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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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GENERAL PUBLIC UTILITIES CORPORATION, :
JERSEY CENTRAL POWER & LIGHT COMPANY,
METROPOLITAN EDISON COMPANY and :
PENNSYLVANIA ELECTRIC COMPANY,
:
Plaintiffs, 80 CIV. 1683
: (R.O.)
-against-
:
THE BABCOCK & WILCOX COMPANY and
J. RAY McDERMOTT & CO., INC., :
:
Defendants. :

- -x

Continued deposition of GPU NUCLEAR CORPORATION, by WILLIAM H. ZEWE, taken by The Babcock & Wilcox Company, pursuant to adjournment, at the offices of Davis Polk & Wardwell, Esqs., One Chase Manhattan Plaza, New York, New York, on Friday, May 28, 1982, at 9:40 o'clock in the forenoon, before Harvey B. Kramer, R.P.R., Certified Shorthand Reporter and Notary Public within and for the State of New York.

Appearances:

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* * *

W I L L I A M H. Z E W E, resumed, having been previously duly sworn, was examined and testified further as follows:

EXAMINATION (CONTINUED)

BY MR. FISKE:

Q Mr. Zewe, going back to the period of time after you came back from the turbine room and before the second set of reactor coolant pumps was turned off, did you obtain any information during that period on the temperatures at the discharge line?

A I don't recall the exact time, but I had asked for another set of discharge line temperatures.

Q Well, without holding you to the precise minute, did you make that request sometime during the general time period that I just referred to?

A As I recall, yes.

Q Who did you ask to get those temperatures?

A Mr. Bryan.

Q Was there any particular reason why you picked Mr. Bryan?

A The availability of Mr. Bryan.

Q And what did he do?

A He told me what the tailpipe temperatures were at that time.

Q How long did it take him to give you that information after you had made the request?

A As I recall, a fairly short time. Within a couple of minutes.

Q Did you have any understanding as to how he had obtained that information?

A I assumed that he got them from the computer.

Q What did he tell you the temperatures were?

A I don't remember the exact readings. But the readings were around 228 or 232, around there somewhere.

Q Did he give you a reading for each one of the the three valves?

A As I recall, yes, he did.

Q And was the temperature for any one of the three valves higher than for any of the others?

A I don't remember making that distinction, though I am sure they were not exactly the same, so one would have to be higher than another, but I don't remember differentiating between the three.

As I recall, they were all grouped closely together, around 230 degrees, and that's about all I remember of that reading.

Q Was one of the reasons why you asked Mr. Bryan to get those temperatures to consider whether or not any of those three valves might be open?

A As I recall, I did not do it because I suspected that any of the three valves were open. As I recall, I did it more in the course of follow-up, and I don't remember dwelling on that particular point. I had just asked for them, and he gave them to me, in just the normal course of events that I had asked.

Q What relevance did you think those temperatures had to the problems that you were dealing with at that time, other than their indication of a possibility that one of the valves was open?

A As I have stated, I did not feel that or even suspect that the valves were open. I don't recall precisely what I was thinking at that particular time that I had asked Mr. Bryan for the numbers, again. I just remember that I did, and those were the numbers he gave me.

Q Can you tell us today, Mr. Zewe, any reason why you wanted those numbers, other than the possibility that one of those valves was open?

MR. MacDONALD: I object. He has answered part of that question already and

given you the reason why he asked for them.

MR. FISKE: I don't think he has. That is why I am asking the question.

Do you want to hear it again?

THE WITNESS: Yes.

(Question read.)

A Again, I don't remember considering that the valves were open, but I was interested at the time in what the line temperatures were. I had asked for them before, and I had asked for them at that particular point, though I don't remember exactly for what one or two reasons I had asked. But I do not remember thinking that it was because I felt that they were open.

Q Or that they might be open?

A Or that they may be open.

Q Does that answer that you just gave apply to both times that you asked for the temperatures?

A Yes, it does.

Q Did you at some point learn that at the time Mr. Bryan obtained the temperature readings the second time, that the temperature for the PORV was 283 degrees and that the temperatures for the two code safeties were 211 and 218?

MR. MacDONALD: Are you asking whether he learned it on the day of the accident or at any time?

MR. FISKE: At any time after he made the request of Mr. Bryan.

A Up to the present day?

Q Yes.

A Yes, I did learn that. Because I reviewed the printout sheets from the utility typer. And I read at that particular time period that he had asked for them. And I have -- since I have looked at that sheet, yes.

Q When was the first time that you looked at the utility printer?

MR. MacDONALD: For the particular temperatures?

MR. FISKE: Yes.

A I don't remember. But it was several days after the accident. But I am not sure exactly when that was.

Q Now, Mr. Zewe, going back to the reactor coolant pumps, I think the chronology evolved by GPU shows the first two pumps were turned off about 5:15 and then the second set of pumps was turned off at

about 5:40.

Were you involved in the decision to turn off the first set of pumps?

MR. MacDONALD: Are you asking him in that question about 5:15 to the best of his recollection if the witness was involved? You had stated that, but I don't know if that was incorporated in the question.

Q The question is simply: Were you involved in the decision to turn off the first set of reactor coolant pumps?

A It was my final decision to do that.

Q Who else participated in that decision?

A Mr. Kunder, Mr. Bryan, and the rest of the operating shift in the control room at the time.

Q Scheimann, Frederick and Faust?

A That is correct.

Q So in other words, everybody who was there at the time participated in the decision?

A Everyone participated in the discussion about the pumps. It was my final decision to secure the pumps.

Q Did any one of the people you just named express the view that the pumps should not be turned

off?

A Should not be turned off?

Q Yes.

A As I remember, there was a reluctance on the part of one of the operators. I do not remember which one it was. He had expressed that maybe we should not. But the general consensus was that we should protect the pumps.

Q What was the reason given by the operator who expressed the reluctance?

A Maybe I should state it another way.

I think that we were all hesitant -- all right -- to secure the pumps, because it would not have been a normal thing to do under normal conditions, but that I felt I should do it in order to protect the pump.

I don't recall the one operator that expressed reluctance saying other than in general terms we should not secure the pumps, but not for any particular reason as I remember other than in a general case.

Q Was there any reason why only one set of pumps was turned off at that time?

A Yes. I wanted to maintain RCS flow. I

didn't want to go straight to natural circulation.

Q Did you believe that leaving one set of pumps on would allow you to maintain RCS flow without going to natural circulation?

A As long as I have coolant pumps running, I will not go to natural circulation. And I had hoped that whatever the problem was with the pumps, that if I reduced the flow, that that would allow the two remaining pumps to continue to operate and circulate reactor coolant.

Q And then approximately 25 minutes later, the second set of pumps was turned off; correct?

A As I remember, that is correct.

Q And did you make that decision?

A Yes, I did.

Q And did the same people participate in the discussions leading to turning that set of pumps off as had the first time?

A Yes.

Q And what was the reason why you decided to turn off the second set of pumps?

A I felt that the conditions indicating the status of the pumps was still deteriorating on the two remaining pumps, and that I felt it was best to secure

those two pumps to preclude any damage to those pumps.

Q In the course of your career up to that point, Mr. Zewe, had you ever had experience with running pumps beyond their normal operating limits?

A I did not have experience on running the pump past her normal operating limits, either at the Island or B&W in transient response training.

Q Did you have an understanding, from your training experience or otherwise, that the limits that were prescribed for the pumps were for normal operations? Putting it another way, that normally the pumps should not be operated beyond those limits.

A I was aware of the pressure/temperature curve for operation of the pumps. I knew that that curve was conservative and that the pumps were actually designed for lesser temperature and pressure relationships, but by staying on the proper side of that particular conservative curve, that the pump would be operated well within its normal operating capability.

Q At the time you turned the pumps off, did you believe that the pressure/temperature relationship had reached the level below the net positive suction head curve that you just referred to in your last

answer?

A (No response.)

Q Did you follow my question?

A Yes.

As I recall, we were either right at the curve or slightly on the wrong side of that curve, though I don't recall exactly what position we were.

I felt that we were coming close to our actual limit, but I didn't have a good feel for how far beyond the conservative curve I could go without pump damage. So I was just precluding that operation of the pump so that there would not be any damage, by securing it.

Q Did you feel that you could not go any further below the curve without incurring pump damage?

A As I recall, I was thinking that I had the high vibration, the low amps, the reduced flow, plus looking at the curve I felt that it was in the best interest of trying to protect the pumps to secure it.

I didn't think, well, how much more room did I have before I have damage? I was trying to secure the pump based on not having damage, but I really didn't have a gauge to say that I could go this much more beyond the curve. I didn't have that feel

for when the damage would occur. I was just trying to prevent any damage to the pumps.

(Continued on the next page.)

Q Was there any discussion at the time the second group of pumps were turned off as to whether or not that was the right thing to do?

A I don't recall any discussion at that point other than we collectively agreed that we should protect the pumps.

Q Did anyone in the group express any reluctance to turn off the second set of pumps?

A Yes, I believe that we all had some reluctance, some inherent, you know, reluctance to securing pumps. But we felt that the action was necessary under the conditions that confronted us.

Q What was the reluctance to secure the pumps based on?

A Just that it is not a normal thing to do to go to natural circulation as long as you still had power to the reactor coolant pumps themselves. The only time that you would be forced into going natural circulation cooling would be if you did not have the pumps available.

In this case they were available. But we had made the decision to secure them to preclude the damage.

Q Did you participate in any discussions as

to whether you would be able to achieve natural cirulation?

A As I recall, the people present in the control room, including myself, expected that we would be able to achieve natural circulation.

Q Let me show you a document that has previously been marked as part of Exhibit 275.

275, I guess, is the LER which we have referred to periodically throughout this deposition, the LER that was filed with the NRC by GPU in September 1981.

I direct your attention to page 27.

A What was that again? I'm sorry.

Q 27.

MR. FISKE: Well, let me withdraw that last question.

Q Did you see that LER at any time between the time it was filed with the NRC and today?

A Yes, I did.

Q So you saw it in its initial form?

A Yes, I believe I did, yes.

Q Did you also see various drafts of this LER chronology as it was in the process of preparation?

A Yes, I did.

Q Let me show you a document that we will mark as B&W Exhibit 758 for identification.

(Document consisting of a draft of chronology, dated July 16, 1979 was marked B&W Exhibit 758 for identification.)

Q Do you have Exhibit 758 in front of you, Mr. Zewe?

A Yes, I do.

Q That is a draft of this chronology, dated July 16,1979; is that correct?

A Yes.

Q Do you see the writing on the first page of this exhibit?

A Yes.

Q What does that say?

A "Zewe's comments 9/11/79."

Q Whose handwriting is that?

A I don't know.

Q I would like to have you turn the pages of this exhibit with me for a second. Would you look at page 1.

A Page 1?

Q Page numbered 1, which may be like the third or fourth page in.

A Yes.

Q Do you see some handwriting on that page?

A Yes.

Q Is that yours?

A Yes, it is.

Q Skipping over to page 3, is that your handwriting?

A It looks like it's mine, yes.

Q How about page 5?

A Yes.

Q 6?

A Yes.

Q 7?

A Yes.

Q 9?

A I don't see any writing on page 9.

Q I am sorry. 10?

A Yes.

Q 11?

A Yes.

Q 12?

A Yes.

Q 13?

A Yes.

Q 14?

A Yes.

Q 15?

A Yes.

Q 16?

A Yes.

Q By "yes" in all these answers, you are indicating that the handwriting on that page is yours; correct?

A As far as I can determine, yes.

Q All right. That is the pending question for all these pages.

A Yes, I understand that.

Q All right. 17?

A Yes.

Q 18?

A Yes.

Q To save time, Mr. Zewe, at this point why don't you just go through the rest of this document page by page and let me know if there is any writing that appears on any of those pages that you do not recognize as your own.

Do you understand?

A Yes, I do.

I have reviewed through page 57, I believe. And all the comments that I see appear to be ones that I made.

Q Thank you.

I would like to direct your attention to page 28.

A I have page 28.

Q There is a paragraph there that refers to a time of 1:54.

Do you see that?

A Yes, I do.

Q Do you see the notation on the right-hand side of that that says, "Two pumps on at 1,000"?

A Approximately a thousand, yes.

Q Does that little sign there mean "approximately"?

A As I remember, it does.

Q Okay. And what pumps were you referring to when you wrote that comment?

A Two makeup pumps.

Q I think we have established before, have we not, Mr. Zewe, that the makeup pumps are the pumps which also regulate high-pressure injection flow?

A The valves regulate the flow. The pumps

supply the pressure in the water. They are one and the same pumps.

Q Did you write that comment on this draft chronology sometime between July 1979 and September 11, 1979?

A I don't know exactly when.

Q Was it in that general time period there, about July through September 1979?

A I assume it was.

Q Before you wrote that comment in that draft chronology, you had stated to various people at Met ED that at or about the time the second set of reactor coolant pumps were turned off, makeup or high-pressure injection flow had been increased; is that correct?

A As I recall, yes.

Q And at the time you wrote the comment that is reflected in Exhibit 758, it was your recollection that the flow was approximately a thousand gallons per minute; is that correct?

A That's what I remember, yes.

Q Let me show you another document which we will mark as Exhibit 759, which is another portion of this same annotated sequence of events. It consists

of a memorandum from Mr. Miller to a number of people, dated July 13, 1979.

(Document consisting of memorandum from Mr. Miller, dated July 13, 1979, was marked B&W Exhibit 759 for identification.)

A I have it before me.

Q You are listed as one of the people who received that draft of the chronology from Mr. Miller, are you not?

A I believe I was, yes.

Q I would like to direct your attention to page 27.

A I have page 27.

Q Do you see the handwritten notation there at the time indicated as 1:40?

A Yes, I do.

Q Does that read "Operators manually initiated full HPI prior to tripping pumps"?

A Yes, it does.

Q Do you recognize that handwriting?

A I do not.

Q Then there is a parenthes s. "Previous comment." Then it says "per W. Zewe."

Do you see that?

A Yes, I do.

Q Is it correct, Mr. Zewe, that at some time before July 18, 1979 you had told people at Met ED that were creating this chronology that at or about the time the second set of reactor coolant pumps were turned off, HPI flow had been increased to the full amount?

A As I remember, that is correct, that I remembered that we had initiated high-pressure injection flow at the time that we were tripping the last two pumps.

After that time period, due to other studies on BWST level and other people's investigation, it had proved that that had not been the case, but this is exactly how I had rememberd it.

Q Just so we understand, Mr. Zewe, at the time you made the comment on Exhibit 758 which says, "Two pumps on at approximately 1,000" --

A I remember that, yes.

Q --it is correct, isn't it, Mr. Zewe, that at the time you made that comment it was your recollection at that point that that in fact had happened; right?

A That is correct.

Q And at the time you made statements to people at Met Ed between the day of the accident and September 1979 that HPI had been initiated at 1,000 gallons per minute at or about the time the reactor coolant pumps were turned off, in each case, each time you made that statement you were telling them then what your best recollection was; isn't that correct?

A Yes.

Q Now, you told us, Mr. Zewe, that sometime around June -- that sometime in the spring of 1979 -- you gave testimony at a hearing before the Advisory Committee on Reactor Safeguards of the Nuclear Regulatory Commission, so-called ACRS?

A I did talk before the ACRS in 1979. I don't recall exactly when that was.

Q And did that group include Dr. Max W. Carbon, Dr. Milton S. Plesset, Mr. Myer Bender, Mr. Jesse Ebersole, Mr. Harold Etherington, Prof. William Kerr, Dr. Stephen Lawroski, Dr. J. Carson Mark, Mr. William M. Mathis, Dr. Dade W. Moeller, Mr. Jeremiah J. Ray, Dr. Paul Shewmon, Dr. Chester P. Siess?

MR. MacDONALD: Are you asking him at

the time he gave the testimony before the ACRS if he remembers every name?

Q Do you know any of those gentlemen, Mr. Zewe?

A I recall a few of those names which you just read as being members of the ACRS when I was before them. Not all of them, but I do remember some of them.

Q Did you appear before that group of ACRS in June of 1979 accompanied by other people from Met Ed, including Mr. Herbein and Mr. Keaten?

A Yes.

MR. FISKE: Let me mark a copy of that transcript as the next B&W exhibit, Exhibit 760.

(Document consisting of a copy of Mr. W. Zewe's testimony before the members of the ACRS, June 1979, was marked as B&W Exhibit 760 for identification.)

THE WITNESS: I have the copy.

Q Let me direct your attention to page 326, Mr. Zewe.

A I have that page.

Q I would like to read a question and an answer from that page, starting at line 4.

Question from Dr. Moeller: "Excuse me. I believe this 6:20 is after -- and perhaps even a half or more after -- you had shut down the primary coolant pumps; is this correct?"

Answer by Mr. Zewe, "Yes, sir. At the same time that we secured the last two reactor coolant pumps, which were the A-side pumps, we initiated full high-pressure injection at the same time, which was approximately 5:40, if I remember right."

Were you asked that question and did you give that answer the ACRS on June 15, on or about June 15,1979?

A I have no reason to believe that this is not accurate, though I don not remember the actual words.

Q At the time you testified before the ACRS, Mr. Zewe , were you telling the truth in the answers that you gave to the questions that you were asked? Telling the truth to the best of your ability at that time.

A Yes, I was.

Q And on June 15, 1979 the truth with respect to this situation as you remember it then was that HPI had been put on at full flow at the time the second set of reactor coolant pumps were secured; is that

right?

A As I have stated earlier, that is what I remember.

Q Let me, Mr. Zewe, show you a transcript of an interview that was conducted at Met Ed on May 25, 1979, which we will mark as Exhibit 761, B&W 761.

(Document consisting of a transcript of an interview conducted at Met Ed on May 25, 1979, was marked B&W Exhibit 761 for identification.)

A I have it before me.

Q Do you remember participating in a discussion with Mr. Miller, Mr. Porter, Mr. Ross and Mr. Seelinger on or about May 25, 1979?

A I remember a discussion with these gentlemen and myself. I do not remember the date.

Q Who is Mr. I.D. Porter?

A Mr. Ivan Porter was an instrument and control engineer assigned to Unit 2.

Q Directing your attention to page 6 of that, Mr. Zewe, looking at the answer you gave right at the bottom of the page, let me just read it to you, or the statement.

"Mr. Zewe: We talked about that yesterday after we reviewed the tape, and I went over the complete scenario for training and everybody, as an aid for future training classes and Craig and Ed thought again it was either just before the last two pumps or just after the last two pumps."

Do you see that?

A Yes, I do.

Q Is it correct, if you look back at the discussion that precedes that statement, that the "it" that you refer to in that answer was putting HPI on at full?

A Let me review this for a second.

Q Sure.

A Yes, it is.

Q Did you make that statement to these gentlemen on or about the date the transcript reflects?

A I have no reason to believe that this is not accurate, though I do not remember the words.

Q This statement that I just read indicates that you and Mr. Faust and Mr. Frederick had reviewed this situation involving the HPI flow at the time the reactor coolant pumps were turned off, sometime after

you reviewed a tape.

A That is what it says here, but I don't recall. I remember having discussions with Mr. Frederick and Mr. Faust, and I remembed the HPI, and they certainly supported that even stronger than what I remembered, and a few things that they had said recalled my memory to say, "Oh, yes, I remember when we did that."

Q So in this period of time in or about May 1979, you had conversations with Mr. Frederick and Mr. Faust in which they both said to you that it was their recollection of the accident sequence that HPI had been put on at full at the time the second set of reactor coolant pumps were turned off; is that correct?

THE WITNESS: Would you read that back, please.

(Question read.)

A As I remember, that was correct.

Q And isn't it correct that they each made that statement to other people at Met Ed besides yourself?

A You have to ask them and review their recollection or their previous testimony. I don't know.

Q Well, let me put it this way, Mr. Zewe: Were you ever at a meeting or a gathering of people at Met Ed in which, in your presence, Mr. Frederick or Mr. Faust stated that HPI had been put on at full at the time the second set of reactor coolant pumps was turned off?

A As I remember, yes.

Q Did that occur on more than one occasion?

A I don't remember.

Q Who else from Met Ed was present other than yourself and Mr. Frederick and Mr. Faust during that discussion?

A I'm not sure. I don't remember.

Q Was Mr. Miller present at a discussion in which Mr. Frederick or Mr. Faust made that statement?

A I don't remember Mr. Miller being present. The time that I seem to recall that it happened was whenever we were reviewing the sequence of events with members of the PORC, and I don't remember Mr. Miller being there.

And I know who the members of the PORC were but I can't remember who was there that day and who wasn't, because I did that many, many times and I don't remember.

Q Maybe it would be helpful, Mr. Zewe, if I showed you Exhibit 666, which is a copy of a memo from Mr. Miller to Data Reduction, and then a whole lot of other people listed on the first page.

Do you see that?

A Yes, I have the document before me.

Q It says, "The attached marked-up copy of the annotated sequence of events is the result of TMI-2 PORC meetings held on May 14, 16, and 17, 1979."

Do you see that sentence?

A Yes, I do.

Q Was it those meetings that you were referring to a moment ago?

A It may have been. I am reasonably sure that I participated in these particular PORC meetings, but I am not sure if that is when they occurred or not.

Q Who were the members of PORC at that time?

A Mr. Kunder, Mr. Brummer, Mr. Bensel, Mr. Warren. I believe Mr. Hilbish was. Mr. Floyd was.

I don't remember if Mr. Morck was still there or not.

I can picture a couple of other faces, but I don't recall their names at this particular time.

Q Do I understand your testimony correctly that at meetings with the PORC, with whatever members were present, in May 1979, going over this annotated sequence of events, that both Mr. Frederick and Mr. Faust stated to whatever members were there on that occasion that high-pressure injection had been put on at full at the time the second set of reactor coolant pumps were turned off?

A That's as I recall. And it brings to mind that I believe that there was another person that was present in all of those meetings also, and his name appears here. Tom Van Witbeck. I believe that he was there doing some of the research into the sequence of events, and I believe that he was present during those discussions.

Q Could I ask you to look, Mr. Zewe, at the completed sequence of events, Exhibit 275. That sequence of events is dated September 4, 1980, is it not?

A Yes, it is.

Q At any time between the period of July to September 1979 when you made the notation that we referred to earlier, and September 4, 1980 when this final chronology was filed, did you state to anyone

at Met Ed that high-pressure injection had not been put on at the time the second set of reactor coolant pumps was turned off?

A I don't remember, I may have. Because between the accident and this time I was aware of the other studies conducted on water levels and flow calculations. And it was pointed out to me that if we had had that thousand gallons per minute flow at that particular time, that it would have showed the loss in level from the BWST and that was not apparent in the studies that were conducted.

Q Do you know whether those studies had been conducted, Mr. Zewe, before this chronology was filed with the NRC on September 4, 1980?

A That I don't remember.

Q Direction your attention to page 41 --

A I have that page.

Q --down at the bottom do you see the statement that says, "The operator manually initiated the safety injection portions of engineered safety feature trains A & B to supply additional cooling water to the reactor core"?

A Yes, I do.

Q Were you aware in or about September 1980

that that statement was going into the final chronology?

A I don't recall. I assume that I received a copy of the final version, and I believe I reviewed it.

Q Did you tell anybody when you reviewed it that you felt that statement was inaccurate?

A I did not. The reason for my statement before was that at some time after I had learned through the calculations that it must have been in error because it did not prove out but at no time did I say I changed my mind, that I still didn't believe that I had done it. It is just that the proof was not there for it.

Q Do I understand your testimony to be, Mr. Zewe, that as far as you personally recall sitting here today, your recollection is that this happened?

MR. MacDONALD: Based on all he knows?

MR. FISKE: No.

Q You told us that you have seen or heard about certain analyses and certain studies that were made.

A Yes.

Q Putting those aside for the moment -- whatever they show they show -- I am just asking you, independent of those studies, just in terms of the recollection that you personally have about this situation, has your personal recollection of it changed since you gave the testimony that we referred to earlier and made the notations that we referred to earlier this morning?

MR. MacDONALD: I object to the form.

A What I stated earlier is what I remember.

Q Well, I think I understand that answer, but just so we can make it clear, do I understand correctly that what you remember personally, sitting here today, is that at the time the second set of reactor coolant pumps were turned off, HPI was reinitiated at full flow?

A As I recall, what I remember March 28, 1979, that we did high-pressure injection at or about the time we secured the second two pumps. But I cannot void myself of everything else that has happened and what is fact from other sources.

That is what I remember, yes. It hasn't changed.

MR. FISKE: Why don't we take a break.

(Recess taken.)

BY MR. FISKE:

Q You mentioned, Mr. Zewe, that in your discussions with Mr. Frederick and Mr. Faust after the accident, you learned details from them about the initiation of HPI flow at full that you didn't yourself know; correct?

A (No response.)

MR. FISKE: Let me rephrase the question.

Q You said earlier, Mr. Zewe, that in discussions with Mr. Frederick and Mr. Faust after the accident, you learned additional details about the reinitiation of HPI at the time the second set of pumps was turned off; is that correct?

A As I recall it, it was more than additional details. The things that they had mentioned then improved my recollection, and I said, "Oh, yes, I remember when we did that particular thing."

So they added some additional information, plus they helped my recall.

Q Fine. And is it correct that each of them -- that is, both Mr. Frederick and Mr. Faust -- provided further information about the reinitiation of HPI that in turn helped your recollection?

A As I recall, Mr. Faust remembered more details than Mr. Frederick. But, as I recall, they both relayed information concerning that event.

Q They both relayed information concerning their recollections?

A Of initiating the HPI at that particular point at or before we tripped the pumps, yes.

Q In this statement or transcript of this discussion with Mr. Miller and Mr. Porter and Mr. Ross and Mr. Seelinger which has been previously marked as Exhibit 761 --

A I have it, yes.

Q -- and directing your attention to page 5 --

A I have page 5.

Q -- there is a statement that you make in the middle of the page. I would just like to read that and Mr. Miller's statement and then yours.

It starts, "Zewe: I think right here is where we went back to full high-pressure injection.

"Miller: Right at the point where you turned the last pump off.

"Zewe: Just before or just after we did that because they took a countdown and Craig hit high-pressure injection just as Ed secured the last

two pumps."

Do you see that?

A Yes, I do.

Q Did you make those statements to Mr. Miller in or about the date of this transcript?

A I have no reason to believe that this statement is not accurate, though I do not recall the actual words.

Q Was the information that you gave Mr. Miller in that statement information that you had learned from Mr. Faust and Mr. Frederick after the accident, or was that information that you yourself recalled?

A As I recall, that was information that I recalled that was helped by talking with Mr. Faust and Mr. Frederick at sometime later, but, as I recall, it was my recollection.

Q Mr. Zewe, you referred earlier this morning to studies or analyses or whatever had been done at some point with respect to water levels. Do you remember that?

A Yes, I do.

Q What specifically did these analyses consist of?

A I can only recall them in a general sense, that they were -- they knew what the BWST level was at particular time periods, and they knew from the computer when makeup pumps were started and stopped, and they, based on the levels and calculated flow rates and the starting and the stopping of the pumps, they used all that information in trying to reach a conclusion on how much flow there was during any particular time.

Q Who is the "they" that you were referring to in that answer?

A I believe that there was more than one group. And "they" just referred to people that were doing that calculation. As I recall, there were a couple of different groups that were working on that very same thing.

Q Who was the person that made this information available to you?

A I don't remember who it was, except that I remember reading various documents at the time from these groups, stating that the flow rate in their estimation was between two values during a particular time period, and also from other discussions that I had made various times about having the full HPI flow at

that particular time, and then saying that the calculations do not bear that out.

Q When you reinitiated HPI flow at or about the time that the second set of reactor coolant pumps were turned off, did you believe at that point that the high-pressure injection should be left on?

A I don't remember what my thought processes were at that particular time, except that I felt that the conditions had deteriorated to where we had secured the last two pumps and that we initiated the high-pressure injection. I don't remember thinking that I have to leave it on for any particular time period. I just don't remember what I was thinking at that particular time.

Q We established earlier, I think, based on the GPU chronology, that around 6:15 or so the block valve was closed to the PORV; do you remember that?

A Yes.

Q Did you take any actions yourself, Mr. Zewe, to terminate or throttle back the HPI flow between the time the second set of reactor coolant pumps were turned off and the time that the block valve was closed?

A I don't recall. I remember throttling

back high-pressure injection somewhere after the closing of the block valve, whenever pressure and level was high at that point.

Q I am not talking about after the block valve was closed.

A Right. I don't remember changing HPI flow one way or the other between the tripping of the last two pumps and the throttle after we had closed the block valve. I don't recall what the flow was or whether we had throttled back flow and stopped and started again, or what. I don't recall.

Q The GPU chronology, Mr. Zewe, that we were looking at before, page 41 and 42 --

A Is that the LER submittal?

Q Yes.

A I have those pages.

Q The same paragraph we referred to before indicates, does it not, at the bottom of 41 and the top of 42, that based on the sequence of events put out, makeup pump 1-C was stopped prior to 2:28:41?

A I read that here, yes.

Q Now, if you could look at figure 80, which is part of this chronology, do you have that in front of you?

A 80?

Q 80.

A Mine doesn't go up that high. Mine goes up to figure 63.

Q Do you have a 60?

A Yes, I do.

Q Sorry. Look at figure 60, Mr. Zewe.

Do you have that in front of you?

A Yes, I do.

Q And that ispart of this GPU chronology, captioned "Pump operating history."

A That is correct.

Q O.K. Now, going down to the fourth box from the bottom, do you see the heading, "Reactor coolant make-up pumps"?

A Yes, I do.

Q That refers to pump A, pump B and pump C; correct?

A Yes, it does.

Q All right. And then do you see those little diamond-shaped symbols that appear next to the reactor coolant makeup pumps?

A Yes, I do.

Q And then do you see down on the lower

right-hand side of this chart that that diamond symbol indicates that the pumps ran for "a short period (less than five minutes)"?

A Yes.

Q Do you see such a diamond-shaped symbol for reactor coolant pump C at or about the time of the trip?

A Yes.

Q And it is correct, is it not, that reactor coolant pump C ran for -- sorry -- that makeup pump C ran for less than five minutes in the first five minutes of the trip?

A That's what this would indicate.

Q And then do you see another little diamond symbol indicating that reactor coolant pump -- reactor coolant makeup pump C ran for a period of less than five minutes sometime between an hour and a half a and two hours into the accident?

A I see that.

Q Do you know who it was that turned off reactor coolant makeup pump C at or about the time indicated by this GPU chronology?

MR. MacDONALD: I object to the form of the question. It has no foundation.

Q You can answer.

A Could I hear it again, please?

(Question read.)

A (Continuing) No, I don't know. I don't know if it was turned off manually or if it had tripped automatically. I don't have any way of recalling or knowing that.

Q Did the analyses that you saw that you referred to earlier purport to analyze whether or not high-pressure injection was initiated at full, and then one of the pumps turned off within five minutes after it was initiated.

A I lost your question.

Q You said you saw or were aware of some analyses that looked at the levels of flow and water in the tank and so forth and so on. And I am asking you, to your recollection were those analyses directed at trying to determine whether or not high-pressure injection went on at a thousand gallons per minute at or about the time the second set of pumps was turned off and then one of the pumps was turned off within five minutes after that?

A The study that was conducted that I talked about earlier about BWST levels and starting

and stopping of the makeup pumps was used for the entire time of the incident. Not just for that particular time, though it was covered. But they were trying to determine inventory and flow to and from the reactor coolant system during that entire period from the trip up until -- I am not sure what their end point was. And it did cover that particular period in question.

Q In the discussions that you had on this whole subject after the accident, was there a time postulated at which core uncovery occurred?

A As I recall, there were several different opinions on exactly when cover uncovering occurred, postaccident evaluation.

Q What is the earliest time you saw in any of those studies?

A (No response.)

MR. FISKE: Withdrawn.

Q Isn't it a fact that you didn't see any study which postulated core uncovery before the time that the second set of reactor coolant pumps had been turned off?

A I don't recall.

Q One way or the other?

A One way or the other.

Q Well, in the studies that you saw, what assumptions were made with respect to how long the C pump had been on after HPI was reinitiated in full?

A I don't know --

MR. MacDONALD: Objection. There is nothing to show that the pump was even turned on. You are assuming something without basis of testimony.

THE WITNESS: Would you reread that, please?

(Question read.)

A I don't remember.

Q Were any of these studies in writing?

A Yes.

Q How many different ones did you see?

A I don't remember, because I have seen documentation on it, and I am not sure how many were individual and how many were further improvements of the same thing. So I am not sure.

Q Can you tell us now that there was more than one study?

A I believe that there was more than one study, yes.

Q Who were the organizations that did these studies?

MR. MacDONALD: I think you have already asked that.

MR. FISKE: If I did, I didn't get an answer.

A I don't recall who the groups were. I know that Met Ed-GPU was involved in it, but just what group was studying that I am not sure.

Q Were all of the studies that you saw studies that were done internally at Met Ed or GPU?

A I believe that there were also studies made by outside groups, but I am not sure if it was NRC, EPRI, or -- I don't know.

Q Did you see a written study from any outside group that related to the subject that we have been discussing here in the last couple of hours?

A Yes, I believe that I did.

Q Was there more than one study by an outside group?

A Here again, I am not sure. I have seen an awful lot of material relating to this incident and this particular makeup pump operation and the flows, and I really don't remember.

Q What specifically was it in these studies that tended to show that HPI was not initiated at 5:40?

A As I remember, postaccident knowledge was that they used information that they had gathered to compare this particular chart, for instance, makeup pump on and off, and the charts and levels from the BWST, that kind of data.

(Continued on Page 836.)

Q What specifically did it show?

A As I remember, it showed that we had had a thousand gallons a minute of flow starting at that particular time for any length of time that they would have found the evidence to support that in the BWST level, starting and stopping of the makeup pumps and so forth.

Q What was the length of time you were referring to in that last answer?

A I don't know, because I have stated that I don't remember throttling HPI after that initiation or changing it until we throttled back after we had PORV shut, after we recoverd pressure level.

Q Did the information that you saw show that if HPI had been on at a thousand gallons per minute for only five minutes, that there would have been evidence in the water levels to support that?

A I don't believe that a 5,000 gallon change at that particular time would be very conclusive one way or the other.

Q Do I understand, Mr. Zewe, that you did not see any study or analysis that demonstrated that HPI did not come on at a thousand gallons per minute and then was cut back within five minutes to 500

or loss?

MR. MacDONALD: Are you basing that just on the last question as to water level or all the things studied, makeup pumps, starting and stopping and all the computers?

MR. FISKE: Yes, everything.

THE WITNESS: Would you read that back, please.

Q I will put it again.

Did you see any studies that demonstrated that HPI could not have come on at a thousand gallons per minute at 5:40, stayed on for five minutes or less at that rate, and then continued after that point at a flow rate of 500 gallons per minute or less?

A I don't recall.

Q One way or the other?

A No. Your question doesn't recall anything that -- any analysis relating to that that I can recall one way or the other.

(Recess.)

Q Mr. Zewe, a couple of times earlier in this deposition we talked about the point in the accident sequence when the block valve was closed for the first time.

A Yes.

Q Were you in the control room when that happened?

A Yes, I was.

Q By that time had some other people arrived that you haven't placed in the control room before?

A I don't recall all of the people that were there, but I believe at that point Mr. Mehler, was there. I believe Mr. Ross was there at that time. And all the others, Mr. Kunder was still there, Mr. Bryan was still there, and the operating staff was still there and the two engineers from Unit 1 were still there. Mr. Weaver, I believe, was there at that time. If not in the control room, he was in at that particular time. I am not sure, but I believe that Mr. Logan was there.

But near the exact time frame with relation to closing the valve and when the people arrived, I am not at all certain. It may have been just before, it may have been just after.

Q Did there come a point in time during the accident sequence when someone else took charge of the situation?

A Mr. Miller arrived around 7 o'clock, and he relieved me as the emergency director.

Q And were you in charge up until that time?

A Yes, I was.

Q What were the circumstances that led up to the closing of the block valve?

A As I recall, Mr. Mehler and I had a discussion about the block valve, and he suggested that we shut it just from the standpoint, as I recall, that why not shut it at this point.

And I said, "Yes, go ahead."

Q Did he give you any reason why he thought it might be a good idea to shut it?

A Not that I remember. Only generally, because he had been there for some time at that point, and he was going through an evaluation process in his own mind and trying to help out.

And I don't recall if it was any particular thing that led him to that conclusion, but it was based on that discussion, more like, yes, we will go ahead and shut it.

Q Had Mr. Mehler been in the control room any longer than fifteen or twenty minutes before he made that recommendation?

A I don't remember how long he had been there.

Q Mr. Mehler obtained readings from the thermocouples on the discharge line?

A Are you telling me that he did?

Q I am asking you, did you know that he did on the morning of the accident?

A I do not recall knowing that the day of the accident, no.

Q So there was no discussion between you and Mr. Mehler about temperatures at the discharge lines before he said he thought the block valve should be closed?

A Not that I remember, no.

Q Were you aware of any information with respect to temperatures on the discharge line between the time you had gotten the readings from Mr. Bryan approximately an hour earlier and the time the block valve was closed?

A As I recall, the only readings I remember were the ones that I had asked of him, before I originally left the control room, and then sometime later I had asked him again.

Those were the only two times that I

remember being aware of what the temperatures were, because I had asked for them on those two occasions.

Q Did you express any reason to Mr. Mehler why the block valve should not be closed?

A I don't recall any words, but I believe I said, "Why?" And he said, more like, "Why not?" And I said, "Go ahead then, shut it."

Q Did you have any information concerning temperatures at the discharge lines, pressure or temperature at drain tank, or drop in reactor coolant system pressure, at the time the block valve was closed which was different in any meaningful way from information that you had had on either of the two occasions when you had asked for the temperature readings?

THE WITNESS: Would you read that back? I couldn't keep track of what you were asking.

(Question read.)

MR. MacDONALD: I object to the form. No foundation.

MR. FISKE: You weren't here earlier in the deposition.

MR. MacDONALD: I don't know necessarily whether he testified when he received discharge

temperatures that he knew what the drain tank pressures and temperatures were.

Q If that colloquy didn't divert you, you can answer the question.

A The only thing that I recall is, shortly after we shut the block valve, that the RCS pressure started to increase.

Q I guess my question was not clear. Let me try it again.

A Please do.

Q At the time the decision was made to close the block valve, did you have any information about temperature in the discharge lines, reactor coolant drain tank pressure and temperature, or drop in reactor coolant system pressure, that was different in any meaningful way from the information that you had had about those parameters on either of the two occasions when you had asked for discharge line temperatures?

A Not that I remember.

Q Did you have any information on pressurizer level at the time the block valve was closed that was different in any meaningful way from the information that you had about pressurizer level on either of

those two earlier occasions?

A Not that I can remember.

Q Were you aware, Mr. Zewe, on the day of the accident, that there were in-core thermocouples which could measure the temperature in the core?

A Yes, I was aware that there were in-core thermocouples.

Q At any time between the time of the reactor trip and closing of the block valve, did you try to find out from those thermocouples what the temperature of the core was?

A I did not.

Q Was there a reason why you didn't?

A There was never any training at Met Ed or B&W on using these thermocouple readings at any particular time in the course of either a normal procedure or an emergency procedure, and I did not think to use them.

Q You did know, did you not, that if you had wanted to find out what the temperature was in the core, that could use these thermocouples for that purpose?

A Yes. But I would have to make a determination that I would want to do that.

Q Right.

A And I had not reached that conclusion, that I would need to know the temperatures.

Q In the core.

A In the core.

Q Was it your testimony, Mr. Zewe, that up until the time the block valve was closed, that you hadn't seen any condition in the plant which raised any question in your mind as to possible increase in temperature in the core?

A As I recall, I believed at the time that as long as I had a full pressurizer level, that I did not feel that core temperatures were a problem.

Q At any time before the Three Mile Island accident in March of '79, had you expressed any dissatisfaction to anyone with the alarm system in the control room?

A I had expressed my opinion that I felt that we could certainly improve upon the alarm system in the control room.

Q Who had you said that to?

A I remember discussing it with Mr. Ross and Mr. Floyd, and there were others, but --

Q In what way did you tell them that you

felt that the alarm system could be improved?

A As I recall, the discussions were around a couple of different areas.

One was that the alarms that were not meaningful and were nuisance alarms should be eliminated, and that the control room needed more acknowledge buttons placed at better locations, and that the alarm acknowledge reset buttons should be separate functions as they were in Unit 1.

Q Did you still hold those same views as of March 27, 1979?

A I still felt that there was need for improvement. There had been an ongoing process to try to evaluate and eliminate some of the unnecessary and nuisance alarms.

As a matter of recall, there were two engineers that had been engaged in working on that problem. And I believe that they had cut the nuisance alarms that I referred to by as much as half as where they were when they had started, and there also has been additional buttons.Acknowlege buttons had been added.

Q How many alarms went off on the morning of the accident?

A A large number.

Q More than a hundred?

A Yes.

MR. MacDONALD: That is his recollection on the day of the accident?

MR. FISKE: No, I am asking him in fact now how many alarms.

A I remember at one time I was asked by Mr. Miller, I believe, to write down a list of all the alarms that I knew were in. And the number was, as I recall, in excess of a hundred alarms.

Q Did you state to anybody at any time after the accident that you felt that the number of alarms that had gone off during the course of the accident sequence had made it more difficult for the operators to diagnose the problems?

A During the first few minutes of the event I had felt that all the alarms that had come on and the horns sounding was more of a hindrance than a help at that particular point because of the massive number of alarms and the sound.

So I had the operatore acknowledge the alarms, to silence the horns and to silence the flashing alarms.

After that point I felt they were more

meaningful, but initially they were overwhelming from the standpoint of sheer numbers and trying to take action on each and every alarm.

Q Did you hear that same point of view expressed by other operators that had been involved in the early minutes of the accident?

A Yes, I did.

Q Had there been criticisms made of the alarm system following the April 23 transient? April 23, '78?

A I don't recall.

Q Isn't it a fact that it was the April 23, '78 transient which had prompted discussion of improvements in the alarm system?

A It may have been. I don't remember.

Q Mr. Zewe, when HPI comes on automatically or when the operator presses the manual button to actuate, what is the source of water for the HPI?

A BWST.

Q You said earlier, Mr. Zewe, that when HPI comes on automatically, the operators take manual control of it by bypassing HPI?

A After actuation, the operators go to bypass so that if they did have to take manual control, they

could then do it.

Q And is there a regular procedure that after they have bypassed the HPI, that they are supposed to take action to cause the flow of water into the system to come from the makeup tank rather than the BWST?

A Could you rephrase that?

Q Sure. Talking about a situation where the HPI comes on automatically. The operator then takes manual contol and bypasses and then at some point starts throttling back. And it was a regular procedure that when that happens, the operator is supposed to flick some switch or change some valve or whatever that will cause the water that is going into the system at that point to come from the makeup tank rather than the BWST?

A That is true.

Q And on the morning of the accident, March 28, 1979, was that procedure followed, to the best of your recollection?

A As far as I can remember, it was, yes.

MR. FISKE: I have no further questions.

(Recess.)

(Continued on the next page.)

EXAMINATION BY

MR. MacDONALD:

Q Mr. Zewe. do you recall giving testimony earlier in this deposition about a memorandum which you wrote in May of 1978 to Jim Seelinger regarding the condensate polishing system?

A Yes.

Q Do you recall your testimony about portions of that document in which you used the words "very serious accident"?

A Yes.

Q And do you recall giving testimony in relation to what you meant by those words?

A Yes.

Q Do you recall testifying possible damage to equipment and personnel in the turbine building might result --

A Yes.

Q If I can finish -- from problems with the condensate polishing system?

A Yes.

Q Could you explain in a little more detail what you meant by "damage to equipment and personnel in the turbine building" as a result of problems with the

condensate polishing system?

A The serious accident that I was referring to was that there could be possible damage to the feedwater and condensate system on the secondary side of the plant.

Whenever the feedwater is abruptly stopped after flowing at about22,000 gallons per minute, there is a pressure surge in the condensate and feed system as a result of the sudden stoppage of that flow of water, and that may lead to damaging the secondary side components of the feedwater and condensate itself, the instruments, the feed pumps, condensate pumps, booster pumps, the polishers themselves; and if there are any personnel that are around these components when and if they should fail, they could result in being injured.

I at no time wanted to infer that there would be any serious accident occurring on the primary side of the plant.

The loss of feed condition would result in a trubine trip and possibly a reactor trip, but the plant was designed to handle a loss of feed and an ensuing turbine trip and reactor trip, and I didn't feel that there was any cause for concern that there

would be any serious accident occurring at all in the primary side of the plant. All of that damage or serious accident that I referred to was strictly to the secondary side of the plant in the feedwater and condensate system.

MR. MacDONALD: I have no further questions.

EXAMINATION BY

MR. FISKE:

Q Mr. Zewe, was avoiding serious injury to equipment and personnel on the secondary side of the plant as important to you as avoiding serious injury to equipment and personnel on the primary side of the plant?

A I don't believe that I could differentiate between personal injury on either side of the plant. Certainly I would not want to have anyone injured on either side of the plant and I would certainly be concerned with equipment damage on either side of the plant. But I just wanted to clarify what I meant there and the relationship to that particular memo.

MR. FISKE: That's all.

(Time noted: 12:30 p.m.)

-oOo-

WILLIAM H. ZEWE

Subscribed and sworn to
before me this
day of , 1982.

CERTIFICATE

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

I, HARVEY B. KRAMER, a Notary Public of the State of New York, do hereby certify that the continued deposition of WILLIAM H. ZEWE was taken before me on Friday, May 28, 1982 consisting of pages 791 through 851A ;

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

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

IN WITNESS WHEREOF, I have hereunto set my hand this 13th day of June 1982

Harvey B Kramer

HARVEY B. KRAMER, RPR,CSR

5/28/82

I N D E X

E X H I B I T S

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