UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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

Plaintiffs,

-against-

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

Defendants.

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

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Continued deposition of THE BABCOCK & WILCOX COMPANY, by NORMAN S. ELLIOTT, taken by plaintiffs pursuant to adjournment, at the offices of Kaye, Scholer, Fierman, Hays & Handler, Esqs., 425 Park Avenue, New York, New York, on Wednesday, February 11, 1981, at 9:40 o'clock in the forenoon, before Charles Shapiro, a Certified Shorthand Reporter and Notary Public within and for the State of New York.

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Also Present:

SUSAN HANSON

DAVID TAYLOR

EDWARD R. FREDERICK

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N O R M A N S. E L L I O T T, having been previously duly sworn, was examined and testified further as follows:

EXAMINATION (continued)

BY MR. SELTZER:

Q Mr. Elliott, you are aware, are you not, that your testimony continues to be under oath?

A I'm aware my testimony is under oath.

Q Last week you were describing the effect on pressurizer water level of a pressurizer spray valve sticking open; do you recall that?

A Yes, we discussed the effect of a spray valve being open on pressurizer level.

Q It is correct, is it not, that if the pressurizer spray valve sticks open, it results in a dropping of pressure in the pressurizer?

A Yes.

Q Were you telling me that that drop in pressure permits the volume of water in the reactor coolant system to expand?

A Yes.

Q You also stated that if you had the ASME steam tables, you would be able to calculate

how much the water in the reactor coolant system would expand; is that correct?

A Right.

MR. SELTZER: I would like to mark as GPU Exhibit 54 excerpts from the 1967 ASME steam tables.

(Excerpts from document entitled "1967 ASME Steam Tables" were marked as GPU Exhibit 54 for identification, as of this date.)

Q I ask you if you are familiar with these tables.

A They appear to be the tables that I have seen before.

Q What is the normal average temperature in the reactor coolant system?

A Would you please clarify your question? What reactor, whose reactor, and so forth?

Q I'm talking about a reactor like the B&W type installed at Three Mile Island Unit 2.

A You want it eactly like that one or do you want it of that general class of plant?

Q If you know what it is for exactly that plant, that would probably make it easier.

MR. WISE: Excuse me, can we go off the record? There is some kind of a disturbance going on here.

MR. SELTZER: Yes. Off the record.

(Discussion off the record.)

MR. WISE: Could you read the last question and answer, please.

(The reporter read back the last question and answer.)

A The correct answer to that is I do not know the exact temperatures.

Q Did you understand that I was asking for what is called in your trade the T subscript ave?

A Yes, I'm familiar with the term Tave.

Q And is it correct that Tave is the average of the hot leg and cold leg temperatures?

A Yes.

Q Do you know approximately what the Tave is for TMI-2 under normal operating conditions?

A Yes.

Q What?

A 582 degrees Fahrenheit.

Q What is the Tave for the simulator

under normal operating conditions being simulated?

A The way it is set up at the moment, 582 degrees.

Q Is it correct that in using the ASME steam tables one would look for the page that shows temperature as close to 582 degrees as possible?

MR. WISE: For what purpose?

MR. SELTZER: For the purpose that Mr. Elliott said he would refer to the steam tables for understanding the response of water volume to change in pressure with temperature held constant.

Let me break that down into two questions.

MR. WISE: Yes, I'm confused as to what the question is.

Q Mr. Elliott, in prior testimony you had indicated that with the ASME steam tables, you would be able to calculate the change in water volume under changing pressures, right?

A Yes.

Q You also told me that in the simulator at the time that it is reproducing a spray valve sticking open, you assumed that the temperature

remained unchanged, right?

A Well, if we wanted to look in an engineering sense at a problem, we must have a set of bounded conditions; A bounding condition could be maintaining average temperature.

Q Thank you.

And I believe you said last week that you were familiar with a transient being run on the simulator to the Three Mile Island accident which held the temperature constant but permitted pressure to change in response to a stuck open spray valve; isn't that right?

MR. WISE: I don't know what he testified to last week. If you want to ask him that question now, that's fine.

MR. SELTZER: That's the question now.

A I refer to the court reporter and ask that he reproduce that information for us, please.

Q No, I think your counsel is saying to simplify things, if you can respond to the question again for today, he would permit you to.

MR. SELTZER: Is that right, Bob?

MR. WISE: Yes. In other words, let's not have the witness' testimony as to what he

may have or may not have said last week. That's in the record. If you want to ask him now whether or not the simulator has that kind of an event programmed on it, if that's the question, we can answer that question today. I won't object to it being asked and answered.

Q The question is, prior to the Three Mile Island accident did you have a transient that you were training people on in Lynchburg that showed temperature held constant while a spray valve stuck open?

A Yes, that was a general transient or a malfunction condition applied to the simulator used with the training of some students through -- during the period of time that they were using the similator.

Q When you say it was used for some students, are you saying that not all students who received simulator training would be exposed to that transient or were exposed to that transient prior to the accident?

A I can't say that. "All" is -- implies absolute knowledge and I do not have absolute

knowledge.

Q Do you know for a fact whether any of the people sent by Metropolitan Edison received training on that particular transient in the simulator prior to the accident?

A Prior to the accident, I do not know that for a fact. The records of the training of those people exist, they have been made available to you, and if we wish to answer that question, I request that you produce those records.

Q Mr. Elliott, under the conditions that you have said would be maintained in the simulation of this transient, am I correct that the simulator would hold the temperature at or about 582 degrees?

A Yes, the control system if it's in automatic would do that.

Q Can you find in GPU Exhibit 84 which is in front of you the portion of the ASME steam table that describes the properties of superheated steam and compressed water at 580 degrees Fahrenheit?

MR. WISE: I believe you meant Exhibit 54.

MR. SELTZER: What did I say? I'm

sorry. I meant 54. Thank you.

A I have found a number that appears to be the appropriate number.

Q Which page are you on?

A 183.

Q Which numbers on page 183 would be numbers you would be looking for to determine the response of water volume to changes in pressure at 582 degrees?

A Specific volume for approximately 580 degrees, 2,100 pounds.

Q What is the significance of 2,100 pounds?

A Because that's the operating -- we normally operate at 2,155 pounds pressure.

Q If the spray valve stuck in an open position, pressure would drop in the pressurizer; is that right?

A Correct.

Q Pressure would continue to drop until the pressure hit the automatic trip point for the reactor as programmed into the reactor protection system; is that right?

A Yes.

Q What is the trip point?

A I don't remember specifically.

Q What is your best recollection?

A It's approximately 1,800 pounds.

Q Is there a reactor variable trip point that would be reached before the 1,800 pounds that you have just described?

A There is a variable trip point in the system. Whether or not it would be reached, I can't say.

Q Isn't it correct that the reactor variable trip point is approximately 2,060 psia?

A I don't know.

Q Why do you say that you are not sure whether the reactor variable trip point would be reached or not?

A To the best of my recollection, there is an equation that defines that point. I don't have that equation available.

Q That is an equation that would appear in the FSAR?

A I'm not sure that it appears -- where it appears in the FSAR. As I remember it, it appears in the technical specifications which are a part

of the FSAR.

Q Let me show you a portion of the TMI-2 FSAR and ask you if that is the equation for determining the reactor variable trip point.

MR. SELTZER: We will mark this as GPU Exhibit 55 for identification.

(Multi-page document, "Final Analysis Safety Report, Three Mile Island Nuclear Station - Unit 2," was marked as GPU Exhibit 55 for identification, as of this date.)

MR. WISE: Is there a question pending?

Q Do you have in front of you Table 7.2-2 from the FSAR for Three Mile Island Unit 2?

A I have in front of me Table 7.2-2. Identification of where the document is from, I don't know.

Q Does line 6 describe the equation that you were referring to for determining the trip point for variable low reactor coolant system pressure?

A Line 6 appears to be an equation of the form that we referred to.

Q Is it correct that using the equation on line 6, you could calculate the reactor variable trip point?

MR. WISE: At some point here -- I don't know where this line of questioning goes, you know, you have shown this witness something which purports to be from some technical specs, and I don't know that he has ever seen these before. You are now asking him to perform calculations to come up with numbers without qualifying Mr. Elliott as an expert with respect to this particular aspect of the FSAR or the design of the plant. You know, if you have someone who wants to contest the general statement that Mr. Elliott has made in his belief the spray valve stuck open will produce a rising level in the pressurizer, that's fine, but to run him through a lot of calculations, unless you can show that he has some background in these specific calculations and has done them before and it is part of his responsibility to do them them and he can testify about them -- at some point I want to know what this final

questioning is worth.

MR. SELTZER: Mr. Elliott testified last week that with the values in the ASME steam tables he would be able to calculate what the change in water volume in the pressurizer would be in response to a stuck open spray valve. That's all that we are driving at.

MR. WISE: I think what he testified to was that it could be determined. I don't know that he testified that he was an expert and prepared to himself sit down and do it. I think he testified that it could be calculated and I'm sure it can be by someone who is qualified to do it with the proper numbers. Whether this witness is the person to do that is what I'm questioning.

MR. SELTZER: Bob, if you want, we could probably save a lot of time by going off the record and just going through a calculation that we have done. I'm 99-44/100 percent sure that Mr. Elliott did testify last week that he could do the calculation if he had the steam tables' values.

MR. WISE: Why don't we just ask him now.

Mr. Elliott, is it your testimony that you personally are in a position to sit down and do this calculation and come up with the appropriate numbers or is it your testimony that it is something that could be done by someone who was qualified to do that?

THE WITNESS: In the first place, this calculation probably should be done by someone who has done this work more recently than I have done it. It is not a part of my normal functions to make that calculation.

BY MR. SELTZER:

Q Let me refine the question.

It is correct, isn't it, that with the ASME steam tables you do know how to make the calculation? Isn't that right?

A I believe I remember the methodology that would be used in doing these things.

MR. SELTZER: Mr. Wise, I can proceed on the record but I think it might shorten things if we showed Mr. Elliott a calculation that we have prepared using the

values from the steam table and values that he has given us for temperature at 582 degrees and then we could go back on the record to verify that what we have discussed off the record is what everybody in the room understands.

Is that acceptable?

MR. WISE: Well, I'm all in favor of moving things along but I must say I have my doubts about having an off-the-record discussion on some calculations that Mr. Elliott hasn't seen before today. I don't know that that's going to advance the ball very far. I think we ought to proceed with questions and answers so long as they are in an area that Mr. Elliott can testify to, and if he can testify on these calculations, you have every right to pursue it, but my question remains the same as to whether or not Mr. Elliott today can give you the answers and the information that you are seeking.

MR. SELTZER: O. K.

MR. WISE: If you want to show him

some calculations and ask him if he is familiar with those calculations and can agree with them, you are perfectly free to do that so long as we establish that Mr. Elliott is really familiar with those numbers and able to testify one way or the other as to the correctness of whatever it is you have done over the weekend.

MR. SELTZER: The only question is, do you prefer to go about it on the record or take five minutes off the record?

MR. WISE: I think we ought to proceed on the record.

MR. SELTZER: Fine.

BY MR. SELTZER:

Q I would like you to assume, Mr. Elliott, that solving the equation for variable load trip point produces a reactor variable trip point at 246 psig.

MR. WISE: 246?

MR. SELTZER: Right.

MR. FREDERICK: No.

Q I'm sorry, 2,046.

Using the values that are in the ASME

steam table, how would you calculate what the change in volume is for the pressure drop between normal operating pressure and the pressure at the reactor trip point?

A The general methodology for that is to observe the difference in specific volumes that exist at those times and then use the total system mass to determine the change.

Q So is it correct that you would take a ratio of the specific volume at the starting pressure to the specific volume at the reactor variable trip point and multiply that times the total volume of water in the reactor coolant system?

THE WITNESS: I believe that Mr. Seltzer's description of the problem is not to my understanding a correct method of solution of the problem.

Q What would be the correct solution as you understand it?

A I had previously described what I remember is the correct solution, the correct methodology for solution of this problem.

Q Namely?

A It requires the difference in the specific volumes.

Q Are the specific volumes the values that are shown in the body of the chart on page 183 (indicating)?

A From looking at the table, it appears that specific volumes are reported.

Q In order to find the specific volume at normal conditions, am I correct that you would look at the line that has 580 degrees Fahrenheit in the left-hand column?

A Yes.

Q And you would look in the column that is headed what?

A We are discussing an interpolation problem here, the answer relatively close to what we need is the number for 2100 pounds but if I remember correctly, and we would have to verify all of these from the tables and the instructions for the power plant, but the operating pressure -- the exact operating pressure would have to be utilized, and I believe that number is near 2100 pounds, in fact, it is really closer to 2200 pounds, and an interpolation for values would be required.

Q In other words, the correct starting value for this problem would be somewhere between the value for 2100 pounds and 2200 pounds?

A Yes, and the temperature conditions at 580 and 590.

Q Using those interpolations to come up with a specific volume, would you then have to relate that to the total inventory in the reactor coolant system under normal operating conditions?

A No.

Q Would you have to relate it to any factor for the volume in the reactor coolant system?

A It would not be related to the factor of a volume.

Q What do you do with the value you get after you have interpolated for temperature and pressure?

A It would be required to, if we wished to determine the change in volume, we would have to then find the specific volume for the second condition that we were concerned with and perform a similar operation.

Q So that you would have to find out

what the value was for the reactor variable trip point; is that right?

A If that was the point of interest to determine the change in total volume of the system, yes. If we wanted to go to some other pressure condition, we would have to select that one.

Q In the simulator as it was programmed prior to the Three Mile Island accident, did the simulator have a setpoint for the reactor variable trip point?

A The simulator computed a variable low pressure temperature trip point consistent with that calculated for Rancho Seco.

Q So that operators working at the simulator console on a stuck open spray valve transient would see the reactor tripped when the pressure reached the reactor variable low trip point?

A The operators on the console would see the trip occur at whatever conditions happened to cause the trip. There are multiple trip setpoints and each one of them protects the system from some condition in the safety analysis of the plant, and whatever one is reached under those conditions,

the simulation computer will cause the system to appear to trip.

Q Mr. Elliott, the reactor protection system as it is intended to function would trip the reactor off line at the reactor low pressure trip point; is that right?

A I would like to rephrase the answer in that if the system reaches the low pressure trip point, the reactor protection system that is simulated in the simulator will cause a trip provided that it is not bypassed.

Q As soon as the reactor is tripped, the temperature in the reactor coolant system begins to drop; isn't that correct? Let me rephrase that.

At or shortly after the time that the reactor is tripped, the temperature in the reactor coolant system begins to drop; isn't that correct?

A What are the conditions that caused it to trip?

Q The pressure in the reactor coolant system has reached the variable low pressure trip point.

MR. WISE: Do you have enough

information to answer that question?

Q Let me also say we are still focusing on a stuck open spray valve being the initiating event in the transient.

THE WITNESS: Yes, assuming that that's the sole limits to the nonperfect operation of the system.

Q What was the word you used, the sole what?

A The sole limits to the nonperfect operation, that is the only thing that is not working exactly as it was intended.

Q To use a phrase that shows up in your documents, that is the sole casualty being examined or occurring during that transient?

A Yes, and. . .

Q If a stuck open spray valve is the sole casualty during the transient, then when the pressure drops to the variable low pressure trip point and the reactor trips off line, temperature would begin to fall in the reactor coolant system; is that right?

A Yes, if I remember correctly, the average temperature will decrease.

Q What is the effect of decreasing temperature on the volume of water in the reactor cooling system?

A Decreasing temperature, and again we are concerned only with that as an isolated condition, all other conditions of the fluid system remaining the same, changes the volume of the reactor coolant system due to a decrease in temperature.

Q It is correct, isn't it, that if all other conditions remain the same and the temperature of the reactor coolant system drops, the volume of water becomes less? Isn't that right?

A I believe that's correct.

Q When the spray valve sticks open, the pressure begins to drop; is that right?

A Yes.

Q You have said that that drop in pressure will cause an expansion in water volume if the temperature is held constant, right?

A Yes.

Q That expansion in water volume will continue as the pressure drops at least to the point of the reactor variable low pressure trip point, right?

A Yes.

Q After the system reaches the reactor variable low pressure trip point, a drop in reactor coolant system temperature will tend to counteract the drop in pressure; isn't that right?

A To rephrase the question and give the answer, if we consider a reactor trip following the spray-valve-failure type casualty, a new set of circumstances will exist relative to temperature, pressure and volume in the system will occur.

Q You testified last week that the operators in the simulator would see an increase in pressurizer water level during a transient caused by a stuck open spray valve. Is that still your testimony?

A Yes.

Q When you said that the operators would see a rise in pressurizer water level, were you focusing on just the time period between the start of the spray valve sticking open and the reactor tripping off line?

(Witness conferring with counsel.)

MR. WISE: Can we have the question read back, please.

MR. SELTZER: I will rephrase the question.

MR. WISE: Are you withdrawing the previous question?

MR. SELTZER: Yes.

Q It is a fact, is it not, that between the point when the spray valve sticks open and the point where the reactor trips off line in response to the pressure reaching the reactor variable low pressure trip point, the water in the reactor coolant system would expand? Is that correct?

MR. WISE: I think the problem, Mr. Seltzer, that the witness is having in answering your question relates to assumptions that your question contains about where the transient begins and under what conditions the plant is operating when it does begin, and depending upon what assumptions you make, you may get different answers to your question.

Q I would like to assume that the plant is operating under normal conditions when a spray valve suddenly sticks open. Is that an assumption

that is a realistic assumption as far as training of operators is concerned, Mr. Elliott?

A Mr. Seltzer, the difficulty in your question lies in the definition of "normal."

Q Well --

A You must state exactly where you start from.

Q O. K.

A And "normal" is not -- there are a large number of normal conditions.

Q You described for me earlier the fact that normal temperature for the B&W simulator in Lynchburg and for Three Mile Island Unit 2 is 582 degrees Fahrenheit, right?

A The use of the number 582 implies that the B&W type nuclear system is operating between 16 and 100 percent power.

Q O. K.

A That is the approximate setpoint for the average temperature controller in the system.

Q Is it correct that in running a transient in the B&W simulator for training operators if the transient were a pressurizer spray valve sticking open, the starting point for temperature would be 582 degrees Fahrenheit?

A I don't think that's absolutely correct.

Q Are transients simulating a stuck open spray valve run, to your knowledge, in the B&W simulator with the starting temperature for the system being 582 degrees?

A I do not know from personal knowledge whether that's true.

Q Do you have any basis for believing that the stuck open spray valve transient is run at anything other than the normal operating temperature for the simulated reactor?

THE WITNESS: Please read the question.

(The reporter read back the last question.)

A Yes, because it's possible to do it in another point; whether or not anybody ever did it, I don't know.

Q In other words, no lead instructor or other instructor has ever informed you that he ran this stuck open spray valve transient at anything other than the normal operating temperature; is that correct?

MR. WISE: That is an awfully backward way to phrase a question. I don't

know that we have established that the instructors have ever informed Mr. Elliott that they ran it at the "normal" temperature as you have used that term. I think we ought to first establish whether they told Mr. Elliott anything about this particular fact one way or the other.

Q Mr. Elliott, isn't it your under understanding that the starting place for most transients is the plant operating under normal operating conditions?

A It is my understanding that many of the casualties start someplace in the operating range. This does not include all casualties.

Q Do you have any belief one way or the other regarding whether a stuck open spray valve transient has been run on your Lynchburg simulator prior to the Three Mile Island accident with the stuck open valve transient commencing at normal operating temperature?

A I don't know.

Q You testified last week that a stuck open spray valve was a transient that would have shown operators in the simulator a rise in

pressurizer water level at the same time reactor coolant system pressure was dropping.

Is that still your testimony?

A Yes.

MR. WISE: That is the third time today you have asked that question and gotten that answer.

Q When you gave that testimony originally, at what operating temperature were you presuming that the operators had been such a transient?

A That particular transient is the capability of the simulator, it produces the described results. It could have occurred at some number of different temperatures.

MR. WISE: And you weren't assuming any specific one in your answer?

THE WITNESS: No, I was not assuming a specific one.

MR. SELTZER: Mr. Reporter, could you please read back the answer to my question.

(The reporter read the record.)

Q Will the change in volume that is produced vary with the starting conditions?

A Yes.

Q Under the variety of conditions where the transient could be initiated in the simulator, could it have been initiated, not theoretically but in the actual way you run the simulator, would it have been initiated by your instructors at a temperature greater than 582 degrees Fahrenheit?

A I don't know.

Q Are there operating conditions under which the reactor coolant system temperature exceeds 582 degrees?

A There are not usual operating conditions where the average temperature exceeds 582 degrees.

Q When you said that the operators would see a rise in pressurizer water level, did you have in mind any specific number of inches of rise in water level they would see?

MR. WISE: He testified last week that he didn't know, that somebody would have to perform the calculations. That is how we got started on this whole line of questioning. That was asked and answered last week.

MR. SELTZER: Let me withdraw the question.

Q If we talk in terms of a range, did you have in your mind when you gave that answer some range within which you expected pressurizer water level would rise in response to the transient you described?

A My answer remains that the calculation would have to be done; the general phenomenon is understood.

Q Let me show you some graph paper and ask you if you are familiar with graph paper of this tipe (handing).

A The answer is I have seen graph paper in this form.

Q Am I correct that this is graph paper of the type which is used for tracing pressurizer water level?

A Graph paper similar to this is utilized in the B&W simulator for presentation or recording of pressurizer water level.

MR. SELTZER: I would like to mark this as GPU Exhibit 56 for identification.

(Piece of graph paper was marked

GPU Exhibit 56 for identification, as of this date.)

Q What is the level at which pressurizer water level is normally maintained for operation in the B&W simulator?

A To the best of my recollection, the normal or desired pressurizer level for the B&W system operating in the power range with greater than 15 percent power is approximately 200 inches.

Q It is a fact, is it not, that under normal operation there would be fluctuations in pressurizer level of plus and minus 5 inches?

A I don't know.

Q Are you aware that under normal operation there would be some fluctuations in pressurizer level?

A I am aware that under normal operating power conditions it is possible that the level would change.

Q Each of the horizontal lines on this chart represent 5 inches water level; is that right?

A That generally appears to be the case.

Q From your knowledge of training at

B&W, has B&W trained operators that a 5-inch change in pressurizer water level is a cause for concern?

A I don't know.

Q In observing the spray valve stuck open transient, would a 5-inch change in pressurizer water level be a cause of concern?

MR. WISE: I am going to have to object to the use of the term "cause of concern." I haven't the slightest idea what that means.

Q Would that be an indication of abnormal operation in the system?

A I don't know.

Q Would a 10-inch change in pressurizer water level during a spray valve stuck open transient be a signal of abnormal operation in the system?

A I don't know.

Q You said that the other transient that would show reactor coolant system pressure dropping while pressurizer water level rose was a failure of all of the heaters in the pressurizer.

Would that loss of heaters reduce the pressure in the pressurizer?

A Over a long period of time, yes.

Q Is it also correct that under the automatic controls in the reactor system, the temperature of the reactor collant system water would remain at 582 degrees with all heaters out in the pressurizer?

A Yes.

Q It is a fact, is it not, that you would look at the same steam table values then to determine what the change in reactor coolant system volume would be in response to heaters out as you looked at for spray valves sticking open?

A Yes.

Q Therefore, the response of the reactor coolant system volume to all the heaters going out would be the same as the response to a spray valve sticking open?

A The response would be essentially the same. The speed at which the response occurs is different.

Q Last week you estimated the volume of

liquid in the reactor coolant system.

Would you look in Exhibit 55, please, the second page. Does that chart show the volumes in each of the components of the reactor coolant system?

MR. WISE: First let's establish that this witness knows what it is that he is looking at.

MR. SELTZER: Fine.

Q Do you see the label down in the corner that says "Reactor Coolant System Flow Diagram"?

A Yes.

Q Are you familiar with this type of a diagram?

A I have seen --

MR. WISE: Have you ever seen something like this before?

A Yes, I have seen a diagram that looked similar to this.

Q On the far right-hand side there is a funny shaped thing that is labeled "Steam Generator No. 2." Do you see that?

A Yes.

Q Do you understand the notation under that, V equals 2017 cubic feet, to be an indication of the volume of primary coolant in the steam generator?

A I could understand that that might be possible.

Q When you estimated the volume of liquid in the reactor coolant system, were you giving us a value that totalled the water in the reactor vessel, in the steam generators, in the hot legs and cold legs and in the reactor coolant pumps?

A The value I gave you was a value that I remembered being used at some place for that volume.

Q And that volume would consist of the water in each of the places that I just listed; is that right?

A Yes.

Q In other words, the changes in pressure would be acting upon that volume of water; is that right?

A Yes.

MR. SELTZER: Let me just confer

with these people for a second.

MR. WISE: Do you want to take a break at this point?

MR. SELTZER: If you want to. Yes, let's take five minutes.

(Whereupon, a recess was taken.)

MR. SELTZER: I would like to have marked as GPU Exhibit 57 a memorandum from Mr. N. S. Elliott, Manager of Training Services, to R. E. Kosiba, dated March 10, 1980, subject: Training Effectiveness Upgrade Program.

(Memorandum from N. S. Elliott to R. E. Kosiba, dated March 10, 1980, with attachment, was marked GPU Exhibit 57 for identification, as of this date.)

BY MR. SELTZER:

Q Is GPU Exhibit 57 a copy of a memorandum which you sent to Mr. Kosiba on or about March 10, 1980?

A Yes, it so appears.

Q You stated in the first sentence on the first page: "Attached is the Training Effectiveness Upgrade Program which was developed

from a careful study of the following:" and then you list four sources.

Who developed this program from a careful study of the four sources that you list?

A This program was primarily -- the staff work here represented was done by Mr. Odell.

Q Is Odell the man who took over the responsibilities of lead instructor?

A His responsibilities included some of those of lead instructor and his current title is Manager of Instruction Services.

Q Who asked Mr. Odell to prepare this?

A I did.

Q Did you select the four materials that should be carefully studied?

A Yes. He was not restricted to these items. However, he did restrict himself.

Q The copy of GPU Exhibit 57 that we have in front of us is not signed by you or Mr. Kosiba or Mr. MacMillan.

Has the program been approved by Mr. Kosiba and Mr. MacMillan?

A I am not sure.

Q You said in the middle of the first

page, the front page, that "Implementation of this program will be initiated after approval."

Has the Training Services Group implemented this program?

A The general provisions of this program have been implemented. That does not mean to say that all items included herein have been implemented.

Q Would you look at the page numbered 2 in your attachment to GPU Exhibit 57. You have got in the left-hand column, "Item Description," that is a description of a comment or a point made by the President's Commission on Three Mile Island or the NRC special inquiry or NUREG-0585; is that right.

A The comment that is in the left column is a summary of the item identified in the reference which is in the second column.

Q In the third column you have listed B&W's present practice in the area that corresponds to the item in the first column; is that right?

A Essentially.

Q The fourth column is headed "Action

Response." About halfway down the page one of the descriptions in the column "Action Response" says "Resolved."

Do you see that?

A Yes.

Q In fact two items say "resolved."

What does the entry "Resolved" mean?

A The implied meaning of "Resolved" was that no further action was proposed at that time.

Q Where there is something other than "Resolved" written in the fourth column, does what is written there indicate what you were proposing Training Services would do to respond to the item in the first column?

A That was the intent.

Q Would you turn back to the first page of the attachment. Under item 1.a., the second entry is "No syllabi exist for courses." In the "Action Response" in the fourth column for that same item you stated: "Training program syllabus will be developed for each course which will define the topical outline of a typical course. The collection of B&W syllabus will be reviewed and approved by the Manager of Training

and the Manager of Customer Service."

Specifically what type of training program syllabus were you saying will be developed for each course?

A The typical syllabuses that have been developed here describe particular courses, replacement operator, shift technical advisor, requalification training, other services that we normally conduct for utilities that employ our services.

Q Is there any uniform format for the course syllabuses?

A They are generally in the same format.

Q Is it part of Mr. Odell's responsibilities to review the syllabuses or syllabi for their content?

A Yes.

Q It says here that "The collection of B&W syllabus will be reviewed and approved by the Manager of Training."

That is you; right?

A Yes.

Q Have you yet reviewed the syllabuses that have been developed for each course?

A I have reviewed some of the syllabuses. I have not reviewed all.

Q To your knowledge, would Odell have a complete set of the B&W syllabuses that are being used for training programs?

A Mr. Odell would have these set of syllabuses that have been developed and are in use.

Q Do you know whether the Manager of Customer Services has reviewed any of the syllabuses that have been developed?

A I don't think so.

Q Are the training program syllabuses a more expanded description of course content than existed at B&W before the Three Mile Island accident?

A Yes.

Q What do the training program syllabuses contain that was not written out in the course descriptions prior to the accident?

MR. WISE: I don't know whether the witness can answer something like that.

MR. SELTZER: I will rephrase it and make it easier.

MR. WISE: If the syllabus contains material that is greater than what they had beforehand, presumably it contains additional information. I don't know how you can answer something like that.

MR. SELTZER: You put your finger right on it.

Q What is the additional information that is contained in the new training program syllabuses?

A I cannot answer that at the moment.

Q If you had a sample in front of you, would you be able to point out what the new information is?

A Presumably.

Q What use is made of the training program syllabuses?

A The primary use of the training program syllabuses was to gain agreement between B&W and the organization for which we were providing services as to the content of the instruction provided to those people such that their management understood what we were doing for them and they were given an opportunity to participate.

Q Prior to the creation of the training syllabuses, was the description of courses which B&W would give to the utilities in the form of this T401 description that I am showing to you? (Document handed to witness.)

A They were in that form in its most generalized state.

Q What do you mean, in its most generalized state?

A The specific content of the course to be given is defined or was defined in the period prior to Three Mile Island Unit 2 incident on March 28th, in class schedules that were provided to the students and in general discussion had with the management, the management at that time being the training organization at the utility purchasing the service.

Q Are the course syllabuses used to give any additional guidelines to the instructors on what is to be included in particular courses?

A That was their intent.

Q Would you look at item 1.c. in GPU Exhibit 57. The description is "No training manuals used to standardize materials."

Let me ask you this: What does the phrase "training materials," as you have used it in this item, mean to you?

MR. WISE: Where in this item?

MR. SELTZER: In the phrase "no training materials used to standardize materials."

MR. WISE: That is not what I read. Mine says "no training manuals used" --

MR. SELTZER: Thank you very much.

Q What does the phrase "training manuals," as you have used it across this line, mean?

MR. WISE: Let me just say this, about this particular document. In the left-hand column where the phrase "training manuals" appears, there is a reference to the technical staff report of the Kemeny Commission. Obviously whoever was making this up is reciting concerns raised in the various referenced sources. As to what those sources may have meant in discussing training manuals, that is one thing; as to what Mr. Elliott and Mr.

O'dell meant by "training manuals" when they discussed it in the two columns on the right-hand side of the page, I think this witness can testify to that.

MR. SELTZER: Okay.

MR. WISE: But I think we should have that distinction in mind, that the two columns on the left reflect things that someone else has said, and Mr. Elliott and Mr. Odell may or may not be in agreement with whatever the people on these various investigating groups concluded.

MR. SELTZER: Or whatever they meant, at least.

MR. WISE: Or whatever they meant.

MR. SELTZER: All I am focusing on is what the two words immediately adjacent to one other, "training manuals," means, and I just want Mr. Elliott to tell me what he meant when he used those two words together.

MR. WISE: The question is: What did you mean by a training manual?

A As referenced to training manuals used in

the present practice, training manuals have been prepared as an item for a part of B&W training programs and they were specific to that particular item.

Q Okay. You have told me that they were prepared. I just want to find out what is a training manual as you have used it here. If one came up and bit me, what would it be?

A B&W Training Services has prepared some books that contained technical information. Those books were used in conjunction with the training course, and in our understanding, those were the training manuals.

Q What kind of books are you talking about?

MR. WISE: You mean to physically describe them, or did they come in a looseleaf form or bound up? What would you like the witness to tell you?

Q Are they run off on a printing press or are these just something that is typed up and photocopied?

A The manuals that I am referring to in general had been produced by the reproduction

group at B&W and they have printing type machinery that they use.

Q Are there several different training manuals that have been used?

A There is more than one training manual that has been produced.

Q Are these training manuals that have been produced since the accident that you are referring to?

MR. WISE: I am afraid now I am confused as to what your question covers. He has testified that there have been a number of training manuals.

MR. SELTZER: Right.

MR. WISE: Are you asking whether there was a number before the accident as well as after?

MR. SELTZER: I just want to find out what he is referring to. He said "we have made up training manuals." I want to find out if the ones that he is referring to are the training manuals created since the accident. I don't know what he is talking about. I am just trying to ask him.

Q Are the manuals that you are telling me about, Mr. Elliott, manuals created since the accident?

MR. WISE: The way you asked the question, I don't know that you are --

MR. SELTZER: Let's get that answer and I will ask another question.

MR. WISE: I just want the record to be clear, that's all, Mr. Seltzer. There may well have been manuals that he is talking about that have been created since Three Mile Island. That does not mean that there are not a number of items he is also talking about that were prepared before Three Mile Island. As long as you are only asking about the former and you don't care about the latter, that is all right.

MR. SELTZER: I will ask it more globally.

Q When were the manuals that you are talking about prepared?

A In general, the existing training manuals that are at B&W and have been provided to

utilities were produced prior to Three Mile Island. I do not recall any being produced since the Three Mile Island incident of March 28th.

Q Do you still use the pre-accident training manuals in the instruction at Lynchburg?

MR. WISE: I object to the form of that question. You have used an assumption in your question, namely, that they are still used. We have not established that they were ever used. The witness has testified they were prepared at some customer's behest.

MR. SELTZER: Okay, I note the objection.

Q Have you ever used these manuals in instruction of operators?

A The manuals prepared were prepared in support of a specific training program and, in general, their use was restricted to that program.

Q Was that the Arkansas unit for which they were prepared?

A Training manuals were prepared at one time for Arkansas Power & Light Company in support

of a training program.

Q Are those the manuals to which you have just been referring?

MR. WISE: You are asking him about only the manuals; is your question exclusive?

MR. SELTZER: I think he said that those manuals were prepared for a specific customer. I am asking him, are the manuals that were prepared for Arkansas the manuals he was just referring to.

MR. WISE: Mr. Seltzer --

MR. SELTZER: I will let you ask a clarifying question after I get this answer.

MR. WISE: Mr. Seltzer, I don't like the way you interrupt me when I start to make a comment on the record, and I hope you would provide me the same courtesy that I have provided you.

My problem with the question is that the witness has testified that manuals were prepared for specific customers. Arkansas Power & Light may have been one of those customers. There may have been

others.

The way you have asked the question would leave the record in a misleading state, even if it were answered as to whether or not there were manuals prepared for other customers. That is my problem. Your question implies the answer or assumes the answer, rather than asking the witness to give information.

MR. SELTZER: Okay. Your understanding of what the witness said is obviously different from mine.

Q Is your counsel correct in assuming that you may have prepared manuals for more than just Arkansas?

A Mr. Wise is correct, manuals have been prepared for customers in addition to Arkansas.

Q For whom else have you prepared training manuals, other than Arkansas?

A It is my understanding that manuals have been prepared for the Duke Power Company, Sacramento Municipal Utility District, Arkansas Power & Light Company, Florida Power Company, Metropolitan Edison Company, Toledo Edison

Company, Consumers Power Company, and there may be others at the moment.

Q What, if anything, was different about the manuals prepared for Arkansas Power & Light that caused you to single them out when you were first identifying customers for whom manuals were prepared?

MR. WISE: Mr. Seltzer, he did not single them out; you did.

Q Is there anything different about the manuals that were prepared for Arkansas P&L from manuals prepared for others?

A I don't know.

Q Did you prepare more manuals for Arkansas than you prepared for others?

A I don't know.

Q To your knowledge, was the task of manual preparation no different for Arkansas P&L than it was for any of the others that you have identified?

A In general, the task of preparing the manuals was the same for each of those instances.

Q Was the task as extensive for all of these customers?

A It is more or less the same for each.

Q How many different manuals have been prepared?

A I don't know.

Q Are some of the same manuals used for different utility customers?

A I don't think so.

Q Is the substance of the manuals used for some customers the same as the substance of manuals used for other customers?

A That is generally the case.

Q Are some of the manuals substantially identical except for a cover page indicating for what utility this particular version is prepared?

A I don't know.

Q What are the subject areas covered by the different manuals?

A To the best of my recollection, these manuals cover primarily the construction and design of the various components associated with the B&W-supplied equipment.

Q In other words, the manuals basically

contain system descriptions; is that right?

A The manuals in some cases included system descriptions.

Q When you say that the manuals contained descriptions of the construction and design of various components, what else besides system descriptions did the manuals contain?

A The manuals, in addition to the system description, contained component description.

Q To what extent, if at all, did the descriptions of equipment and components -- I am sorry -- systems and components vary from plant to plant?

A I don't know.

Q Did the manuals contain any guidance for operators on how systems or equipment should be operated?

A I don't know.

Q Did the manuals refer to any operating or emergency procedures?

A I don't know.

Q Are the manuals that have been prepared maintained in one particular place that you are aware of?

A Copies of the manuals are maintained.

Q If you wanted to find copies of particular manuals quickly, where would you go?

A The first place I would look is in the general area where the training files are and instruction material.

Q Is that the same place where you said some textbooks are kept?

A Yes, some textbooks are kept there and other documents related to the particular customer.

Q Of what use are such training manuals in the instruction of operators?

A These manuals were utilized as a part of a systems and component training course to the extent that it was performed by B&W, and further use of those manuals is generally not made by B&W. The owning utility might use them for some purpose.

Q What was the purpose to be served by your indication in the action response to item 1.a., namely, that the Manager of Training would review and approve the B&W course syllabus?

A The purpose of the review by the Manager of

training was the exercise of technical direction to this activity.

Q What was the purpose in proposing that the Manager of Customer Service would review them

A Generally the same.

Q Have you directed any changes in how the syllabuses are prepared, based on your review?

A I don't recall.

Q Would you look at item 1.e. That item is described as "Hot License nor Requalification weeky examination are not used." Under "Present Practice" you have indicated "No examinations are administered," and under "action Response" you have stated: "Weekly examinations will be used beginning August 1980. Operational examinations are being proposed."

Have you begun to give weekly examinations?

A Weekly examinations have been given on one or more incident.

Q Who is being examined?

A The people being examined are the employees of the utilities who were providing the service.

Q How are the examinations administered?

A I believe this examination is a written examination.

Q Who grades it?

A B&W training instructors.

Q What is the purpose of giving such examinations?

A The general purpose of these examinations is to determine the general retention of knowledge of those lectures presented and to report those facts to the utility paying for our services.

Q As the Manager of Training Services at B&W, do you consider yourself in any sense an educator?

A I do not consider myself an educator.

Q Do you consider yourself in any sense a teacher?

A I do not consider myself a teacher.

Q Do you consider the staff that works in Training Services engaged in the process of education?

A In general, the staff of the Training Services Group is involved in the area of technical training, that is, the development of

specific skills rather than that of education which undertakes the development of basic understandings.

Q Approximately what proportion of the time that is spent at Lynchburg on requalification programs is spent in classrooms?

A Approximately one-half.

Q Is that time spent in classrooms spent educating the operators?

MR. WISE: You know, I have allowed this to go on, but it is getting silly. I think that the question of what is a semantic difference between education and training is something we might get -- what is the person who writes dictionaries? -- a lexicographer in to talk about, but I don't know what the point of arguing with Mr. Elliott about that is.

You can ask him what the content of the classroom exercises is and we can get that on the record, and at some point somebody can argue whether that is education or training or something else. I mean they have classroom training; he has

testified to that.

Q I take it, in the classroom training it is intended that the students are going to learn something; isn't that right?

A It is hoped that the students learn something, yes.

Q To your knowledge, do any of the students study in preparation for the weekly examinations when they are given?

A I don't know.

Q Is any time given during the requalification training program for the students to study in preparation for the examinations?

A As a general response, study time is not normally included on the class schedule.

Q Is it sometimes included?

A I don't know.

Q When you attended Annapolis, you took examinations there; right?

A Yes.

Q I take it that you also studied for examinations?

A Yes.

Q Would you agree that by the act of

giving an examination, students are encouraged to study for the examination and consolidate what they have learned?

MR. WISE: I am going to object to that. I think we have gone about as far in this line of questioning as you can.

MR. SELTZER: Well --

MR. WISE: You are asking questions that I suppose anybody who has been to school could presumably provide their own answer to.

MR. SELTZER: That is fair enough.

MR. WISE: I don't know that Mr. Elliott's information on this is going to be any better than anybody else's information.

MR. SELTZER: I am sorry --

MR. WISE: If you want to ask him a specific about the B&W training programs, he can answer, but to have him give general thoughts on the educational process, I don't think is valuable. I don't see how he can do it and I think it is irrelevant.

MR. SELTZER: Mr. Wise, I am not

asking just any Joe Dokes off the streets of New York these questions, I am asking the man who has been the Manager of Training Services for B&W for the last eight years these questions. His training, what is it, a unit, a department, a division?

MR. WISE: Whichever. I will accept any of those for purposes of this discussion.

MR. SELTZER: Section. His section has now decided to administer weekly examinations. I am trying to find out from the man who is the head of this and responsible for the training of operators to run America's nuclear plants what he conceives as the function of an examination, and I am trying, through my style of examination, to elicit one aspect of that.

By the way, I will also state that I am not at all proceeding in a frivolous area. I believe that what I am driving at is fundamental, it is very important.

MR. WISE: I don't want to comment one way or the other on whether this is

fundamental or important. You are entitled to pursue these areas as you wish. I would object to the characterization of Mr. Elliott or B&W as being responsible for training the operators. It is my understanding that the law in this country is exactly to the contrary and the licensee is responsible for the training of the operators.

However, with respect to the specific questions that you have asked, I am perfectly happy to have Mr. Elliott answer questions as to why examinations were proposed by B&W and why they are given; I think that is an appropriate area of inquiry. What I object to is the broad, vague questions that we could sit and talk about all morning, as to whether or not examinations do or don't encourage people to study. I don't know whether the people at Met Ed study for examinations or not. I don't know whether Mr. Elliott can tell you that, and I don't know whether his answer to that question

can advance this ball one lick. It seems to me we are talking about things in a vacuum.

If you want to get to specifics as to what the institution of examinations at B&W was, I am perfectly happy to have Mr. Elliott answer those questions if he can.

Q Mr. Elliott, at the time that B&W began giving weekly examinations in the hot license and requalification training programs, did you have any expectation that giving examinations would encourage students to study for those examinations and consolidate what they had been learning in classroom instruction?

THE WITNESS: Would you please read the question again.

(The reporter read the question.)

A No.

Q Before you became the Manager of Training at B&W, had it ever been your experience that examinations do serve that function, namely encouraging students to study for an examination and consolidate what they have learned prior to

the examination?

A Prior to my employment at B&W, I did not consider this area.

Q I am not asking you to consider the area of testing for requalification.

I am asking you whether, isn't it true that it was your experience before you became the Manager of Training that examinations given to students do encourage students to study for the examination and do encourage students to consolidate what they have learned in courses given leading up to the examination?

MR. WISE: I think he answered your question that he had no such experience. He didn't consider this series of questions that you have just asked.

Isn't that what you testified to?

THE WITNESS: Yes.

Q In giving examinations at B&W, is the examination itself a learning or teaching device?

A The examinations given by B&W are not intended as a learning device.

Q Do you ever review the results of

examinations given by B&W?

A I have reviewed specific examinations.

Q Have you reviewed the test results from specific examinations?

A I don't know.

Q Have you ever used the examination results or suggested that anybody in your Training Section use the examination results to determine what areas of courses need to be strengthened?

A I don't know.

Q Do you give the examination results to the utilities whose operators took the exams?

A I do not personally.

Q Does the Babcock & Wilcox Company?

A That is our intent, yes.

Q Have you ever received any response from utilities on the examination results achieved by their operators?

A Yes.

Q What kinds of responses?

A The responses that I remember have been oral.

Q What has been the substance of those responses, as best you can recall them?

A The utility did not agree with B&W's result.

Q What result did they disagree with?

A Generally they were in the area of not agreeing that B&W should deny certification.

Q Did the utility that was questioning the results of the exam question whether the examination had been graded properly?

MR. WISE: Let's clarify. Are we talking now about one specific instance or a number of instances? I am confused.

Q Has more than one utility voiced objection to the results?

A I don't remember.

Q When you said that one had objected -- I am sorry. When you said at least one had objected to the results, were you thinking of one particular one that had objected?

A Yes.

Q Which one?

A Duke Power Company.

Q Focusing on the only one that you can recall specifically, did Duke's management object to the way in which the exams had been

graded?

A I don't remember.

Q Did they dispute the content of the exam?

A I don't think so.

Q Did they think that answers that their operators had given were correct even though B&W had marked them incorrect?

MR. WISE: I don't know if this witness can answer the questions the way you are phrasing them. If you want to ask him what Duke said, I have no objection to that. As to what Duke thought or what their considerations may have been, I don't think he can answer.

MR. SELTZER: I am only asking what Duke said to him.

MR. WISE: So long as the questions are clear, because that is not the way they were phrased.

Q Did Duke object -- I think that was the phrase I used -- but did they make their objection to you that they felt an answer that had been graded incorrect should have been graded

as correct?

A I don't remember.

Q Did you handle the objection yourself or did you refer the Duke people to somebody else for resolution?

A I received the objection and I transmitted to Duke Power the resolution.

Q What was the resolution?

A That B&W's position was not going to change.

Q To how many operators had you denied certification?

A I don't know.

Q More than one?

A B&W has denied certification to more than one.

Q From Duke?

A I don't remember.

Q Before you responded to Duke telling them that you would not change the results, did you review with any of your instructors the performance of these particular Duke operators?

A Yes.

Q What did you determine?

MR. WISE: Mr. Seltzer, is this leading

someplace? Is Duke Power relevant to this case?

MR. SELTZER: Well, it is relevant in understanding what standards B&W is applying in deciding to certify or not certify people who have gone through its training program. Duke per se is not relevant, it is the standards applied by B&W.

MR. WISE: I will let it go a little bit further, but I would appreciate getting back to this lawsuit.

What is the pending question?

(The reporter read the question.)

A I determined from review with the lead instructor at the time that the conclusion originally reached was correct and that would be B&W's position.

Q In words or substance, did the lead instructor tell you that the particular operators who had not been certified had generally performed worse than the operators who had been certified?

A I don't remember.

Q Is the weekly examination one of the

principal bases on which B&W decides whether or not to certify operators who have come down to Lynchburg for requalification training?

MR. WISE: I think it might help clarify what we are talking about if we could get on the record what is meant by certifying people who have been to B&W for requalification training.

Q Do you want to respond to Mr. Wise's question?

A B&W does not certify anything relative to requalification at B&W other than the individual attended and participated in the program and was exposed to the evolutions and events that take place on the simulator. There is no certification of performance of any kind.

The judgment of adequacy of students' performance during requalification remains with the utility who has purchased B&W's service. They are responsible for judging the performance of their own people. B&W does provide certifications to the utility on the completion of results of specific courses, in particular the cold license training program; on completion of the simulator

training portion, there is an examination consisting of multiple parts.

If that is completed satisfactorily, certification of that completion is provided.

Similarly with hot license, there is a certification of satisfactory completion of a reactor startup.

Those are the only two certifications provided by Babcock & Wilcox.

Q You said that an examination is given in the cold licensing program.

A Yes.

Q If an operator -- is that a written examination?

A That examination consists of three parts: a written examination, an oral examination, and an operating examination.

Q Let me see if I understand what you have told me.

If an operator shows up for and takes the written examination, shows up and takes the oral examination, and shows up and takes the operating examination, but just displays a rather appalling lack of ability to respond adequately

to the questions in the oral and written examinations and doesn't know his rear end from his elbow when he is doing the operating examination, would you give him a certification?

MR. WISE: Mr. Elliott, I think you know the sense of Mr. Seltzer's question. I do not encourage you to agree with his characterizations as to how one might go about failing the examination. If you can answer the question based upon the standards that B&W uses, why don't you do it that way.

A The certification of completion of the B&W portion of the cold license training program is a written, oral and operating examination. For B&W to provide a certification to the utility on satisfactory completion of that portion requires the achieving of a passing mark in all three categories, that is, the written examination, the oral examination and the operating examination. Failure to pass one of those sections constitutes failure and B&W does not certify.

Q In other words, it is not sufficient for the operator merely to attend and participate

in the program; he must also achieve a minimum level in the three examinations; right?

A That is correct.

Q In the hot licensing program, are there examinations given?

A In general, in the hot license training program, or more correctly that portion of the program, there is an operating examination provided by B&W as a service to the utilities who purchase our services relative to the individual's ability to make a reactor start up at the time the examination is done.

Q Is it correct that B&W's certification of an operator following hot license training depends on whether he has performed adequately in the reactor startup operating examination?

A B&W's certification only relates to the reactor -- the actual performance and ability to answer questions during the reactor startup and there is some prequestioning of the individual. The certification is made only on the results of that examination.

Q So the operator's performance at some threshold level is a prerequisite; it

wouldn't be sufficient for him merely to attend and participate in the hot licensing program; is that right?

MR. WISE: Sufficient for what purposes? To get the B&W certification?

MR. SELTZER: Yes.

A Yes. The individual must perform satisfactorily on the examination for certification.

Q Is there any certification given for operators attending requalification training?

A No. There is no certification.

Q You said that Duke Power protested to B&W the denial of certification to one or more of its operators; is that right?

A Yes.

Q What training program had their operators attended and participated in prior to this denial?

A Their operators had participated in a training program related to cold license.

Q In item 1.e. where it says under the "Action Response": "Weekly examinations will be used beginning August 1980," for what programs

were weekly examinations to be given in the summer of 1980?

A The weekly examinations that were to be given are consistent with B&W's agreements with the utility that we were providing services for.

Q Do you normally give weekly examinations in your requalification training programs now?

A B&W gives training in accordance with our agreements with the management of a particular utility. Our programs are specific to that utility and represent what that utility wants B&W to do.

Q Does more than one utility ask you to give weekly examinations in requalification training?

A I don't know.

Q Do you know if Met Ed's operators are given examinations as part of the requalification training program?

A I think so.

Q Does B&W make any recommendations to its utility customers regarding the content of training programs?

A B&W provides suggested subjects to be covered in the training program. The content of that training program is negotiated with the utility to be consistent with our capabilities and their overall training program.

Q Does B&W currently recommend weekly examinations as part of requalification training?

A B&W has discussed examinations as a part of requalification training program with some of its customers. That is a part of our program, to have mutually agreed-to syllabuses.

Q Item 1.f. is described as "Home work is not assigned."

Listed under "Present Practice," it states that "Test preparation time requires work beyond classroom instruction."

Does that mean that for students to prepare for examinations that are given in the B&W training program, they have to do work outside of classroom instruction?

A B&W does not require students to do work outside the classroom. If the students elect to do work to change his performance, that is the prerogative of the student.

Q In the "Action Response," the second sentence, you said "Work after class may be required for comprehension and examination performance."

In what sense did you mean that work after class may be required for comprehension and examination performance?

A Just as I previously stated.

Q You mean that if the student is going to understand the material and do well on the exam, he may have to do work outside of class?

A If the student wishes to do that and improve his understanding, he may be required to do that. He is the sole one to decide what he does.

Q Have you perceived or has anybody told you that adding examinations to a course curriculum has encouraged students taking the courses to be more attentive?

A I don't know.

Q Item 1.g. refers to using professional educators in training programs.

Is it currently B&W's practice to use no professional educators in training?

A The present practice of B&W is as stated in item g.

Q You say in the "Action Response": "Professional educators would be of more use at INPO in evaluating industry wide training methods."

How were you suggesting that professional educators would be useful at INPO?

A That is a personal opinion, that their involvement in INPO or INPO using such people might be helpful.

Q Right. I am asking how. How would they be useful, in your personal opinion?

A I don't know.

Q Whose personal opinion were you referring to when you included this in the "Action Response" in your memo to Kosiba?

A Mine.

Q And why did you personally believe that professional educators would be more useful in INPO?

A INPO was charted to certify -- not to certify; to accredit certain training programs as a part of their function, and if professional

educators were useful in the industry as suggested by, in this case reference b., that that was probably the useful place for them.

Q Have you ever given any serious consideration to using professional educators in B&W's training programs?

A I don't remember.

Q What is the significance to a utility, if you know, of B&W denying certification to operators who have come to B&W for training?

A As a general statement, these certifications are related to the establishment of minimum qualification of the utility staff seeking licenses by -- from the Nuclear Regulatory Commission.

Q Are there any NRC licenses for which certification from B&W would be a prerequisite?

A No.

Q To the extent that a utility does not have its own simulator and doesn't send their operators to any other utility for hands-on experience, would certification by B&W be a prerequisite for certain operating licenses?

MR. WISE: Can you answer that question

as it is phrased?

THE WITNESS: I can't answer the question.

Q Do you get operators coming to B&W who need to be certified for handling a certain number of reactivity changes?

A I have previously described B&W's certification program.

I do not understand your question.

Q Don't operators have to handle a certain number of reactivity changes each year in order to maintain their operating license?

A The codes that govern the issuance and renewal of licenses for operators for nuclear power plants have provisions for requalification training that associate that with reactivity changes, that that particular -- that the individuals must participate in. There is no requirement in that document or those sections that require the simulator be utilized, to the best of my knowledge.

Q I understand that, but if an operators is getting near the end of a year and has not had an opportunity to handle 10 reactivity

changes on the utility's reactor, it is a fact, isn't it, that the operator can come to Lynchburg and participate in reactivity changes on the simulator to bring his total up to 10; isn't that right?

A That is generally true.

Q Does B&W have to certify that the operator has participated in those reactivity changes?

A No, B&W just reports in the documentation for training that certain things were done, and the specific list is not -- not there, just what training was provided.

Q If an operator fails to get B&W certification in your cold licensing exam, does that prevent the operator from getting an NRC cold license?

A No.

Q How could he get a cold license after failing your exam?

A He may qualify to take the cold license exam by one of the four means provided in ANSI 18.1 or the later revision of that, ANSI/ANS 3.1.

MR. WISE: Off the record.

(Discussion off the record.

MR. SELTZER: Why don't we break for lunch at this time.

(Whereupon, at 12:55 p.m. a lunch recess was taken.)

AFTERNOON SESSION

2:00 p.m.

N O R M A N S. E L L I O T T, resumed.

EXAMINATION (continued)

BY MR. SELTZER:

Q Could you take a look at page 2 of the attachment to GPU Exhibit 57, please.

A Page 2. Okay.

Q Item 2.c. states: "No drill guidelines or drill objectives are used."

Under the "Action Response" to that item you have written " "Drill guides will be developed and approved."

First, as you used the phrase "drill guides" in the "Action Response," what did you mean by that?

A Well, the drill guide is explained in the written statements below.

Q Well, let me make it clearer. "Drill guide" might mean something to somebody who works in a machine tool shop and another things to a person who is responsible for training.

Why don't you first help us by telling me what you mean by "drill"? What is a

drill?

A In the context of this item, drill was an exercise generally conducted on the simulator.

Q Is each exercise conducted on the simulator a separate drill?

A Generally.

Q If a group of operators are handling the simulator and a loss of feedwater transient is thrown at them by the simulator instructor, is the complete course of that transient one drill?

A The conduct of a drill as described by you, the loss of feedwater incident, would be considered a drill.

Q Since you wrote the "Action Response" in March 1980, have drill guides been developed?

A Yes, some drill guides have been developed.

Q At the time you wrote this, for how many different types of drills did you intend to write drill guides?

A I personally did not write the drill guides.

Q I didn't mean you personally, I meant you guys down at B&W.

A My staff was directed to prepare drill

guides for most of the evolutions that we did that would be used for long-term training of people, long-term being a long simulator exercise, and might be used in case we were conducting a performance examination so we would have a standard at which to judge performance.

Q After a drill guide is developed, to whom is it submitted for approval, if anyone?

A That, at the time, we intended that the Supervisor of Training would take care of that.

Q Is that the same as the Manager of Instructional Services?

A Yes.

Q Mr. Odell?

A Yes.

Q You say at the time you wrote this, that was the intention.

Do you know who, if anyone, has approved any drill guides since they have been developed?

A I don't know.

Q Have you reviewed any drill guides?

A No.

Q Have you seen any drill guides?

A Yes.

Q How many pages is a guide for one particular drill?

A I don't remember.

Q Do you know for approximately how many different drills guides have already been developed?

A No.

Q Is that something that Mr. Odell should know?

A Mr. Odell probably would know, or could find out if assigned to do that.

Q Do you know if Odell has assigned anybody to prepare drill guides for his review and approval?

A I think so.

Q Who, to the best of your knowledge, has been assigned to prepare drill guides?

A Mr. Watson.

Q What is Watson's position?

A Mr. Watson is a senior instructor.

Q Is there any particular individual who has been responsible for the preparation of training manuals?

A No individual has had an ongoing assignment of training manuals.

Q Are training manuals prepared by the Training Section?

A Yes.

Q Who has been responsible for preparation of the examinations that you give, written examinations?

A One of the instructors.

Q Who?

A It depends on the particular course and the particular utility that we are serving.

Q Do you keep copies of the examinations that you have given?

A Yes.

Q Who prepares the training program syllabuses?

A They have, for the most part, been prepared by Mr. Odell. Others may have helped him.

Q I would like to return for a moment to the simulation on the B&W simulator of a transient in which the pressurizer spray valve sticks open or the heaters all fail.

You have testified that the response of the system to either of those casualties would be a drop in pressure in the reactor coolant system and an expansion in the volume of liquid in the reactor coolant system; right?

MR. WISE: That is now the fourth time you have asked that question.

A Well, it is generally true, the reactor system volume expands, that expansion goes to the pressurizer, so that the volume of fluid for constant mass has increased.

Q The rise in pressurizer water level under either of those casualty conditions is an accurate indication of the increase in liquid volume in the reactor coolant system, isn't it?

A Assuming that we have remained at a pressure that the system has remained water, and that we have a margin to saturation, margin in temperature or pressure to saturation.

Q Assuming that the reactor coolant liquid is subcooled --

A Okay.

Q -- that is the assumption you are making?

A Yes.

Q If you assume that the water in the reactor coolant system is subcooled, in other words, has not reached saturation --

A Yes.

Q -- then the rise in pressurizer water level is an accurate indication of the volume of liquid water in the reactor coolant system in those two casualties; right?

A I am unclear about the last part of your statement.

Q "In those two casualties," do you mean?

A Prior to that.

Q I said that first I am following your assumptions that the water in the reactor coolant system other than the pressurizer is remaining subcooled.

A Okay.

Q That means that it is not saturated; right?

A That's correct.

Q If either the spray valves fail open or the heaters shut off, the pressure drops and the liquid water expands in the reactor coolant

system, you have told me.

A The pressure drops and the liquid expands, those are together.

Q Yes. And that occurs; right?

A Yes.

Q The rise in water level in the pressurizer is then an accurate indication of the expansion of volume of liquid water in the reactor coolant system, isn't it?

A I would say that the rise in pressurizer level is an indication. The accuracies involved inabilities to measure that, and the system is very complicated and there is a great deal of things that must be considered relative to temperature compensation of instrumentation, ability of instrumentation to read accurately small differential pressures, and likewise to read data out on an instrument that people could look at. All of those inaccuracies must be taken into account before we can get exactly the right answers.

Q Rather than focusing on whether it is an accurate gauge of how much the water has expanded, let me ask you: Is it correct that the

rise in pressurizer water level is an indication and a correct indication that the total water volume in the reactor coolant system is expanding?

A Yes, assuming we have no other influences on the system. Please recognize there are potentially other influences that could occur.

Q You have told us that before the Three Mile Island accident the sticking open of a pressurizer spray valve or the failure to work of the pressurizer heaters was a transient on which some operators were trained.

When that transient occurred, in training, and operators perceived that that was the transient that had been simulated, can you tell me, Mr. Elliott, under the training being given by B&W, should the operators have terminated high pressure injection?

A I don't know.

Q If the only disturbance to the system was that suddenly a pressurizer spray valve stuck open, would high pressure injection be actuated?

A It is possible.

Q Under what circumstances?

A That the pressure reached the level at which the engineered safeguards actuation system energized high pressure injection.

Q What level is that?

A Depending on which of the power plants it is related to, it is approximately 1600 psi or 1500 psi.

Q It is a fact, isn't it, that either of those actuation points is lower than the reactor low pressure trip points?

A That is my understanding.

Q So, in other words, before the pressure had dropped down to the level to actuate high pressure injection, the reactor would have tripped off line; right?

A It is certainly possible in this case that the reactor was never critical and never started up.

Q If we assume that the reactor was operating at the time one of these transients was simulated, the tripping of the reactor would stop the pressure from falling to the point of actuation of high pressure injection, wouldn't it?

A I don't think so.

Q Do you know, under the training that was being done before the Three Mile Island accident, how long a stuck open spray valve transient would be allowed to progress before that drill was concluded?

A No.

Q So, in other words, you don't know whether that drill was ever continued beyond the point of tripping the reactor off line, do you?

A That is correct. I do not personally know.

Q Is it correct that between the point where the spray valve sticks open during normal operation and reactor trip, high pressure injection would not be actuated, other things being equal?

A In the case that the system operates correctly, it would not be expected that the high pressure injection would initiate before the reactor trips, assuming we start from a condition where a reactor trip is an allowable function. The reactor protection system would indicate trip as an output signal on pressure going to the setpoint. However, if the control

rod drive breakers were open, no trip would occur; the breakers were shut, the control rods would slip.

Q If the control rod's breaker were open, so the reactor didn't trip, would that make the drill into a multiple-casualty drill?

A No, it probably means that it was a drill that started without the reactor critical.

Q Would training records show what the status of the plant was at the time a spray valve sticking open drill commenced?

A I don't know.

Q So you don't know whether you would be able to look back and tell whether any operators had been exposed to a spray valve failing open before the plant was critical; is that right?

A That's correct.

Q If the plant were critical when a spray valve fail open transient occurred, the reactor would be tripped off line by the reactor protection system before the pressure had dropped to the point of actuating the high pressure injection; right?

A That is the way it should work, yes.

Q And if it worked that way, then the tripping of the reactor off line would drop the pressure in the reactor coolant system; isn't that right?

A The trip of the reactor does not necessarily change the pressure in the reactor coolant system. It is the readjustment of the system temperature setpoints that cause pressure to change.

Q What temperature setpoints?

A The secondary temperature setpoints, and the ability of the control system to operate the Tave controller.

Q I would like to assume the following transient being taught prior to the Three Mile Island accident, and if you say that you don't believe that any such transient was being taught, then I will withdraw the question as hypothetical.

I would like to assume that the reactor is operating at or near full power and that normal operating temperatures and pressures are being maintained and that all the other primary parameters are within their normal range,

without any operator action, the spray valve failes in its open position.

Is that a transient that you believe would have been one of the possible spray valve fail open transients being taught before the Three Mile Island accident?

A It is a possible drill.

Q What would be the correct operator response to that casualty?

A The response to casualties are in accordance with the particular student's operating procedures. Most plants -- most students have available their operating procedures, and their operating procedures cover casualties associated with the pressurizer.

Q Are you familiar generally with what those procedures are or, in the absence of those procedures, the B&W simulator procedure would call for as the proper response to that casualty?

A No, I am not, at the moment.

Q Does the B&W simulator procedures book have a procedure to follow for this casualty?

A I don't know.

Q Have you ever worked with the B&W simulator procedures book?

A Yes.

Q If it had a procedure for handling this casualty, would you be able to find it?

A Probably.

MR. SELTZER: I would like to mark as GPU Exhibit 58 for identification the B&W Operations Manual for Nuclear Power Plant Simulator.

(Multipage document entitled "Operations Manual for Nuclear Power Plant Simulator" was marked GPU Exhibit 58 for identification, as of this date.)

Q Mr. Elliott, it is a fact, is it not, that this is a copy of a set of procedures which B&W has created and which are available for use in operating the B&W simulator?

A Yes, they are B&W procedures and they are at Lynchburg and they are used on certain occasions.

Q Is it correct that if students do not bring their own plant's procedures to Lynchburg to use in the simulator or if their own procedures

don't cover a particular manipulation on the Lynchburg simulator, that they would use these operating procedures for handling the simulator?

A Generally that is true.

Q Am I correct that the page that has been numbered B 4491 is the start of the section dealing with transients initiated in the pressurizer?

A I am sorry, I don't know where you are.

THE WITNESS: The pages are unnumbered in their numbering system.

MR. WISE: Off the record.

(Discussion off the record.)

Q Do you have Operating Procedure 1202 29?

A Yes.

Q Do you see listed there a spray valve failure?

A Yes.

Q Does this indicate the section of the procedures for operating the simulator, as prepared by B&W, that would describe the response that would be the proper response by operators to a spray valve failure?

A From looking at the document, it appears so.

Q Does Section 9 of Operating Procedure 1202 29 list the operator actions that are prescribed?

A This document in Sections 9.3 and 9.4 appears to give instructions.

Q Am I correct that in the description of the symptoms, there is no indication that high pressure injection has actuated, as one of the symptoms of pressurizer spray valve failing?

A You are correct that the symptoms listed here do not list initiation of high pressure injection.

Q In the immediate action or followup action section, there is no instruction given regarding initiation or termination of high pressure injection, is there?

A There doesn't appear to be.

Q Is there also a section of OP 1202 29 dealing with the heaters failing to operate?

A I don't know.

Q Does Section 6 deal with the heaters failing to operate?

A In accordance with the index, yes.

Q Turning to Section 6, there is no indication there that any symptom of the heaters failing is actuation of high pressure injection; is that right?

A I don't see any symptom listed as actuation of high pressure injection.

Q Among the actions, either immediate action or followup action, there is no instruction regarding actuation or termination of high pressure injection, is there?

A I don't see any.

Q Among the symptoms listed, there is no mention of any change in pressurizer level, is there?

A I don't see any mention of change in pressurizer level.

Q Since you said that this is a casualty for which there would be a rise in pressurizer level, do you think that the omission of a rise in pressurizer level is a significant ommission?

A I don't know.

Q Would you look at Section 9 of this same OP 1202 29, under symptoms. I take it

these are symptoms which the simulator would show following the start of a pressurizer spray valve failure casualty; is that right?

A These are some of the symptoms that would be shown.

Q In other words, an operator standing at the panel in your control room would see these symptoms following a reactor pressurizer spray valve failure?

A He would see at least -- well, he may see one or more of these symptoms.

Q Okay. Symptom No. 3 is: "Abnormal change in reactor coolant pressure without associated change in pressurizer level."

I thought you were testifying that there would be an associated change in pressurizer level.

MR. WISE: I don't understand that as a question.

MR. SELTZER: I am going to ask a question now.

MR. WISE: Well, does that preamble have anything to do with the question?

MR. SELTZER: Yes, it does, and here

it comes.

MR. WISE: If it does, I will object.

MR. SELTZER: Here it comes.

MR. WISE: I will listen to your question, but I will object to the preamble.

MR. SELTZER: You know, Bob, you have thought it was appropriate to note that I have asked him three times or four times to reiterate the point that pressurizer level would rise and respond to pressurizer spray valve failing open, so I haven't reiterated it as a question, I have just restated it. He has previously testified that in response to pressurizer spray valve failing open, there would be a rise in pressurizer level.

MR. WISE: That's correct.

MR. SELTZER: Okay.

MR. WISE: What is the question?

MR. SELTZER: Here is the question.

Q Why does the B&W simulator procedures indicate that a symptom of the pressurizer spray valve failing open would be no associated change in pressurizer level?

A I don't know.

MR. WISE: I don't think that is what it says, to begin with. "Pressurizer Spray Valve Failure" is the title of the section. It covers both, as I read it, failure open and failure closed. So I don't know that we have established which Symptom 3 relates to.

Q During the failure of a spray valve, is there any possibility that the margin to saturation could be lost as the pressure fell?

A Just as a generalized thought, yes, the possibility exists.

Q There is no mention in this discussion of pressurizer spray valve failure of the possibility of saturation, is there?

A I don't see any.

Q Are the symptoms that are listed in 9.1 symptoms for both the valve failing open and the valve failing closed?

A There appear to be symptoms there related to both of those conditions.

Q And does Symptom 3 relate to both of those conditions?

A Symptom 3 can be related to both of those conditions.

Q And you are saying that you don't know why Symptom 3 shows no change in pressurizer level when you have testified previously that you thought there would be a change in pressurizer level; is that right?

MR. WISE: Do you understand that question?

THE WITNESS: No, I really don't.

Q You don't know why Symptom 3 is inconsistent -- well, let me not load it up.

Symptom 3 is inconsistent with your testimony that the pressurizer level will change, isn't it?

A It is a matter of degree.

Q Tell me about that.

A What --

Q Are you -- let me ask you.

MR. WISE: Let him finish. You asked him a question. He began an answer and I want him to have an opportunity to finish it.

MR. SELTZER: Fair enough.

A That somebody in writing this has used "without associated change in pressurizer level." That is a relative term and I can't say what the man meant.

Q When you are saying that that is a matter of degree, are you saying that as you understand these procedures prepared by B&W, the degree of change in pressurizer level might be so small that the writer of this at B&W would say that there was no associated change of pressurizer level?

A I can't say.

Q Is that what you meant when you said it is a matter of degree?

A I am not sure I can even answer your question.

Q Do you think that this Symptom 3 is wrong when it says that there would be an abnormal change in reactor coolant pressure without associated change of pressurizer level?

A In the operation of light water reactors, there are changes that can occur in the system pressure and pressurizer level associated with temperatures, and as I read this now, I believe

that it is essentially consistent with what I previously described to you.

Q How can a statement that says "without associated change in pressurizer level" be consistent with your description of there being a change in pressurizer level in response to the same failure mode?

MR. WISE: Are you assuming in your question that the words "without associated change" are equivalent to the meaning of saying "no change"? Is that the assumption that is in your question?

MR. SELTZER: Yes. I will ask the witness exactly.

Q Mr. Elliott, when it says "without associated change," does that mean, other things being equal, with no change in pressurizer level?

A I don't know. I can only read this and apply my own personal understanding.

Q I will take that. You are the Manager of Training. B&W wrote this. When it says "without associated change," do you understand that to mean with no significant change?

MR. WISE: I think the record might

be clearer if we simply asked the witness what he understood Symptom 3 to mean, rather than taking it in bits and pieces.

MR. SELTZER: Fine. I will do that.

MR. WISE: I am afraid we are getting the record terribly clouded here.

What do you understand Symptom 3 to mean?

THE WITNESS: Symptom 3 to me means that in some cases the pressure in the system will go down due to a temperature upset, and when that temperature upset occurs, pressurizer level will follow the pressure.

In the case of pressure going down alone, pressurizer level will remain up and it could even increase. It would not be an associated temperature upset.

MR. SELTZER: Maybe I should have had coffee instead of soda. Could you repeat that, please.

(The reporter read the record.)

Q You said that when the pressure dropped due to a temperature upset, pressurizer level would follow it down?

MR. WISE: Are you asking him now whether the reporter got the right notes or --

Q I am asking, that is what you meant to say.

A You made a statement, Mr. Seltzer.

Q That is what you meant to say?

A That is what I said, as reported by the court reporter.

Q Why would such a drop in reactor coolant system pressure at the same time that there is a drop in pressurizer level not be an associated change in pressurizer level?

A I don't understand the question.

MR. WISE: I am sorry, it doesn't follow, Mr. Seltzer.

Q Symptom 3 says "Abnormal change in reactor coolant pressure without associated change."

MR. WISE: That is what it says is a symptom of a failure in the pressurizer spray valve. That is a symptom.

MR. SELTZER: What I am trying to understand is how can a simultaneous drop in RC pressure and pressurizer level be

described as a change in RC pressure without associated change in pressurizer level.

MR. WISE: That is not what the witness testified to. He testified to 100 percent the opposite of that.

MR. SELTZER: That is what I thought. Here it says "without associated change," and he said there could be a simultaneous change.

Q Have I misunderstood you, Mr. Elliott?

A It appears so.

Q Where did I go wrong?

MR. WISE: I don't know if this witness will be able to answer that question. I think his testimony was fairly clear. I was able to follow it. It seems to me to be the obvious implication of what is said here.

MR. SELTZER: Let me try again.

Q Under this transient pressurizer spray valve failure, do you expect the pressurizer level is going to change as reactor coolant system pressure changes?

A Yes. And to clarify that, they are not necessarily the same, only that one will change and the other will change.

Q You mean they might be going in the same direction or they might be going in opposite directions? Is that what you are saying?

A You are making a statement.

Q That is what you are saying.

A The question is what. What did I say?

Q By your last answer, are you telling me that the RCS pressure and the pressurizer level might be going in the same direction or they might be going in the opposite direction in response to a pressurizer spray valve failure?

A Well, we previously had a long discussion on the behavior of the compressed water under change in pressure and the -- on the spray valve failing open, we have a decreasing pressure condition; the water in the system will expand on a decreasing pressure and the pressurizer level will go up. Likewise, if the valve fails shut, it is possible for the reverse to happen, that pressure increases, compressing the water

further, causing pressurizer level to go down.

Q As you read Symptom 3, does Symptom 3 describe what you have just described?

A To me it does.

Q Turning back to GPU Exhibit 57, The Training Effectiveness Upgrade Program, looking at item 2.g. on page 2, it states that "The B&W simulator was not, prior to March 28, programmed to reproduce the conditions that confronted the operators during the accident. It was unable to simulate the increasing pressurizer level at the same time that reactor coolant pressure was dropping, or simulate solid conditions."

The "Present Practice" entry states: "Simulator program has been modified and will now reproduce the TMI-2 and other small break accident responses."

Prior to the Three Mile Island accident, it is a fact, is it not, that the simulator could not simulate voiding conditions in the primary coolant system?

A Prior to the Three Mile Island incident, voiding in the reactor coolant control volume

in the simulator was not a condition.

Q And the primary control volume means the coolant outside of the pressurizer; is that right?

A Yes.

Q It is correct, is it not, that when the temperature and pressure in the control volume had used up the margin to saturation, the simulator could not simulate the formation of steam in the control volume?

A Yes, we previously stated that.

Q Therefore, it is also a fact, is it not, that the simulator could not reproduce the response of the primary system to voiding occurring in the control volume; is that right?

A Yes, that's correct.

Q It is also correct that the simulator now can reproduce the effect of voiding in the primary control volume; isn't that right?

A Yes.

Q Can you show the effect of saturation in the hot leg?

A The B&W simulator has two control volumes in its set of equasions and the hot leg is not a

specifically identified area for computation of void conditions.

Q What are the two locations that are monitored?

A The simulator computes conditions for the reactor coolant system as one lump and includes the whole flood system, other than the pressurizer, and that is computed as one control volume. There is a second control volume which is the pressurizer.

Q Is it correct that before Three Mile Island's accident, operators were not trained at B&W on what the system response was to saturation occurring in the primary control volume?

A I don't know.

Q Is it correct that prior to the Three Mile Island accident, operators could not be trained on the simulator on the response of the system to saturation of primary control volume?

A Saturation in the primary control volume was not a possible condition on the simulator prior to -- shortly after the Three Mile Island

incident.

Q Prior to the Three Mile Island accident, did you have any transients that were programmed on the simulator in which a pilot operated relief valve failed in the open position?

A It was possible using the system to fail the pilot operated relief valve in the open condition.

Q Do you know whether that casualty was actually run on the simulator as part of a training program for any operators before the Three Mile Island accident?

A No, I do not.

Q Do you know whether the failure open of a code safety valve on the pressurizer was run as a casualty in training prior to the Three Mile Island accident?

A No, I do not.

Q If either of those casualties had been run on the simulator prior ot the Three Mile Island accident, it would not have produced the change in pressurizer level that such a casualty now produces; isn't that correct?

MR. WISE: I don't see how he can answer that. It depends upon what the

operators do during the drill, doesn't it?

MR. SELTZER: I am talking about before there is any operator response.

MR. WISE: You mean assuming the operators do nothing?

MR. SELTZER: Up to the point where the operators do anything, right.

I will take your assumption, assuming the operators do nothing.

Let me restate the question.

Q If you ran a pilot operated relief valve failing open on the simulator as it was programmed prior to the Three Mile Island accident, and assume no operator actions, it is correct, isn't it, that the response in pressurizer water level would not be what the response is on the simulator today?

A Based on my understanding of the equasions that were utilized and general principles that were employed in the construction of the simulator, the simulator would have responded correctly up until the time the pressure reached the saturation condition in the primary system.

Based on an engineering understanding

of what should happen, pressurizer level would have gone up just the same as it did at Three Mile Island.

Q It would have gone up at what point, prior to saturation?

A Prior to saturation.

MR. WISE: Are these questions and answers assuming that the HPI has been turned off, or are you assuming it remained on?

THE WITNESS: We had no operator action.

MR. WISE: And HIP does come on?

THE WITNESS: Yes. The system operates as it would have operated.

MR. WISE: Just so that I understand it, your testimony is, both before and after the accident -- rather, before and after the reprogramming that occurred following the accident, your understanding is that in both instances the pressurizer level would have responded the same way?

THE WITNESS: Yes.

A Please understand, there are no tests that were conducted to prove that. That is based on

my understanding of how the equasions are there and how it made the computation.

Q The response to the pressurizer as the machine was programmed before the accident would be different from the response of the pressurizer as it is now programmed from the point at which any saturation in the control volume occurred; isn't that right?

A Yes, that is essentially true.

Q Would you turn to page 4 of GPU Exhibit 57, please.

Item 3.a. in the "Item Description" states: "Regular meetings not held between Engineering and Training - General lack of interaction between Engineering and Training. Engineers do not observe training. Less than 20 percent of the engineers participate in the training courses."

Under the "Action Response" to that item, you wrote: "1. Procedures must be established to exchange information on the following items between Engineering and Training:

"a. System design changes or proposals that affect operating practices."

Has a procedure been established to exchange information on system design changes that affect operating procedures?

A Yes.

Q Is there a name to that procedure that has been established? Is it part of any formal program?

A It is a part of our program relative to sending instructions to the operating plants.

Q Item b. indicates that a procedure must be established to exchange information between Engineering and Training on response to failure analyses.

Whose response to failure analyses or the response of what failure analyses were you referring to there?

A From reading this, at this time Engineering has and does conduct studies of equipment failure analysis and interchange between Training and Engineering might be helpful in that area.

Q So Engineering has done an analysis of failure modes for components; is that what you are indicating?

A There has been analysis by B&W Engineering

on failures.

Q And are you indicating that there should be an exchange of that information with the people in Training?

A That is what is proposed here.

Q Has any procedure been established for exchanging information that Engineering developes on failure analysis of components?

A I don't know.

Q What was your intention with respect to what Training would do with the information it got on failure analysis?

A It is my understanding that what we were attempting to do is to improve the total response of the company to this work and use the knowledge of the training instructors to help engineering, and likewise Engineering might be able to help us help the people we serve.

Q Is it correct that if the Training Department were informed of failure analyses being done by the B&W Engineering staff, Training might be able to inform operators of possible casualties that could occur in the plants?

A Yes, it is possible.

Q The next item or sub item indicates that you thought procedures should be established to exchange information regarding "evaluations of operating experience items."

Is that something that has been established as part of the "Quick Lock" program?

A Yes.

Q What did you perceive would be the value to Training Services of evaluating operating experience items?

A The value to Training Services is that information gained and analyzed from experiences that actually happened allow us to better serve the people that we provide services to.

Q Would you include in this if an operating experience happened at one plant that was transferable to another plant, you would use that experience in training the operators from a second plant?

A B&W does do some of that.

Q Do you think that that is a valuable training device?

A We think it is of value. Not necessarily all of our customers that we serve think it is

of value.

Q Are there customers who told you they think, in words or substance, that it is a waste of time?

A I don't think they said that it was a waste of time. They said they preferred something else be provided in that time slot and that we not provide that service.

Q Has anyone from Metropolitan Edison ever expressed that view to you?

A I don't know.

Q Not that you can recall?

A Not that I can recall.

Q If one plant had had a failure of a pilot operated relief valve to operate correctly, would using that operating experience to train the operators from other plants be an example of the application of item 1.c.?

A It is possible that such a situation could be included in those.

Q Is it a recent addition to your training programs to include evaluations of operating experiences?

A As a formal part of the program, yes.

Q Is it something that has been instituted since the Three Mile Island accident?

A The formal presentation of operating experience as a part of requalification is an addition to our requalification training program since Three Mile Island.

Q Is there anyone in particular in Training Services who is responsible for incorporating recent operating experiences into the training program?

A In the current operations of the Training Services Department, or section, there is a file on a lesson associated with operating experience and that has been developed and kept up by the instructors who have to give that lesson.

MR. SELTZER: I would like to mark as GPU Exhibit 59 for identification B&W Training Services, description T304, Simulator Requalification Training, dated June 1977.

(Multipage document entitled "Simulator Requalification Training 304," dated June 1977, was marked GPU Exhibit 59 for identification, as of this date.)

Q Is GPU Exhibit 59 a description of the B&W simulator requalification training program offered by Training Services as of June 1977?

A The exhibit, Training Services T304, is a general description of the B&W requalifcation training program.

Q And is that a description that was intended to describe that program as of June 1977?

A It is -- it is -- it was a general description and it appears to be printed in June of 1977.

Q You were the Manager of Training Services in June of 1977; right?

A Yes.

Q To whom was this description made available?

A I don't know.

Q Is this something that would be generally distributed to customers of B&W?

A It was available.

Q To customers?

A Yes.

Q It states in the second paragraph: "The program includes a review of recent abnormal

occurrences applicable to B&W plant operations as well as a review of the utility's abnormal and emergency procedures."

In September of 1977 the failure of the Davis-Besse pilot operated relief valve to close was an abnormal occurrence applicable to B&W plant operation, was it not?

A It is my understanding that that was an abnormal occurrence that occurred at Davis-Besse. That is a B&W type power plant.

Q It also states that the program will include "a review of the utility's abnormal and emergency procedures."

What, if any, work was done as part of simulator requalification training to review a utility's abnormal and emergency procedures?

A The general method of reviewing abnormal and emergency procedures was to -- to the best the training staff was able, to cause the utility staff attending or participating in our requalification training program at the simulator to utilize their procedures and thereby review them.

Q Were the trainers from B&W expected

by you to make any comments if they observed that there was something in the utility's procedures being used at the simulator that was not correct?

A I believe that the instructors are responsible individuals, greatly concerned with the proper operation and successful operation of the customers that they serve, and they would have noted to the students places where procedures were not optimum.

Q Did any of the instructors come to you and say that in the course of working with a team from a particular utility, they had found portions of the abnormal or emergency procedures that didn't seem correct?

A I don't remember.

Q It indicates that there would be 20 hours of exercises on the simulator and 20 hours of classroom instruction as part of the simulator requalification training program.

Is that a correct description of what was the standard requalification training program prior to the Three Mile Island accident?

A Yes, that is a general description of it.

Q Going through the five days of the program, can you indicate which of the items would be covered in classroom and which would be covered on the simulator and which would be covered on both?

A Generally if we observed that it says practical exercise and provides a description, those were the generalized events envisioned at the time this was prepared. And the specifications of what were done are contained in the detailed schedules for the particular course conducted.

Q In other words, where it says "practical exercise," that was the part to be conducted on the simulator?

A Yes.

Q And the other portions were classroom?

A Yes.

Q In each of the first four days there is an item that is listed "Review of procedues" or "Review of technical specifications."

Based on what you have just said, would that be done as part of a classroom exercise?

A It might be.

Q Is that your understanding of what

this description of course material would indicate?

A That -- it says "Review of procedures" on Day 2, "general power operations."

This is a typical suggestion of what might occur. It is no representation that this really occurred.

Q In this representation of a typical schedule, does it represent to you an offer by B&W that procedures would be reviewed in classes as opposed to on the simulator?

MR. WISE: I don't know what you mean by an offer. I think we are belaboring a point. He said it is a typical schedule and he said to you that the parts that come after the phrase "practical exercise" are the parts that went into the simulator training and the other parts of it were classroom. You have got that answer. Now you are pressing him further and I don't see the point of it.

Q If that is generally true, then is it correct that since review of procedures is listed in a place other than after "practical exercise," does that mean to you that procedures

would be reviewed in classrooms?

MR. WISE: Under this typical schedule?

MR. SELTZER: Yes.

MR. WISE: If that has any relevance to the action, you can go ahead and answer it, without any showing that this typical schedule was ever adopted by anybody.

A If we were using this for the course that we were doing, that would be the way we would generally do it.

Q To your knowledge, was it B&W's practice in administering Program T304 to review procedures as part of classroom instruction?

A I don't know.

Q I take it the instructors who were running the courses should know?

A Yes.

Q Returning to GPU Exhibit 57, page 4, item 1.d. at the top, you indicated as part of the "Action Response" that procedures must be established to exchange information between Engineering and Training with respect to development of operating limits or guidelines.

What did you mean by "operating limits or guidelines"?

A The general statement "operating limits or guidelines" was the development of such material as were instructions sent from B&W to the operating utilities, such things as small break guidelines, anticipated transient operating guidelines, such as that.

Q Are those operating limits and guidelines more detailed than the operating instructions that B&W had been sending to utilities before the Three Mile Island accident?

MR. WISE: Well, let's clarify. Does this witness have any idea as to what it was B&W was sending, if anything, to operating utilities before the accident, before we ask him to make a comparison?

MR. SELTZER: Fine.

Q What is the answer to Mr. Wise's sagacious question?

MR. WISE: The question is: What knowledge do you have of what, if anything, B&W was sending to utilities in the way of operating instructions prior to Three

Mile Island? Are you knowledgeable about that?

THE WITNESS: I have not made a detailed study of that. I have seen some of the instructions.

Q Okay. What, to your knowledge, do the small break guidelines add to what B&W had been sending to the utilities previously?

MR. WISE: Now, wait a minute. All he has said is he had seen some of the instructions.

MR. SELTZER: Right.

MR. WISE: I will tell you what we will do. I will object to the form of the question and permit the witness to answer it to the best of his ability.

Q Would you like me to restate the question?

A Yes, please.

Q With Mr. Wise's objection, what do you understand the small break guidelines added to what B&W had previously transmitted to the utilities?

A First of all, I do not at this point, and

I don't think I did at the time I was involved in those, know what B&W had sent to the utilities relative to the handling of loss-of-coolant accidents which the small break guidelines addressed.

The operating guidelines, as they were ultimately developed, do add instructions to be incorporated in the utilities -- correction, recommended instructions to be included in the utility's loss-of-coolant accident procedures that govern the control of the high pressure injection system and provide limits on when it might be terminated and under what set of circumstances.

MR. SELTZER: Why don't we take a short recess. We have been going for awhile.

(Whereupon a recess was taken.)

BY MR. SELTZER:

Q Item 3.b. on page 4 of GPU 57. The item description is "Feedback of operating experience or lessons learned to operators in the classroom or simulator is inadequate."

The "Action Response" as transmitted

by Mr. Elliott states: "Selecter SPR's from B&W plants and event evaluations from other plants should be forwarded to training by the Manager, Plant Performance Services."

Are SPR's something that were created prior to the TMI accident?

A Yes.

Q Prior to the TMI accident, was there any formal procedure for transmitting SPR's to the Training Section?

A I don't think so.

Q Since the TMI accident, has a formal procedure been established for forwarding SPR's to the Training Section?

A All SPR's are not transmitted to the Training Section. If one is of interest, we receive that particular item.

Q Who makes the decision which ones to forward to Training?

A SPR's are generally handled by Plant Performance.

Q Is there a particular individual that you know of that screens SPR's to determine which ones should be forwarded to Training?

A Mr. Hallman, who is the -- in charge of this group, tries to look out for our gaining information to the extent that he can. I don't know exactly how this system operates at the moment.

Q Is the system for getting selected SPR's into Training a system that has been established since the Three Mile Island accident?

A I don't know.

Q Who in Training receives the selected SPR's?

A I don't know.

Q Do you know if anybody in Training receives the selected SPR's?

A No.

Q Sub item 2 in that same "Action Response" states: "Routing of operating experience items is made to all instructors. The lead instructor is designated to determine what items will be included in operator training."

To your knowledge, does the lead instructor keep a log of the operating experience items which he determines should be included in operator training?

A I don't know if there is a log.

Q Is there any other compendium of the operating experience items that are designated to be included in operator training?

A There are those included in the lesson that we call operating experience, and it is developed from such information as we find available.

Q Is there a course syllabus for operating experience training?

A No, I don't think there is a syllabus. There is an outline for that particular lesson. That is a specific lesson that -- in the whole course.

Q So if we got the course syllabus, we would find a lesson included in there on operating experience?

A I think so.

Q What course would that be?

A Generally the requalification course; those might be included in something like a cold license training program.

Q When courses are revised, where, if anywhere, do you keep the outdated course

syllabus or a portion of the course syllabus?

A I don't know that there have been any outdated ones at the moment.

Q Are you familiar with the recent St. Lucie incident?

A Somewhat.

Q Has the St. Lucie incident been included as an operating experience that is part of the lesson on operating experiences?

A Yes.

Q Why is the St. Lucie incident one that is included in training today?

A The St. Lucie incident is a situation that is possible for almost any pressurized water reactor to experience and it is worthwhile communicating that experience to people who operate pressurized water reactors.

Q What, particularly, happened at St. Lucie that is instructive to other operators of pressurized water reactors?

A The significance of the St. Lucie event, as I interpret it, is that they were conducting a natural circulation cooldown of the system, the cooldown rate was very high, and they experienced

what appears to be boiling in a localized region of the reactor head, and this caused some, at the time, unexplained behavior of the pressurizer level that the operators at the time were concerned with.

Q At St. Lucie, is it correct that there was saturation in one portion of the reactor vessel head?

A That is the postulated cause.

Q What was the reaction that that produced in the pressurizer, to the best of your understanding?

A To the best of my understanding, the resulting boiling in the selected region of the head of that reactor caused an expansion in the volume of the reactor coolant system and caused a -- at the time, an unexplained rise in the pressurizer level.

Q Did you receive a report on the St. Lucie event?

A B&W has received the Nuclear Regulatory Commission report on that event, and I believe we have received the INPO investigation of that incident.

Q How long ago did the St. Lucie event occur?

A I don't remember.

Q Was it within the last few months?

A I think it has been longer ago than that.

Q Do you have any understanding as to how large a rise in pressurizer water level occurred during that transient?

A I do not.

Q Is it correct that it took more than an hour for the operators of the St. Lucie plant to interpret those rises in pressurizer water level?

A I don't know.

Q Have you asked anybody to find out?

A No.

Q Has B&W issued any guidelines or site instructions as a result of the St. Lucie event?

A I don't remember seeing any.

Q Who gave the instruction at B&W to include the St. Lucie event in training?

A I would believe that that is a consensus inclusion of that event. It was known by my

immediate superior who had suggested that we include it. I have discussed it with Mr. Odell, probably discussed it with Mr. White, who was the first one that conducted our instruction on operating experience.

Q In the Training Section have you at any time, before or after the Three Mile Island event, instituted any programs to identify likely areas of operator error?

A No, I don't -- we have not established any such study.

Q Do you in any of the simulated transients simulate casualties that are caused or aggravated by operator error?

A Well, as a general statement, certain of the casualties that occur or are used in the simulator training portion might be created by a non-control room operator that just appears as a symptom to the control operators. How that symptom occurred, the instructor might inform them that the technician was working on this particular function and caused things to go awry. That may be the explanation for it, on it, after the control room personnel have combatted the

situation when the instructor has asked to find out what happened, go out and investigate.

Q Has anybody ever voiced to you the criticism of simulator training that it does not give the operators a sense of crisis?

A I believe those words or something generally like that is contained in some of the Kemeny and subsequent NRC or somebody's investigation; I don't know where.

Q Has that ever been anything that you have given consideration to?

A Yes, it has been considered, and the criticism is -- well, yes, it has been considered.

Q Do you think that there is -- when you considered it, did you think that there was validity to the criticism?

A I do not personally feel there is much foundation to the criticism.

Q Do you think that human beings tend to perform at the simulator console the way they would under actual operating conditions?

A That is my opinion.

Q Has B&W ever done any psychological testing to determine whether that is in fact true?

A Not to my knowledge.

Q Have you ever seen any psychological studies to test that?

A I don't remember.

Q Other than having data printouts on tapes and show up on CRT screens, do you do anything else to simulate real life circumstances when a transient occurs?

MR. WISE: Waht is that question? Will you read the question back, please.

(The reporter read the question.)

MR. WISE: You are excluding from your question all the dials and controls, lights, buzzers?

MR. SELTZER: Fine.

MR. WISE: And whatever there is in the simulator room which is designed to simulate the reactor control room?

MR. SELTZER: Why don't you raise your hand and we will swear you in. That is a good answer. If Mr. Elliott wants to adopt it, Bob, that is fine with me.

MR. WISE: I just don't understand your question. Certainly by this point,

Mr. Seltzer, you have some knowledge of what the simulator is and what it looks like. If you are asking that question without having any more knowledge than that, then the only thing I can see is that you are trying to perhaps trick Mr. Elliott by hoping he will be confused by the methodology of your question. Otherwise, I don't understand your question.

MR. SELTZER: I am just trying to get into the record what occurs in the simulator control room that would make the operators there feel that they are in the same environment that they would be in if they were at an operating plant's control room and a serious casualty occurred.

MR. WISE: I have no objection to that question.

A The simulator has alarms, it has an alarm bell, it has lights, it has meters, dials, and so on, that generally conform to the control room of the Rancho Seco nuclear station. Those respond in generally the same way that Rancho Seco would have responded to those casualties.

It is obvious that the room is a simulator; the students know that. They are attempting to -- or they are there for training, and such training is as agreed to with the utility, and they are to respond to the conditions that they are confronted with.

Q Are they allowed during the transient to ask the instructor for advice?

A They might ask for information from the instructor. It depends on the course and the sophistication of the students that we are dealing with, whether or not those kind of things would be received favorably or not favorably.

Q Have you ever brought in anybody from outside B&W to evaluate the effectiveness of B&W's training programs?

A B&W has not employed outside consultants to perform this evaluation.

The owning utilities for which we are providing a service have on occasion had outside people -- outside being nonemployees -- involved.

Q Do you mean utilities have brought in people who were not employed by the utility to

review the quality of the B&W training program?

A I don't know if they observed quality. They were there as observers and reported to the utility that had hired them.

Q Have you ever received any written reports from such outside consultants?

A I don't remember.

Q Have such outside consultants viewed the B&W training program prior to the Three Mile Island accident?

A I don't know.

Q Have they reviewed the B&W training program since the accident?

A Yes, we have had visitors since the accident.

Q Have you made it a practice to speak with those visitors to find out what their observations have been?

A Generally somebody from my staff talks to visitors.

Q Do you, generally?

A I may have on some occasions.

Q You don't make it a general practice to; is that right?

A I cannot guarantee that I have talked to all of them all the time. I have talked to some of them some of the time.

Q Do you remember the names of any of the utilities that sent outside experts?

A The only people that I remember coming in recent times have been people that General -- GPU Nuclear has employed.

MR. SELTZER: I would like to mark for identification as GPU Exhibit 60 a memorandum from Mr. Elliott to Mr. Lind, et al., dated November 30, 1979, subject: Training Programs/Operation Modification.

(Memorandum to J. A. Lind, and others, from N. S. Elliott, dated November 30, 1979, with attachment, was marked GPU Exhibit 60 for identification, as of this date.)

MR. SELTZER: Off the record.

(Discussion off the record.)

Q Is GPU Exhibit 60 a copy of a memorandum which you sent to others in the Training Section on or about November 30, 1979?

A It appears to be.

Q You stated at the beginning of the memo: "Attached is the proposed organization and functions of the Institute of Nuclear Power Operations. Please read and relate to the President's Commission Report on Training."

Is the President's Commission Report on Training the staff report by somebody on the President's Commission that dealt specifically with training?

A Yes, that is a portion that is referred to.

Q Ron Eytchison?

A Yes.

Q What did you mean when you were telling your training staff that you wanted them to relate this to the President's Commission Report on Training?

A For them to compare.

Q You then said: "The following are some of the things we may need to do, specifics of what and how we will develop in early January:"

Is it correct that you were saying that the five things listed below are things that you may need to do in response to what INPO

has said and what the President's Commission on Training had said?

A That is the general thought.

Q The first item, "Syllabus for each major lessons/course," is something that you have previously described today; is that right?

A Yes.

Q The second item is "Instructor training-performance improvement. This will be primarily related to our guest lectures from Engineering and used to help ourselves. This will lead to qualified instructors."

Who were the guest lecturers from Engineering going to be delivering their lectures to?

A Students from utilities we were providing services to.

Q How would that lead to qualified instructors?

A The qualified or certified instructors area is one that INPO will get into eventually and we felt that someplace we needed to work on the instructional techniques utilized by the instructors.

Q How would using guest lecturers from Engine ring lead to qualified instructors? That is what I don't understand.

A Probably somewhat cryptic writing here. Instructor training is necessary in dealing with the guest lectures; instructor training is also applicable to help Training Services instructors perform better.

Q Was it your intention that the Training Services instructors would add to their qualifications by working with and observing the guest lecturers from Engineering?

A No.

Q How would the Training Services instructors be upgraded?

A Through a specific training instructor program, or instructor training program that we are working on at this time.

Q Has that been implemented yet?

A We are working on its implementation.

Q Who is in charge of that?

A Mr. Odell.

Q Have the outlines of that program been developed?

A We are working on those outlines.

Q What is your present intention on how that program will be developed?

A Our present intention is to develop an instructor training program utilizing the local community college to provide outside assistance to our permanent training staff.

Q What will the permanent training staff learn at the local community college as part of this program?

MR. WISE: We are getting pretty far afield. I don't know what they are going to learn there. I don't know that it has been decided that they are going to go or how hard they will study when they get there.

MR. SELTZER: Whether they will take exams and be forced to --

MR. WISE: Is this leading someplace, Mr. Seltzer, or are we just pursuing it for the sake of pursuing it?

MR. SELTZER: We are pursuing it for the sake of finding out how B&W presently intends to increase the

qualifications of its instructors in training. I am not going to push it much further.

Q Can you tell me what you are presently intending that your permanent instructors in Training Services will be studying at the local community college to improve their ability to instruct or train?

A I am not familiar with exactly what Mr. Odell has set out for this program to accomplish. He is modeling the program somewhat after the instructor training programs as developed and utilized in the Military.

Q I think you told me that his background is working in the nuclear training program for the Navy; is that right?

A That was a part of his background.

Q Do you know when this program will get under way?

A No, I do not.

Q Item 3 says that "Program/class/simulator audits by others outside Training." You say, "Bill Odell has started -- we need to expand and give direct feedback."

Who outside of Training has been doing any auditing of the training programs?

A Mr. Kosiba visits for short periods of time, and in general we have had no audits outside. It is very disruptive and probably not a very practical situation for us, other than to invite and encourage the utility management to be involved in the training of their people so that their wishes relative to their qualifications and training would be carried out.

Q Your fourth item to be developed is a question. It says" "What should B&W teach to keep plants on the line and handle accidents when they occur?"

Is that something that has been addressed and developed since you wrote GPU Exhibit 60?

A This particular item was to encourage Mr. Lind, Mr. Book, Mr. Odell and Mr. Rosser to think about this item. We have done some things, this is a predecessor of the training improvement plan, and we will find that over there we -- we are now discussing operating experience to a greater extent than prior, and that is -- that

is essentially the result of thinking and working about this item.

Q In the last paragraph, the second sentence, you refer to the expansion of SEL capability.

A Yes.

Q What is SEL capability?

A SEL is the Systems Engineering Laboratory, an auxilliary computer that is connected in the training simulator system, is one of these machines, and it serves certain utility functions to help the instructors and, in some cases, the students to understand what is going on.

MR. SELTZER: Off the record.

(Discussion off the record.)

Q Let me show you first, before I mark it, a memo you wrote to Mr. Olds, dated October 14, 1977, subject: Trip Report - Visit to Toledo Edison Company.

I would like to ask you to look at that and tell me if that is the trip report which you said you believed you would have prepared regarding your trip to Toledo Edison shortly after they had had the September 24,

1977 pilot operated relief valve transient.

(Document handed to witness.)

A Yes, I believe this is.

MR. SELTZER: Okay. I would like to mark this as GPU Exhibit 61 for identification.

MR. WISE: And I will state at this time that upon reviewing it while we were off the record, B&W is prepared to withdraw the "Confidential Counsel Only" stamp that was placed on the document during production.

(Memorandum dated October 14, 1977, to G. M. Olds from N. S. Elliott, was marked GPU Exhibit 61 for identification, as of this date.)

Q Am I correct that there is no reference in GPU Exhibit 61 to any of the conversations that you have testified you had with B&W's site representative, Mr. Faist?

A That's correct.

Q There is also no reference in here to the malfunction of the pilot operated relief valve in the Davis-Besse plant; is that right?

A Yes.

MR. SELTZER: Off the record.

(Discussion off the record.)

MR. SELTZER: So, let's resume at 9:30 tomorrow morning.

MR. WISE: All right.

(Time noted: 4:47 p.m.)

_____

Norman S. Elliott

Subscribed and sworn to before me

this day of 1981.

CERTIFICATE

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

I, CHARLES SHAPIRO, a Notary Public of the State of New York, do hereby certify that the continued deposition of NORMAN S. ELLIOTT was taken before me on February 11, 1981 consisting of pages 315 through 471;

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 2ND day of MARCH, 1981

Charles Shapiro

Charles Shapiro, CSR

I N D E X

E X H I B I T S

INDEX TO EXHIBITS (continued)

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