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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	:	
SACRAMENTO MUNICIPAL UTILITY DISTRICT	:	Docket No.
(RANCHO SECO)	:	50-312

Conference Room W-1140
United States Federal Building
2800 Cottage Way
Sacramento, California

Wednesday, May 7, 1980

The above-entitled matter came on for hearing, pursuant to recess, at 9:00 a.m.

BEFORE:

ELIZABETH S. BOWERS, CHAIRMAN
DR. RICHARD F. COLE, MEMBER
MR. FREDERICK J. SHON, MEMBER

APPEARANCES:

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INDEX

WITNESS	DIRECT	CROSS	REDIRECT	RECROSS	BOARD DIRECT	BOARD CROSS
Ronald J. Rodriguez	---	2995	---	---	---	---

EXHIBIT	DESCRIPTION	IDEN	REC'D	WITHDRAWN
CEC-34	Diagram	3004		3005
CEC-35	SMUD Administrative Procedures	3082	3106	
CEC-36	Deposition of Dennis E. Tipton plus attachments.	3107	3107	
CEC-37	Deposition of Daniel E. Comstock and attachments	3107	3107	
CEC-38	Deposition of Wayne S. Morrisawa and attachments	3108	3103	
CEC-39	NRC Investigation Report	3124		
CEC-40	Abnormal Occurrence Report	3140		

PROCEEDINGS

(9:00 A.M.)

CHAIRMAN BOWERS: We have a preliminary matter. Yesterday morning, while the public address system person was setting up his equipment, we had a discussion about where we might possibly hold the next segment of the hearing, the June segment, and I described the difficulty in finding space, because neither Federal or state space is available, and the people that handle this for us have checked a number of motels and could not find anything available.

Mr. Baxter informed us that there is an available room at the District Headquarters that is available that we can use. And so, off the record we went around the room and got the response of the other parties, and so, we would like to do it now on the record. There is no problem, is there, Mr. Baxter? Nothing changed overnight as far as the availability of the room?

MR. BAXTER: No, that is right. The room would be available during the week we discussed.

CHAIRMAN BOWERS: Mr. Ellison, yesterday, when we got your response, it was not on the record.

MR. ELLISON: We have no objection to meeting in the SMUD hearing room.

CHAIRMAN BOWERS: And the staff?

MR. LEWIS: We have no objection, if that is the

only suitable space available.

CHAIRMAN BOWERS: As far as we know, because there was a heavy search made.

MR. BAXTER: At some point, Mrs. Bowers, before we recess this month, if it becomes apparent that we are going to have a June session, I would suggest that you or the entire panel visit the facility and let us know how you would like the arrangements made. Some of the tables are permanent, but we can add other tables for the Reporter and things of that nature. It would be helpful to know a little bit ahead of time.

CHAIRMAN BOWERS: We will plan to do that, but tomororw morning I will call my office and inform the person responsible for space that he can now quit worrying about it, that we will go ahead, if it is necessary.

Mr. Parker, our Reporter, tells us that the outfit reproducing yesterday's transcript had problems because of the weight of the paper. Their automatic machinery was not quite geared to it, and they are adjusting to that problem, and so the transcript will be here this morning, but a little bit late.

Now, yesterday before we adjourned Mr. Rodriguez was telling us about Figure 7-9, and we were reading the second paragraph on Page 7-6 of CEC's Exhibit 33, and when we first started out on this line of inquiry, I thought I

was very clear in understanding what the criticism was, and then when there were explanations and further discussions, in my mind it got a little bit confused. I thought the problem was that these little gadgets that you took ahold of and turned were pointed on each end, and that that was the criticism. That is not it.

Of course, it shows an arrow on them.

At any rate, can we go back to that?

MR. BAXTER: Mrs. Bowers, if I may, I have just two brief preliminary matters before we start. I would like to first observe the anniversary of the Commission order that is under review in this proceeding, which is today.

(General laughter.)

MR. BAXTER: Secondly, I would like to introduce, sitting to my right, Ms. Nancy Knowles, who is a legal assistant with my firm and will be assisting me at counsel table in Mr. Diaz' absence over the next two days.

CHAIRMAN BOWERS: Fine.

Mr. Ellison?

MR. ELLISON: Mrs. Bowers, I had concluded my questioning on that problem, but if you have any questions about it or would like to return to it --

CHAIRMAN BOWERS: What I did not understand, and I did discuss this with Mr. Shon off the record, this business when you turn the knob or the thing, something about you

can't go wrong. You are turning the other numbers. I do not understand that.

MR. ELLISON: Mrs. Bowers, if I may, I can briefly summarize what I understand to be the problem here, and if Mr. Rodriguez or anybody has a disagreement with that understanding, they can express it.

MR. BAXTER: Why don't we allow the witness to attempt to explain how the knob works? That may have more evidentiary weight in answer to Mrs. Bowers' question.

MR. SHON: Is it not true that the gadget is simply a large version of the usual type of TV channel selector in its design? The television channel selector knob usually looks like and works like this, does it not?

THE WITNESS: That is correct.

CHAIRMAN BOWERS: So the backing behind this knob does turn?

MR. SHON: Exactly.

THE WITNESS: That is correct.

CHAIRMAN BOWERS: Oh, okay.

Whereupon,

RONALD J. RODRIGUEZ,

the witness on the stand at the time of recess, having been previously sworn, resumed the stand, was examined, and testified further as follows:

CONTINUED CROSS EXAMINATION

BY MR. ELLISON:

Q Mr. Rodriguez, do you have CEC 33, the EPRI report?

A Yes, I do.

Q Moving on, I would like you to refer to Page 7-8, and also to Figure 7-15, which appears on Page 7-9.

A Pardon me?

Q And also Figure 7-16, which appears at Page 7-9. In the second full paragraph under clarity of control operation on Page 7-8, the author of this EPRI study states that Figure 7-16 shows the use of indicator lights and switch lights on the safeguards panel. There is no differentiation in appearance between those simple indicators and the indicators that can be depressed for switching purposes.

This problem is pointed out in Section 13, which deals with coding techniques. To add to the confusion, some switch lights are pressed once when the switching takes place. Others require the operator to hold the switch for several seconds before the system responds. Again, the panel does not alert the operator to this special requirement.

It goes on to describe some of the problems operators may have with that.

Referring to Figure 7-16, do these type of --

A Excuse me. I am finishing reading that paragraph so I can handle that.

Q Fine.

While Mr. Rodriguez is reviewing the document, I would like just for the record to identify the person sitting to my right. It is Mr. Dale Bridenbaugh, who will be a witness in this proceeding.

CHAIRMAN BOWERS: One other preliminary matter. We received this morning copies of the staff index to the transcript, and I understand all parties have received copies of this. We want to thank Mr. Black. It looks like an excellent job, and will be a very helpful tool.

MR. ELLISON: We would also like to thank Mr. Black particularly for furnishing that index.

CHAIRMAN BOWERS: We hope you will continue.

(General laughter.)

MR. BLACK: I would like to say, though, that even though I have been doing this, I have paraphrased and taken great liberties at times to paraphrase what witnesses' statements are, so this should be used only to get a transcript page number to go back and find out exactly what the witness did say, but as we all know, we have been having problems with the transcripts, and so the paraphrasing of the witnesses was done -- it was done with quite a great deal of liberty, so really, just go back and go to the initial source rather than refer to the index.

CHAIRMAN BOWERS: You mean, the entire thing is

self-serving statements?

(General laughter.)

MR. BLACK: Yes, maybe.

BY MR. ELLISON: (Resuming)

Q Have you had a chance to finish reading the paragraph?

A Yes, I have.

Q Referring to Figure 7-16, do you recognize the switches and indicators as being either from the Rancho Seco control room or substantially the same as those in the Rancho Seco control room?

A The labeling of the actual pushbutton switches with regard to auto, manual, open, closed, is essentially the same as Rancho Seco. I cannot read the label between the switches, and therefore I cannot say for sure that those are from Rancho Seco.

Q Would the Rancho Seco control room switches such as these have labels between the switches, like these appear to?

A The label indicating the switch's function is located between the two separate switches.

Q Is it true for Rancho Seco that some of these indicators are simply indicators and some of them are switches?

A They are all switches.

Q Is it true for Rancho Seco that some of these switches also serve as indicators?

A That is true.

Q Is it true for Rancho Seco that some of the switches actuate immediately upon being pressed and some of them need to be pressed for a period of time?

A They all actuate immediately upon being pressed. Some of these switches operate valves which are modulating valves. Some of the switches operate valves which are open and shut valves.

Q In the case of the modulating valves, would I -- Could you describe how the operator depresses the switch to modulate the valve?

A He pushes it with his finger.

Q In order to -- Is there any correlation between the amount of time that the operator is in contact with the switch and the position of the valve?

A Yes, there is.

Q Would it be true that the longer he presses the switch, the longer the change in the position of the valve or the greater the change?

A For modulating valves, that is true.

Q Are the modulating valve switches labeled in such a way that they are clearly distinguished from those switches that are simply pressed in order to open and close

a valve?

A Yes, they are.

Q Could you describe that labeling?

A Small letter "m" on the switch.

Q Where would that appear? Could you refer to 7-16 and describe where that would appear?

A It would appear on either the open or closed lamp.

Q On either but not both?

A That is true, on either but not both.

Q Is there a uniform pattern to where the "m" is placed, or is it random?

A The letter "m" is normally placed on the upper lens of the two lower switches. I cannot say for certain that we do not have one or more that may have the "m" on the lower lens, but it is normally on the upper lens.

Q And the upper lens could be either the open or the closed lens?

A That is correct.

Q Could you describe some of the more significant modulating valves that are actuated in this way?

A The high pressure injection valves are, when under operator control, are modulating valves.

Q Are any of the feedwater or auxiliary feedwater valves modulated in this way?

A The safety features initiated, auxiliary feedwater bypass valves when in the manual mode are modulating valves.

(Pause.)

Q Mr. Rodriguez, Mr. Lanpher is going to distribute a diagram of the Rancho Seco control room that we can refer to in order to --

MR. SHON: Mr. Ellison, before we leave this particular point, these modulating valves and the arrangement that is here -- criticized in this report, I would like to ask Mr. Rodriguez a question. I notice that the paragraph in the report also implies that in some cases perhaps in the case of modulating valves the operator has to make an adjustment on the back board and then run around to the front console to see what he has done. Is this true?

You notice it says the operator presses the switch light and then runs around to tend to matters on the primary control panel. Is he in the position of having to be in two places at once this way?

THE WITNESS: I read that, and running through my mind to try to determine the specific type of evolution -- in the case when he for whatever reason might be manually controlling auxiliary feedwater at the 24-inch level on the start-up range, the once-through steam generator, that start-up range indication is not on the back panel. In modulating

the valves -- This was, of course, prior to our having feedwater flow indication. If he was the only operator in the control room by himself, after adjusting the valve, he would have to come back around and look at the start-up level to see where it was going.

MR. SHON: Thank you. That is all. Please proceed.

BY MR. ELLISON: (Resuming)

Q Just to follow up on the last comment, Mr. Rodriguez, you implied the situation is now different because of the installation of the feedwater flow indication. Is it your opinion that the operator would now not run around to that panel to examine the feedwater level but would simply modulate the valve and examine feedwater flow?

A No, that is not my opinion. He would still come back and look at the level. Again, I preface this answer by saying, if he was the only person in the control room. Since that time we have had a requirement that there be two people in the control room continuously, and typically when the kind of situation occurs wherein you are required to use auxiliary feedwater, there is at least one other person in the control room.

Q So would it be your opinion that it would be more typical to have one operator at the back panel modulating

tp P3

the valve while the other is examining the feedwater level?

A That is correct.

Q And they would be in communication?

A That is true.

Q If that were taking place, would that -- and assuming there were the minimum number of operators allowed in the control room, would that allow any operations to be taking place at the same time?

A Yes, it sure would.

Q What kinds of operations are you contemplating?

A It would allow also controls -- well, I think we need to set up the kind of scenario that got you into this position. Normally he would not have to use auxiliary feedwater flow control valves. Normally the steam generator level would be controlled from the normal Bailey controls.

If he had lost those valves, then he would have to proceed back to the back panel to modulate the auxiliary feedwater valves.

Q Okay.

A He would also while being at that panel be available for any other valving that the operator at the console may want done.

Q The other operations you are envisioning would be, one operator would be doing two things simultaneously. Is that correct? That is what you are contemplating?

A I have no operators that can do things simultaneously. They each take a separate action. He can control auxiliary feedwater valves. He can go over and modulate, for example, if it was required, high pressure injection valves. He could come back and change the position on the auxiliary feedwater valves. He is not going to operate the two valves simultaneously.

MR. ELLISON: We would like the diagram we have just passed out identified as CEC 34.

(The document referred to was marked for identification as CEC Exhibit Number 34.)

MR. ELLISON: For the record, this diagram was distributed in the operator depositions, and was attached as an exhibit, and will also appear when the depositions are identified.

The numbers that are handwritten on the diagram were added by the California Energy Commission.

MR. BAXTER: I would simply like to inquire whether we are going to use any of the parts of the exhibit that are outside of the immediate console area. My copy is virtually illegible. I would ask whether it would be possible to get a better reproduction if the Energy Commission has it.

MR. ELLISON: Yes, it would be. One of the

problems we have had is, this copy has gone under several evolutions. This is a copy prepared by the reporting service for inclusion in the depositions, which was made from a copy of something that we got in the discovery process. If it would be more convenient that Page 4-5 of CEC 33, I think there also appears a clearer diagram without the numbers of the Rancho Seco control room.

I think for the purposes of this examination it would be clearer to use the copy at Page 4-5 of CEC 33.

CHAIRMAN BOWERS: Well, Mr. Ellison, does that mean you are not going to use CEC 34 at all?

MR. SHON: Do you need the numbers to make your point in some fashion?

MR. ELLISON: If they were legible, it would be convenient, but we simply can do it by reference to the position. That was simply a way of identifying positions in the control room.

CHAIRMAN BOWERS: My thought is that maybe 34 should be withdrawn, because once a document like this gets into the file, then people are unhappy about not being able to read it, not realizing that we actually were substituting something else.

MR. ELLISON: Fine. We will withdraw CEC 34.

(The document referred to, previously marked for

identification as CEC Exhibit Number 34, was withdrawn.)

MR. ELLISON: Mrs. Bowers, perhaps the best procedure for us would be to refer to this page of CEC 33. We will have this Xeroxed and distributed later as CEC 34.

CHAIRMAN BOWERS: Figure 4-5 on Page 4-5? Is that correct?

MR. ELLISON: That is correct.

BY MR. ELLISON: (Resuming)

Q Mr. Rodriguez, if I recall correctly, you identified one of the valves associated with the high pressure injection system, and the valves we have been discussing associated with the auxiliary feedwater system as being modulated valves actuated by the type of switches we are discussing.

First of all, could you refer to Figure 4-5 and describe where the switch for those two valves would appear?

A On Figure 4-5, it would be on the panel identified as safety.

Q And the level indication that you are referring to for the auxiliary feedwater system would be where?

A On the panel labeled reactor.

Q What indication would the operators be relying upon

to determine the proper flow from the high pressure injection system when they are operating the modulated valve?

A The panel labeled safety.

Q So the panel -- Would I be correct in assuming that the panel labeled safety has both the switch and the level or flow indication in this case?

A That is correct, for high pressure injection flow.

Q So with respect to this system, a single operator at that panel could modulate the valve while simultaneously examining the flow rate to the system?

A That is correct.

Q Could you identify where the -- On CEC 4-5, where the new auxiliary feedwater flow indicator is indicated?

A I do not know what CEC 4-5 is.

Q I am sorry. Figure 4-5.

A Would you ask your question again, please?

Q Certainly. Could you indicate with reference to Figure 4-5 where the auxiliary feedwater flow indication that was recently installed is?

A They are located on the panel labeled primary.

Q Are you aware of any other modulated or non-modulated valves that have switches such as we are discussing here that are located in such a way that the operator actuating the switch cannot read the relevant

indication of a flow or level or whatever we are discussing.

A The way you couched that term, I guess I disagree with your supposition. He can read flow when he is modulating auxiliary feedwater valves. He can read that flow on the primary panel.

Q I understand that. You did, as I recall, refer to the situation where two operators would be required or one operator would be required to go from the back panel to the front panel in order to examine feedwater level when operating the modulated AFW valves. My question is, are you aware of other separation that switches from flow or level indication of that sort in the Rancho Seco control room?

A When I answered that question, I was answering in reference to the statement that the author of this document made. At that time, feedwater flow for auxiliary feedwater was not available to the operator from the area in which he operated switches. Now that is available. He can determine that he is feeding a steam generator without coming back to the panel labeled reactor, and looking at the steam generator level.

Q I also recall that you testified, however, that it would be typical for the operator to return from the console to examine feedwater level even after the installation of the feedwater flow. Is that correct?

A That is correct.

Q Okay. Are you aware of other separations of switches and relevant indication of that sort in the Rancho Seco control room?

(Pause.)

A With regard to the safety features panel, I cannot think of another situation right now.

Q Can you think of another situation with respect to any other panel?

A Not right now, I can't, no.

end P1,2,3
Bob
foll.

flws jl
p-4
em-1

Q Referring again to figure 4-5, could you point out where the operator would change the position of the power operated block valve, as well as the power operated relief valve?

A He would change the position of the electromatic operated relief valve from the panel labelled "coolant." He can change the position of the block valve from the panel labelled "coolant."

Q Are the position indicators for those valves in the same place?

A The position indicator for the block valve is in that place. The position indicator for the EMOV itself has not yet been installed.

Q Where would the operator go to examine an indication of the temperature in the EMOV vent line, or the pressure and temperature inthe pressure relief tank?

A The pressure indication for the pressurizer relief tank is available on the panel labelled "primary." The temperature indication from the telltale, from the EMOV is available off of the panel labelled "computer."

There is no temperature indication for the temperature within the pressurizer relief tank.

Q How would the rupture of the pressurizer relief tank rupture disc be indicated to the operators?

A Prior to the rupture disc rupturing, the operator

bfm2

would have received a high pressure alarm on the pressurizer relief tank. He would probably also have received a high level alarm on the pressurizer relief tank.

When the rupture disc ruptures, that high pressure alarm would clear and indicate that it is cleared. Simultaneously, the pressuirzer relief tank pressure instrument would show a rapid drop in pressure.

This should be accompanied shortly thereafter with an indication of increasing frequency of dumping from the reactor coolant system from the reactor containment building.

Q Did you mean to say from the reactor containment building or to the reactor containment building?

A From. As the water collects and condenses in the sump in the building, it will fill the reactor containment building drain accumulator tank more rapidly.

That tank indicates when its level reaches 100 gallons. It alarms.

Q It would go from the containment building to where?

A To that drain accumulator tank located in the auxiliary building.

Q Located where?

A In the auxiliary building.

Q Could you describe where the indications that you just mentioned are located with reference to figure 4-5?

bfm3

A I could mention a lot of them. The pressurizer relief tank high pressure alarm is located on the panel labelled "primary." The pressurizer relief tank pressure indication is on the panel labelled "primary."

The pressurizer level indication is on the panel labelled "primary." The annunciator for the pressurizer relief tank high or low level is located on the panel labelled "primary."

Q You mentioned that the operator would, among other ways, become aware of the rupture of the pressurizer relief tank disc by the clearing of the high pressure indication for that tank.

When that high pressure -- first of all, the high pressure indication is anannunciator, is that right?

A There is a high pressure alarm that annunciates, yes.

Q The alarm is both a sound as well as a visual?

A It is a flashing light and a bell.

Q Okay. The operator would acknowledge that by doing what?

A Pushing the acknowledge button.

Q Would that clear the alarm?

A No, that would change the alarm from flashing to solid white.

Q When the alarm clears, what happens?

bfm4

A It would reflash and ring a bell.

Q The operator would again acknowledge it?

A Yes.

Q How would the operators determine the proper high pressure injection flow rate?

(Pause.)

A He would determine the high pressure flow rate by monitoring the indication of the high pressure flow monitors -- flow instruments.

Q Which are located where?

A On the panel labelled "safety."

Q That indication would tell the operator what the actual flow rate is, is that correct?

A That is correct.

Q How would the operator determine whether that was the proper flow rate for a given situation?

A Could you give me the situation?

Q Does the way that the operator determines the proper flow rate determine the situation that he is in?

A No.

Q In that case, without reference to a particular situation, can you tell me how he would determine what the proper flow rate is?

A By monitoring the high pressure injection flow instrumentation.

bfm5

Q My question is not how he determines what the actual rate is, but how he knows that that actual rate is the proper rate?

A The only specific rate that is given to the operator is that condition in which he finds himself in a subcooled condition of less than 50 degrees.

He is directed then to operate high pressure injection on maximum flow not to exceed 500 gallons per minute per pump. He can determine that by looking at his high pressure injection flow instrumentation, and balancing those flows so that two pumps operating, they do not exceed 1000 gallons per minute, or with one pump operating it does not exceed 500 gallons per minute.

Q Is the reason for that procedure, to prevent pump run-out?

A The reason for that procedure is to ensure that you can maintain 50 degrees subcooling and not overload the electric drive on the pump.

Q Is overloading the electric drive on the pump related to pump run-out?

A The limiting condition for the run-out of the high pressure injection pumps at Rancho Seco is the overload on the electric drive.

Q Okay. Perhaps I am a little confused. Overloading the electric drive of the high pressure injection pump would

bfm6

occur in a situation at the opposite end of the spectrum, if you follow me, from running out the pump where --

A There are generally two conditions that will limit the pump in its capacity to pump water.

One is maintaining the net positive suction head, and the other is not overloading whatever drives the pump, which either of those two conditions you arrive at first limits the pump and is normally defined as the pump run-out limit.

In our particular case, the 500 gallons per minute outlet from the pump will overload the electric drive, even though it still has sufficient net positive suction head to prevent flashing in the impellers of the pump.

(Pause.)

Q Mr. Rodriguez, could you refer to page 8-2 of CEC-33, also at page 8-5, figures 8-9 and on the opposite page, page 8-6 -- pardon me.

Yes, on the opposite page 8-6, figure 8-10.

(Pause.)

Does figure 8-9 depict either the Rancho Seco control room or one substantially the same as the Rancho Seco control room?

A Yes, it does.

Q Is that also true for figure 8-10?

A No, it is not.

Q Do you have an instrumentation or switch such as depicted in figure 8-10 in the Rancho Seco control room?

(Pause.)

A I cannot picture that type of switch in my mind. The reason I say that is not Rancho Seco, is the label next to is says "feed-pump 1-C." We don't have a feed-pump called 1-C.

Q At page 8-2, the author of this document describes generally the problem of accidental actuation in switches and controls from inadvertent contact. Figure 8-9 shows a picture of an operator sitting on a, or leaning on a console, demonstrating how that inadvertent contact might arise.

A I think what that picture is depicting is the fact that the switches are mounted flush with the control console. Even though he is sitting on them, he has not actuated them.

The author's comment is it is inadvertent actuation, but the small switches are not going to be actuated by somebody sitting on them. They have to be pushed with a small object, your finger.

Q Mr. Rodriguez, I would appreciate it if you would allow me to complete my question before you answer.

A I am sorry, I thought you had.

Q No, I had not. In the course of your answer, you can describe the situation that you are discussing, but I

bfm7

would appreciate it if you would allow me to complete the question.

My question is, is it possible, through the type of inadvertent contact that is depicted here or any other time, that controls or switches in the Rancho Seco control room could be accidentally actuated?

A It is possible that they could be accidentally actuated.

Q Has that occurred?

(Pause.)

A I cannot recall right now it ever being reported to me that we accidentally actuated a switch.

Q If that situation were to occur, do you expect it would be reported to you?

A Depending on the severity of the outcome of that accidental switch, I think it would depend on whether or not it was reported.

Q Could you refer to page 11-1 and figures 11-1 through 11-5.

(Pause.)

Does Rancho Seco have a chart recorder such as is described on page 11-1 and figures 11-1 through 11-5?

A Figure 11-1 looks like a type of recorder that we have.

Q Can you tell whether it is the Rancho Seco chart

recorder?

A No, I cannot. Figure 11-2, I cannot tell if that is a type of recorder we have or not.

Q Could figure 11-3 and 11-4 be from Rancho Seco?

A Yes, they could be.

Q Could figure 11-5?

A Yes, it could be.

Q Do you know if the limits for the parameters of the Rancho Seco chart recorder had been handwritten, as is described in the first paragraph under readability of chart recorders on page 11-1?

A I cannot, as I said earlier on figure 11-2, I cannot identify that as a recorder for Rancho Seco. One picture is just too vague.

Q Without relying on the picture, can you recall whether those parameters and those limited conditions are hand written on the Rancho Seco chart recorder?

A No, I can't recall that.

Q Do you know whether it is necessary to -- for operators to use the recorder with the front door open?

A No, I do not recall it as necessary that the front door be open. The operators have opened the door to facilitate reading the numbers on the chart recorders.

I think they were there at the time the study took place. We have changed out some of those recorders in this

last outage. I don't know if those were the ones in place when this report was made or not.

Q With respect to figures 11-3 and 11-4, you testified a moment ago that these could be from Rancho Seco. Isn't it true that because the printed out numbers on this paper are superimposed, they are very difficult to read?

A The reason they are difficult to read is that they are superimposed, yes.

Q Are you aware of instances in which operators at Rancho Seco have been -- have had difficulty or been unable to read a given parameter off the chart recorder because of this kind of superimposition?

A Yes, there have been instances where a particular point could not be determined primarily because a number of those points monitoring similar parameters are all in tne same normal range.

If they fall out of that normal range, then they are picked up quite easily. While they are in that normal range, the superimposition of the points does obscure or may obscure any particular monitored parameter.

Q Are you aware of where instances of operators at Rancho Seco who have been interested in a particular parameter had waited for the recorder to cycle around again to print that parameter in order to read it?

A Yes, I am.

bgn tP-5
bfm10

Q Is that common?

A For particular recorders, yes.

Q With respect to figure 11-5, this figure is captioned "decal, identifying 42 parameters assigned to a recorder which was designed for 24 points." Is it true at Rancho Seco that the recorder, or any other recorders, that they have had more parameters assigned to them than they were designed for?

A Yes, that is correct.

Q In that circumstance, if an operator were interested in a particular parameter, is it not possible that one number of a chart recorder would depict at different times different parameters?

A That is correct. That is possible.

(Pause.)

Q Okay. Referring to the bottom of page 11-1 and continuing on the top of page 11-4, the author of this document states: "As one actual case history will reveal, poorly human engineered chart recorders can be quite costly to the utility.

"One such chart recorder was designed to accept 24 points. In the interest of economy, 42 points (figure 11-5) were incorporated to this chart recorder with six spare channels. The identification window in the upper right corner of the recorder provides numbers from 1-24.

"Therefore, when this display window reads '5,' the operator must somehow determine whether the pointer is reading parameter 5 or 29. Because so many numerical point printouts are crowded onto the chart paper, it is extremely difficult to sort out the individual numbers.

bfm11

"One one occasion, an annunciator alarm window announced the following problem: PRIM SYS MISC TEMP HI TJR-04.

"The suffix to this message referred the operator to the chart recorder with 42 points. The operator had to wait about four mintues for the relevant reading -- before the relevant reading appeared and a high pressure injection pump which might have been saved, was destroyed."

First of all, was this situation -- did this situation occur at Rancho Seco?

A Yes, it did.

Q Has there been a change in the chart recorder that led to the situation after that accident?

A One of the recorders that we changed recently, I believe, was this particular one.

Q Is it now the case with that recorder that all of the parameters have individual and different numbers on them?

A I cannot answer that specifically. I might add, though, that again the author inusing the word "might" is conjecturing. That particular pump destroyed itself because

bfm12

of a lack of supply water to it.

It was not the bearings that went on it, which is what this was monitoring. It was actually overheating of the impellers. They destroyed themselves within the pump casing.

Q When was this incident?

A It seems to me it was in 1974 or 1975. One of those. It was early on, either shortly before we received our license to load fuel and take the plan up, or shortly after we received the license.

Q What was the cause of the lack of suction for the pump?

A I do not remember the exact details of it. It came about after some testing in which the pump was started while the test for the safety features panel was under way.

Commensurate with the test, the valve from the borated storage water tank was shut. It may have affected the make-up tank. As a result of that, the water was applied to the pump for some three or four minutes.

Q So that would be -- the valve -- that was a human error, essentially. The valve was shut?

A As I said, I do not remember the exact details. I remember the pump was started inadvertently and the suction valve was not opened.

Q You mentioned the chart recorder was one of the

bfm13

ones that had been changed recently.

A I said I think it is. I am not positive.

Q If it had been changed recently, by recently do you mean the most recent fueling outage?

A That is correct.

Q Could you refer to page 15-2? At the very bottom of that page under Plant C, I would like to read that -- I will read it to you.

That paragraph says: "This control room included a phone page system. The usual telephone and a hands off telephone speaker arrangement. These operators also remarked that the page system was unreliable. In high noise areas, some complainedthey got cross-talk and low volume problems on phone lines.

"The operator had to yell to be understood on the hands off phone system. This plant had the largest number of auxiliary operators under the control room operator supervision.

"Therefore, the communication needs were greater than at other plants. Normally there were two operators in the control room, even though one operator is required by tech specs.

"When two men are in the control room, one goes out into the plant when communications with outside personnel breakdown. However, when only one man is in the control room,

bfml4

this action is no longer available and the lone operator feels especially vulnerable.

"The operators suggested a better distribution of phones in the plant. More important, they felt the need for a combined audio-visual system with which by dialing a special code on an emergency call basis, both a visual alert and a coded horn message would be transmitted throughout the plant's high noise areas."

There has been a change in the tech specs at Rancho Seco that requires two operators in the control room, is that correct?

A That is not correct.

Q How many operators are required under the tech specs?

A There are required to be three licensed operators at the plant, and one licensed operator in the control room at all times.

I might amplify that there are also required to be two additional operators not licensed at the plant at all times, except if one becomes ill; we have four hours to replace him.

Q A typical shift at Rancho Seco would have three licensed operators. Is that correct?

A That is correct.

Q How many auxiliary operators?

bfm15

A One.

Q How many power plant operators?

A Two.

Q With respect to the two paragraphs I just read, do you believe this is an accurate description of the communication from the control room that is presently existing at Rancho Seco?

A No, I do not.

Q Could you explain what you feel is inaccurate about the description?

A We have conducted a couple of surveys in the last few months in the high noise areas. During this recent outage, we did put visual indications in the high noise areas, flashing lights for alarms.

We also put in -- we have also gone through and readjusted amplifiers so that more volume will come out of those.

At the end of 1979, we also scrapped the original telephone system which was in place at the time this survey was conducted, and replaced that with a much more modern system that provided a much higher level of reliability, and eliminated cross talk, and allows a higher level of volume in a phone circuit when you have more than one -- more than two lines hooked into it.

Q Referring to the last part of the two paragraphs

bfm16

that I read, on page 15-3, the operator's suggestion of a combined audio-visual system which by dialing a special code on an emergency call basis, both a visual alert and a coded horn message would be transmitted throughout the plant's high noise areas. Has that been put in place at Rancho Seco?

A No, it has not.

Q Do you know whether SMUD has done any full studies or investigations of the cost or feasibility of putting in such a system?

A As I said earlier, we have recently installed a visual alert system in the high noise areas. We have also gone through and readjusted, we have done that a number of timestothe speakers so that they can be heard more clearly.

We have not investigated the cost of a system providing a coded horn message.

Q Would you refer to page 15-4 and figure 15-3? Figure 15-3 appears on page 15-6. The second full paragraph of 15-4 states that another problem is that: "The operator must have access to the control board while communicating with others, e.g., during maintenance activities (figures 15-3 and 15-4).

"The distribution of phone and the length of phone cords proved a problem in some plants. For example, at one plant, an operator pointed out the lack of a paging phone on the radiation monitoring panel and the service water panel.

bfm17

"Both of these panels are far removed from the primary control board area and the operator's desk phones." Is that a description of Rancho Seco?

A That is correct. There is a phone -- with regard to the radiation control panel there is a phone adjacent to, I think, the water control panel he is talking about.

Q Could you refer to figure 4-5 and describe where the phone that you just referred to would be located and where the radiation monitoring panel is?

I'm sorry, that's page 4-5.

A There is a phone on the panel labelled "Cooling Water."

Q Are there other phones that would serve the same purpose?

A Yes, there are.

Q Where are they located?

A They are located on the desk.

Q Am I correct that the radiation monitoring panel referred to is on the far right of this diagram and is labelled "Radiation Monitoring"?

A That is correct.

Q Where would the service water panel be?

A I believe what he is talking about here is the panel labelled "Cooling Water."

Q So, with respect to the service water panel, you

bfm18

would not agree that that panel is far removed from the -- from the telephone. Is that correct?

A I think. Maybe you ought to read it back. I thought I said maybe we had a phone on that panel.

Q You did. That is what I am saying. You would disagree with the statement that -- with respect to the service water panel, that it is far removed from the telephone system?

A Yes.

Q Okay. But you would agree that it is far removed from the primary control board?

A No, I would not agree that it is far removed.

Q Is it the word "far" that causes you to disagree?

A Yes.

MR. BAXTER: Did you say it was ten feet?

THE WITNESS: I said it was approximately ten feet.

BY MR. ELLISON: (Resuming)

Q With respect to the telephones and referring to figure 15-3 -- first of all, figure 15-3 is the Rancho Seco control room, is that correct?

A What page is that figure on?

Q 15-6.

Q Yes. That is the Rancho Seco control room.

Q Figure 15-3 shows a photograph of an operator on

bfm19

the telephone with an extension cord of a few feet, standing at the primary console. Is it an accurate portrayal of the Rancho Seco control with respect to the length of the extension cords and the telephone cords?

A Yes, that phone has the extension cord as shown in that picture, if that is what you are asking.

Q Are the extension cord -- is the extension cord of the telephone located at the desk sufficient to allow the operator to reach everything or the front panel?

A When you say "the front panel" would you look at figure 4-5 and tell me which one you are talking about?

Q Certainly. I am referring to the panel that is comprised of four panels labelled "computer, coolant, reactor, and secondary."

A It is a sufficient length for him to reach all of those panels.

Q Is the extension cord long enough for him to reach the back panels labelled "secondary, primary, safety, and auxiliary"?

A No, it is not.

Q Is the extension cord on the telephone, which you identified as the cooloing water panel, long enough to allow an operator to reach the auxiliary, safety, primary, and secondary panels?

A Some of those. It is not long enough for him to

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reach all of them.

Q Which ones could he reach and which ones could he not reach?

A I think he can reach around as far as the panel labelled "Safety."

Q If I recall correctly, yesterday, Mr. Rodriguez, you testified that you believed SMUD had been provided with a copy of the EPRI study that is summarized in CEC 33. Do you know whether SMUD did any formal analysis in response to this study?

A No, I do not know of any formal response or analysis.

Q Do you know if anyone was assigned as a prescribed task within the SMUD operation to review this document or the study in general?

A No, I do not know that.

Q Do you know of any -- Strike that.

(Pause.)

Mr. Rodriguez, is it common for alarms to be sounding in the Rancho Seco control room?

A When the unit is operating, it is not unusual for an alarm to sound a few times each shift. When a unit is shut down, it is quite common for a number of alarms to be sounding in the control room.

Q Is it common when the unit is running for there to be annunciator alarms lit that have been previously acknowledged so they are not sounding but the annunciator light would be lit?

A It is not unusual.

Q It is my understanding that in an event like the

Three Mile Island accident at Rancho Seco, that indication of hot leg temperature and also indication of pressurizer level would be off scale. Is that correct?

A At what point in the Three Mile Island scenario are you talking about? Because I guess I disagree that Rancho Seco is going to have an accident like Three Mile Island had fundamentally.

Q Assuming that you had the same -- Let me back up for a minute. If Rancho Seco had experienced the same equipment malfunctions and the same operator errors as occurred at Three Mile Island on that same day, except for the difference in containment isolation, would it not have experienced substantially the same accident?

A Yes, I think it probably would have.

Q And during the course of that accident -- At some point during the course of that accident, would it not be true that the hot leg temperature indication as well as the pressurizer level indication at Rancho Seco would have read off scale?

A If the accident proceeded for the same length of time without taking proper action to mitigate it, the T-hot indication would read off scale. The in-core thermocouples, however, would read considerably higher than the T-hot leg, 1500 degrees, approximately.

Q Would the pressurizer level indication read off

scale?

A If sufficient voids were developed within the primary coolant system, yes, it would.

Q I have not had an opportunity to review yesterday's transcript, but I recall you described certain changes -- I believe you described certain changes in both T-hot indication as well as pressurizer level indication. Is that correct?

A I described changes with regard to the installation of additional meters. That is correct.

Q Both indications?

A For both pressurizer level T-hot and T-cold.

Q Has the scale been expanded with respect to the T-hot indication?

A No, it has not.

Q Has the scale been expanded with respect to pressurizer level indication?

A No, it has not.

Q Are you aware of other indications in the Rancho Seco control room that would have read off scale during the accident that we have been discussing?

A The reactor building particulate and gaseous monitors would have read off scale. I believe our area monitors which go to 10^7 mr per hour -- 10^4, they would have read off scale.

CHAIRMAN BOWERS: Mr. Ellison, there is no good time to interrupt for midmorning break. Is this a convenient time for you?

MR. ELLISON: Yes, ma'am.

CHAIRMAN BOWERS: Fine.

(Whereupon, a brief recess was taken.)

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CHAIRMAN BOWERS: Mr. Ellison, do you want to proceed?

BY MR. ELLISON (Resuming):

Q As I recall, Mr. Rodriguez, you had just testified to certain additional indications of t-hot and pressurizer level that would have read off scale in a Three Mile Island type accident. Have those indications been changed since Three Mile Island?

A No, they have not.

Q You also mentioned in a previous answer that -- I believe you said the incore thermocouples have a wider range than t-hot indication. Is that correct?

A That's correct.

Q What is the range of t-hot and what is the range of incore thermocouples?

A The range of t-hot is 520 degrees f to 620 degrees f. The range of the incore thermocouples is from approximately 50 degrees f to 2000 degrees f.

Q I believe you testified a moment ago that the upper range of the incore thermocouples was about 1500 degrees. Are you changing that now? Have you had subsequent information that it's 2000?

A I evidently subtracted wrong. It says 1500 degrees above t-hot, and instead it's 1380 degrees above t-hot.

Q Am I correct that the incore thermocouple would be

read off the computer?

A Yes, you are correct.

Q Can they be read elsewhere in the control room?

A Not in the control room, no.

Q The computer is not a safety system, is that correct?

A That is correct, it is not a safety system.

Q Am I correct that Rancho Seco has, on more than one occasion in the past, operated without the computer main available?

A We have operated with some functions of the computer not available, and early in the startup there were some occasions when it was down completely. I don't recall, though, that those were after we loaded fuel. I think most of those occurred when we were going through our initial testing.

Q Did any of the functions that were unavailable on the computer involve the reading of the incore thermocouples?

A I don't recall.

Q In an accident like the Three Mile Island accident, could the Rancho Seco computer printer cope with the flow of information that would be generated by that type of incident?

A Yes, it could.

Q So in that type of accident there would be no time lag between the time an operator called for information on the printer and the time it was printed?

A There could be a time lag, yes.

Q How great a time lag?

A I don't recall. With reference to my question on the printer, and that's what I was asking, the printer is faster than the computer. That's why the printer would not cause a time lag. The computer might in assembling the information and getting it to the printer.

Q Could the computer printer system as a whole cope with the kind of information flow that would be generated by a Three Mile Island type accident?

A It can cope with it. There would probably be some time lag. How much that time lag is I just don't remember the numbers. We changed out those printers last year and significantly improved the capability of getting the information out. It was improved to the point where instead of the printers being the limiting factors they were at Three Mile Island, it was the computer being the limiting factor.

Q Can you recall whether the time lag that might result from the computer would be -- I'm not asking for an exact recollection, but can you recall whether it would be on the order of a few seconds as opposed to minutes?

A I can't honestly answer. I just don't recall.

Q Assuming for a moment a loss of power to indication in the control room, like what occurred in the light bulb incident or Crystal River, is it true that various control room

indications would fail in a variety of ways -- either fail high, fail low, fail mid-scale?

A If you lost -- and I use as an example x power in the non-nuclear instrumentation, those meters powered from x power would fail mid-scale.

Q All of them?

A Yes. Well, I can't say all of them. All the Bailey type meters that are powered from the NNI would. There are other meters in the control room that are not powered from NNI.

Q Would they be affected by the power failure?

A No, they would not.

Q Would the same situation hold true if you lost y power?

A Yes, there are other meters that receive power from the y power supply and they would fail mid-scale.

Q During the light bulb incident, isn't it true that instrumentation in the control room did fail in a variety of ways, mid-scale, fail low, failed high?

A That's true.

Q Is your previous answer that they would now fail mid-scale based upon changes in the Rancho Seco control room made subsequent to the light bulb incident?

A My previous answer addressed the meter movement itself. If the meter movement is from x or y power and you

lose that power, the meter will fail in mid-scale. If the meter movement is a y powered and you lose x power that is powering, say, a temperature indication, and loss of x power that temperature transmitter makes it fail high scale, then the meter will indicate high scale even though it still has power from the y power supply.

And the same situation if the loss of power causes the actual transmitter to fail low.

Q So then, it would be true that in a loss of -- there are potential loss of power situations that would cause indication in the Rancho Seco control room to fail in a non-uniform way.

A Some of the indication.

Q Is it common for x powered meters to indicate signals from y powered transmitters?

A We have a number of meters that do that, yes.

Q Is it typical for gauges in the Rancho Seco control room to have indication other than value of a level or whatever, but also of the normal operating range?

A No, it is not typical.

Q Have there been any changes to the computer, aside from the change inthe printer that you described, since Three Mile Island?

A Yes, there have been.

Q Would you briefly describe them?

A We have changed the computer program for the nuclear calculations scheme to incorporate the characteristics of our Cycle 4 core. We have added particular parameters to the computer on a group function that will allow the operator to call up a group of critical parameters and have a computer give them to him automatically at one-minute intervals in the event of a loss of NNIX or NNIY power.

We have modified the nuclear core calculation program to shift that to a parameter monitoring program upon a reactor trip to provide a longer history of various plant parameters which would be used in an analysis to determine the cause and, of course, the response to whatever the trip situation was.

There have been others but I can't think of what they are right now.

In this line of questioning, the computer that I've been referring to is the computer associated with a console in the control room. We also have a second computer that we're bringing up to provide backup to that one.

Q Where will that computer be located?

A It is located in the same area where the current computer is; however, its control console will be out in the control room on the operator's desk.

Q On the desk, is that correct?

A Yes. It's a visual display.

Q And will it display essentially the type of information as the computer you've been discussing?

A Yes, sir.

Q Will that computer be a safety system?

A You have to define for me what you mean when you say safety system, because a safety system to me is a system that is providing core cooling to the core, and the computer has no cooling functions. If that's what you're asking It is not a process control computer; it is a monitoring computer.

Q My question is whether or not it will be permissible for Rancho Seco to operate without either or both of the computers when the second one is installed.

A There are no conditions of our license which require that the computer be operable.

Q Mr. Rodrigeuz, I'd like to turn to your testimony with respect to the training of licensed operators. And my first question is in response to your statement at page 4 of your testimony on line 10 that between the years 1968 and 1970 you were responsible for establishing initial phases of the Rancho Seco operating training program and the selection and hiring of plant operating personnel.

Can you briefly describe how the Rancho Seco licensed operator training program was developed, and in particular, what models or other experience was called upon in developing that program?

A I didn't really have a model to go by because SMUD was in somewhat of a unique position from the standpoint that it had been a hydroelectric facility with no thermal units, and therefore, the staffing and the training program had to account for the fact that there was no cadre of operating experience to draw upon within the company. Which meant that everyone had to be hired from outside the company.

From that aspect, the training program had to acknowledge that people from various backgrounds were going to be coming together to operate Rancho Seco.

I'm not going to be able to do this briefly. It's going to take a while.

Q Take as much time as you need.

A The initial part of the program involved hiring, for my function at that time, hiring shift supervisory personnel who had operating experience in commercial nuclear reactors or large production reactors. Bringing those individuals together in a non-nuclear situation to spend some time, if you will, to learn to communicate so that acronyms, references to cooling water systems and things like that could be ironed out. As an example, a main circulating water system to one individual meant what you cooled the condenser with. To another one it was a spray pond and to a third one it's what you cool a reactor with, and those kind of problems had to be ironed out. So we spent a considerable amount of time just

apostling it just to get everyone talking the same way.

Then from there, I took them to a nuclear plant for a three-month training session, as I described in Appendix I of this testimony, wherein they were around an operating unit while it was operating and also around it while it shut down. For the same purpose, again, to learn how to talk to each other so we were talking about the same kind of thing and go through a short familiarization course.

Q Mr. Rodriguez, if you don't mind, I'd like to interrupt you just for a second, and perhaps as you continue with your narrative, to take the liberty just to clarify parts of your answer rather than coming back. Were you just referring to the Indian Point training experience that's described in Appendix I to your testimony?

A That's correct.

Q Please go on.

A The Indian Point training experience took us to May and I ended that responsibility in February of 1970.

Q Were you responsible for the development of the training program itself?

A Not in the detail. I was responsible for the basic concept of how we do it. I established, for example, the contract with Sacramento State College to conduct the academic training. As part of the contract with the Babcock and Wilcox Company, the six-week reactor fundamentals or reactor technology course had already been established.

I did establish with Babock and Wilcox the 10-week simulator training course and reviewed with them the content of that and what we wanted to have in that course, but they actually put the program together.

Q Does that complete your answer?

A Well, I didn't directly contract with an onsite program; my relief, if you will, the Assistant Superintendent for Nuclear Operations under me, did and that was, as I recall, a 40 -- I guess I have to go back to my testimony, excuse me, for how many hours that was.

What I was referring to and I don't see it in here was a 40-hour review course that another contractor, General Physics Corporation, conducted for us shortly prior to our licensing examination.

The Appendix IE program -- excuse me, the Appendix IF program was generated by our onsite licensing instructor who was a member of the Nuclear Operations Department, and the details of that he prepared.

Q Had the individual that you just mentioned, the onsite licensing instructor, been an instructor of licensed nuclear power plant operators prior to his assuming that role in SMUD?

A Prior to assuming that role at SMUD he had been a licensed shift supervisor in an operating nuclear plant, and then came to SMUD as a shift supervisor candidate and had gone

through the training up to that point.

Q Is Appendix IB the Sacramento State program that you described?

A Yes, it is.

Q You mentioned that you obtained outside training assistance from B&W and Sacramento State and also from General Physics. Were there any other outside contractors who assisted in the training of the original Rancho Seco licensed operating crew?

A Yes. We had a a course from the Westinghouse Corporation.

Q Is that described in your testimony?

A No, it's not. The reason I didn't really describe it in there was it really dealt with the turbine and the generator as opposed to the licensing training for operating the nuclear steam supply system.

Q Your testimony beginning at page 7 and including referencing Appendix I and Appendix II, describes three different kinds of training as I read it. Appendix I being training of the original crew; Appendix II being the training of crews after Rancho Seco began operating; and the third category being the requalification program. Is the Appendix I training generally what's referred to as the cold license program?

A That's correct.

Q And the Appendix II would be the hot license program.

A That's correct.

Q Would it be common for an operator to go through both the cold license program and the hot license program, or would it be more common for them to go through one or the other but not both?

A It would be more common for them to go through one or the other and not both at the same facility.

Q Are you aware of any operators at Rancho Seco that have undergone at Rancho Seco both the hot license and the cold license training program?

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A I believe there were a couple of operators that participated in part of the cold license training and then went on and completed the entire hot license training before they were licensed.

Q How many operators are there employed at Rancho Seco at the present time?

A Are you talking about licensed operators or --

Q That's correct.

A -- operators? Licensed operators.

Q I am sorry. Licensed operators.

A There are 24 licensed personnel. I think approximately eight of those are senior license personnel who are part of management and supervision and do not normally stand watches, and while I am thinking of it, I said yesterday I had no change to my testimony, and I think in my testimony I referred to 22 licenses, and we did receive -- we did successfully license two additional people in April.

MR. BAXTER: Excuse me. To clarify and correct the testimony, would that be a correction to your testimony at the top of Page 22?

THE WITNESS: Yes, the four licensed operators, the number "four" should be changed to "six."

BY MR. ELLISON: (Resuming)

Q Were the two additional successful license

candidates people who would ordinarily stand shifts, or are they management?

A They would stand shifts.

Q So that would bring the number of operators standing shifts to 16. Is that correct?

A Yes. And as I sit here and think, we also successfully licensed a contractor instructor as a senior license, and he doesn't stand any shifts. He is just doing teaching.

Q He would be someone who would be instructing operators? Is that correct?

A He is instructing, yes.

Q Was this individual previously licensed at another facility?

A No, I don't think so. I think he -- he came -- his experience, his operating experience, for the most part, I think, was in the Navy nuclear program.

Q And is this someone who has recently been hired to train the Rancho Seco operators. Is that correct?

A No, this individual has been training Rancho Seco operators for over a year.

Q With respect to the 16 operators who regularly stand shifts, can you describe approximately how many of them went through the cold license program and how many went through the hot license program?

(Pause.)

A Of the initial six shift supervisors who went through the entire cold licensing training program starting back with the initial trip to a fossil unit and then Indian Point. There are two shift supervisors on the staff. A third shift supervisor is now the operations supervisor, so he does not stand.

Of the -- there -- Of the operators who came to work while the cold licensing program was under way essentially participated in it after the fossil unit experience and the Indian Point 1 experience. There are three. All of them are now shift supervisors.

And -- no, there are -- Well, there are three that are shift supervisors. There is one that is the outage coordinator, who was a shift supervisor, and the training supervisor. Those latter two, though, are part of that eight management.

I guess, to sum it up, two that went through the entire cold licensing program, three that attended essentially the major portion of it, the V&W technology training, the simulator training, the on-site review courses, and the start-up testing phase.

Q And the remaining eleven went through the hot license program. Is that correct?

A I think that's right. I may have not recalled

exactly the timing when some of those people came to work, but I think that is essentially it.

Q On Page 20 of your testimony, Mr. Rodriguez, beginning on Line 17, you describe how both the plant superintendent and yourself have been active in industrial organizations dealing with plant activities and facilities across the country, and how that has increased your knowledge and experience in improvements in plant management with other units.

Are you generally familiar with the training programs for licensed operators at the nuclear facilities?

A Well, I know generally that they all have training programs. I am not generally familiar with the specifics of the individual training programs.

Q In developing the Rancho Seco training program, is it your understanding that it was based in large part upon the training programs under way at other utilities operating nuclear power plants?

A In a large part, as I recall, our training program for the B&W NSS was breaking some new ground. As I recall, the technology course, I think, had been given one time to one of the Oconee unit staffs prior to us. The simulator course, as I recall, we were the first to go through that course. The academic training program was set up essentially based on my knowledge from experience I had on

the type of academic training that a licensed operator needs to prepare himself to better understand some of the engineering aspects of how a reactor works, and the on-site training program was developed by the training individual who had had an experience at another utility and brought that experience with him, and I don't mean to say that he did it all by himself. He was responsible for putting it together, but certainly there was quite a bit of consultation with other members of the staff, because we had brought people from many different power stations, and the best of their information is what went into this training program.

We did not extensively examine training programs for units other than those units that were participating in the B&W training program.

Q I have two questions with respect to your past answer. First, you are referring in that answer to the cold license training program. Is that correct?

A That's correct.

Q Second, you mentioned a trainer with experience at another facility. Was that experience as a trainer or as an operator?

A He had been a shift supervisor. I don't remember whether or not he had had actual classroom training experience there. I think he had, but I can't say for sure.

I just don't know.

Q With respect to the hot license program, is it your opinion that that program is substantially different than those of other utilities operating nuclear power plants?

A The hot license program was essentially generated in house with review and approval by the Nuclear Reglatory Commission. What it followed was some of the underlying general requirements in the intensive R50 series, and fundamentally the types of information that we had used in the cold licensing program.

I -- I don't recall our taking somebody else's program and putting our letterhead on it and saying, that is what we are going to do. We pretty much generated that based on what we felt was a satisfactory program.

Q Did you consider the programs of other utilities in developing your own program?

A As I said, I don't recall getting other utility programs and analyzing them and determining what portions of those we would use. What I recall pretty much is that we developed this based on our cold licensing training program, and what training we had received during that period of time.

Q Did you have any outside consultant help in developing that hot license program?

A I don't remember. I don't remember.

Q Subsequent to your development of the hot license program, have you had occasion to compare it to the programs of other utilities operating nuclear power plants?

A I have not personally done that. I believe our training supervisor and the plant superintendent have.

Q Do you know how they compare?

A No, I do not.

Q With respect to the cold license training program -- Let me refer to the appendices at the back of your testimony, beginning with Page 1-1, where you describe the Indian Point training. At Page 1-1, you state in the second paragraph, "During this training period, the Indian Point unit was shut down for refueling." A little earlier this morning I think you said that it was operational during part of that time and shut down during part ot that time. Is the latter correct?

A When we first arrived at Indian Point, the unit was operating, and it operated for three, four weeks, something like that, and then shut down for refueling, and just prior to our completing that cycle, it returned to power and went through the zero power physics test, and it was escalating in power when we left.

Q You state that Indian Point is a Babcock and Wilcox designed reactor. Do you know whether it has

a once-through steam generator?

A It did not have a once-through steam generator. Right now I am not sure they have any steam generators.

(General laughter.)

Q Turning to Page 1-2, where you describe the Sacramento State course, you give a total of 520 hours of instruction. Recognizing that that includes apparently eight hours of examination, do the remaining hours describe the number of hours that the student would actually be in lecture, or does it include self-study time?

A As I recall, that course ran eight hours a day, five days a week in the classroom, and that those hours reflect that portion, the classroom, not any outside study by the student.

Q The course was how many weeks long? Do you remember?

A Unless I am dividing incorrectly, it was 13 weeks long.

Q Was each operator candidate required to attend all eight hours that are described here?

A Each licensing candidate was not required to attend all of the hours.

I can clarify that. For example, there were some of those areas that I did not attend, and I just took the final examination, and that same thing applied to other

licensing candidates who had had college degrees, plant superintendent, the engineering supervisor. Those individuals who did not have that normal academic training were required to attend those lectures, unless, of course, they were ill or had the day off to do something.

Q All of the candidates taking this course took a final examination? Is that correct?

A I don't recall. I think so. I don't remember specifically.

Q And was it necessary for a candidate to pass the final examination in order to continue on in the program?

A No, we didn't establish a cutoff passing mark where if the individual did not receive that mark we would take him out of the program.

Q Referring to Page 1-3, Appendix 1.C describes the pressurized water reactor technology course at the B&W facility in Lynchburg, Virginia.

A I guess I should have read over this a little more closely. Here is another change. That was not an eight-week program. That was a six-week program. We were gone eight weeks, but we took a break every couple of weeks.

Q This is a different program at a different time than the ten-week simulator course described in Appendix 1-D?

A That's correct.

Q And the ten weeks is correct for Appendix 1-D?

A Yes, it is.

Q Do you know whether the 240-hour figure which is given in Appendix 1-C is correct? That is at the bottom of the introductory paragraph.

A Yes, that is correct. It was a five-day week, eight-hour a day course.

(Pause.)

Q Would it be fair to say that the instruction was fairly evenly apportioned between the topics that are described here, or were there any that were given special emphasis?

A Are you on Appendix 1-B?

Q I-C.

A I-C?

(Pause.)

A No, I couldn't characterize that equal hours were spent on each topic, because some of the topics are much more complex than others.

Q Could you identify the topics that you think were given particularly strong emphasis?

A All the topics had strong emphasis. My question related to the complexity. I guess I would say, for example, integrated control system has a lot of features to it, and in going through each of those features and

how they function would take a considerably longer period of time than, for example, describing how a fuel assembly is put together. But they are both important to the operator that he understands each of those topics.

Q I gathered from your last answer that the course consisted of a description of each system, how it operates, and that sort of thing. Is that a fair description?

A No, it is not. It only really dealt with those systems that were part of the nuclear steam supply system. It did not deal with the systems that were outside that nuclear island.

Q No, my questions is, with respect to the systems that you identify here that you did cover, is it fair to say that the instruction was generally -- generally involved a description of the system and how it operates normally?

A You had both the functional description of the system as well as a fairly detailed description, and by that I would give as an example how the differential pressure detector, for example, worked. Other than just saying that the pressurizer level has three channels in it, you would also go into a pretty detailed physical description of the differential pressure cells, and it would also dwell upon the limits for operating those systems.

Q Was there an exam given at the conclusion of this course?

A There were exams given periodically through the course covering accumulation of some of the topics. I -- would have to go back and look at records again to determine whether there was any -- and I don't think the record would show me whether there was a final exam that included everything. There was an exam at the end of the course, but I don't know whether it included a summary of all 22 of those topics.

Q Was it necessary for a candidate to pass this exam in order to continue in the program?

A No, it was not.

Q With respect to Appendix 1-D, at the top of the page you describe a breakdown of the 392-hour simulator training program. Then the third item is study and counseling. Could you identify what you mean by study and counseling?

(Pause.)

A This course consisted of periods of time actually in the simulator operating and periods of time in the lecture program. Typically, not every week, but typically the day was broken up with four hours in the simulator and four hours out in the classroom area.

We did not have lectures all the time during that four hours outside the classroom. There were periods of time when the individual had some time to do studying. When

he was having a particular problem with something in the simulator or understanding some portion of it, the instructor could spend that time trying to pump him up on a one-on-one basis.

That is the studying and counseling.

Q With respect to the normal operations that are described in the next section, Appendix 1-D, would it be typical to take each normal operation essentially from beginning to end in real time through the simulator?

A During the initial phase of the course, when the candidate was becoming first familiar with it, yes, it would be typical to do it in real time. One area that I can recall that we never really did in real time was the actual heat-up of the plant, since you were only in the simulator about four hours, and typically it takes 24 to 30 hours to heat up.

As the course progressed, in order to show and give more practice, the time sequence could be speeded up, not speeded up so much, but the simulator initialized in an operating configuration so that whatever particular evolution you want to practice on could be conducted.

end SB2
Bob follows

Q This would be part of the 126 hours of control room operation. Is that right?

A Yes, that is right.

Q And can you -- At the bottom of this page, you describe in addition to the normal operation experience which you describe as a wide spectrum of failures. Can you estimate how much of the 126 hours was spent on normal operation versus abnormal operation?

A I would estimate that 70 to 80 percent of the time period that was spent -- and I am talking about the four hour time periods -- that were spent at the control room had during those four hour time periods abnormal conditions with which we had to cope.

Q Can you estimate the amount of time, however, that was spent on abnormal operations versus normal operations?

A That is what I just thought I did. It is kind of hard to do, because you do not walk in and have everything falling apart without first having it run normally, if you understand what I mean. For example, you might be in there running along at 100 percent power, and he tells you -- the instructor tells you to change power to 80 percent or change power to 50 percent, so you start manipulating to bring the unit come down, you watch it come down, and then, bang, you lose a feed pump, but part of that time was normal operation in setting you up to get your mind off on

something else when he dropped the feed pump on you, and that is why I couched my answer. In 70 to 80 percent of those periods of time that we were in there for four hours, I would estimate dealt with some malfunctions during that four-hour period, but I cannot give you a time for, you know, how many hours we spent out of that actually controlling the casualty and how many hours we spent waiting for it to happen.

Q Okay. With respect to the 110 malfunctions you described, you are referring to 110 single failures rather than 110 accident sequences. Is that correct?

A What I am referring to is that approximately 110 malfunctions are individual malfunctions that were given by the instructor. Now, those malfunctions may come in groups of two or three or more in a particular scenario to test an operator's ability to respond to them, and by giving these different malfunctions, we pushed the unit into an accident scenario.

Q Do I understand from your last answer that some of the malfunctions involved multiple failures?

A Yes, that is true. No, no, no, that is not true. The malfunctions that I am talking about are individual malfunctions, failure of PORV to open, for example. Then you do not let the block valve go shut. Those are two separate malfunctions that are in the same scenario that the operator

is trying to cope with.

Q But operators were given experience with scenarios involving more than one malfunction?

A Yes.

Q Was there an exam given at the end of the simulator course?

A That was nine years ago.

Q I am sorry.

A I haven't thought about it recently, but I thought --

Q I just noticed at the conclusion of Appendix I.D it stated there was an exam, so I am going to withdraw the question and just ask you if having refreshed your memory by reading that -- it is at Page 1-5 -- if you can recall the passing of this exam was mandatory for the completion of the program.

A The purpose of the exam was to evaluate the simulator as a training tool. That exam was administered by the then Atomic Energy Commission. There were evaluations written on each of the candidates and how they did and what if any weak areas they had. There was no one determined at the end of that course to be unsatisfactory as an operator.

Q Did all the candidates take that exam?

A All the candidates in the group that I was with

which was the first of -- the first group of about 12 or 15 did, and I guess I really do not remember -- I do not remember what the second group did, whether or not AEC came down and examined them or not.

Q Can you recall whether during the -- if simulator instruction operators were asked to simulate the feed and bleed mode of cooling?

A The feed and bleed mode of what?

Q Cooling.

A No, I do not recall that.

Q Just to clarify your response, you do not remember?

A I do not recall that any operators were required to cool the core by feed and bleed mode.

Q Were operators asked to simulate the experience of cooling the core by natural circulation by voiding in the primary system?

(Pause.)

A I do not recall that particular scenario being one of the accident scenarios.

Q Did operators simulate reflex boiling?

A No, I do not recall that being simulated. I am referring now to this simulator course nine years ago, not what we have been doing recently.

Q I understand that. Can you recall to summarize

the cold license program how much time was spent actually on the simulator? And in asking this question, I recognize that you stated control room operation of 126 hours in Appendix I.D. Is that the total amount of time spent on the simulator doing the cold license program?

The reason why I ask the question is that I also recognize that on Page 1-12 you describe the simulator refresher course.

A To answer your question, that 126 hours is what we had had documented in the letter that we sent in 1974. I sure do not recall any more how many hours specifically, and what was the source of that number.

We completed that simulator training course, the first group, in November or something like that of 1971, and the second group went back in 1972 and we did not go up for our license until 1974, and prior to going up for that license, we went back for a simulator refresher course and spent some more hours.

Q Can you recall how many hours you spent on the refresher course?

A No, I cannot. I cannot recall whether it is a one-week course or a three-week course. I think it was a one-week course, but I do not recall.

Q The low estimate would be one week. Is that fair to say?

A That is right. That would have been the minimum time, five days.

Q And all that time was on the simulator?

A No, typically in the simulator course you spend four hours in the simulator and four hours outside recovering.

Q So the low end estimate would be that you spent 20 yours on the simulator in the refresher course?

A That is right. The other four hours you spend outside essentially getting lectures on some aspect of operating.

Q Is it your opinion that the simulator training is among the more effective means of training licensed operators?

A Yes,it certainly is.

Q Would you say that it is the best?

A I think in my description of both the cold license program and the hot license program, it should be pretty clear that the training program has different aspects to it, and you cannot pull out any one aspect and say that that is the best. On an individual preference, one individual may enjoy being in the simulator and feel that he gets more out of that than another individual from an overall program standpoint, though I think the simulator training is an essential part of that program.

Q Okay. Referring to Appendix -- Referring back to your testimony, when you describe the cold license -- pardon me, the hot license training program, that discussion begins at Page 7 and continues for several pages thereafter. Am I correct in my understanding that the hot license traning program involves 60 hours on the simulator?

A Yes, it is a three-week program.

Q Mr. Rodriguez, if you can, I would like briefly to refer back to Appendix I.D, Page 1-4 and also to Page 14 of your testimony, beginning on Line 4.

In Appendix I.D you describe the 110 malfunctions that were presented to the operators in your cold license program. However, at Page 14, Line 4, you say the simulator has the capability of introducing over 60 individual casualties in the various reactor plant systems.

To me, there is an apparent discrepancy between the number of malfunctions the simulator is capable of presenting, 110 or 60.

Could you explain that?

A Let me give you an example. Assuming you are running at 100 percent power and the instructor fails the A main feed pump on you. And you go ahead and restart it and get it back on line and he fails the A main feed pump again. You have had two malfunctions.

Q So the 110 malfunctions referenced in Appendix

I.D are not necessarily different malfunctions?

A That is right.

Q The wide spectrum of failures you are referring to would essentially be the menu of 60 failures discussed on Page 14?

A Yes, that is correct. The 60 referred to the spectrum that you can receive. The 110 refers to the factual number.

Q Would it be fair for me to assume that the hot license training program -- simulator program covered basically the same operations as the cold license program described in Appendix I.D?

A Basically it does. There are certain aspects of it that are not the same, of course, as the cold license, one of those being the lengthy simulator training, but the hot license candidate has the advantage of actually operating at the facility, whereas the cold license candidates do not.

CHAIRMAN BOWERS: Mr. Ellison, I assume again there is no good place to stop you, but it is 12:00, and we would like to take the one hour for lunch.

MR. ELLISON: That is fine.

(Whereupon, at 12:00 p.m., the hearing was recessed, to reconvene at 1:00 p.m. of the same day.)

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A F T E R N O O N S E S S I O N

(1:00p.m.

CHAIRMAN BOWERS: We would like to begin. Are you ready, Mr. Ellison?

MR. ELLISON: Yes, Ma'am.

Whereupon,

RONALD G. RODRIGUEZ

the witness on the stand at the time of recess, having been previously duly sworn resumed the stand, was examined and testified further as follows:

CROSS EXAMINATION (RESUMED)

BY MR. ELLISON:

Q Mr. Rodriguez, in describing the development of the hot license training program, you mentioned some of the people within SMUD that were involved in developing that program.

Were there any outside consultants involved that you know of?

A I cannot say with assurance. I just do not remember.

Q Are the people responsible for the development and implementation of the training program -- do they work for you and in your division?

A At the time that the hot license training program was developed, we were organized wherein I was acting both

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as the manager of the department and the plant superintendant; an assistant superintendant for operations, and a training coordinator -- the assistant superintendant reported to me and the training coordinator reported to him. Those two individuals did the detail work on generating the hot license training program. At this time, since we are reorganized now, there is a plant superintendant who reports to me.

He has essentially the training supervisor that reports to him.

Q Referring to page 9 of your testimony where you describe the simulated training that is part of the hot license program, would I be correct in stating that the simulator training would follow the same four hours on the simulator and four hour lecture pattern you described earlier?

A That is correct.

Q At the bottom of the page at line 22, you describe the third week of simulator training.

A Excuse me, where are you?

Q Page 9 line 22.

A Okay.

Q Where you state: "The third week continues with power operations in both the manual and automatic control modes, and additional malfunctions for which the operator

bfm3

must take mitigating actions, are introduced.'

Does that mean in the previous two weeks there were no malfunctions presented that required operator action?

A I think in line 18, I say in the second week the course is expanded to plant operations with malfunctions.

Q My question, though, is whether the operations in the second week include malfunctions for which the operator must take mitigating actions?

A Yes, they do include malfunctions for which the operator must take mitigating actions.

Q Could you explain what you meant when you said that those types of malfunctions were intorduced in the third week?

MR. BAXTER: The testimony says "additional." It does not say that they were introduced.

THE WITNESS: Malfunctions are conducted in both of those latter two weeks of the three week program. Maybe I just took liberties with wording. I did not mean to indicate that the third week was the only week in which malfunctions were presented to the candidate.

BY MR. ELLISON: (Resuming)

Q To clarify the record, I am referring to malfunctions -- I am distinguishing between malfunctions that the plant would automatically respond to and malfunctions that require operator response. Would I be correct --

bfm4

A Well, I -- it is, I guess --

Q Let me correct my question.

A Yes.

Q Would I be correct in reading your testimony to say that in the second week, the operator is introduced to malfunctions that the plant would automatically respond to. Then, in the third week he begins to see malfunctions that he must respond to?

A No, you would not be.

Q Okay. Could you -- is there any distinction -- is there any differentiation in the training program between those two types of malfunctions?

A I cannot think of any determined attempt to make a differentiation between the two. There are some malfunctions that are introduced.

For example, a rod drop which the integrated control system will automatically run back the plant. The operator's essential action is to verify that the automatic system is operating properly.

There are other malfunctions that, for example, loss of feedwater which again, the reactor protective system will automatically trip the plant for, but the operator takes some action as well in verifying that there are other automatic functions that will occur.

Those malfunctions are introduced or are given to

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the operator in either the first week or the second week. Compounding the malfunctions is more appropriately done in the third week when the operator has had a little more time at practicing handling various malfunctions.

So, in the third week you are more likely to have more multiple malfunction scenarios than you are in the second week.

Q So, operators would be receiving or simulating malfunctions in all three weeks of the simulator training. Is that correct?

A Not normally. Normally, the first week is pretty much devoted to normal start-ups and shutdowns and making power changes. That is not to say that at the end of the first week a particular instructor would not begin to give some malfunctions.

Normally, the first week deals with normal functions.

Q Would it be fair of me to say that in the first week, one receives essentially normal operations. The second week, you begin to see malfunctions of increasing complexity through the third week?

A That is reasonably correct, yes.

Q Has the hot license program been substantially changed since it was first conceived?

A The only significant change that I can recall right

now that we have made to it is the introduction course of the Three Mile Island scenario and the Lessons Learned from that.

bfm6

Q That would be a change in subject matter more than format. Is that correct?

A That is correct.

Q With respect to the in-plant phase of this hot license program, it is my understanding that until recently, candidates were instructed by SMUD personnel. Is that correct?

A The last group of operators that we put through training starting a year ago this February were trained by -- almost entirely by a contractor instructor. The licensing training that we conducted over three or four years ago was conducted some by contractor and some by our own instructor, as best I recall.

Q Is the contractor involved here General Physics Corporation?

A Yes.

MR. BAXTER: Can I ask some clarification, counsel? We are on page 8, what is described on line 16, the second part of the training program, the in-plant phase. Is that what the last questions referred to?

MR. ELLISON: That is correct. I am assuming that that is the same as the in-plant phases which are given as

bfm7

Part 2 of Appendix II, page 2-1.

THE WITNESS: I might clarify that somewhat. When they go into -- when I talk about the instruction. The individuals are put on shift and we have a single instructor, if you will, who then rotates around the shift so that he spends time with each candidate, but he does not spend the full eight hours every day with each candidate because there is only one of him.

In this particular case, there were three others. The candidate is going through systems and learning about them by reading and asking questions of the other operators. Those operators are asking him questions, in turn, to check out how much he knows.

The instructor that is monitoring that then evaluates the individual's progress and determines whether he needs to spend more time or not.

So, he is still doing -- he is still conducting the major portion of the training program but he is not one-on-one with the licensing candidate on an eight hour day basis as he is when they are in the classroom.

A lot of their interface comes from the operating crew that they are assigned to. The shift supervisor, the control room operator, the senior control room operator are all spending time teaching the candidates various aspects of operation.

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Q Is SMUD contemplating any revisions to the hot license training program?

A Yes, we are.

Q Could you describe them?

A Fundamentally, the revisions involve longer experience before a senior control room candidate is eligible to take that license.

It also involves more details in the area of heat transfer and fluid flow, adequate core cooling, mitigating circumstances, these are requirements that have recently been defined by the Nuclear Regulatory Commission and published to all nuclear power operating licensees.

Q So, is the motivation for the changes the requirements of the Nuclear Regualtory Commission? Is that correct?

A That is substantially the details of what, for example, the fluid system thermodynamics additional instruction should have, and the adequate core cooling should have -- where it is coming from.

We have in the current course thermodynamics and fluid flow. We have instruction now on adequate core cooling and small break LOCAs.

What needs to be defined is specifically what is the Commission interpreting their words to mean, because we have things now that we can say -- what we have not had up to this point was the longer experience requirements for

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a senior conrol room operator.

Q With respect to the requalification program, which is described in your testimony, who is responsible for the development of that program?

A The initial development was carried out by essentially the same individuals that developed the hot licensing program.

Q Do you know if there are any outside contractors or consultants in the development of the requalification program?

A Again, I do not recall.

Q On page 11 of your testimony, line 11, you describe an average of 60 hours of lectures that are scheduled as part of the requalification program.

My first question is: are those 60 different hours of lectures, or do those include repetition of the same lecture more than one time?

A What those are, those are 60 hours approximately of material that is presented a number of different times during the two year cycle.

Q If an operator had attended one presentation of a given piece of material during the two year cycle, would he be expected to attend the repetition of it?

A Only in the case -- I will give you a hypothetical case because it has happened -- wherein a lecture may have

bfm10

given -- scheduled for a particular crew early in the cycle. Then, that lecture may have been rescheduled -- may have been scheduled later in the cycle for the same crew.

Then he would come in and take it a second time.

Q So, is it true then that it would not be correct to infer from your statement in line 11, that an individual operator would receive 60 hours of lecture training during the two year period?

A I am not sure what you asked me.

Q Let me resume the question and see if I can clarify it. You stated in your testimony that there is 60 hours of lecture training offered, but you just testified that that includes some repetition; that operators were not necessarily being required to attend the repetitive presentation of --

A I think what I said --

Q Mr. Rodriguez --

A You're telling me I said something that I don't think I said.

Q Let me repeat the question.

A That's not what I said.

Q Let me repeat my question, then you can correct me if I am wrong. My question is simply this: Is it reasonable to expect that an operator will attend all 60

bfm11

hours of the lectures that you have presented during the two years?

A It is reasonable to expect that, yes.

Q That includes -- those 60 hours include repeated presentations of the same material. Is that correct?

MR. BAXTER: Object. Asked and answered.

MR. ELLISON: The only reason I repeat the question is that Mr. Rodriguez has stated that I misunderstood his answer.

CHAIRMAN BOWERS: The objection is overruled. We would like to have the witness answer.

THE WITNESS: There are approximately 60 hours of lectures covering different subjects in the requalification program that are scheduled on a two year cycle.

The specific lectures are given more than one time.

DR. COLE: Excuse me, I am not sure I understand that now. Mr. Rodriguez, of the 60 lectures, how many of them are different, approximately?

THE WITNESS: Let me answer that question in a little different way. Maybe it will kind of tie up the problem.

We have five crews attached to Rancho Seco. Normally, four of them are on a rotating schedule in order to cover the 24 hour a day, seven day a week session.

This would be in order to provide the training to those individuals who have to have a particular lecture more than one time, because you cannot have everybody there at the same time.

There are 60 hours of lecture materials scheduled. Those 60 hours are repeated a number of times during the cycle in order to catch everybody on the rotating shifts.

DR. COLE: So, it is 60 separate one hour lectures?

THE WITNESS: It might be 240.

DR. COLE: Sixty different hours of instruction on different material.

THE WITNESS: That is correct.

DR. COLE: Fine.

THE WITNESS: Sixty hours of lecture material repeated a number of times.

DR. COLE: I understand. Thank you.

MR. SHON: And everybody gets all 60 hours, essentially?

THE WITNESS: Essentially. Let me correct that. Not everyone is required to attend all those lectures, but those lectures are available to everyone.

BY MR. ELLISON: (Resuming)

Q Who is not required to attend all those lectures?

A Our requalification program stipulates that if an individual achieves a score of 80 percent or more on the examination, he is not required to attend the lectures.

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He is not requried to attend the lectures covering those areas within the examination in which he achieved that score.

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(Pause.)

Q These lectures are offered on a monthly basis. Is that correct?

A No, that is not correct.

Q How many lectures would typically an operator have available to him in a given month?

A In one month he may have 12 hours of lectures available to him. In another month, zero.

Q Is the requalification training focused upon the shift that is not part of the four-shift rotation that would be operating a facility?

A What we have focused on in the recent past year or two years has been on that shift. That is on what we call the swing shift, and on the swing shift they come in for their training early.

Q Okay. Is the swing shift the shift that is not part of the four shifts that are operating the facility, or is that the shift that operates the facility during a given time of the day?

A The swing shift is the shift that operates the facility from 1600 to 2400.

Q So they would come in early and receive the lecture. Is that correct?

A Typically they are brought in Wednesday, Thursday, and Friday, early.

Q Mr. Rodriguez, Mr. Lanpher is going to provide both you and the parties and the board with a document entitled SMUD administrative procedure AP 25, licensed NRC operator retraining.

I would like this document identified as CEC 35.

(The document referred to was marked for identification as CEC Exhibit Number 35.)

MR. BAXTER: Should it not be 34? Or do we -- Is that number withdrawn from the public domain?

MR. ELLISON: We have retired that number. No, 34 is -- as I mentioned, we are going to get a better copy of the page from CEC 33.

MR. BAXTER: What is in 33?

BY MR. ELLISON: (Resuming)

Q Do you recognize this document?

A Yes, I do.

Q Is this the current procedure for requalification training at Rancho Seco?

A I note that the latest revision on this is Revision 4, and I am not sure if there is not a Revision 5 or a Revision 6.

Q You stated you don't know if there is a subsequent revision. Is that --

A I cannot recall if we have had another one since

then.

Q Subject to check, will you accept this as the --

A Yes.

Q -- governing procedures for the requalification program?

A moment ago you described the exception to the requirement that operators attend the lectures. I would like you to refer to what is the fifth page in my copy, the page numbered AP-25-5, under the section .6.1.1. and .2. It describes written examinations, and describes exceptions to the requirements that operators take examinations.

I would like you to read that and tell me if you believe that is the correct statement of the requirement for taking requalification examinations.

(Pause.)

A I finished reading that. Did you have a question?

Q My question is, is this a correct statement of the requirements for who must take requalification examinations and who need not?

A Yes, it is.

Q At the bottom of Paragraph .6.1.1, it states, "It is not required that the individual preparing or reviewing the examination up to a maximum of three also take the examination."

Would it be typical that an operator or a group of

operators would prepare and review the examination?

A No, it is not typical.

Q Who would prepare and review the examination?

A The training supervisor would prepare the examination. THe plant superintendent would review it.

Q Can you recall any instances in which a member of an operating crew was excused from the examination requirement pursuant to this provision here?

A No, I do not recall any instance where a member of an operating crew was excused from the written examination requirement.

Q Are you familiar with the test scores of the operators at Rancho Seco on the requalification exams?

A Well, at the end of each requalification exam I send a report on what the individual scores were, and the average scores, I do not recall what they are.

Q Would it be unusual for an operator to score above 80 percent on all sections of the examination?

A No.

Q Would it be typical?

A It would be typical for some and not typical for others.

Q Taking the operating crews as a whole, is it your recollection that more of them than not -- more of them score higher than 80 percent than do not?

A I do not recall. I guess the best I can recall is that the shift supervisors who are taking these exams and have a lot more experience typically score higher than the new control room operators.

Q You stated that you submit, I believe, the average score among other things to the NRC.

A If I stated that, I guess I was wrong.

Q I might have misinterpreted what you said.

MR. BAXTER: I believe he stated he received the average score.

THE WITNESS: Yes, I receive a report on what the average score is on each individual, and then the average score for the group that took that particular exam.

BY MR. ELLISON: (Resuming)

Q Can you recall what the average score for the group taking the last exam was?

A No.

Q Can you recall what a typical average score would be, if you can pardon that expression?

A I can just guess. I do not recall the exact number.

Q Do you recall any average scores above 80?

MR. BAXTER: I object at this point. The witness has said he cannot recall. If he cannot recall, he cannot recall. How can he recall whether they are above or

below 80?

THE WITNESS: I cannot recall. As I said right at the outset, when I get that report, I get it, but I do not recall specifically what the grades were.

CHAIRMAN BOWERS: Are you leaving this, Mr. Ellison, for another matter?

MR. ELLISON: Yes.

(Pause.)

CHAIRMAN BOWERS: So the record will be complete, Mr. Baxter, your suggestion was sustained.

(General laughter.)

MR. LEWIS: Look at that smile.

(General laughter.)

MR. ELLISON: Mrs. Bowers, at this point we would move the admission of CEC 35 into evidence.

MR. BAXTER: I would like to request a deferral of the ruling until the witness is able to verify that this is the latest edition of the procedure, and that there have not been further revisions to it.

CHAIRMAN BOWERS: Mr. Ellison?

MR. ELLISON: That is fine.

MR. LEWIS: I have no objection. I think it should be deferred until then.

MR. ELLISON: We would only request that if there are further revisions, that they be provided.

CHAIRMAN BOWERS: The board concurs.

This document does not have any kind of a date any place.

MR. BAXTER: It is taken out of a large manual, Mrs. Bowers. It is kept up to date on a routine basis as supplements are added.

THE WITNESS: I might add, Mrs. Bowers, that if it had an April date on it, I cannot say it was for sure the latest, because we have been revising them so quickly in the last few months.

(Pause.)

BY MR. ELLISON: (Resuming)

Q With respect to Pages 11 and 12 of your testimony, where you describe the general subjects included in the lecture series, would I be correct in my understanding that each -- that within any given two-year, 60-hour presentation, that you would cover all of these topics?

(Pause.)

A I think that is a correct statement.

Q Does this list include all of the major topics that are included in the lecture series?

A I cannot think of any major area that -- you know -- that would not be found under one of the 13 listed here.

Q You mentioned that there had been a number of

revisions to the requalification program.

A Excuse me. I did not mean to imply by that comment that they were necessarily to the requalification program. We have been changing a number of procedures recently, all kinds of different procedures, and my comment was that if this had an April date on it, we have been changing so many here in the last few months that I could not be sure if it was the latest or not.

Q Okay. Do you know whether there have been any major changes to the requalification program since it was originally developed?

A I thought I answered that earlier. I said earlier that the only significant one I can think of was that relating to including the Three Mile Island information in it.

Q I apologize. I did ask that question earlier. I thought I asked that with reference to the hot license program.

Turning to Page 12 of your testimony, on the bottom, Line 20, you describe the on the job training and the manipulations that an operator would be required to experience. At Line 20 you say, "These manipulations may include," and then you list eight different manipulations. Is it customary for the manipulations to include all of the things here?

A No, it is not customary for any particular individual to have accomplished all of these.

Q Could you describe what would be the typical manipulations that a single operator would experience?

A Well, typically, I think most single operators would experience -- Let me preface that with the last part of my testimony, which I believe -- I thought I did; maybe I didn't. I thought I made some comment that these requirements can be met at the simulator as well as at Rancho Seco, on the last -- about Line 21, Page 14: "Credit is given at the simulator for the purpose of meeting the minimum training requirement."

My answer will be in that context,either at Rancho Seco or at the simulator. Number One is typical of all operators. Number Two as well. Number Three. Number Four is not. Number Five is typical. Number Six is typical. Number Seven is not typical from the standpoint of the operator -- all operators physically moving fuel. It is typical from the standpoint of all operators either physically moving fuel or being in the control room at the time the core configuration is being changed.

Number Eight is not necessarily typical for all operators.

MR. BAXTER: Excuse me, Mr. Ellison.

Mr. Rodriguez, you said Number Three without any

follow-up. Did you mean to state it is typical or it is not?

THE WITNESS: Generally that is typical, but it is primarily conducted in the simulator.

BY MR. ELLISON: (Resuming)

Q When these manipulations are conducted at Rancho Seco, does the operator actually conduct this operation at the facility or does he walk through it, so to speak?

A Those operations that are conducted at the facility are actually conducted.

Q Referring to Page 15 of your testimony where you describe the special training provided subsequent to Three Mile Island, does SMUD intend to continue this kind of training as a separate matter from the requalification program?

A Could you be more specific on what kind of training you mean when you say "this?" What kind of training?

Q Certainly. Recognizing that you are incorporating some of the subject matter from the Three Mile Island accident in your requalification program, my question is, do you intend to extend the format of your requalification program, or have you already,to make this kind of training permanent that is described here? Or was this simply a one-time training exercise?

MR. BAXTER: I still do not understand the question.

The testimony describes some group discussions conducted during specific periods of time and other things that are apparently one-time training sessions given immediately following the accident, and they go on for several pages, so I really don't understand what we are talking about in terms of, has this been incorporated into an expanded format for the overall program?

BY MR. ELLISON: (Resuming)

Q Let me rephrase the question.

For example, the simulator training that was given post Three Mile Island, you describe the amount of simulator training given in the requalification program. Obviously last year there was more training given because of the special Three Mile Island training. Will that continue or will you this year and in subsequent years have the same amount of simulator training that was described in the requalification program?

A Are you speaking specifically to the simulator training in your question?

Q That is correct.

A The additional training that was given last year was one additional day on the simulator for the purpose of watching the simulation of the Three Mile Island accident without any operator action.

Then that was followed up by allowing the

operators to take action which essentially stopped the transient before it got anywhere.

We will be sending operators annually to a one-week simulator course as we have in the past. That simulator course will include accident scenarios similar to or identical to Three Mile Island. It will not necessarily include that the operator sit there and just watch it without taking any action to indicate it.

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88

Q The following questions are going to be with respect to the capabilities of the simulator itself. First of all, I'm not sure Ican make this question clear so if you have trouble understanding me, ask me to repeat it.

I can envision two different kinds of simulators. And my question, of course, would be which kind is the B&W simulator. The first kind would be a physical model of a nuclear power plant in which the computer would be programmed with the actual physics equations of the characteristics of the coolant, nuclear reaction core and all the other parameters that are involved in predicting the behavior of a power plant.

The second kind would be a mechanical logic model, if you will, where the computer would not be programmed with the physics equations of the reaction of the core, et cetera, but instead would be programmed with set responses to a given number of types of control manipulations and that sort. Can you understand the distinction I'm making?

A I think so.

Q Which kind is the B&W simulator?

A The former.

Q So would it be your estimation that any control manipulation that's available at Rancho Seco and at the simulator, and assuming we have the same controls, that the simulator could respond to any combination of manipulations

of the controls?

A I couldn't say that any, that it could simulate any, response that the actual plant could have. I couldn't say that because I don't know.

Q Do you know whether B&W determined any limitations of their simulator upon trying to run the Three Mile Island accident right after the accident?

A It's my understanding that they had to make revisions to those calculations that dealt with I think natural circulation response. But I'm not sure of that but it seems to me that I heard they had to spend some time with their programs to get the simulator to respond in a natural circulation mode equivalent to what the data showed it would do.

Q You mentioned earlier that your operators had pointed out that the auxiliary feedwater controls on the simulator are not located in the same position that they are located at Rancho Seco. Is that correct?

A It's correct that the auxiliary feedwater controls on the simulator are not located in the same position as they are at Rancho Seco. Those are the -- what I'm referring to is the integrated control system, Bailey valves.

Q What other differences are you aware of in the location of controls or indication between Rancho Seco and the simulator?

A We have at Rancho Seco some systems that are

differently designed in the kind of balance of plant and the boron addition system that are different from the simulator, and therefore, our arrangements -- there are switches that we have that they don't have in the simulator, and there are some switches which they have located on their H1-RC panel that we don't have.

What I'm thinking of primarily is in our system to add boron to the coolant system we take concentrated boric acid, demineralized water and mix it together and add it in. In the B&W simulator, the design incorporates the capability of going to a tank that has essentially the same concentration as the reactor coolant system in drawing water direct. The switch layout is different from what we have.

They have a different arrangement for what they call a fog system which is a feed-only good generator, as compared to our steam line brake failure logic system and the switches are in different locations. Their switches are on the H1-RI panel and our switches are on the H1-SS panel. Those are a couple of examples.

Q Does the B&W simulator assume the same performance of systems not designed by B&W as would occur at Rancho Seco? And in particular, you mentioned the steam line brake detection system, for example, where the switches are located. Would the simulator assume the response of that system as it would be at Rancho Seco?

A The steam line brake failure logic at Rancho Seco functions at 435 pounds gauge. The simulator fog system I think functions at 600 pounds gauge. Likewise, I think the fog system in the simulator also isolates the auxiliary feedwater, and our steam line brake failure logic does not isolate the auxiliary feedwater.

Q The steam line brake detection and isolation system, if you will, played a role in the Crystal River event, isn't that true?

A Yes, it did.

Q So if one wished to simulate Crystal River with a B&W simulator, could one do it?

A Yes, you could.

Q And would the steam line brake play the same role in the simulation as it would in the actual event?

A For Crystal River, I believe it would, yes.

Q Would it for a similar accident at Rancho Seco?

A Not to the extent that it would isolate the auxiliary feedwater system at Rancho Seco.

Q Does the B&W simulator display the same performance of the non-nuclear instrumentation system as would appear at Rancho Seco?

A With regard to that instrumentation's response to the parametric variables within the NSS, yes, it does.

Q Are there any important differences that you're aware

of between the simulation of the NNI performance at B&W and the actual operation of that system at Rancho Seco?

A Well, there's one very significant difference in the fact that the -- I believe in simulator the responses, the parameter responses, are all calculated and then fed out to the meters in the control room, as opposed to having a separate non-nuclear instrumentation system actually having signals transmitted to it, amplifying, massaging those and then driving meter movements.

Q What's the basis for the simulator's calculation of the information that's fed to the indication which you just described?

A I don't know, I'd only be presuming since I'm not a computer programmer and really had nothing to do with the generation of the computer program for that simulator.

Q Does the B&W simulator display the same performance of the auxiliary feedwater system as would occur at Rancho Seco?

A I think the auxiliary feedwater system from the simulator does not have the -- I don't think because I only spend a week a year there and I just don't remember. But I don't think that it has the emergency feedwater -- the auxiliary feedwater safety features actuated bypass valves that Rancho Seco has.

Q Does it have one motor drive and one dual drive?

A I think in the simulation it's -- I don't think it's a dual drive.

DR. COLE: I didn't hear your answer.

THE WITNESS: I don't think it's a dual drive.

BY MR. ELLISON (Resuming):

Q Are they two, one steam and one motor, or two motor drives?

A It would be two motors. I just don't remember.

Q Do you know whether the simulator can accurately represent the performance of Rancho Seco's condensate polisher system?

A With regard to feedwater flow through the polisher and bypassing the polisher or malfunctions that would cause you to lose flow because of a polishing malfunction, yes, it can. Of course, it's all in the computer so you don't have the systems that you utilize in regenerating polishers and moving one polisher and putting another polisher in service.

Q I'm going to ask you a few questions about various types of phenomena or events that could occur at Rancho Seco and ask you if the simulator could accurately represent them. The first one would be two phase flow in the primary system.

A The simulator will demonstrate to the operator the phenomena of two phase flow, and it's my understanding that the demonstration at the simulator corresponds with what

occurred at Three Mile Island. We've never had two phase flow at Rancho Seco so I can't really say whether or not it accurately demonstrates what happens at Rancho Seco. It does accurately demonstrate what happened at Three Mile Island.

Q Do you know whether it can simulate any other void fraction, if you will, than that which occurred at Three Mile Island?

A Well, it can simulate a range of void fractions. Not just the one specific fraction, but it's a range of fractions depending on how long the degraded conditions are allowed to persist.

Q Is that the same range as what was experienced at TMI or would it be a range of zero to 100 percent, or some other possibility?

A Well, zero to 100 percent would cover what happened at Three Mile Island I think.

Q Yes, but it would be a --

A Pardon me?

Q It would also cover ranges that were not experienced at Three Mile Island. Unless I'm mistaken. I don't think they reached the values of zero or 100.

A It started out with zero.

Q Okay.

A I think. Typically, that's how.

(General laughter.)

Q My question is do you know whether the simulator can represent any desired void fraction?

A To the best of my knowledge, it can.

Q Can it simulate feed and bleed?

A Yes, it can.

Q Can you simulate non-condensable gases in the primary system?

A The reason I'm hesitating is when we went back for that training last May and June, at that time it was the full scenario of what happened at Three Mile Island and it showed the core melting and that. So I assume that somewhere in the calculation it generated gases. The subsequent training, of course, for those particular instances, is the operator is an operator taking action and you never get to that point of having gas. If you let it persist, let the degrading condition persist, it will give the operator the same indications that occurred at Three Mile Island; namely, that he cannot get natural circulation in operation because of gas binding.

Q Do you know whether the simulator could, if the operator made the right mistake, if you will, display to him the introduction of non-condensable gases into the system and the inability to condense the voids that would result?

A It will demonstrate to the operator the loss of

natural circulation as steam voids begin to occur. If that is allowed to persist, it will demonstrate to the operator increasing temperatures in the hot leg, resist the temperature detectors, to the point where they peg high. And it will demonstrate incore thermocouple temperatures increasing as the core goes into a degraded condition. That's what it will demonstrate.

Q Is that all it will demonstrate?

A No, it will demonstrate a loss of feedwater pumps and it will demonstrate some 16 other items.

Q My earlier question was whether it would demonstrate, well let me back up and ask the preliminary question. Will it demonstrate the ability to, if you repressurize, condense the steam voids you were referring to?

A Yes, it will.

Q Okay. Then my earlier question was, will it demonstrate in the presence of non-condensable gases, the inability to condense those gases under similar operator action?

A Yes. Just thinking back to that scenario, it did demonstrate that you couldn't get natural circulation going again after you'd waited too long, so I'm sure that was the underlying phenomenon, why you couldn't get it started because you had non-condensable gases accumulating in the tops of j legs.

The problem I'm having with your question is that

typically in operating that, we don't let it go that far so I can't recall, you know, seeing -- just standing there not doing anything other than that one instance a year ago where we sat there to watch what happened at Three Mile Island.

Q Do you know whether the simulator was specifically programmed with a Three Mile Island sequence in order to just display the accident prior to your retraining?

A No. It's my understanding that the reprogramming that was done involved changing the calculations in the program to account for the natural circulation phenomena and the creation of steam voids or gas voids and its effect on natural circulation. And then after that program was completed, the simulator was run through the Three Mile Island scenario to see if those calculations which were in the computer would provide the data output from the simulator that accurately reflected what the data was from Three Mile Island. It was not a case where they wrote a little program and said, this is what we want out of it. It was more one of changing the calculations to account for those phenomena that evidently hadn't been accounted for earlier.

Q Could you simulate the light bulb incident at the B&W simulator?

A I don't think so because the B&W simulator, as I said earlier, uses the computer to feed the meters, they're essentially the non-nuclear instrumentation, and they do not

have a separate set of non-nuclear instrumentation, power supplies, cabinets and relays that really would be needed to reflect that loss of power.

Q Do you know whether the simulator can simulate any size break in the primary system?

A I know the simulator can simulate various size breaks. Whether those are distinct sizes, as opposed to like a rheostat that they could change the voltage and make it any size, I don't know. There is a spectrum of breaks, though, that it can simulate. I do know that.

Q You're familiar with the rationale for the reactor coolant pump? Is that correct?

A Yes.

Q Can the simulator display for the operators the consequences of failing to trip the pumps in a timely fashion?

A Yes, it can.

Q And would it be able to simulate the phase separation that would be involved?

A Yes. I think all the calculations that went into setting it up for the Three Mile Island type scenario incorporates that problem of two phase flow separation.

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Q Do you know whether any of the operators at Rancho Seco have been presented with that at the B&W simulator since the problem was identified?

A Yes. All of the Rancho Seco operators who have gone to the simulator since that problem was identified have been confronted with automatic initiation of high pressure injection and watched that they took the action to trip out the reactor coolant pumps.

Q Do you know whether any of them have been shown at the simulator the consequences of failing to trip the pumps and with the phase separation problem that we described?

MR. BAXTER: Excuse me, counsel, I don't think the testimony in the record supports the fact that there is phase separation from failure to trip the pumps alone. I think it's from subsequent loss of the pumps in a certain size break.

MR. ELLISON: That's correct.

BY MR. ELLISON (Resuming):

Q With that understanding, can you answer my question?

A If you'll repeat it.

Q Sure. Do you know whether any of the operators at Rancho Seco have been shown at the B&W simulator the consequences of failing to trip the pumps with a subsequent trip, and particularly the phase separation that would be involved?

A I do know that in the simulator course, a portion of

that program which is carried out in the classroom reviews the basic underlying principles on why that action is taken; goes over the spectrum of break sizes that are involved in causing two phase flow and phase separation if you secure the reactor coolant pumps.

Excuse me, if you do not secure the reactor coolant pumps and then they trip subsequent to that.

Q And you're referring to the lecture part of the simulator course, is that correct?

A Yes. I am.

Q My question really addressed the actual simulator part of the course. Do you know whether they have actually seen the phase separation in the simulator part of the course?

A I think I could almost state unequivocally that they have not because the purpose is to train them on how to avoid that, not train them how to have it occur.

Q Do you know whether the B&W simulator has been programmed to incorporate all of the failure modes and effects of the ICS that were identified in the FMEA?

A No, I do not, one way or the other.

Q Do you know whether the simulator has been modified to incorporate the changes particularly in the control room at Rancho Seco since Three Mile Island?

A No, I don't know if it's been modified to incorporate

all the changes we've made since Three Mile Island.

Q I'd like to refer to the portion of your testimony on training unlicensed operators that begins on page 36.

MR. ELLISON: Mrs. Bowers, inasmuch as I'm moving onto a new topic, this might be a good time to take a break if that's what you're considering.

CHAIRMAN BOWERS: Fine.

(A short recess was taken.)

CHAIRMAN BOWERS: On the record.

MR. BAXTER: We have verified that the document that's been marked and offered as CEC-35 is the most recent version and we have no objection to its admission.

MR. LEWIS: No objection.

CHAIRMAN BOWERS: The CEC Exhibit No. 35 is admitted into evidence.

(The document referred to was admitted into evidence.)

MR. ELLISON: Mrs. Bowers, at this time we would also like to identify the operator depositions. The first one would be the deposition of Dennis E. Tipton which we would like identified as CEC Exhibit 36. And we would move the admission of that entire document, together with the corrections made by Mr. Tipton and the exhibits to that testimony, of which there are three.

MR. BAXTER: No objection.

MR. LEWIS: No objection.

CHAIRMAN BOWERS: CEC Exhibit No. 36 is admitted into evidence. The document you described with the attachments.

(The document referred to was marked for identification as CEC Exhibit No. 36 and received in evidence.)

MR. ELLISON: As CEC Exhibit 37 we would like identified the deposition of Daniel E. Comstock, together with Mr. Comstock's corrections and exhibits of which I believe there is only one. That's correct, one. And we would move the admission of CEC Exhibit 37.

MR. BAXTER: No objection.

MR. LEWIS: No objection.

CHAIRMAN BOWERS: CEC Exhibit No. 37 as described by Mr. Ellison is admitted into evidence.

(The document referred to was marked for identification as CEC Exhibit No. 37 and received in evidence.)

MR. ELLISON: And lastly, for CEC Exhibit 38 we would like identified the deposition of Wayne S. Morisawa, together with Mr. Morisawa's corrections and the exhibits, of which there are three. And I would move its admission.

MR. BAXTER: No objection.

MR. LEWIS: No objection.

CHAIRMAN BOWERS: CEC Exhibit No. 38 as described by Mr. Ellison is admitted into evidence.

(The document referred to was marked as CEC Exhibit No. 38 for identification and received in evidence.)

BY MR. ELLISON (Resuming):

Q Mr. Rodriguez, earlier you identified a number of auxiliary operators and power plant helpers. I neglected to ask you regarding the number of equipment attendants. Do you know that number?

MR. BAXTER: Is that on a given shift?

MR. ELLISON: No, this is the total number at the facility employed at SMUD.

THE WITNESS: Earlier, I think my answers were addressed to numbers of personnel on an individual shift. I said two power plant operators, one auxiliary operator. There are two equipment attendants on each shift.

BY MR. ELLISON (Resuming):

Q When you referred in your testimony to the training of unlicensed operators, are you referring to all three categories of auxiliary operators, power plant helpers and equipment attendants, or a smaller group?

A The auxiliary operators, equipment attendants and power plant helpers classifications are normally held by unlicensed personnel.

Q And these are the people that you're referring to when you say unlicensed operators?

A That's correct.

Q Could you describe the functions of auxiliary operators?

A The auxiliary operator's primary function deals with operation of the miscellaneous rad way system and the reactor coolant rad way system. That's where he spends most of his time. He also does routine walkarounds to observe operation of other equipment in the, what is referred to as a minus 20-foot level auxiliary building, and he will also do some switching in the 4160 volt and 480 volt switch gear rooms.

Q What are the duties and responsibilities of a power plant helper?

A Power plant helper is the initial learning level. They are normally assigned with an equipment attendant. In one case, the power plant helper assigned to the equipment attendant who monitors the water systems functions as an assistant to him in the regeneration polishing demineralizers and operation of the service water system.

In another case, a power plant helper assigned to the equipment attendant who is responsible for the outside

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systems -- the turbine system, the boiler, the main circulating water system as examples -- will function as an assistant for that equipment attendant, and assist him in making his rounds and carrying out his duties.

Q And what are the duties and responsibilities of an equipment attendant?

A One equipment attendant is assigned the responsibilities of water processing; that's polising demineralizers and their regeneration, regeneration of demineralized water, makeup system and control of the service water chemical addition system, and processing of water prior to discharge from the retention basins.

The other equipment attendant normally is assigned the responsibilities for running equipment in the turbine building, the boiler feed pumps; monitoring temperatures and pressures on the main turbine generator system itself; operate the auxiliary boiler. He'll do some switching in the 4160 volt switch gear room when called upon to do that.

Q Do unlicensed operators have among their responsibilities maintenance and operation of safety systems?

A The maintenance functions are carried out by the maintenance organization which is separate from the operating organization -- mechanical, electrical and instrument control maintenance. As part of their normal responsibilities they will not operate safety systems routinely. What they will do

is in conducting valve lineups they will operate some valves that are associated with a safety system, the manual valves.

Q In a transient situation, is it true that unlicensed operators could conceivably be called upon to reposition valves outside the control room that are necessary to the response to that transient situation?

A It is conceivable that they could be called upon to reposition valves outside the control room.

Q What are the principal valves that they might be called upon to reposition?

A They could be called upon in the event of a multiple failure scenario to operate the integrated control system auxiliary feedwater valves, the Bailey valves. They might also be called upon to change the valve lineup. An auxiliary operator might be called upon to change the valve lineup for the makeup pump so as to line it up to an emergency bus in the event that the bus which it was normally lined up to failed. Those are some typical examples.

Q The Bailey vales that you referred to are outside the control room, is that right?

A Yes, they are.

Q Where are they located?

A One is located -- they're both located outside the auxiliary building and the containment building. They're in the corridor between the containment building and the

spent fuel building. One is located approximately 20 feet north of the spent fuel building and 30 feet west of the steam generator, a main steam line penetration to the containment building. And the other one is located approximately midway and about four feet off from the secondary steam relief gallery on the east side of the spent fuel building.

Q Referring to page 38 of your testimony, the paragraph beginning at line 1 and continuing to line 8, you mentioned the repositioning of auxiliary feedwater valves. Are these the same valves?

A Two of those four valves that are addressed in there are specifically the ones I referred to. The other two are the safety features actuated bypass valves that are in the same general location.

Q And there are transients for which an unlicensed operator would operate the other two valves. Is that correct?

A Transients can be hypothesized with a series of failures that might require an unlicensed operator to operate one of these valves. The likelihood of it is extremely remote. Actually, in excess of what the design of the plant called for.

Q In the circumstance where you had a loss of offsite power and a failure of one diesel generator to start, is it true that it would be necessary to reposition valves in order to ensure the operation of the high pressure injection system?

A No, it is not true. You would not have to reposition valves to ensure the operation of the high pressure injection system in the scenario where you have loss of offsite power and a failure of one diesel generator.

Q There are three HPI pumps, is that correct?

A There are three pumps that essentially are identical; two of which are normally referred to as a high pressure injection pump A and the high pressure injection pump B. The third pump is a makeup pump; it is an identical pump to the other two. Yes.

Q And of the three pumps, one of them is connected to one diesel generator, one to the other, and one of them can be connected to either. Is that correct?

A That is correct.

Q How is the swing pump disconnected from one deisel generator and connected to the other?

A To change the power supply from one pump to the other, or from one bus to the other for the makeup pump, it's necessary first of all to go down to the 4A bus and rack out the breaker that's normally used as supply power to the makeup pump, and then go to the 4B bus and rack the breaker in so that you transfer power to that bus; and then go down to the minus 20-foot level and throw a disconnect that is used to separate the cabling to maintain cable separation to get power to that pump.

Q And who would be performing this operation?

A If it's something that needs to be done quickly, the operator or the shift supervisor would probably direct the equipment attendant to change the breaker positions and the auxiliary operator who is normally down in the area where this disconnect is to throw that.

Q There would be no valve repositioning associated with this operation? Is that correct?

A To line up that makeup pump with the B bus, there is also valving that needs to be done to valve in the nuclear service cooling water system that's associated with that same side and valve out the nuclear service cooling water system associated with the A side.

Q Would this also be done by unlicensed operators?

A If it was directed to be done, it would be an unlicensed operator who would do that.

We addressed two separate problems here. The first one -- at least I want to make sure that was the one my answer was addressed to. The first problem was whether or not you had to do any valve manipulation to ensure high pressure injection on a loss of offsite power and a loss of diesel, and my answer to that is no. And the second set of questions really dealt with changing the makeup pump and had nothing to do, at least my answer had nothing to do, with what your first question was about.

Q If the makeup pump were connected to the diesel that failed to start, would you have to perform the second operation that you described?

A No, we would not.

Q Is that because you would simply go forward without using the makeup pump?

A You would have the B high pressure injection pump supplying high pressure injection.

Q And would that be the typical -- if there is -- strike that. Is that how you would expect the facility to be operated in that circumstance?

A I would expect that the shift supervisor, as he went through his scenario and he got things settled down, eventually would obtain the use of that makeup pump as the backup pump in the event that something happened to the running B pump.

Q Does SMUD have a formal training program for training unlicensed operators?

A We have a program for training unlicensed operators. The degree of formality of that program is not to the same extent that it is on the licensed operators.

Q What training would an unlicensed operator go through before assuming his responsibilities?

A Well, the auxiliary operator, before assuming the responsibilities as an auxiliary operator, would typically

have had training in emergency plan, first aid, security, a three to four-week classroom session on systems training, and he probably wouldn't become an auxiliary operator for some two years or so after he came to the site. He would have participated in many of the lectures that are given to the licensed operating people as a member of that crew.

The same thing holds true for the equipment attendant except that the equipment attendant must achieve his position as equipment attendant within six months to a year of hiring on at Rancho Seco.

The power plant helper assumes the learning responsibility or the training responsibility as a new employee immediately. The training that he does get prior to being assigned to the crew covers health physics, emergency plan, and security. Typically then, he's assigned to the crew for on the job training, and some time after he has been on that drew he is then pulled off and put in a three to four-week classroom systems training and then reassigned to the crew.

Q Would it be fair to say that generally speaking, unlicensed operators are trained on the job?

A Yes, generally the majority of the training is on the job training by performing the function along with a previously trained individual and the shift supervisor or the senior control room operator periodically examining his performance and showing him how to carry out his functions.

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Q Would it be permitted for an unlicensed operator to train another unlicensed operator?

A Yes.

Q Is there a formal testing program for unlicensed operators?

A Currently there is a set -- we use a set of power station manuals that the unlicensed operators, the new unlicensed operators go through and complete. They will complete sessions on the general familiarization manuals with the plant, and sessions on how they operate. They take oral and written quizzes at various times during this training program.

We have also instituted coming out of this shut-down another formal system by system check off program wherein the unlicensed operator will learn about a system and will study it and then come to a licensed operator for oral exam and signature check-off that his level of knowledge is satisfactory.

Q With respect to the check-off program, would it be required that an unlicensed operator be checked-off on every important system before assuming responsibilities for those systems?

A No. As I said, that formal check-off program is one that we have just recently instituted. Those individuals that are currently standing the watches as auxiliary opera-

bfm2

tors, equipment attendants will have to proceed through those check-offs and have a record that they have been examined to verify their level of knowledge.

(Pause.)

Q Would it be possible for an unlicensed operator then to be asked by a licensed operator to perform an operation that he had not been given instruction on and not yet performed himself?

A Yes. That might be possible.

(Pause.)

If I might, I would like to, I guess, add to that comment just for the sake of clarity, even a fully qualified shift supervisor who has been licensed for years may come up against an operation that he has not performed before.

I don't think it is unusual to call on somebody to ask him what he has not done in a complex set of systems.

Q Is it true that there has been a high turnover of unlicensed operators at Rancho Seco in the last 18 months?

MR. BAXTER: I object to the question on the grounds of irrelevancy. The issues before the board here on unlicensed operators is whether they have been adequately trained to respond to feedwater transients.

I fail to see what turnover rate among those personnel have to do with training.

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CHAIRMAN BOWERS: Mr. Ellison?

MR. ELLISON: Mrs. Bowers, Mr. Rodriguez has testified that unlicensed operators are trained on the job and essentially they gain more experience when they remain on the job in operation of the facility.

In examining the questions, as Mr. Baxter has pointed out, we are here to examine. I think it is quite relevant to determine whether based on that answer, of Mr. Rodriguez, whether the operators presently at the facility have been there for a long time or whether there is a high turnover.

CHAIRMAN BOWERS: Does the staff have a position on this?

MR. LEWIS: I think it has some relevance.

(Board conferring.)

CHAIRMAN BOWERS: We think it has a relevance. You are describing experience and training. It would certainly be good to know the length of service of personnel in these roles.

We would like to have an answer to the question.

THE WITNESS: Would you repeat the question, please?

BY MR. ELLISON: (Resuming)

Q Has there been a high turnover of unlicensed operators in the last 18 months?

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A In the 12 months prior to October of 1979, there was a relatively high turnover in the operator classification of power plant helper and by high turnover, I mean somewhere in the area of a dozen or ten individuals that left our employ during that period.

We made some adjustments based on some of the interviews and reasons for that. They were primarily economic in nature and promotional opportunities.

In the last six months we have had two people leave.

Q Were there any other reasons given aside from the economic and promotional ones that you described?

MR. BAXTER: Again, I object, Mrs. Bowers. If we are going to talk about the length of time which unlicensed operators are employed in the plant, that may relate to experience and training and that is one thing.

Reasons for leaving the plant, I suggest, is irrelevant to the question of their training and experience. I object on that ground.

CHAIRMAN BOWERS: Mr. Ellison?

MR. ELLISON: Mrs. Bowers, among the questions we are examining is the training of these operators, the management competence.

I think that reasons which might go to that would be dissatisfaction with the operation with the factility, et

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cetera.

I think it is relevant for us to inquire in that direction.

CHARIMAN BOWERS: Mr. Lewis?

MR. LEWIS: I think with that explanation of what CEC is looking for, I would have no objection.

(Board conferring.)

CHAIRMAN BOWERS: We think the objection should be overruled and that the witness should answer the question. One thing that crosses my mind on a personal basis is I don't know how many people tell the truth when they are leaving a job.

MR. ELLISON: Well, the board can certainly weigh that, the evidence, as it sees fit. Would you like me to repeat the question?

THE WITNESS: Yes.

BY MR. ELLISON: (Resuming)

Q Aside from the reasons you described, promotional opportunities and economic related reasons, are you aware of other reasons given by the operators for leaving?

A Shift work -- dissatisfied with shift work, dissatisfaction with the security concept based on the fact that an employee is a security threat to operating the plant satisfactorily, dissatisfaction with the quantity of inspection in overlooking an individual's shoulder, dissatis-

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faction because another individual -- a particular individual had quit -- he felt he was more qualified than the one who was promoted.

Generally, those are the reasons. I cannot recall anyone quitting and saying, boy, he sure would like to stay; they all had their reasons for wanting to leave.

Q With respect to the shift work, could you elaborate on what the nature of the dissatisfaction was?

A Have you ever worked a rotating shift?

Q Yes, I have.

A Essentially, then, that -- the problem is that their routine is broken up. They are working days for a week, then they go off for a couple of days, then they come back and they are working swings.

Then they go off for a couple more days then they are working the mid-shift. That interferes, particularly for themarried individual who may have some children -- it just kind of interferes with his home-life.

As I said, most of these individuals that have left were in the power plant help area, some equipment attendants, but they are all individuals that have not been with the power station for a long time.

No matter how much you try to explain to an individual what shift work is all about and that it is a real change of life-style from the way most of us live, a lot of

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them don't believe it until they get into it.

After they are into it for four or six or eight months, they just decide that that is not for them.

Q Licensed operators also work on the same shift pattern. Isn't that true?

A That is true.

Q You also mentioned that one of the expressed reasons for leaving was dissatisfaction with the amount of oversight of unlicensed operator work. Could you elaborate on that?

(Pause.)

A The individual operators, for the most part, do not see or do not experience the checking by quality assurance, or mechanical electrical inspectors, or the regulatory inspectors.

There is an awful lot of discussion about how much of that goes on. In most avenues of endeavor, looking over your shoulder, if you will, is much less and there are some individuals that cannot adjust to that concept.

That is essentially what I am talking about.

Q So, they felt there was too much oversight rather than too little?

A Not all of them, but I am saying that those comments are made when an individual leaves.

Q Were there any that express dissatisfaction in the

sense that there was too little oversight in their work?

A I do not know.

Q What is the total number of unlicensed personnel that serve shifts that are employed by SMUD?

A I cannot give you the exact figure.

Q Could you give me an approximate --

A Approximately 30 to 35.

(Pause.)

Q Mr. Rodriguez, Mr. Lanpher is going to provide you as well as everyone else with a document that is -- it has a cover letter from the U. S. Nuclear Regulatory Commission. It has a stamped date on it of Auguest 1, 1979. It is a letter addressed to John Mattimoe and SMUD, generally, from J. L. Crews, Chief of Reactor Operations in the nuclear support branch.

Then attached to it -- there are various attachments to it numbering -- the subject of this is an NRC investigation at Rancho Seco, that was conducted between June 19 and July 6 of 1979.

I would like this document identified as CEC-39.

(The document referred to was marked CEC Exhibit No. 39 for identification.)

BY MR. ELLISON: (Resuming)

Q Are you familiar with this investigation?

A Yes, I am.

Q This investigation was initiated upon an anonymous phone call to the NRC from someone purporting to be a SMUD employee. Is that correct?

A That is what the NRC said, yes.

Q Do you recall what the -- generally, what the allegations of that anonymous telephone call were?

A No, I would have to read back through this inspection to see what they were.

Q Okay. Could you refer to page 3 of the attached details of the investigation section?

(Pause.)

The first allegation listed down there?

A Is, "the turnover of nonlicensed station operators and other personnel is excessive and training of new people is minimum.

Two trainees dropped out of a training and licensee class. We should find out why."

Q Are you aware of complaints by SMUD personnel that the training of new personnel for the unlicensed operator positions is minimal?

A Yes, I am.

Q Apart from this particular allegation?

A No, this particular allegation was the major reference I was referring to when I said, "Yes, I was aware

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of it."

Q Do you know of any others -- incidents where people have complained that about the same minimal training?

A Yes, I do. I think that has to be in a proper context, though. I could complain about training myself if there is something particular I want to be trained on.

Q Does that complete your answer?

A Yes.

Q Referring to the next page, page 4, at the bottom of the third paragraph appears the statement: "Licensee representatives state that they were developing a more formalized training program for unlicensed operators which would be implemented in 1980."

Is that the program you described earlier with the check-off system?

A Yes. At the time that this response was made, we had -- we were actively recruiting for two additional instructors for the primary purpose of being able to expand the very formalized licensing training program to include a more formal training program for non-licensed operators and maintenance personnel.

Q So, am I correct in believing that the new program has been implemented?

A We are implementing it.

Q Under the new program, will it still be true that

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unlicensed operators will be trained by fellow unlicensed operators, or will there be someone who will be hired specifically to train them?

A For the most part, their training will be by other unlicensed operators. The instructors will perform some formal classroom training as they have in the past on systems.

The shift supervisors and senior control room operators will be carrying out the detailed check-off audit of the individual's knowledge.

Q Will it still be true under the new program that training will be essentially on the job type training?

A Yes, that is true.

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Q Referring to Part B of Page 4, there appear three additional allegations. I would like you to focus on the first one, which states, "There is a lack of communication and general disregard concerning AO's and below as to plant status and the specific ongoing evolutions that affect their work areas. One auxiliary operator was sent to a high radiation area to reposition valves. He found that they had already been repositioned, probably in March or April of 1979, with no prior knowledge of the situation."

With respect to the communication and concern for keeping auxiliary operators informed of plant status and evolutions that affect their work areas, the NRC letter finds on the next page, Page 5, a statement, "Licensee management personnel stated that the individual has the responsibility for keeping himself or herself informed of plant activities."

Will that still be true under the new formalized training program?

A Yes.

Q DO you know whether it is true that an auxiliary operator was in fact sent to a high radiation area to reposition the valves and found they had already been repositioned as described on Page 4?

MR. BAXTER: I object to that question as well. I fail to see the relationship at all to the training of

unlicensed operators and their ability to assist this facility in responding safely to a feedwater transient. The Board also has the authority to limit cross examination based on the materiality of the questions being asked, I would point out,even if it finds there is some marginal relevance.

MR. ELLISON: Mrs. Bowers, I believe this is not only relevant to training of unlicensed operators, but certainly to the competency of SMUD management, which is an issue addressed by Mr. Rodriguez.

As far as the materiality of this particular event, I would simply point out that the NRC thought it was material enough to initiate an investigation.

MR. BAXTER: I don't believe that means anything is necessarily material. They are merely being prudent when they investigate allegations.

CHAIRMAN BOWERS: Mr. Lewis?

MR. LEWIS: Well, I think that it does not relate to the training of the operators. It may somehow have a nexus to the question of management competence. I have not thought about that before. So I think if it has relevance it would be in that area rather than the training of the unlicensed operators.

(Whereupon, the Board conferred.)

CHAIRMAN BOWERS: We think it is relevant and it

is material, and we think it is just part of the overall picture of the training, of the way the people are used or how they are not used at the plant. It might even go to the morale of the individual employees, the feeling that he is in a situation where he can have confidence as to what is happening around him.

BY MR. ELLISON: (Resuming)

Q Do you want me to repeat the question?

A Yes.

Q Referring to Page 4, Item B-1, the second half, do you know whether the incident that is described there in fact occurred?

A I do not know the details of that particular incident or how it occurred.

Q Is it your understanding that it did occur?

A I said I do not know the details. I do not know for sure whether it occurred or not.

Q Mr. Rodriguez, if you could, I would like you to turn back to Page 3 under the section, Findings.

Early in response to the high turnover question you stated that the people that had left were primarily power plant helpers at the --

A Excuse me. I think I said power plant helpers and some EA's.

Q I am sorry. Perhaps I misrecollected.

Is this, this first paragraph here, the findings, does that reflect your understanding of the turnover?

A With regard to the classifications being primarily power plant helpers and EA's, yes. The exact numbers, I do not recall.

(Pause.)

CHAIRMAN BOWERS: Mr. Ellison, we want to make sure this record is clear to people reviewing it who may not have the technical information that many people in this room have, and also in other levels of review in NRC, but for instance if it would go into court, the acronym AO was used. Is that an auxiliary operator in this first paragraph?

THE WITNESS: Which paragraph are we in?

CHAIRMAN BOWERS: Page 4, and it is Allegation One.

THE WITNESS: Yes. The AO is auxiliary operator.

CHAIRMAN BOWERS: And I think Mr. Shon just brought to my attention on Page 3. The first paragraph under Findings does identify the acronyms. Okay.

BY MR. ELLISON: (Resuming)

Q Referring to Page 6, Mr. Rodriguez -- this refers to the high turnover problem -- there appears a statement, "Licensing management personnel stated that they were aware and concerned about this matter, but that there was little

inducement that they could offer to retain the best qualified individuals."

Could you briefly explain what the limitations on the inducement that SMUD can offer qualified individuals are?

A Well, the primary inducement is the dollars per hour rate that is paid, and as I said earlier, we made some adjustments in the economic picture for power plant helpers late last year, and at least for the six months since we have done that, our ability to retain them has improved.

Q Who sets the pay scales for SMUD employees such as unlicensed operators?

A The Board of Directors of the Sacramento Municipal Utility District.

(Pause.)

Q Referring to Page 8 of the same document, under Subsection C, it is entitled Follow-Up Items Identified by NRC IE Inspectors on June 21 to 22, 1979 -- Unlicensed Plant Operators, and it lists six items.

The second one is, "Procedures used by operators are not up to date and or are not the same as the official plant procedures."

First of all, do you believe that statement at the time it was made was true?

A For those particular procedures that were

identif '. The one that I remember in particular was a procedure dealing with regeneration of the resins in the polishing demineralizer beds, and that particular procedure had had additional notes annotated in the column, and those no' s had not been included in an official revision.

The other instance, I believe, was a procedure located at the rad waste panel. There was one procedure in, as I recall, a clear plastic envelope to protect that procedure, and a more up to date procedure was in the volume that was located at that station, and there were two procedures there. One was the most up to date one and the other one wasn't.

Q Could you describe what steps, if any, SMUD took to ensure that operators were using up to date or official plant procedures following this investigation?

A Well, following that investigation, those procedures at the local work stations were examined to ensure that they had the up to date procedures in them, and the procedure which had the notes annotated in the column were reviewed by the operations supervisor and those notes which did in fact improve the ability to regenerate that resin were included in a formal procedure and approved by the Plant Review Committee.

The procedure that was outdated and contained in the clear plastic holder was removed and an up to date procedure

was inserted.

Q Can you recall any other actions that were taken?

(Pause.)

A In the area of the regeneration of the polishing demineralizers there is one auxiliary operator who essentially is repsonsible for the operation of both demineralizers, and although he is not on watch all the time, he sees the crews and he does much of the training of the crews for regenerating that resin, and he was also instructed by the operations supervisor to ensure that any changes that he thought were improvements in that -- or reminded, I guess, that any changes which he thought were improvements to the procedures should be properly documented and passed up through the chain and through the PRC for formal approval and incorporation rather than simply writing in pencil comments in the columns of the applicable procedure.

Q The third item on Page 8 states,"Reactor coolant system pressure was lowered below the technical specification limits for about a year to keep technical specification primary leak rate below limits."

Is that true?

(Pause.)

A Not to my knowledge. I think the inspector's response that he examine the reactor power and powering

system pressure records spanning 1978 and found no items of non-compliance or deviation supports it. He could not find any either.

Q That is correct. On Page 9 the statement appears under 3, "The inspector examined selector reactor power and primary system pressure records spanning 1978. No items of non-compliance or deviations were identified."

A I think on the top of Page 9, Paragraph 2, is also the response to what the inspector found regarding procedures used by operators.

Q That is right.

The fourth item that is identified here discusses the condensate demineralizer system and concludes by saying, "Operator knowledge of the system is incomplete." And over on Page 9 it describes in the second paragraph that the NRC office requested that the licensee complete additional unlicensed operator training for the condensate polisher system." And it goes on to describe the training.

Can you tell me whether this led to any change in the program for the training of unlicensed operators?

A Well, as I think we indicated, at the time we were implementing a more formalized documented training program for unlicensed operators, and we had begun implementing that.

Q My question is as to the implementation of that

new program, whether there was increased emphasis on the polisher system as a result of this investigation.

A Yes, there was. As I said, we modified the procedure, and also brought the attention of the auxiliary operator who was fundamentally responsible for the operation of the condensate polishing demineralizer system to ensure that changes in those procedures are forwarded timely and as the investigation identifies that additional training consisting of classroom discussions and hands-on sessions in the plant were conducted.

As I recall, the fundamental concern here was the proper manipulation of the resin beds during the regeneration cycle, which means proper separation of the beds, chemical addition to regenerate them, proper mixing, and then placement back into the -- into the demineralizer tanks before putting that tank back into service on the condensate system itself.

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Q One more question on this document. If you could turn to page 4, there it is discussing two personnel who had dropped out of training for licensed operator status, and says that: "They had stated to plant management that they wished to drop out of the training due to the increased responsibilities being placed on operators after the Three Mile Island accident."

Is it your opinion that operators at Rancho Seco -- have the responsibilities of operators at Rancho Seco increased since the Three Mile Island accident?

MR. BAXTER: Clarification? Licensed operators or both licensed and unlicensed operators?

MR.ELLISON: It is my understanding of this comment that these people did not -- let me ask Mr. Rodriguez this.

BY MR. ELLISON: (Resuming)

Q You are familiar with the people referred to here?

A Yes, I am.

Q These people were unlicensed operators at the time. Is that correct?

A Yes, they were.

Q They dropped out of the licensed operator training program, but remained as unlicensed operators. Is that correct?

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A That is correct.

Q In that case, my question is addressed only to licensed operators, whether you feel their responsibilities had increased after Three Mile Island.

A Basically, the responsibilities have not changed. Licensed operators have always been responsible for operating the plant in a safe mode to protect the general -- the health and safety of the general public.

What has increased is the social pressures on them. There was a time when they could go home and feel proud that they worked in a nuclear plant. It is difficult to do that today.

These are -- I am relating comments that were essentially given to me from some licensed operators, control room operators and senior licensed operators and shift supervisors.

The large amount of publicity that occurred as a result of Three Mile Island, each of those individuals felt personally -- a number of them said, you know, "We are not that incompetent, but you read the newspapers and every power plant operator in the country is incompetent."

Those are the pressures. I think that in this context, these operators used the word "responsibility," but I think that is what they are really talking about. They are being looked at, and a lot of doubt being cast on their

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ability, additional pressures from increased inspections. Particularly in May and June, just prior to this occurrence the great deal of additional training, auditing, the NRC regional inspectors audited and came in and quizzed the operators.

SMUD managment did training on them. The training supervisor trained, the operating supervisor trained. They were sent to the simulator for training.

The NRC came in and quizzed again and found that some of the -- at least in the NRC's opinion, some of the operators were not adequately familiar with natural circulation cooling.

Then we hired a contractor to come in and do some retraining and reauditing. Then the NRC came back and audited again. These individuals were in a classroom undergoing a very intensive training program.

It put a lot of pressures on them, too. I think that is really what is being reflected. They saw what was happening and it was just too much. They did not want to put up with that.

Q Have you had occasion to talk to these two personnel about the situation?

A Not about this particular situation, no. The training supervisor and the plant superintendant and the operations supervisor talked to them about it.

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CHAIRMAN BOWERS: Mr. Ellison, we think it is appropriate to take another very brief break now.

MR. ELLISON: Fine.

(Recess.)

CHAIRMAN BOWERS: Are you ready, Mr. Ellison?

MR. ELLISON: Yes, ma'am.

BY MR. ELLISON: (Resuming)

Q Mr. Rodriguez, Mr. Lanpher is providing you, as well as everyone else with a package of licensee event reports which we would like identified as CEC-40.

(The document referred to was marked CEC Exhibit No. 40 for identification.)

THE WITNESS: Excuse me, Mr. Ellison. I wonder if I just might regress back to the question about that valve, because I could not remember specifically what it applied to.

In reading the --

BY MR. ELLISON: (Resuming)

Q Before you go forward, could you tell me which valve?

A The valv the operator said he had been sent in to change. Reading through the inspection, I see the inspector's bottom line was the allegation could not be substantiated.

That is parobably the reason I cannot remember the

valve because they could never determine specifically what it was.

In fact, that it had not been properly placed.

Q All right. Mr. Rodriguez, would you be involved in the preparation of licensee event reports related to operation problems at Rancho Seco?

A I normally review those licensee event reports prior to their being forwarded to Mr. Mattimoe for his approval.

Q You are you familier, are you not, with the three reports that led to the recent imposition of a civil penalty -- imposition of a civil penalty against SMUD by the NRC?

A Yes, I am.

A There were three separate instances involved in that. Is that correct?

A That is correct.

Q In each of those instances, there was a failure to position valves that affected the -- to correct the position valves that affected the performance of the high pressure injection system. Is that correct?

A Well, I guess to be more specific, there were valves that were misplaced that had an accident scenario that ensued, coupled with failures, where part of the high pressure injection system might not have performed part of its function.

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Q In any of those instances as a result of the operation error alone, was one of the HPI trains made inoperable?

A A single HPI train may have become inoperable had there been additional failures, at the time that it was called upon to operate.

Q Additional failures in the HPI system, or additional failures requiring the operation of the system?

A The operation of the single train that might have failed would have required either a complete loss of off-site power or a complete loss of one or both of two other supporting 4160 volt buses.

Q Had that occurred, there would have been one HPI train available?

A Yes.

Q Is that the case for all three of the instances that we are referring to, or it is only the case for one?

A I guess I need to get specific in order to answer you r question.

The report that we made that was deemed to be considered a violation involved shutting a valve in the cross tie which was supposed to have been left open.

That cross tie has two valves in it. One is supposed to be shut and one is supposed to be open. The procedure at that time required in the event that a break

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occurred, the operator had ten minutes to open the one cross tie that was shut.

The two valves are immediately adjacent to each other. The timing test that we ran indicated that the operator could get down there any open it in four and a half minutes. The accident scenario for that one wold have requried first of all that the operator, in opening the first valve in four and a half minutes, was unable to open the second valve in the next five and a half minutes.

It would also have required that the break in the reactor coolant system be a break of a certain size spectrum in the discharge piping from one of two reactor coolant pumps.

Then, a failure of the other high pressure injection pump, either the pump failed or the electric bus supplying it failed. Those conditions occuring simultaneously may have resulted in not supplying sufficient cooling water to the reactor coolant system.

One of the other incidents that we reported was classified to be an infraction. In that instance, one high pressure injection pump might have failed due to lack of cooling water to its lube oil cooler.

If both component cooling water pumps that supply that cooling water would have failed -- that is how I relate back to the fact that those pumps are associated with 4160

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volt buses and the buses failed--you would expect both pumps not to operate.

So, you need that scenario of accidents for that to become a situation where one high pressure injection train would not perform its function.

The third infraction dealt with not supplying power to a safety features valve in the discharge of the make-up tank, so that that valve would go shut on a safety features injection and to preclude allowing a hydrogen overpressure in the make-up tank from expanding into the suction of the make-up pump in the high pressure injection pump associated with it.

Under those conditions, that pump may become air bound. It may not. The assumption is that it would become air bound. That is why in the general design, the design is to close that valve off.

How that pump would actually function, I don't know because we never tested it that way. It has a supply from the make-up tank. It also has a supply from the borated water storage tank, which would provide sufficient water to it.

The question was or is, what is the effect of the gas coming out of the make-up tank? My assumption is that the pump would be pumping a gas-water mixture, but we never tested it, so I cannot prove out that that pump would have

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operated.

Q Could you refer to the last three licensee event reports which are attached to CEC-40?

A could you give me the dates? I'm not sure mine would be in the same order as yours.

Q They should be, although I may have mixed up mine, here. Okay. The last three are dated February 16, 1980, the licensee report number is reportable occurrence 80-3; the next one is January 25, 1980, reportable occurrence 79-24; and the last one is January 14, 1980, reportable occurrence 79-23. Have you found those?

A Yes.

Q Are those the three instances that you are referring to?

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A Yes, they are.

Q And these were three instances that were reported by SMUD to the NRC by way of these letters. Is that correct?

A That is correct.

Q Could you identify which by the -- either the date or the reportable occurrence number -- which one is which relative to your last answer?

A The reported dated January 14, 1980, relates to the closing of the cross connect valve. The report dated January 25, 1980, relates to the closing of valves associated with the component cooling water failure that I discussed, and the report dated February 6th, 1980, relates to the introduction of hydrogen and nitrogen gas into the high pressure injection and makeup pump.

Q Referring to the first one, the January 14 letter reporting the cross connect valve, when was this problem discovered and how long had it been present at the time that it was found?

A The problem described on the last page of that first paragraph -- the last paragraph of the first page was discovered on December 27, 1979. In backtracking, it was determined that valve manipulation had occurred on December the 17th, 1979.

Q And with respect to the January 25, 1980, letter,

when was that problem discovered and how long had it persisted?

(Pause.)

A It was discovered on January the 9th, 1980, and that had persisted since December the 17th, 1979.

Q Finally, the same question with respect to the February 6th letter.

A The occurrence was January 9th. The discovery was 42 hours later.

Q With respect to the first two incidents, both of them you stated occurred December 17th. Do you know whether they occurred in the same maintenance operation?

A No, I cannot say categorically that they did.

Q Has SMUD identified who was responsible for the error involved in these two incidents?

A No, SMUD has not identified the personnel.

Q Has SMUD attempted to do that?

A No, SMUD has not attempted to identify the personnel.

Q Is that also the case with respect to the February 6th incident?

A Yes,that is also the case with the February 6th incident.

Q Are any of these incidents,taken separately or the fact that three of them occurred within a short time,

serious matters in your opinion?

A Yes, they are.

Q To your knowledge, has SMUD attempted to determine the reasons why these three incidents occurred within the time period that they did?

A Yes, SMUD has.

Q Could you elaborate on what that effort involved?

A For the incident dated January 14, 1980, the reason this occurred and went unidentified for ten days was that the individuals approving this valving operation did not generate a document identifying that it was a deviation from the procedure. As a result of that, the management above those individuals was not made aware of the incident early on to correct it.

Q Mr. Rodriguez, if I may, I know you have not completed the answer with respect to the other two, but let me ask you, you mentioned the individuals who performed the operation, et cetera. Earlier I asked you if SMUD had attempted to identify who was responsible for these incidents, and you said no.

Has SMUD identified who the individuals that you just referred to are?

A SMUD as an entity has not specifically identified who the individuals are. The lower supervision, primarily the operations supervisor, knows who they are.

Q Would you like to complete your answer with respect to the reasons for these other incidents?

A Prior to the 1975 Browns Ferry fire, the make-up pump was normally lined up to receive cooling water to its lube oil cooler in the event of a safety features actuation from the A nuclear service cooling water system. As a result of the Browns Ferry fire and the fire hazards analysis conducted by SMUD, it was determined that a fire in the area of the make-up pump could cause some leakage from both the A and B nuclear service cooling water systems.

The reason for this was that the cooling water piping is copper piping, essentially silver soldered as opposed to welding, and it was determined that there was some possibility that the fire could get so hot on -- I do not recall particularly what was burning in there. I assume it was -- I don't know; it is all pipe in concrete. But anyway, the insulation on the motor or something like that -- get so hot that the silbraze joints might melt and it would begin to leak from both systems.

As a result of that, it was required that those valves remain shut. Then, except for the case where the make-up pump is aligned to serve the function for high pressure injection A or high pressure injection B, these particular valves occurred in two places. They occurred in the locked valve procedure, and they also occurred in the

make-up and purification system procedure. In changing the valve line-up from leaving, both valves shut, providing for one set of valves to be opened. When you put the make-up pump in a high pressure injection mode the locked valve list was changed.

However, the procedure, the make-up and purification system procedure, which also dealt with changing the pump configuration, was not changed. The operator in lining up this pump lined it up per the make-up procedure and not checking the locked valve procedure, and therefore did not provide for nuclear service cooling water to this system, although it did have component cooling water.

The February 6th, 1980, reportable occurrence identifies failure to provide power to the discharge valve from the make-up tank, in bringing the make-up pump out of its configuration to operate in place of the high pressure injection B pump. The operator in carrying out about a nine-step program overlooked the step which includes racking in the A breaker and racking out the B breaker.

Q Are the operations -- Had you completed your answer?

A Yes.

Q Are the operations that you just described covered by written procedures?

A Yes, they are.

Q Has SMUD changed those written procedures since these incidents?

A The make-up and purification system procedure which did not identify the proper line-up of the nuclear service water valves. The make-up pump when it was placed in a high pressure injection A or B position was changed.

We also changed the administrative procedure which controls the generation and review of procedures to require that their group supervisor and the Plant Review Committee and their review of any procedure change and determine whether or not that change may be reflected in some other procedure, and if that is the case, then the appropriate group supervisor is notified, and given a time to generate a change to bring his procedure up to date.

We also changed those procedures that deal with the safety features systems to require the taking out of and putting into service of those systems requiring dual valve and electrical breaker verification. By that I mean that one operator takes a copy of a procedure and runs through and places it in the proper valving operation, and brings the procedure back to the control room.

Another operator takes another blank of the same procedure and goes down there and verifies it is done correctly.

I think that essentially describes the procedure

changes that we made. We have also made a commitment that prior to using any surveillance test procedure during our monthly, quarterly, or refueling interval testing, that procedure will be reviewed to ensure that it incorporates the requirements to verify dual valve operation -- dual valve verification and electrical valve verification.

Q Before I ask this question, I would like to clarify for the record that we are not interested in having you name any of the individuals that were involved in these incidents. We are simply concerned with SMUD's organizational response to the incidents.

A That is good, because I don't know their names and specifically I have not asked for those.

Q Would you like to go on?

A No.

Q What is the reason why you do not know their names?

A Because I did not ask for them.

Q Why did you not ask for them?

A I asked the operations supervisor to make a determination of whether or not the individuals that were involved in this had a history of making these kinds of mistakes, and his report to me was, they did not.

Q Do you know whether the three incidents we have been discussing involved three different sets of

individuals or whether there were individuals that were involved in more than one of these incidents.

A I do not know.

Q Was there any disciplinary action taken against anyone as a result of these incidents?

A No, there was not.

Q The types of operations that you have been describing for these three incidents would ordinarily be performed by unlicensed operators. Is that correct?

A That is correct.

However, those operations were performed under the direction of the shift supervisor.

Q The next licensee event report I would like you to look at is the first one. It should be on the very top of the stack. It is dated Octover 9, 1974, and it describes an incident in which the reactor start-up was conducted with the borated water storage tank capacity below the minimum established in the technical specifications.

Do you recognize that report?

A If you can give me a few minutes, I will look through it, and then maybe I can tell you.

(Pause.)

MR. BAXTER: Mrs. Bowers, I suggest that if the witness is going to be asked questions about this very large stack of reports which on their face go back to

1974, it is going to be a very cumbersome and long process. I do not know what the answer is to it other than to give the witness an extended amount of time to review them.

Could we have an inquiry as to the scope and nature of the examination that will be conducted with respect to these documents? I am not asking for an identification of your questions.

CHAIRMAN BOWERS: Mr. Ellison?

MR. ELLISON: Well, first of all, I would assume, although one of the purposes of this examination is to determine that Mr. Rodriguez is familiar with these incidents already. Secondly, as far as the scope of our examination, we are simply interested in identifying these incidents, and I do not expect to be engaged in a great deal of examination on any of them.

CHAIRMAN BOWERS: How many are there?

DR. COLE: A through T.

MR. ELLISON: There are 17 of them.

MR. BAXTER: Just to understand what we are doing, is there any theory to the selection of these reports or any particular subject matter in Mr. Rodriguez' testimony to which they are purportedly related?

MR. ELLISON: Yes, these are all incidents that I believe are related to Mr. Rodriguez's testimony and to

Mr. Rodriguez' employment at SMUD.

MR. BAXTER: I know you believe it, but I am asking for an explanation. I was asking about an explanation.

MR. ELLISON: These all pertain to incidents involving operation matters at Rancho Seco.

CHAIRMAN BOWERS: Is it your plan to go down through these in essentially the same kind of way that you covered the last three?

MR. ELLISON: No, I would say that we spent more time on the last three for two reasons. One, theyare more recent, and secondly, they involve a civil penalty from the NRC and are arguably more serious.

(Whereupon, the Board conferred.)

MR. BAXTER: I would just suggest to the Board that it might be appropriate that cross examination of this nature be kept to a minimum. These are not reports relied upon by Mr. Rodriguez in his testimony. They were available to the Energy Commission, and they have witnesses in this subject, and it certainly is a more efficient way to build a record, to ask witnesses to testify on direct with respect to these matters, than to spend endless hours reading them on cross examination.

MR. ELLISON: I would simply respond that we did not author these documents, nor do we have access to

the SMUD personnel who did, and it would have been very difficult for us to offer a witness on these particular documents.

Mr. Baxter?

MR. BAXTER: You did not author the deposition transcripts either, but your witnesses discuss that as they do any other reference work that is in the literature and available to you in your files.

MR. ELLISON: Mr. Baxter, perhaps we could shorten this. Would you be willing to stipulate to the admission of these licensee event reports?

MR. BAXTER: Not at all. I have not had a chance to review them to see if they are at all relevant to the matters we are discussing in this hearing.

CHAIRMAN BOWERS: They appear to the Board to be relevant.

MR. BAXTER: Has the Board reviewed them?

CHAIRMAN BOWERS: Well, we have listened to what they cover. Of course, we have not had a chance to review them, but following Mr. Ellison's explanation of what they cover, we do think that they can be discussed, and Mr. Rodriguez can be questioned with a certain amount of brevity on each one, because you are covering a lot of years.

MR. ELLISON: I appreciate that.

DR. COLE: I count 20 of these. I count 17 of

these. Did you say there were 20?

MR. LEWIS: He has already covered three.

DR. COLE: Oh, I see.

MR. ELLISON: Shall I go ahead?

CHAIRMAN BOWERS: Yes.

BY MR. ELLISON: (Resuming)

Q Have you had a chance to review the October 9th licensee event report?

A Yes, I have.

MR. BAXTER: That is October 9, 1974?

MR. ELLISON: That is correct.

BY MR. ELLISON: (Resuming)

Q Do you recall this incident?

A I think so. It sounds familiar to me.

Q According to this document, the nature of the incident was that the reactor was started up without sufficient volume in the borated water storage tank. Is that correct?

A The reactor was brought to a critical position. Itwas not taken to power, with the volume in the borated water storage tank approximately 10 percent below the technical specification value.

Q On the second page, the apparent cause of this incident is designated as the operator, and the analysis is given that the shift supervisor misunderstood the

technical specifications for the volume of that tank. Is that correct?

A That is what the analysis says, yes.

Q Is that also your understanding of the cause of the incident?

A I cannot remember all the specifics of that particular instance. I think if this is what we put down in our report, that is what the investigation determined to be the cause at the time.

Q Can you recall whether SMUD, aside from authoring this report and adding volume to the borated storage tank, took any other actions in response to this incident?

A According to the report, it was at that time that we also changed B1 to reflect the equivalent of 390,000 gallons in feet and inches and the borated storage tank, and that the procedure was revised to require reverification of it if actual start-up was delayed four hours or more.

And we instructed operating personnel not to use previous data when verifying parameters which are readily available with the existing instrumentation.

Q Is that an instruction that had not been previously given?

A In the context of the statement, I would make the assumption yes, because the words used are, "Operating personnel have been instructed" rather than "reinstructed."

Q The next licensee event report in CEC 40 is dated October 17, 1974. This one describes the exceedence of the maximum cooldown rate established in the technical specifications. Referring to the third page, the apparent cause is designated as a procedure. Do you recall this incident?

A If you will give me a few minutes, I will read through it and see if I can jog my memory.

(Pause.)

MR. ELLISON: Mrs. Bowers, perhaps I would suggest that we defer this line of questioning until tomorrow in order to give Mr. Rodriguez an opportunity to review CEC 40 at a time when we are not in session.

MR. BAXTER: Well, Mr. Rodriguez has a lot of other things to do in preparing for his testimony every day, and I cannot commit him to spending the evening tonight reading CEC 40.

MR. ELLISON: As I recall, we agreed that Mr. Donohew from NRC would appear in the morning.

MR. BAXTER: That is right, and Mr. Rodriguez will -- Mr. Rodriguez has to go to the site in the morning.

MR. ELLISON: Fine,we will continue.

(Pause.)

THE WITNESS: I have read the first three

pages of it, and that does not jog my memory, but I am sure this occurred at that particular time since we reported it.

BY MR. ELLISON: (Resuming)

Q From your reading of this document, does it appear that one of the causes of this incident was procedures which did not warn the operator of a problem with opening the -- warn the operator not to open the gland steam spillover block valve if the control valve is open, since this may lead to a loss of condenser vacuum.

A Excuse me. What was your question again, please?

Q Based on your reading of the document, is it your understanding that one of the causes of this incident were the improperly written procedures?

A I guess I would not say the procedure was improperly written. What the procedure did not encompass was the warning of the gland steam spillover block valve and the gland seal control valve interface.

Q Mr. Rodriguez, I would like you to refer to the next one, which is dated December 6th, 1974. This one describes an operator valving area that led to the failure of a feedwater pump with the plant at cold shutdown.

Do you recognize this report?

A Yes, I do.

Q Do you recall the incident that it reports?

A I recall the incident, yes.

Q What was the cause of that problem?

A The cause of the incident was that the auxiliary feedwater pump was run without water, and it overheated and destroyed itself -- well, created considerable damage. We repaired it and put it back in service.

Q Would you characterize this as being an operator error as opposed to a procedure -- miswritten procedure?

A Yes. I would characterize it as an operator -- One of the fundamental concepts of operator training is that you do not start a pump without a suction to its water source open.

Q Were any procedures rewritten as a result of this incident?

(Pause.)

A The last statement says that the Plant Review Committee concluded that an operator error which failed to open -- I am sure the procedure that the Plant Review Committee came up with was written. I state that surely primarily not because I am that familiar with the details of every procedure we have, but typically a commitment like this in a report to the NRC is then followed up in the future by an inspector to make sure we made that commitment, unless there was another report in here that says we did not meet that commitment, and there is a

violation cited against us.

(General laughter.)

Q Do you know whether any action was taken with respect to the operator that erred in this case?

A He was eventually promoted.

(General laughter.)

A Let me clarify that, because I remembered this particular instance with some detail, primarily because our own maintenance course turned the pump around very quickly. There was an operator error. It was discussed with him at some length, and as a matter of fact, a very competent operator who erred in this particular area. His performance in the following years after that certainly has indicated any concern that I might have about his basic competence -- he made a mistake and there is no doubt about it, but he has done a lot of good things since then.

Q The next one is a letter dated February 18, 1975. This one describes a flow instrumentation that was not valved in properly, that affected the performance of the emergency cooling system. Do you recognize this report?

A I will have to read through it.

(Pause.)

A I do not recall that one specifically.

Q You do recognize this document as a SMUD authored

licensee event report. Is that correct?

A Yes, I just do not recall -- I have read this. I am sure it occurred the way it is described here, but I do not specifically recall the incident.

Q I would like you to refer to the next one, which is dated April 16, 1975. This one describes an incident in which operators improperly increased the boron concentration in the concentrated boric acid storage tank. Do you recall this incident.

A I will have to read it again.

(Pause.)

A I do not recall that specifically either.

Q Do you recognize this as one of SMUD's licensee event reports?

A Yes, I do.

Q What is the nature of the incident that is identified here?

A The technical specifications require that we maintain a minimum 390,000 gallons of borated water in the borated water storage tank at a boron concentration of approximately 1825 -- 1850 parts per million boron. As a backup to that, it also requires that we maintain an equivalent quantity of boron in a concentrated boric acid storage tank.

That equivalency at the time this was written

was related to a specific volume in a range of concentration. We have changed that now to an equivalency, so you might have a lower concentration and a higher volume.

What this relates to is,that specification had a maximum boron concentration allowable in the tank and in -- and that concentration was a fixed number not related to the temperature, and the purpose of that was to prevent boron precipitation in adding additional concentrated boric acid to the tank and then sampling it, the tank exceeded the technical specification as described in the report. It was about half of what would have been required for precipitation.

However, the technical specification had a given number in it, and therefore we had exceeded that number, and we reported it.

CHAIRMAN BOWERS: Mr. Ellison, it is time to quit for the day.

We will resume at 9:00 o'clock tomorrow morning. So this will close the record for today.

(Whereupon, at 5:00 o'clock p.m., the hearing was recessed, to reconvene at 9:00 a.m. the following day.)

This is to certify that the attached proceedings before the

NUCLEAR REGULATORY COMMISSION

in the matter of: SMUD (Rancho Seco)

Date of Proceeding: 5/7/80

Docket Number: 50-312

Place of Proceeding: Sacramento, CA

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

David S. Parker

Official Reporter (Typed)

Official Reporter (Signature)

This is to certify that the attached proceedings before the

NUCLEAR REGULATORY COMMISSION

in the matter of: Rancho Seco

Date of Proceeding: Wednesday, May 7, 1980

Docket Number: 50-312

Place of Proceeding: Sacramento, California

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

SUZANNE R. BABINEAU

Official Reporter (Typed)

Suzanne R. Babineau

Official Reporter (Signature)