't it, Mr. Zewe, that in a situation -- looking, again, at this pressurizer system failure procedure -- where you saw temperatures above 200 degrees Fahrenheit on the thermocouple, drain tank pressure and temperature had increased to the point where the relief valve had lifted, where the rupture disc had blown and pressure had dropped all the way to the point where high pressure injection came on, you'd know that there was something more going on than a normal opening and closing of the PORV, right?

A. You have a lot of things in that.

Q. Well, I only have the three things right out of the procedure.

Let's start again. Number three, under symptoms. RCR2 discharge line temperature is above 200 degrees Fahrenheit, that's number one.

A. Okay.

Q. The next thing is RC drain tank pressure and temperature are above normal and we have a situation in what I am putting to you where the temperature is over 200 and the drain tank pressure has gone so high that a relief valve has lifted or the rupture disc has blown in the drain tank and the third thing I'm putting into it, right out of the procedure, is automatic action A-2-C, that as a result of whatever is going on up at the top of the system with valves and the pressurizer, high pressure injection pressure has dropped all the way to the point where high pressure injection is coming on at 1600 PSIG.

So you have got temperatures over 200, you have blown the rupture disc on the drain tank and pressure has come all the way down to where high pressure injection is coming on.

My question to you is, before the accident, you knew that that kind of a situation wouldn't result from a normal opening and closing of the PORV?

A. If that was the only thing that you considered,

yes.

THE COURT: Mr. Fiske, it is about 5 o'clock.

MR. FISKE: I have one more question and we'll be through with this but I'll stop now if you would like.

THE COURT: You finish the subject.

Q. I'd like to go back to one answer that you gave the other day, Mr. Zewe, and I'm reading now from page 2017. Again, a question from the court, where the court was referring to the same section of the pressurizer system failure procedure, Section B, the inoperative pilot-operated relief valve, page 2017. In the middle of the page about line 12. Where the court says.

"You have B-2" -- referring to symptom B-2 RCR2 system is below 2205, PSIG and RC25 fails to close.

The court says: "You have B-2"-- and you interrupted and say.

"The Witness: Your Honor, B-2. How do I know I had that by itself as a separate --

"The Court: Your pressure was down, was it not?

"The Witness: Yes, but that in and of itself does not mean the valve failed to close. I think that the reference here is that your indicating light shows that it did not close at set point when it should have otherwise. I cannot show how I could use that as a symptom."

Do you remember giving that answer to the court

last week, Mr. Zewe?

A. Yes.

Q. When was the indicating light installed at TMI-2?

A. I don't recall the date but sometime after April of 1978.

Q. This procedure became final on June 22, 1977, right?

A. Yes.

Q. This language in B-2 RC system pressure is below 2205 PSIG and RCR2 fails to close was printed in that procedure nine months before there was any light, isn't that correct?

A. Yes, it was.

Q. Isn't it a fact that after the light was installed no change was made to this procedure at all?

A. Yes.

Q. There was an amendment to the pressurizer system failure procedure in another section, was there not, in September of 1978?

I am referring you to page 5; is that correct?

A. Yes.

Q. And at the time that page of the procedure was changed in September 1978 nothing was added to the section dealing with a stuck open pilot-operated relief valve to make any reference to a light at all, isn't that right?

A. That is correct.

MR. FISKE: That's all I have, your Honor.

THE COURT: We'll be in recess until 10:15 in the morning.

MR. FISKE: Your Honor, I think Mr. Klingsberg and I would like to see you with respect to the matter that I brought up the other day at the end of the testimony of another witness.

THE COURT: Very good. You want to come up to the side bar or do you want --

MR. FISKE: Perhaps we could excuse the witness.

THE COURT: We'll excuse you, sir.

(Witness excused)

MR. FISKE: I asked your Honor earlier about your practice with respect to instructing witnesses not to confer during the course of the cross-examination and you said on previous cases you had done that where it was appropriate.

I think it is appropriate in the case of this witness and I would ask for that instruction.

Mr. Klingsberg just handed me this afternoon this memo which I haven't had a chance to read yet let alone respond to. But if your Honor thinks it needs a response, we will do it.

THE COURT: I looked at it during the recess and

I am familiar with these cases.

MR. KLINGSBERG: May I be heard?

THE COURT: You may.

MR. KLINGSBERG: Your Honor, I have two problems with the request.

Number one, the redirect is going to require ongoing preparation and at times that may require consultation with the witness. That, certainly, as to matters that have been passed, with regard to preparation for the redirect, it certainly would be extremely useful to be able to prepare that during the next few days. I would agree, and I told Mr. Fiske, that if at a recess, for example, he's in the middle of a subject, I'm perfectly agreeable not to discuss that subject with the witness.

If we have subjects that we haven't reached at all and we're not even close to, this witness, has, for example, a very unusual amount of testimony, as do all the witnesses in this case, you have heard about the Kemeny Commission, the Hart Committee, et cetera, et cetera, and I think the witness should be allowed the time, which he hasn't had, as thoroughly as he might because he has a job to do and he's been working on the preparation of the direct under the guidance of counsel to review some of that, as in the deposition proceedings for his own protection.

The Potashnick case and the Supreme Court case

by Chief Justice Burger, and the Geders case, indicate that it is very important for the protection of a witness to have the advice of counsel where you have testimony stretching over long periods of time just as Justice Burger indicates there are ways to deal with this so you don't have counsel speaking to a witness in the middle of a morning recess about something that's ongoing.

He suggests stretch out the examination so you don't have a subject break in the recess. I'm not even going to ask him to do that.

I'm merely saying that on subjects that even haven't been reached at all, for the protection of the witness, he should be entitled to be able to do preparation under the guidance of counsel. There are an awful lot of documents and an awful lot of prior testimony which he should be reviewing in order to protect himself in this case and I don't see why he shouldn't be able to do that.

MR. FISKE: Just two brief responses.

First of all the theory -- you just don't take the case in little blocks and pigeon hole them. All of these things interrelate to each other.

Secondly, if he wants to read his prior testimony, I have no objection to that. We can give him all of his prior testimony to read to his heart's content.

MR. KLINGSBERG: It would take six months to do

that.

MR. FISKE: Third, with respect to the redirect, as I said with regard to Mr. Arnold, we wouldn't ask for that kind of response to delay the redirect. When we get near the end of the cross-examination, I will be perfectly willing to allow --

THE COURT: We can do redirect after we pass on to other witnesses or any other number of ways.

MR. KLINGSBERG: I don't know if your Honor has had a chance to read the memorandum.

THE COURT: I did. I did read the memorandum.

MR. KLINGSBERG: I was going to suggest if you wanted to cogitate over the matter overnight we would be willing to forego this evening if there was further thought that your Honor wanted to give to us. But even this evening, I think, the witness should have the opportunity, if he wants to, and I think he's entitled to under the constitution, as is indicated in these cases, to have the guidance of counsel.

I mean the indication is that where the sixth amendment right to counsel conflicts with other exigencies that must govern. Mr. Fiske says he should go ahead and read testimony. It would take him six months to read all the testimony. He can't possibly do it unless he has guidance of counsel as to what areas we think are likely to

come up and what testimony and documents he should read to be thoroughly knowledgeable.

THE COURT: That's exactly where I am concerned because then he is being focused on things by lawyers and it seems to me the interest of justice in this, as in every case, mandate that we get his present recollection on subjects uninfluenced by any outside input of a steering kind, which this necessarily will be.

If it gets down to a question of your preparing for redirect and if we have to take an adjournment for it and we have to defer his redirect and take another witness intervening before you get to redirect so you have time or there could be any other number of ways, I think it important that he not be in a position where he may say tomorrow that he is affected by conversations where he said, "what did I about this", and then things are picked out for him that you all pick out, based upon what you are suggesting to me rather than him giving us his best recollection.

MR. KLINGSBERG: This is just what Justice Burger says.

THE COURT: That's a criminal case and, frankly, it was between direct and cross. The cross hadn't even begun, as I remember, in that case. So we're into cross.

MR. KLINGSBERG: Chief Justice Berger says:

"It is common practice during such (overnight) recesses for an accused and counsel to discuss the events of the day's trial. Such recesses are often times intensive work, with tactical decisions to be made and strategies to be reviewed. The lawyer may need to obtain from his client information made relevant by the day's testimony, or he may need to pursue inquiry along lines not fully explored earlier. At the very least, the overnight recess during the trial gives the defendant a chance to discuss with counsel the significance of the day's events. Our cases recognize that the role of counsel is important" --

THE COURT: That's where the witness who is involved is a defendant where his liberty is at stake.

MR. KLINGSBERG: The Potashnick case, which applies that rule, where it is a civil case where the court held that the right to counsel was equally important and applicable and it certainly is my suggestion this right to counsel is applicable in a civil case.

THE COURT: I will grant Mr. Fiske's application.

MR. FISKE: I assume this would mean, this is no communications directly or indirectly. In other words --

THE COURT: Very well. I am instructing them.

MR. KLINGSBERG: I think the reference in the Allen case, in the Supreme Court, which is cited in our

brief to the effect that the danger asserted is that counsel's advice may significantly shape or alter the giving of further testimony by the defendant that will be untrue or tailor a distortion or arrangement of the truth. We think that apprehension is greatly exaggerated. Such a fear rests upon more synicism than is justified by the performance of the bar.

I certainly think that in this case, which is a technicological case involving scientific evidence that there is certainly no --

THE COURT: It is, but another part of it is not.

One of the things that is troublesome here is that Mr. Fiske tells me that this man on several occasions testified to turning on the HPI prior to 6:18 in the morning.

MR. FISKE: He certainly did.

THE COURT: And there is, from what you tell me, there is apparently going to be a witness or witnesses and it is your effort through these exhibits that I felt obliged to exclude to indicate that notwithstanding he said that he is being -- it is being suggested to him that he is quite possibly in error, if I can put it that way.

MR. FISKE: That's exactly what is happening.

THE COURT: It seems to me you have got to get what he says and not what people may be suggesting to him

is what he said or picking out for him to focus on things as to what he said. This is not a technical case. A lot of this is a detective story.

MR. KLINGSBERG: You take, for example, on that very point that the witness testified from his recollection it was sometime after 5:40 he couldn't place the time.

THE COURT: But I gather elsewhere that he said he could place the time.

MR. FISKE: Two weeks after the accident he could place the time, now three and a half years later he can't.

MR. KLINGSBERG: We had testimony in the deposition which I pulled out over the weekend after pouring over this, where Mr. Fiske shows him prior testimony and starts in the middle of a point where the witness has an answer. The very point before that somebody says it was after the block valve was closed and the witness says, "that's when the HPI was put on". Mr. Fiske leaves out that part before that.

MR. FISKE: That's not true.

MR. KLINGSBERG: That's the very kind of reason that a witness needs a lawyer to defend him in order to guard against that kind of situation.

MR. FISKE: I ask Mr. Klingsberg to bring the transcript over now and show where it happened.

MR. KLINGSBERG: I will do that right now.

THE COURT: There are two ways to handle it. You either are on the offense screaming or you can handle it on redirect. The short answer is I will impose the order that Mr. Fiske requested.

MR. KLINGSBERG: Mr. Fiske did indicate before we came up where we tried to resolve this thing, if we had the Thanksgiving weekend and he was almost or not quite through that we could take another look at this.

MR. FISKE: I'm willing to revisit it depending on where we are Wednesday.

(Open court)

THE COURT: Mr. Zewe, we are recessing for the evening. You are on cross-examination and in order that the court be the beneficiary of nothing but your best recollection as to matters while you are on the witness stand, I am going to issue a direction that, certainly, until further application to me, that until your cross-examination is over, you are not to talk to anybody about the substance of your cross-examination.

In other words, if you go to dinner with the lawyers tonight, which you may very well do, you are not to talk about what you are being asked about in the case. You can talk about the renewal of the football season, you can speculate on who is going to within the Super Bowl, you can

talk about where you are going for Thanksgiving dinner, but you are not to talk about the case and I am directing that they not talk to you about the case either directly or indirectly. This is so that you will not -- you will be giving me your best recollection of things as you sit here today or tomorrow or the next day. Okay.

THE WITNESS: Yes, sir.

THE COURT: Thank you very much. I will see you tomorrow at 10:15.

(Whereupon the evening recess was taken)

WITNESS INDEX

Name	Direct	Cross	Redirect	Recross
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