ORIGINAL

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

Friday, May 9, 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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bfm1

P R O C E E D I N G S

MRS. BOWERS: Are you ready, Mr. Lanpher?

MR. LANPHER: Yes, ma'am.

Whereupon,

RONALD J. RODRIGUEZ

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

CROSS EXAMINATION (RESUMED)

BY MR. LANPHER:

Q Mr. Rodriguez, could you please turn to page 26 of your prepared direct testimony? Mr. Rodriguez, in lines 15 through 17, page 26, you describe the -- you state that new instructions regarding -- relating to small break LOCAs were implemented prior to the restart of Rancho Seco after the May 7th order.

Were those instructions subsequently changed in light of the reactor coolant pump scenario?

A Yes, they were.

Q Further down on that page, at lines 23 and 24, you were asked the question: "What procedural changes have been instituted as a result of these new small break LOCA analyses?"

I would just like you to clarify when you say these new small break analyses. Are you talking the time

bfm2

period prior to July 5, 1979, or are you up through the date of submission of your prepared testimony?

A The procedures were changed prior to July 5 and continued to be changed up to the point of my prepared testimony, and have been changed since that prepared testimony.

Q But your response to that question, which begins at line 23 of page 26, when you talk about the procedural changes that have been instituted. You are talking of procedural changes up through the time of your prepared testimony, not as of July 5?

A The procedural changes that had been made up to July 5, with respect to the reactor coolant pump aspect of it were changed sometime in late July or August to eliminate that prescriptive requirement to run the pumps, and to shut them off.

At the time that this testimony was prepared, the procedures incorporated that change.

Q Your discussion of the procedural changes includes all the procedural changes up to the time of the preparation of this testimony?

A That is correct.

Q Up to the time of restart of Rancho Seco on July 5, 1979, were you aware that the NRC was considering a change in the requirement to run reactor coolant pumps after a HPI

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initiation?

MR. BAXTER: I do not believe there was foundation in the record that the NRC was considering such a change as of July 5, 1979.

MR. LANPHER: I will change the question.

BY MR. LANPHER: (Resuming)

Q Were you aware whether the NRC was considering such a change?

A I do not recall the date, the specific time frame when I first became aware that such a change was contemplated.

Q I was not asking for a specific date. I was just asking whether you knew, in terms of a relative time frame, whether you first learned of such a possibility prior to restart of after restart.

A I do not recall.

Q Is it true that shortly after the Three Mile Island accident, NRC issued an I and E bulletin which stated that if high pressure injection had been actuated, that licensees were required to keep it going for at least 20 minutes, then could throttle it after 20 minutes, if there was a 50 degree subcooling?

A Yes. I recall that direction in one of the 7905 series.

Q Did that direction, the specific reference to the time frame for keeping HPI on raise any concerns with you?

bfm4

A Yes, it did.

Q Could you please describe those concerns?

A Well, the concern was the prescriptive requirement of the 20 minutes running, and the potential for some possible scenario, wherein meeting that 20 minute requirement, an operator might be in conflict with the technical specification limitations with regard to system temperature and pressure.

end tP-1

bgntP-2

Q Was the concern with the cooldown rate or with vessel integrity?

A The concern was with vessel integrity.

Q Mr. Rodriguez, do you still have a copy of CEC-43? That was the emergency procedure D.5. I would like you to turn to page 29 of your prepared testimony.

DR. COLE: That is Exhibit 43, Mr. Lanpher?

MR. LANPHER: Yes.

BY MR. LANPHER: (Resuming)

Q At the bottom of page 29, you quote from this procedure -- from one of the symptoms in this procedure, "That system pressurizer level and/or reactor coolant system pressure decreasing without associated decrease in coolant average temperature."

You go on to state that this would be a sympton of a loss of coolant accident as opposed to an overcooling event. Does procedure D.5 specify that this system is

indicative of a loss of coolant accident, and that this is a way of distinguishing it -- such a transient from an overcooling event?

A Sympton 3.1 on page 1 of procedure D.5 says -- this is the loss of reactor coolant, reactor coolant system pressure procedure. "Pressurizer level and/or reactor coolant system pressure decreasing without associated decreasing coolant average temperature."

Q Does not the note on the next page of that procedure state that the symptons, the coolant leak system -- I assume that note includes the symptom you just quoted -- may be caused by make-up system malfunction or steam line rupture, which is an overcooling event.

A That's what it says, yes.

Q I would like you to look at page 30 of your testimony, please? In the first full paragraph on that page, there is discussion of operator action to stop an overfeed or overcooling transient.

The last sentence of that paragraph, you state that the operator action is "Simply to close off the appropriate valve or valves."

My question is, would an operator close those valves all the way, or do you mean that they would close them part way, throttle the valves to reduce flow somewhat, but not all the way?

bfm6

A Again, it kind of depends on the scenario. If the overfeeding condition occurred while he was at power, and his overfeed condition was relatively small; by that I mean it is not feeding 100 percent more than what it is supposed to be; his action would be to throttle the valve to bring reduced feed flow to that appropriate for the power level the reactor was at.

In a scenario where the unit had tripped, and his overfeed condition is in excess of the limit, the low level limit, I would expect that he would close the valve until the steam generator boiled down to approximately that limit, and then begin to throttle the valve to gain control of it.

Q Were you assuming that second situation when you prepared this testimony, then, when you said his action would be to close off the appropriate valve?

A No. I think in the context of the way I was answering that, the close would probably more have been appropriately close or throttle.

Q If you had a less severe overcooling event of the kind you were describing in your previous answer, and if the operator were to entirely close off those valves, could that lead to an overheating event, and a boil-dry of the steam generator?

A In the case of a scenario where the operator --

bfm7

where the unit was at power and the operator took control to close the main feedwater valve and did not reopen it, and the reactor remained at power; then the reactor would trip on a high pressure signal.

The control would then be -- after the trip, would then be performed by the start-up feedwater valve.

Q Would it be fair to say, then, that in taking action to stop an overfeed or overcooling transient, the operator has to exercise judgment as to just how much to throttle back on these valves, whether to throttle just part way, or all the way?

A His manual throttling of that valve is going to be -- he needs to take into consideration his feedwater flow, and monitoring a high feedwater flow beginning to throttle the valve back to get it back to the more appropriate position. I do not think that the operator particularly with the unit at power, the operator would not shut the valve off completely, because the unit is still at power and some feedwater is needed.

The action would be to throttle it back to reduce the feedwater flow somewhat below what the normal level is for that power until the indicated level in the operating range of the steam generator returns to a normal level, then readjust for the appropriate feedwater flow.

Q I would like you to turn to page 41 of your prepared

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testimony, please. Beginning at line 17 and continuing about half way over to the next page, you list certain feedwater transient diagnostic instrumentation which is available to operators in the control room.

Would you please go through this list and specify which instrumentation either is new or has been altered since the TMI event?

A The auxiliary feedwater flow instrumentation is new. The reactor coolant system hot-leg, cold-leg temperatures have been altered in the respect that there is additional meter indication.

However, the hot-leg, cold-leg, the average indication is the same. The steam generator level indication comprised of five channels of instrumentation for each steam generator has been changed.

One additional wide range level of instrumentation has been added on each steam generator. That has occurred since I wrote my testimony. That is another change to the testimony that I did not pick up.

That should read six channels now, instead of five. The steam generator outlet pressure, additional metering has been added to provide that as a shut-down at, what we call, the boron panel, where the additional metering is located.

Q Could I just interrupt you for a second? When you

bfm9

say "additional metering," another indication of steam generator outlet pressure?

A Yes. As part of our fix of the March 20, 1978 incident, we added additional instrumentation that the operator had available to him in the event of a loss of NNIX or NNAY or both.

Q You said that was in response to the "light bulb incident," but that was not implemented until after TMI?

A We implemented it during this past shutdown. Number five is still correct. Number six is not changed. Number seven has not changed except some additional metering has been added. Again, number seven has not changed.

Q Excuse me?

A Excuse me, number eight has not changed. Number nine has not changed, except that the available metering has been rescaled. Number ten has not changed.

Q Except for number four, the steam generator outlet pressure, were the other changes which you described, taken to -- in response to the TMI incident and the various lessons that have been learned from that?

A The changes innumber two, the additional metering was in response to our "light bulb incident." The change in number three, again, the additional channel for wide range pressure was in response to the "light bulb incident."

The change in number four was in response to the

bfm10

"light bulb incident." The change in number four was in response to the "light bulb incident." The change in number seven was in response to the "light bulb incident."

MR. SHON: Excuse me, Mr. Lanpher. Mr. Rodriguez, could you tell us a little bit more about what you mean "changing meters in response to the 'light bulb incident'?"

Did you simply change the meter and take the same signal from a transmitter and feed it into another meter; is that what you did?

THE WITNESS: No, sir. We installed additional transmitters and powered them from a separate power supply from the power supplies that supply that NNI.

MR. SHON: And the actual sensing devices?

THE WITNESS: They are new.

MR. SHON: So, it is a whole new system?

THE WITNESS: Yes, sir.

MR. SHON: Sensor transmitter and read-out?

THE WITNESS: Yes, sir. Excuse me, the indications for the t-hot use the sensors that were in place earlier. It was just that now those signals come through a separate panel with a different power supply, so that loss of NNI power will not affect the read-out.

We did not add new sensors for t-hot.

MR. SHON: Thank you.

BY MR. LANPHER: (Resuming)

bfm11

Q Mr. Rodriguez, have you completed your previous response -- answer? You were going through to say which of the changes were in response to the TMI or some other incident.

A The --

Q Number nine?

A The change in number nine, I guess, we might say human engineering. The operating people, because of the way that the flow meters are designed. There was some paralax in the low flow area, around 100 gallons per minute.

They said it was not so easy to read, so it was rescaled. So the meter, instead of, I think it originally went from about zero to 1200 gallons a minute, now goes from zero to 600 gallons per minute.

That puts the 100 gpm area higher up on the meter. It is easier for them to read. We did that during this past shutdown when we had the system down.

Q It was not in response to any specific event, it is just something you thought you could do to perhpas upgrade the instrumentation or the indication?

A That is correct. It was not in response to the 0578 requirements.

Q Is there indication in the control room today that would cover the range 600 to 1200?

A What are the units on those numbers?

bfml2

Q I believe in your previous -- I think it was gallons per minute. I thought your previous response said that before, you had --

A I think it was -- I think the meters were scaled either zero to 1200 or zero to 1000 gallons per minute. We rescaled them to zero to 600 gallons per minute.

Q My question is whether there was indication in the control room today which would cover the 600 to 1200 that you used to have indication for?

A No, there is not. The pump maximum, pump runout is 500 gallons per minute.

Q Would it be fair to say that with respect to this list of ten items, that only the first one, the auxiliary feedwater flow instrumentation, was implemented in specific response to the TMI incident?

MR. BAXTER: Asked and answered. Objection.

MRS. BOWERS: Well, he is attempting to summarize, I think.

MR. LANPHER: I was just trying to make the record clear.

MR. BAXTER: I think he stated of the ten items, that was the one that was in response to Three Mile Island.

(Board conferring.)

end tP-2

MRS. BOWERS: The record will show that response.

bgn tP-3

BY MR. LANPHER: (Resuming)

bfm13

Q With respect to the change in the scaling of the high pressure injection system flow, was there a reason for doing it now, where there are some operator suggestions that this would be a helpful change in the control room?

A Well, the experience that we had had, had been that the range of operation is in the low part of that meter; and that down at the low range, the scale was quite narrow. To accurately determine the proper flow balance expanding that scale would make it easier to do.

We were down at this time. We had also made a modification to the high pressure injection valving so that it automatically throttles to a certain level. It was in the context of doing all these other changes that the rescaling was also done.

Q Had you known about or considered this change prior to this recent outage?

A It has been considered for some time. This time, its priority fell to the point where it was installed, because we were shut down. It has been a year and a half ago since we have been shut down for a refueling overhaul.

The shut down that we had last year was more involved with all the other items I have already been through that we were trying to get changed.

Q Beginning at the bottom half of page 42 of your testimony, Mr. Rodriguez, you list feedwater transient

bfm14

control equipment, which can be manipulated from the control room.

In a manner similar to the way we went through the previous list, I would like you to tell me which of this control equipment is either new or has been altered since TMI and whether this change is in response to the TMI incident, also.

A The first one that we changed in response to the Three Mile Island incident was number five, control of the pressurizer heaters.

Number seven was changed, but not in response to the Three Mile Island incident. Those are the only ones that were changed.

Q Could you please turn your attention to page 45 of your testimony? You state that there have been 34 cases when actual loss of feedwater capacity to varying degrees has been experienced at Rancho Seco. Am I correct to assume that that is since the time that Rancho Seco received its operating license?

A That is correct.

(Pause.)

Q Do you recall when the first of these feedwater incidents occurred, whether it was 1976, '75, or --

A I do not recall.

Q Could you turn your attention to page 47, please,

bfm15

line 10? You refer to operating the high pressure injection pumps to provide an indicated level in the pressurizer. What is that indicated level?

A That indicated level is a chart located in the control room on the H1RC panel that gives the pressurizer level trend. I think about the time period, that is actually -- that the operator can visually see progress about one to two hours.

(Pause.)

Q In earlier testimony of Mr. Dieterich, there was some discussion about the number of HPI cycles that have been experienced at Rancho Seco.

I believe the number was somewhere around 30. Do you know whether there has been any change in instructions to operators about when they can use the HPI pumps?

A The change in instruction has been to prescribe a technique for adding additional water by use of a high pressure injection pump and a val. that will allow water to enter the reactor coolant system through a cooled nozzle that will not experience a thermal cycle.

Q So, there has been a change to try to avoid using up the number of cycles that are allowed. I guess it is approximately 40 right now. Is that correct?

A That is correct.

Q When was this change instituted? Do you recall?

bfm16

A We instituted this change during this refueling shut down.

(Pause.)

MR. LANPHER: Mrs. Bowers, I would like to move the admission of -- into evidence of CEC-43. That is the D-5 emergency procedure.

MRS. BOWERS: There was an explanation yesterday that you simply do not have page 9, but you did not cross examine on any matter beyond 8, is that correct?

MR. LANPHER: That is correct. If I had page 9, I would be happy to insert it.

MR. LEWIS: Mrs. Bowers, there is a greater problem than this. The problem is there is a subsequent revision, revision 15.

In fact, there are a number of items as to which Mr. Lanpher cross examined, which are altered in revision 15. So, I am not certain, bringing this document in with a prior revision might raise some confusion about what the current procedures are of the licensee.

MRS. BOWERS: Is the 15 a complete revision? Because this shows various revisions, 13 and 14.

MR. LEWIS: The copy that Mr. Capra showed me have some pages have revision 15, other pages are probably unchanged. In looking at it, it did appear that it was -- that there were explanations that were provided in revision

bfm17

15, which are quite relevant to some of the line of inquiry undertaken by the energy commission.

MRS. BOWERS: Mr. Baxter?

MR. BAXTER: I agree with Mr. Lewis. First of all, missing pages are important if it is going into evidence, whether or not they were cross examined on. I would submit that we would be happy to provide a more recent revision and would have no objection to its receipt.

MR. SHON: WOuld it then be necessary to conduct -- to reconduct the cross examination on those portions that have now been revised?

Mr. Lewis seems to think they have been materially revised concerning questions you have already asked.

MR. LANPHER: Well, I think definitely, if there have been material revisions; yes, we would have to have an opportunity to review it and to ask questions about it.

I do not believe that the fact that there has been a later revision to this procedure means that the procedure revision 14, which was marked at CEC-43, should not be admitted into evidence.

If there is a later revision of that, I think we probably could have gone through every revision since TMI -- if there is a later revision, someone else can offer it, and we would not object to even sponsoring it ourselves, after we have had a chance to review it.

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We do not have a copy of it. I learned about it -- a later revision yesterday for the first time. I do not have a copy of it. I would just like to inquire for the record when that revision was, I am just curious.

end tP-3

MR. BAXTER: We could put them both in.

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tS-1-3

MR. LEWIS: I might say, Mrs. Bowers, of course the Energy Commission's review of it will reveal whether or not this is correct, but a number of the -- it appeared to me in looking at it that a number of the explanations in Revision 15 were more or less commented upon by Mr. Rodriguez in his testimony. So when I said material alteration, I may have been giving you a little bit of the wrong impression. I think that what I observed in it was various greater explanations, and a number of them were commented upon I think by Mr. Rodriguez but, of course, the document itself would be a more definitive statement of what those altered explanations and clarifications are.

MRS. BOWERS: Are we correct in assuming that CEC obtained the document for --

MR. LANPHER: I'm sorry, I didn't hear the beginning.

MRS. BOWERS: Are we correct in assuming that CEC obtained what it has identified as Exhibit 43 when you personally did a search of the files? It's not that this was furnished to you by SMUD. Is that correct?

MR. LANPHER: Well, we got it from the licensees in the discovery process.

MR. BOWERS: But as we heard earlier, you were permitted to go through their files and you did the pullout and the selection.

MR. LANPHER: The revision was in March, I believe, so that our discovery, which was back in December or January would not have revealed this Revision 15. And to my knowledge, we have not received from the licensee this Revision 15. So that's why I haven't questioned on it.

MRS. BOWERS: But the licensee didn't even know exactly what you pulled and reproduced from the files, from a prior explanation.

MR. LANPHER: I'm not sure that's correct. I think they may have been pretty careful on what we had reproduced. I think they did the reproduction for us.

MR. BAXTER: We did the reproduction; we didn't do the selection

MRS. BOWERS: You know, what we're getting at is did SMUD have an obligation to you to give you the Revision.

MR. ELLISON: Mrs. Bowers, perhaps I can clarify something about the way the discovery process worked. We asked for SMUD's current procedures at that time; we certainly didn't ask for any out of date procedures. I'm not suggesting that these were out of date at the time they were produced. I'm just explaining what we asked for.

In response to our request for production of documents, SMUD did not open up all of their files to us; we didn't go through everything they've got. They set out the things that they thought were responsive in a room, and our people went

down and picked up the things that they thought were relevant.

This was copied from a book that contained, to our knowledge at that time, all of SMUD's current operating procedures, I have that book here. That occurred in January, and if this revision was made to those procedures subsequent to that time, there would be no way to know that. I can't tell you right now as a legal matter whether the licensee has an obligation to be furnishing us with all of the revisions that they make to these procedures as a matter of course, but I can't say that that has not occurred. We've done what we can to try to keep up to date and to try and have the most current procedures.

We would certainly be willing to stipulate to having the most current procedures as of this date. I would also point out lastly,however, that I expect the licensee will be making revisions to its procedures between now and the time your final decision comes out, so this will be a continuing problem.

MR. BAXTER: I don't disagree with anything Mr. Ellison said except to note that the material that was made available did include all of the plants operating in emergency procedures. We have made the Energy Commission aware, since the close of discovery, of some of the documents we have filed with the NRC. We have not -- I do not have a record of everything that they've asked to have copied and we have

not attempted to, like a CCH service, provide them with supplementation of every minor procedural change, and I don't think the rules of practice, which I'm looking at here, would call for that either.

Nevertheless, we are willing to stipulate to -- and we will produce of -- the latest revision to this procedure and provide it to everybody, and we would have no objection to both Rev. 14 and Rev. 15 going into evidence to show what the procedure was during the interval and what it is now.

Tape S2

MRS. BOWERS: We want to have a complete and current record, and we think that can be done by first admitting CEC 43 and then having one of the other parties of SMUD, I assume, offer the Revision 15 to this, and Mr. Lanpher, Mr. Lewis has given us the explanation that he thinks the testimony of Mr. Rodriguez covered some of the revisions that are in 15, but you should have an opportunity to review that.

MR. LANPHER: I was attempting to do that right now, but I don't know if SMUD has changed their ways of marking their procedures. In the old one, they had in the margin where there was a revision, like for 14. And Mr. Lewis just provided me his copy of Revision 15 and it doesn't have those marks in the margin, so I'm not sure where it was changed this time. So instead of just going and looking at those

specific changes which -- unless Mr. Rodriguez can tell me where they've been changed. He probably can't from memory.

THE WITNESS: At the bottom of each page where you'll see the change number, if the change number at the bottom of that page is "Change 15" there should be some indications in the margin of "Change 15."

(Pause.)

MR. LANPHER: I can attempt -- I'm sorry, Mr. Rodriguez, were you going to say something?

THE WITNESS: The entire procedure was retyped and reproduced; that's why there are no markings in it as opposed to other changes which might occur only on a particular page, then just that page would be changed and it's marked, that's why there are no marks on that.

MR. LANPHER: I have no objection to both documents coming in so long as we have an opportunity to review it, and if we have questions, to address those questions to Mr. Rodriguez at an appropriate time. I can't tell you right now, Mrs. Bowers, whether I can be prepared today to do that or not. We're continuing with this. I can certainly try, for instance, over lunch to review it and I'll tell you I will.

MRS. BOWERS: Could you have copies made, Mr. Baxter?

MR. BAXTER: Yes, for the other parties. Do you have one?

MR. LANPHER: No. I was just looking at Steve Lewis' copy which is marked with his markings.

MR. BAXTER: I'll lend you mine and you will get more and have them after lunch.

Are we receiving Exhibit 43 without page 9?

MRS. BOWERS: Well, I gave an explanation of how from page 8 on was not the basis for cross examination.

MR. BAXTER: Yes, but to the extent it's being received into evidence, I think --

MR. LANPHER: Mr. Baxter, do you have a copy of page 9 that we could get from you?

MR. BAXTER: No, I don't have Revision 14; I only have the one you gave me. I can do some research.

MR. LANPHER: I'm sorry, we cannot produce page 9, Mrs. Bowers.

MRS. BOWERS: But earlier, you said --

MR. LANPHER: I don't it's necessary. I understand Mr. Baxter's comment that he'd like to have a complete document, and I think in theory that makes eminently good sense. I specifically did not include any examination beyond the Case 2 sequence in there because that's where we had that problem with the pages.

MR. BAXTER: My point simply is, Mrs. Bowers, even if he didn't cross examine on it, if it's received into evidence it is citable in proposed findings as record evidence

by any parties for anything in here, whether or not he asks questions about it. There's a missing page, that may cause some problems, depending on how it's used by someone.

MR. SHON: Suppose we were to receive only the first 8 pages? We've done that with documents before in this proceeding. That is, use curtailed versions that were out of the middle of something or left the end off. If we took in the first 8 pages as CEC Exhibit 43 and simply threw the rest of them in the wastebasket or something like that.

MR. BAXTER: Let me propose something else. Can I search and see whether I can come up with page 9 from Rev. 14, and if I can, provide that after lunch as well with the new edition?

MRS. BOWERS: I'm surprised that CEC didn't ask about page 9.

MR. ELLISON: We asked for the emergency procedures and got this book, which is the original that was produced, and this book is also missing page 9. We didn't discover that until just now.

MR. LANPHER: Frankly, we were never focusing on the large break either, Mrs. Bowers, so we just didn't pick it up. I'm sorry.

MRS. BOWERS: We'll defer until we see page 9 and the Revision 15.

MR. LANPHER: With all of that, I've completed my

examination of Mr. Rodriguez, Mrs. Bowers.

BY MR. BLACK:

Q Hopefully, Mr. Rodriguez, I will be brief. I first want to elicit some responses from you to get a clear understanding for purposes of this proceeding as to your functions and responsibilities with regard to the Rancho Seco nuclear facility and how these functions and responsibilities interrelate with the overall management and technical competence of the licensee.

In this respect, I'm going to ask you questions regarding your onsite and offsite responsibilities, and how these will interface with other onsite and offsite responsibilities, both in the day-to-day operations at Rancho Seco and also in emergency situations.

So, first I want to direct you to page 4 of your testimony where you indicate that you are the Manager of the Nuclear Operations with department level responsibility for the safe and proper operation of Rancho Seco Nuclear Generating Station. Does this statement mean that you are the onsite person responsible for the day-to-day operation of Rancho Seco?

A With regard to the details of the day-to-day operation and maintenance functions, the individual on site that's primarily responsible for that in the management role is the Plant Superintendent.

Q Are you functions carried on onsite or offsite?

A My functions are carried on onsite.

Q Who do you report to?

A I report to the Assistant General Manager and Chief Engineer of SMUD.

Q When you say that you have department level responsibility, what exactly does that mean?

A I'm a department manager having reporting to me the Plant Superintendent who is responsible for the day-to-day operation and maintenance of the unit, the Supervisor of Engineering and Quality Control who's responsible for the engineering functions performed within our department, and an Administrative Assistant who is responsible for the administrative functions of the department.

Q When you say that the Plant Superintendent has the day-to-day responsibility for the line function responsibility at Rancho Seco, what is your inter-relationship with the Plant Superintendent?

A Well, it's a supervisory relationship with respect to planning what the unit is going to be doing or what the unit is doing, or what support may be needed from outside organizations so that he can carry out his functions; what support he might need from other departments within the District to assist him to carry out his function.

Q Both you and the Plant Superintendent do not work

swing shifts I take it, is that correct?

A Not normally.

Q But since TMI, you as well as Mr. Deiterich have been putting in fairly long hours. Is that correct?

A If you're inferring by that that Mr. Deiterich is the Plant Superintendent --

Q No, I'm not inferring that. He just made a statement earlier that he was working, I believe, sometimes up to 100 hours a week, and that certainly would put him on some type of swing shift or put him certainly beyond the 9:00 to 5:00 day shift.

A I should call it an extended day shift.

Q Yes. If this Plant Superintendent is not onsite and you are not onsite, who has responsibility for the safe operation of the Rancho Seco facility?

A When I am not onsite, the Plant Superintendent is designated as assuming the departmental responsibilities. If he is not onsite, the Supervisor of Engineering and Quality Control is designated to assume the departmental responsibilities. If the Plant Superintendent is gone, even though I may be onsite and the Quality Control Supervisor is onsite, the Superintendent will designate one of his personnel, either the Operations Supervisor, the Chemistry and Radiation Control Supervisor or the Maintenance Supervisor as an acting Plant Superintendent.

Q Are there written procedures that delineate these responsibilities?

A There are written procedures that delineate the responsibility of the Plant Superintendent. Then he issues a separate memo when he is going to be offsite, or essentially away from the area, that identifies which supervisor reporting to him will assume the responsibilities.

Q Do these supervisors that are designated by either the Plant Superintendent or the Quality Control Superintendent have the same authority to issue orders and take whatever actions are necessary to run the plant, and even make decisions in abnormal situations?

A Yes, they do with the exception that they will not grant permission to bring the reactor critical unless they are licensed.

Q And the Quality Control Supervisor is licensed, isn't he?

A Yes, he is.

Q The Plant Superintendent is licensed?

A Yes, he is.

Q But those people whom those two may designate, none of them are licensed, as I recall.

A No,the Operation Supervisor is licensed.

Q If you need offsite technical support, how do you go about doing so?

A Well, I have a number of alternatives. First of all, immediately to our Generation and Energineering Department; secondly, to the Babcock & Wilcox Company, the vendor for the NSS; thirdly, through a standing contract with the Bechtel Corporation who is the architect engineer; and then depending upon the specifics, there are other contractors that I can call on to provide either information or personnel support.

Q When you need this offsite support, let's say, for instance, from the General Engineering Department, do you go directly to the General Engineering Department or do you have to go through the Assistant General Manager?

A No, I go directly to the Engineering Department.

MR. BAXTER: Excuse me, are you speaking of the Generation Engineering Department?

THE WITNESS: Generation Engineering.

BY MR. BLACK (Resuming):

Q When someone from the Generation Engineering Department is assigned to you, do you have total control and supervision over that person or group of people?

A As long as the individual is not assigned to the Department, I will never have total control. When he is assigned, I have control for his work activities, but then I would not be the one writing his evaluation, I would not have total control.

Q You could direct that person or persons as to their job responsibilities, if that person or persons was assigned to you from Generation Engineering, let's say.

A That is correct.

Q How do you obtain contractual offsite support? Do you have to go through the Assistant General Manager, or can you get Bechtel or B&W help directly?

A It depends. If it's support that I've had the foresight to see coming, I can set up the contractual arrangements and normally this is how it's done -- set up the contractual arrangements and then get approval and have the individual onsite. If it's a case where I didn't have the foresight or the situation generated in a very rapid manner and there wasn't time for all this approval, then I just pick up the phone and call the vendor and tell him what I want and when I need it and in the past 11 years they've responded.

Q Does the fact that SMUD is a public utility have any bearing on how these interfaces happen?

A The fact that SMUD is a public utility has bearing on the timeliness of getting contractual arrangements formally approved. However, the Board of Directors, by resolution, have passed an emergency resolution, have passed a resolution, that in an emergency condition funds can be expended and people can be obtained.

Q So in other words, if Rancho Seco goes through an

incident such as TMI-2, you can go directly to get offsite contractual support without going through the Board of Directors.

A That's correct.

Q How do you interact as the Manager of Nuclear Operations with the Training Supervisor?

A The Training Supervisor reports to the Plant Superintendent. My interaction with the Training Supervisor is generally an information one of what areas he's expending his effort in and what planning he's doing. I will send to him on occasion, as I think I said earlier in my testimony, documents that I think he ought to use in his reading assignments to licensed operators, and I get the exam from him once a year to take.

Q Do I infer correctly from your answer that the Plant Superintendent perhaps has a broader or greater interface with the Training Supervisor than you do?

A Yes, he does.

Q With regard to the training function, do you personally review and screen LER's that you may consider applicable to the training function?

A I personally screen almost all the LER's. The only ones that I wouldn't screen prior to their issuance -- these are ones generated with SMUD -- would be those that occurred while I was out of the area. Whether they pertain to training

functions or not has no bearing on whether or not I screen them.

Q Would it be correct to state that when you screen them, if you feel that they have some bearing on the training function that you would send them down to the training supervisor for inclusion in his training program?

A If I felt that that route would be a better route than the Standing Order route, yes. The Standing Order route would be more timely for the operator reviewing the particular LER.

Q Do you personally, as Manager of Nuclear Operations, screen and review new revised applicable federal regulations?

A No, I certainly can't screen and review all revised applicable federal regulations.

Q Is there someone under your control and supervision who would do that on a routine basis?

A No one individual. The regulations, for example, as they apply to the handling of waste material and shipping of waste material would be screened in our organization by the Supervisor of Chemistry and Radiation Control, a health physicist or nuclear engineer, or in the Generation Engineering Department, the environmental specialist, as an example. Those regulations that pertain to training would be screened primarily by the Plant Superintendent and the Training Supervisor.

Those regulations pass across -- those changes pass across my desk but I'm not the one that spends the time normally reviewing those and screening them.

Q How would each of these people, whether they are Training Supervisor, Plant Superintendent, some chemistry person, how would they be aware of the revised federal regulations?

A That revision mailed to SMUD and eventually finding its way down to me or the Plant Superintendent would then be distributed from there to the applicable individual in my department for screening.

Q So they would first come to the SMUD offsite organization and they would send to you and you would do the necessary distribution by function?

Tape S3

A Sometimes they come both to the offsite main SMUD organization and directly to Rancho Seco, and there are many occasions when I'll see the same thing two times in the same week.

Q Do you as Manager of Nuclear Operations review and screen different publications or documents that reflect changes in the state-of-art with respect to the nuclear facility?

A There are a large number of publications that come through from the Electric Power Research Institute, for example, that I screen. But by no stretch of the imagination

do I do an indepth review of them due to the quantities.

There are also a number of publications that come out from vendors advertising what their latest piece of equipment is, and typically, those are distributed to -- if it's an electric piece of equipment to the electrical area engineers; if they're mechanical to the mechanical and likewise.

Q As Manager of Nuclear Operations, do your functions and responsibilities change during an emergency situation?

A When you describe an emergency situation, I assume you're -- are you referring to the major emergency or are you referring to the procedures that we have called emergency procedures?

A Say procedures that are designated emergency procedures.

Q No, myfunction really doesn't change. The amount of attention that I personally play in it, of course, would change depending upon the nature of the emergency. And I use this as an example again, one I used yesterday. We have an emergency procedure for a high startup rate, and certainly I wouldn't participate in that.

In an emergency involving a radiation casualty or a potential release for irradiation or a natural release irradiation, then I'd be involved actively as part of the management of that as the emergency coordinator.

Q During an emergency situation, do you have inter-

relationship or responsibilities with regard to the technical support center or the operational support center?

A Yes, my responsibility as an emergency coordinator would be in the technical support center as the overall coordinator for the activities that are not directly related to the actual operation of the systems, but rather coordinating the department's interface with any offsite agencies.

Q Have these procedures been changed since TMI? The emergency procedures?

A They have been changed to reflect the identification of a technical support center and the personnel that will be in that center.

Q I'm going to turn now to your testimony on page 18 that has to do with documents that are distributed to operators. In that one you specifically referenced Standing Orders 5-79 through 15-79, and my question is who determines what documents are distributed to licensed as well as unlicensed personnel?

A As I said earlier, I think yesterday, the distribution of those documents or the determination of which documents are distribued is vested in myself, the Plant Superintendent and the Operations Supervisor primarily.

Q Is there any written procedure that would define how documents should be screened and distributed to personnel?

A No, there's written criteria.

Q So it's a discretionary screening and reviewing function?

A That's correct.

Q Is there a place where pertinent documents are kept to be used by both the licensed and unlicensed personnel?

A The Training Supervisor keeps a set of documents, NUREGs and operating instructions and procedures in his area. In the immediate area of the control room but outside the control room, there are maintained operating procedure documents. The Operations Supervisor maintains a file of the documents that he has received, and also a file of those documents that he has passed on to operating personnel to acquaint themselves with if they want to come back and reacquaint themselves.

Q Do you have any -- go ahead.

A We also have in the Administration Building a library of documents; regulations, manuals, operating procedures, EPRI reports, NUREGs, et cetera.

Q Are you aware of let's say the usage of the library or of any of the other document centers by any of the other licensed personnel?

A Well, the Training Supervisor is a licensed individual and he uses those documents. The Operations Supervisor also is licensed. I use those documents, the Plant Superintendent uses those documents; they're all licensed.

Q How about the reactor operators?

A I can't cite specifically reactor operator utilization of the library. I've seen the shift supervisor on occasion coming into the library to get something out of there, but as far as reactor operators I can't comment specifically on that.

Q Is there a feeling amongst the reactor operators that you are aware of that they're being inundated with paper? Requirements to read documents, procedures, regulations?

A Yes,there's a general feeling that -- not just at the operator level, however.

(Laughter.)

Q At the management level as well?

A That's true.

Q If a licensed operator is required to read something, how is it documented that, in fact, that person did read and understand that document?

A As I said in my previous testimony, when it's required that an operator read or review a particular document, he attests to that review by signing or placing his initials on the Special Order that promulgated that requirement. Or, if it's an assignment from the Training Supervisor, he returns to the Training Supervisor a slip of paper with his signature attesting that he's read and understands what the Training Supervisor required him to read.

Q So he does have to sign his signature indicating that he does, in fact, understand it?

A Yes.

Q If he did not understand it, would would be his recourse?

A His recourse then would be to discuss those areas that were unclear to him with the shift supervisor, or the operations supervisor, if it's a Special Order. Or, if it's a document that the training supervisor put out, he'd discuss that with some member of the Training Department.

Q What's the difference between a Special Order and a Standing Order?

A No difference. It's just that I'm using those terms interchangeably.

Q Has any licensed personnel, or even unlicensed personnel, brought to your attention any area in which he desired further information or supplemental training?

A Not specifically to me, no.

Q Are you aware of such requests going specifically to any other person?

A Yes, I'm aware of personnel requesting training in various areas. That's part of the feedback that the training supervisor uses to formulate what training he's going to give.

Q In that instance or those instances,are you aware of whether further training was given?

A Yes, I'm aware of the training program being altered to accommodate those requests. Not in all cases, but in some cases.

Q Is --

MRS. BOWERS: Mr. Black, I think it's about time for our mid-morning break. I'm sorry to interrupt you.

MR. BLACK: Can I ask one further question in this area and then I'll move on to another subject?

BY MR. BLACK (Resuming):

Q Are personnel, licensed or unlicensed personnel, given the freedom or encouraged to request further training or further information in any given area?

A I guess I'll answer that that there is no prohibition on an individual requesting information or requesting training in any area. It doesn't necessarily mean that that's going to be given to him as soon as he wants it. It's something that we'll try to accommodate.

Q Does this include simulator training?

A Simulator training in our program is a requirement for licensed personnel.

Q If a licensed personnel requests further simulator training, can it be given to him, or is this something that he's going to have to wait until next year to get?

A He's probably going to have to wait until the next scheduled program. It's not come to my attention that anyone

has requested additional simulator training because -- I think what has come to my attention is that a number of operators don't like to fly and would like some other way to get that accomplished.

MR. BLACK: This is a good time for a break.

MRS. BOWERS: All right, 10 minutes.

(A short recess was taken.)

MRS. BOWERS: On the record.

BY MR. BLACK (Resuming):

Q Mr. Rodriguez, if you'd turn to page 20 of your testimony, starting at line 3 you indicate that prior to the initial startup of Rancho Seco certain management personnel participated in the extensive licensing program, licensing training program, described in Appendix I to your testimony. Have those management personnel changed since the initial startup? That would include yourself, Manager of Nuclear Operations, Plant Superintendent, Engineering and Quality Control Supervisor, Chairman of the Plant Review Committee and Operations Supervisor, each of whom holds a senior reactor operator license. My question is have those personnel changed since initial startup?

A I guess I could give a facetious answer in that we all 10 years older. No. The context in which I wrote this was that people who have these jobs now participated in that program.

Q That's what I meant. Are the same ones that participated in the program still there now and holding those job titles?

A The individuals that hold these job titles today participated in that program. At the time they participated in that program, they were not necessarily in those jobs.

Q I see the distinction. But they did all participate in that program.

A Yes.

Q Do they all still participate in the requalification program?

A Yes.

Q Down at the bottom of that page you indicate that management and supervisory personnel have begun participation in a command and control training program being presented by a consultant to the District. What is the scope of that training?

A That training is going to involve a set of different scenarios in which members of my department broken up into different groups will participate, and the purpose is to generate discussion in how those individuals would interact to control the particular scenario.

The purpose of it is to generate a dialogue in an area where these individuals are not also being confronted with their day-to-day activities over a fairly lengthy period

of time to further reinforce the general philosophies on how the particular individual supervisors would approach a given accident or transient scenario.

Q So the scenarios that you are talking about are accident or transient scenarios.

A That's correct.

Q Has this consultant made any recommendations to the management personnel as a result of this training, or is the training just beginning?

A The program, the initial phases of the program, have been completed. The actual scenario discussions will commence next week.

Q But is the answer still that they have not made any recommendations per se to SMUD management at this time?

A That's correct. Other than the recommended scenario.

Q Turning to page 34 of your testimony, on page 21 you indicate that certain information with regard to significant events which occur at Rancho Seco as screened by management personnel. Who would be those management personnel that would do that screening?

MRS. BOWERS: Excuse me, Mr. Black, you referred us to page 34 and then you inadvertently said page 21, and it's line 21, isn't it?

MR. BLACK: Excuse me, you are correct. It's line 21 on testimony page 34.

THE WITNESS: Again, that screening is done by the same three individuals I spoke about earlier; the Manager the Plant Superintendent and the Operations Supervisor primarily.

BY MR. BLACK (Resuming):

Q And they would determine what would be relevant and pertinent information to be disseminated to the operating crews?

A That's correct.

Q On page 35, you're talking about lectures that are given to operating crews. Do you have any knowledge as to how often these informal lectures are given to operating crews?

A What particular line are you referring to?

Q The last paragraph on page 35.

In other words, I guess what I'm seeking here, is this something that's done on a daily basis or is just something that crops up as the need is there?

A It comes about as the need is there, and it's not done on a daily basis.

Q But it is up to the shift supervisors whether those lectures are given, or is it determined by someone else other than the shift supervisor?

A No, the lectures here that I'm referring to are the ones by the Operations Supervisor, and those are the lectures

that he gives and he and the Training Supervisor come to some meeting of the minds of who will take the responsibility for putting out whatever information is deemed to be necessary.

Q My last line of questioning has to do with the concern of a continuity of command or of operations at Rancho Seco during shift changes, and I would like to ask some questions with regard to that.

When there is a shift change, what is done at Rancho Seco to assure the status of all SFAS and AFW valves and switch positions in the control room at the time of the transfer of responsibilities?

A Our shift change procedure -- I believe it's AP-23 has in it a set of log sheets for the shift supervisor's turnover that he goes through,verifying that the systems are in a normal operating mode, or noting if there have been any changes to it so that the oncoming shift supervisor can review that and be brought up to date.

A similar set of log sheets is transferred for the control room operator so that the oncoming control room operator is brought up to date on what, if any, changes are being made to safety systems and a number of other systems, and whether or not any of those systems are in an abnormal configuration.

Q So that is a log that indicates that status of all safety system valves or switch positions that is kept by

every shift?

A No. That log is identified by system, and the system is in its normal configuration. And if it is not, then the sheet annotates what is abnormal, and it's that sheet which gets reviewed.

Q For those valve and switch positions that are not indicated in the control room, is there any periodic verification of those conditions?

A We have under the surveillance program what's called a locked valve list that deals with the lineup of valves in safety systems that are outside the control room and not identified in the control room.

The control of those valves is maintained by -- on each valve -- a heavy metal brass tag identifying that that valve is to be locked closed or locked open. If the position of that valve is moved, that tag is taken off and brought up to the control room and given to a shift supervisor, and by reviewing the condition of those tags, he can determine if any of the vital locked valves that are not indicated in the control room have been taken out of position. That tag will identify that.

Q So if a valve is taken out of position, a valve tag will be taken up to the control room to so indicate that?

A That's right, and that tag will remain there until that valve is positioned back to its normal position and

locked in that position.

Q Where is that tag kept in the control room?

A It's kept in the shift supervisor's office on a board.

Q On a board.

A Yes.

Q And if that valve is put in its normal position, that tag will be taken off that board, and when an unlicensed personnel or whatever, valves it into the correct position he will so tag it, and the tag will be taken off the board?

A The tag will be re-installed on the valve when it's put in its proper position.

Q Is there any verification that that unlicensed personnel or whoever is doing the tagging has done the correct valve positioning and tagging?

A In the manipulation of valves dealing with the safety systems and breakers dealing with safety system components, there's a dual verification in which one operator will go down and do the task and then a second operator will go down and check that it was done properly.

Q Do they have to report back to anybody that the task has been completed?

A Yes, they have to report back to the shift supervisor.

Q Is there a licensed operator that could -- that is

part of that dual verification?

A Not necessarily.

Q So it could be one unlicensed operator doing the maintenance and then another unlicensed operator doing the verification?

A It could be, yes.

Q And they report back to the shift supervisor?

A That is correct.

Q Would this dual verification process also be applicable in any surveillance, maintenance or special procedures with regard to safety features valves or switches or AFW valves or positions?

A That's correct. The same program applies.

Q Is anything done special in the control room at shift turnover time to assure knowledge of -- strike that. Let me go back. Is anything done in the control room, the primary plant, secondary plant or outbuildings to assure knowledge of system status at shift turnover time?

A As I said earlier, on the AP-23 shift turnover, there are I think two sheets that list the systems and switch gear and its status that is checked by the offgoing shift, and then the oncoming shift supervisor and control room operator check that and sign off on it before assuming the watch so that they're made aware of any changes if any changes have been made.

Q Is there anything personally that you do to assure special status or abnormal status of plant conditions?

A No, there's nothing personal that I do. If you're referring to going out and checking the valve lineups.

Q No, I'm thinking more is there anything -- is there a special memo or board or tag or anything that you would become aware of in your office or even let me expand it to the Plant Superintendent's office, that would assure knowledge of special plant conditions.

A Well, that knowledge is passed on primarily from a shift supervisor to an operations supervisor who's keeping the Plant Superintendent informed and that superintendent will keep me informed. Also, during the normal course of our activities at Rancho Seco, when both the Superintendent and I are there, as far as the headquarters we are in the control room at least once every day just to look the parameters over and see what's going on in the control room, and on occasion reading through the logs.

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MR. BLACK: That completes my cross examination.

BOARD EXAMINATION

BY DR. COLE:

Q I will try to go ad seriat m through your testimony, Mr. Rodriguez. I do not think it will be too long. On page 7 of your testimony, lines 21through 25, you write about the -- how persons are selected for the training program, indicating that it is on the basis of a written math and science examination.

Are there any other requirements, sir? Academic requirements for example, high school graduation, or --

A What we have tried to do, and admittedly it has been difficult in the recent past with the Equal Employment Opportunity programs, is to specify that the new hiree into the operation department have an equavalency of a two-year college degree in the electromechanical area, or experience similar to that, like a Navy nuclear training background.

Q All right, sir. Thank you. On page 10 of your testimony, sir, on line 4, you refer to examinations that are given throughout the various phases of the one year training program to test the candidate.

Who prepares these examinations?

A The training department.

Q This would be the training supervisor?

A It could be the training supervisor and it could be

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also the instructor conducting the training.

Q How large is the training department, sir?

A We currently have four instructors and one training supervisor.

Q Now, the training department, are they involved in training all of the plant personnel, or are they designed more towards operator needs?

A They are designed primarily towards operator needs. The health-physics training is carried out by the training department. The first aid training is carried out by the safety department.

Q A separate department?

A Well, it is the safety supervisor and the nurse, two people.

Q But not under the training?

A Not under the training. The safety technician reports directly to me.

Q All right. The training supervisor and the four instructors, could you tell me a little something about their background, sir; their qualification and training for that position?

A The training supervisor is a former shift supervisor who had been a licensed operator on another commercial unit before he came to Rancho Seco. He had also been a licensed operator with a vendor facility, and prior to that

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had been in the Navy nuclear program.

We have one instructor who is a graduate nuclear engineer who was a licensed individual at another commerical unit before he came to us. He has only been there about seven months. He is in the process of working through our licensing training himself.

Another individual that we have recently hired was not licensed but with another vendor for a short period of time. Most of his experience is experience in the Navy nuclear program.

One instructor who is the instructor I referred to earlier that is actually a vendor employee that we have under contract, who we have recently licensed as a senior licensed operator on Rancho Seco.

He has been training at Rancho Seco for about a year and a half, and was doing training in other facilities before he came to us.

In addition, we have sent -- well, I have one other instructor who is primarily the health-physics instructor. He was originally a Navy nuclear engineering laboratory technician and had done some instruction at a Navy nuclear prototype facility. He left the Navy and joined a utility and became a health-physicist technician. He did mostly instruction services while he was there.

Then he came to us and functioned first as a health-

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physics and chemistry technician, and later as a senior chemistry and health-physics technician in essentially a foreman position, then in the training department.

We have sent all of these individuals to vendor-provided instructors school to sharpen their instruction presentation.

As far as the subject matter is concerned, their backgrounds provided a great deal of experience in the particular subjects they are dealing with.

Q Later on in your testimony in response to a question, you list the total number of licensed employees. I believe the number was 18 and 6 for a total of 24. Of the five people in the training program, how many of those are included in the 24?

A Only the training supervisor.

Q On page 11, you refer to the requalification program for licensed personnel. That program is directed by whom, sir? The training supervisor again?

A That is correct.

Q So, he would also, in effect, be training himself for the requalification?

A That is true. Much of the lecture series in that program is presented by engineering personnel. The instructors deal with systems, but technical specifications, the core physics parameters, the more engineering oriented

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portions of the training program are presented by engineers. He sits in and listens as well.

Q What is your source of engineers for this training program, sir?

A Well, the plant engineering staff, nuclear engineers, mechanical engineers, electrical engineers. The chairman of the PRC presents lectures on technical specifications because he is the one that is most knowledgeable on them.

Q PRC, sir?

A The Plant Review Committee, the chairman of the onsite review committee.

Q On page 12, line 9, you refer to individual study assignments. How are these individual study assignments determined, and who assigns them?

A They are determined by and assigned by the training supervisor.

Q All right. Thank you. On page 13, line 17, you refer to an annual one week simulator course at the B & W facility.

Is that for each licensed operator each year?

A Yes, sir. There have been some years in the past when a member of the management -- not the on shift licensed personnel -- but a member of the management team might have missed a year, but the program is to put the on shift

licensed people through this every year.

Q So, you would be sending at least a dozen people each year down there, on the average?

A Close to two dozen on the average, because the lack of participation in annual simulator training from the management people has been sparse.

Most of us have been to it every year. I guess, just taking myself as an example, I probably missed as much as anyone in the six years since initial licensing; I have missed it twice.

Q So, then it is closer to your 24 licensed personnel going each year?

A Yes, sir. The reason I say that is our approved procedure provides for allowances to the management people with regard to just scheduling for missing those.

It does prescribe that the on shift licensed operators will attend every year.

Q All right sir. Thank you. On page 14, line 6, you used the term "casualties." Could you tell me what you mean by that, sir, how that is used?

A Those are malfunctions. It is the same thing.

Q Okay. Thank you. On page 17, line 24, you refer to formal training being conducted by the General Physics Corporation, a consultant to the District.

Could you tell me something about the qualifications

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of the General Physics Corporation to undertake such a task?

A General Physics Corporation is very actively involved in providing training support services to the nuclear industry. I think, currently, they are essentially running the TVA simulator for TVA.

They have participated in training at a number of B & W units as well as Westinghouse. The individual that we use to provide this training from General Physics had provided similar training -- had provided similar training to some of the other units, but more specifically the individual that did the auditing at the end of this training for us was the individual who audited the Oconee site.

He was available. I thought that it would be in our best interest to have that same individual audit our people so that we would have a comparison, because by the time -- by the time this training had -- came about for Rancho Seco, the NRC had determined that Oconee licensed operators had met their requirements with regard to knowledge of the Three Mile Island incident, natural circulation, and transient effects.

Q Thank you. On page 19, the original version of the first Castro contention 32 appears. Are you familiar with the voard question HC-32, as it was restated by the board?

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A Yes, sir. I cannot recall immediately the words, but I have read over that.

Q Let me read it to you. Then, if you have any additional comment to make, I would you to make it at this time, sir.

"Board question HC-32, what procedures have been used to test and evaluate the competence of Rancho Seco's operating personnel and management?"

I believe you have answered that in your testimony, sir.

A I do not think I have anything more to add than what is in my testimony.

Q All right, sir. You might want to take out a couple of words, like on line 9 of page 21, referring to refuting the statement in Board Question HC-33, since Board Question HC-33 was not as stated, but we understand that situation.

On page 22, in the first paragraph of that page, talking about the number of licensed operators, you have I believe yesterday in testimony, you indicated almost five crews. You have four full crews then a fifth crew that is not filled. Is that correct, sir? Or did you say shifts?

A I have enough licenses to fill out five crews. So, I can fill out the five shifts. Yes, sir.

Q For a total of 24 operators, 8 of which you say

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are -

A The five shifts would require 15 licensed operators. With the two -- I have not made the crew assignments yet, because I just -- there were two that were just recently licensed.

Those two would give me a total of 24, 16 of which are available to stand shifts. I need 15 to have enough licenses for five crews.

Q All right, sir. Sir, what is the current status of the electromatic operated relief valve at Rancho Seco?

A Right now -- we went critical this morning about 5:00. We had completed our heat-up to full system temperature and pressure a couple of days ago. Up to this point, the EMOV is holding well and is not leaking through.

Q So, it has been repaired where it was previously blocked off because of excess leakage?

A Yes, sir.

Q On page 32, you refer to emergency procedures and the special order program. In response to a question from Mr. Black, you indicated that special order and standing order, you use those as the same.

A Yes, sir. That is correct.

Q With respect to special orders or standing orders, you have described the procedure under emergency procedures. It is the same for any standing order or special order, is

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that correct, on page 32, in the lines 9 through 21?

A Would you repeat that, again? I think I missed the drift of your question.

Q Let me just say how do you handle special orders? What is the procedure to transmit the information in special orders to the men, and what verification procedure is used to determine that they have, in fact, read it and and understand it?

A The operations supervisor, in transmitting the special order, will identify on that special order whether or not each operator is required to read and verify that he has read that.

That verification then is substantiated by the operator initialling opposite his name as it will appear in the address portion of the special order that he has read -- read and understood the procedure.

Then, the operations supervisor will retrieve that and maintain that in his file.

Q Does the operator get a copy of this to keep for his own?

A If he wants that he can get a copy of it, but routinely, we do not -- the operations supervisor does not provide 18 copies along with it, because many of the changes are very very small.

Q All right, sir. On page 35 of your testimony,

bfm11

lines 13 and 14, referring to the weekly summaries produced by Babcock and Wilcox, you state that these summaries are provided to the operating crews. In what manner are they provided to the operating crews, sir?

A They are distributed to the shift supervisor. It is left out on the desk of the control room operator for his reading.

Q All right, sir. Thank you. On page 36, we have Board Question H-C34. I will read to you the real board question.

"What actions and/or programs are employed at Rancho Seco to assure that operating personnel, both licensed and unlicensed, adequately respond to feedwater transients?"

The original question -- the original Mursh-Castro 34, I believe, just referred to unlicensed operators. So, I believe that was modified. Would you like to add anything?

A I do not think so. What I have written here answers the question.

Q All right, sir. On page 39, Board Question H-C31. It might very well be that this contention could have been articulated a little bit differently. The intent of the board, I think, you have addressed it in response to the question on line 20 of page 39.

Board Question HC-31 is, are there features of

bfm12

Rancho Seco's control room design and configuration which make it difficult for operators to avoid a loss of feedwater transient?

Probably what we meant there was is it difficult for operators to adequately respond to loss of feedwater transients. That is certainly what we meant there, and I think you have answered that in question 20. Would you like to add anything to that now, sir?

A No, sir. I do not think so.

Q On page 42 of your testimony, on line 1 item 6, you refer to flow instrumentation. In line 7 item 8, you refer to flow indication. Could you tell me the distinction you have made there between flow instrumentation and flow indication?

end tP-5
1 flws
tP-6

A There really is not any subtle difference there. It is the instrumentation that provides the indication.

Q Is it actually a flow measurement?

A In the case of the reactor coolant system, it is a loop flow measurement in millions of pounds per hour. In the case of the steam generator flow indication, it is also a meter indication in hundreds of thousands of pounds per hour.

Q All right, sir. Thank you.

Page 43-- Page 44, excuse me.

A Let me correct that. The units on the feed flow are in hundreds of thousands of pounds per hour, but it goes to six and a half million pounds per hour.

Q In the sentence, Page 44, the sentence that begins on Line 21, you refer to a saturation meter that was planned for installation during the current refueling outage. Is that now installed, sir?

A Yes, it is installed and operating.

Q All right. Thank you.

Page 46, Line 18, you refer to an operating range for the pressurizer. What is that operating range, sir?

A The instrument range on the pressurizer is zero to 320 inches. Now, that range does not cover the full length of the pressurizer. At zero on the pressurizer there is still approximately 70 inches of water remaining in it.

Q Your experience in operating the Rancho Seco plant, over what range have you observed the pressurizer level?

A In those cases in which -- Well, typically it is 200 inches plus or minus 20 for normal operation. In transient conditions when I have been in the control room, I think the minimum level that I have seen is the order of about, oh, 30 to 40 inches. We historically have had a couple of transients, I think, where it went lower than that, but I was not there at the time that it occurred. By the time they got there, they had recovered it.

Q Do you recall how low it went, sir?

Did you lose--

A I think we got down to zero once, but it was down and then right back up again.

Q Have you ever observed the system go water solid?

A No, I have not.

Q All right, sir. Page 49, I refer you to yesterday's transcript, sir, Page 3255, on Line 20, Page 3255.

A This copy that I have jumps from 3207 to 3259.

Q Let me read the sentence to you, sir, and I think we can clarify it quite quickly, with respect to the number of times the auxiliary feedwater system has been called upon to operate. On Line 20 you indicated some 84 times, and in

your testimony on Page 49, you stated a total of 101 times.

A Yes, sir. We called on it a considerable number of times in the latter part of 1979 in the course of testing it and checking it out. Those additional 16 times came about from the time interval of May, when I was responding I think, yesterday to why at the time we agreed to shut down Rancho Seco I thought we had a reliable system, and up to that time it had been called on 84 times; 101 was the updated number by the time I got around to writing the testimony in January.

Q All right, sir. Thank you.

On Page 45 of your testimony, on Lines 7 through 10, in talking about certain special features within the Rancho Seco control room, you say it has been demonstrated in 34 cases when actual loss of feedwater capacity to varying degrees has been experienced, could we then say that it was 34 times the auxiliary feedwater system was called upon in other than a test condition, or is that some other situation, sir?

If you had 101 conditions which under actual transient and test conditions -- would the 34 number on Page 45 indicate the transient conditions under which the auxiliary feedwater system was called upon?

A No, it would not. What I am referring to there in that 34 times is the loss of feedwater capacity to some

varying degree. The majority of those came about as the loss of a single feedwater pump when we were in two-pump operation, and auxiliary feedwater would not be initiated, and the other pump was adequate to continue feedwater flow.

Q Do you know how many times of this 101 times the auxiliary feedwater system was called upon as the result of an actual transient?

A I cannot give you an exact number. No, sir. I just do not remember. Most of those 101 times I referred to, though, are surveillance testing requirements. The surveillance testing is much more frequent, and the vast majority of those are testing rather than transients that were requiring auxiliary feedwater.

Q When you used the term "most of them" out of 100, what are you talking about?

A Just as a guess I would say 75 to 80 percent of them.

Q All right, sir. On Page 50 and 51, with respect to safety system challenges, you describe a system of monitoring. Am I correct, sir, that this is the system by which you propose not exceeding the original design and licensing bases of the facility by monitoring carefully the challenges and at sufficient intervals determining what the status of that is -- Let me stop there. Is that --

A Yes, sir, that is the technique we are using.

Q Are there any other programs that you are aware of, sir, that would go further than just monitoring but attempt to minimize the number of challenges?

A Well, certainly with respect to the core flood valve -- high pressure injection nozzles that I spoke to earlier this morning, the change to our procedure was primarily to avoid those challenges. I think if it was not for the number of cycles available on those core flood nozzles because of their design and the way they are used, I would not have been that prescriptive in the procedure for what the operator can do. He should be able to use whatever he has available to him, if he is in a problem, but we have this limit, and that is why we reduced that utilization, and are going forward with a re-examination at this time to determine exactly how many cycles are available using the actual data that we have accumulated on those nozzles.

Q All right, sir. Any other programs that you are aware of?

A Well, not that I can think of specifically. Most of those cycles are accident cycles or normal start-up cycles. One of the things that for example is how many reactor trips you can take, and certainly our design is trying to minimize an operation, trying to minimize those trips. Nothing specific in a programmatic standpoint that

we are doing.

I cannot think of anything, really.

Q All right, sir. Thank you.

I just have one more question, sir. It is in response to a question by Mr. Black and valve tags. Was I correct in understanding that all valves that do not have a direct status indication in the control room have a tag on them, or essential valves? I believe you used the term.

A We have two different tags. One, the valve is tagged with its valve identification for the purpose of being able to identify the valves when you are making any valve line-up, and that applies to all valves, whether they are a motor operated valve or an air operated valve or a manual valve.

Then, in addition to that for the specific manual valves that are in the safety systems that are not controlled from a control room, and that -- in order to assure response from a design standpoint to a transient, those specific valves are on what we called the locked valve list, and as part of the seal that locks that valve, we use this brass tag, and for those specific valves to provide just one additional level of verification that it is in its proper position.

The tag I was referring to really applies only to those specific identified locked valves in the safety systems.

Q How many valves were involved in that? Do you know?

A I think there are somewhere between 100 and 200.

DR. COLE: Thank you. I have no further questions.

MRS. BOWERS: Mr. Rodriguez, several years ago I was involved -- I was working for FAA, and I was sent to the aeronautical center in Oklahoma City to take a mini-executive course, that is, the small version of what air traffic controllers go through, so I am somewhat familiar with that program.

There, they are looking for similar talents to what I think you are looking for in an operator in the control room, and that is not only the ability to absorb all of the necessary technical matters, but also psychologically someone who will remain calm and go about duties during an emergency, and of course, they do a battery of psychological tests and other things.

BY MRS. BOWERS:

Q In what way do you get a feel for the operators who have the ability to keep their cool?

A Primarily that -- Well, we have at entrance now a Gordon Profile Test. I think I stated that in my testimony. Maybe I did not. But a Gordon Profile Test that the personnel department administers as an initial screening. I think the primary evaluation is made over a period of years

as that individual advances through these various operator steps up to getting into the control room and finally to shift supervisor, because during that period of time a lot of different people are able to observe him, and any shortcomings with regard to the individual's ability to assimilate lots of data in a hurry and then act rationally and in the proper direction normally would come out.

I am not going to say that somebody could not slip through but that is what I think fundamentally we depend upon, just the experience in watching that individual grow and learn and how he is able to handle the increased responsibility that is placed on him.

Q At TMI 2, weren't there some real problems in this area?

A I guess being oriented in an operational manner, I have a difficult time really addressing that question, because I was not in the control room. I have read a lot about the people that over a period of months and now a year have sat back and analyzed what happened where these individuals were in a situation trying to make some decisions in a very short period of time.

I have talked to the manager of that facility about what went wrong. It is so hard for me to understand why they did not recognize the EMOV valve was stuck open for so long, why they shut off high-pressure injection. As far

as how confused they were in assembling a lot of data, I think to assemble it it seems to me that one of the problems was that they did not believe their worst indication, and that is kind of the bottom line in training any operator, and yet that takes constant reinforcement because I guess it is so much easier if everything is going right and if you have something wrong you would like to believe that that is not really the problem, and I think that is what happened there in some respects.

Q What happens when an operator is using the simulator at B&W if the individual does not take the most logical steps that the procedure calls for? What -- How does he know where he went wrong?

A Because the simulator will continue to degrade in its instrumentation just like the real plant will, and at least my experience in the simulator is that you get so involved in operating it that you kind of lose site of the fact that this is a machine and you really can't hurt anything with it. It is just like you are playing with the real machine, that it is actually the power plant on the other end of that, and if you don't keep the core cooled, you can get in trouble and people react that way. They get real nervous about the instrumentation they are getting from the simulator.

So, I think the simulator is an excellent tool,

and if there is a serious weakness in an individual and his ability to cope with a lot of that information and making the right decision, it will come out.

tP-7
ws jl
tP-6

Q You refer to Dr. Lewis's testimony. I did not go back to reread it, but he mentioned that he thought there was too much concentration or a narrowness developing since TMI and that the 30 or 40, I don't know whether they call them scenarios or not in WASH-1400 as far as training exercise should be -- do you recall him mentioning this?

A Yes, I recall that.

Q Well, now how would his criticism -- would it apply or not apply to the training program at Rancho Seco?

A Well, certainly, there has been a great deal of emphasis on the small break LOCA. There has been concern on my part and on my staff's part on not becoming so prescriptive in the direction that's given to them that you tie their hands because of circumstances that are not thought of.

These -- these prescribed procedures could influence us taking the right action. So, from that standpoint, I agree. We have to be careful that we do not get locked into one transient and lead the operator down a merry path by tying his hands when something else comes up.

With regard to Dr. Lewis's comments to WASH-1400, and the 30 or 40 scenarios, those scenarios have not been at Rancho Seco, even generically. I think that is what Dr. Lewis was referring to from an industry standpoint, to look at those scenarios and develop some guidelines; what is happening in the industry right now and particularly in the

bfm2

B & W units, is there an ATOG program ancticipated -- anticipated transient operational guidelines.

That is doing something similar to that. It is taking and developing scenarios and fault tree analyses to look at what would happen under various scenarios and develop some guidelines for an operator for handling those, just to ensure that the actions we have taken for small break analysis has not overlooked some other scenario that could be equally detrimental.

I think the reemphasis of pressure temperature relationships and how to cool the core should really cover most transients that I can think of, because ultimately that is the only way to protect the core, to keep water moving through it.

How ever way you get there is going to be satisfactory. You do not have a lot of options. You have high pressure injection. You have natural circulation.

Not too many scenarios can really change how you operate those, but I think it is more an exercise in assuring that the operator has some guidelines so he does not get to that point where he needs natural circulation and high pressure injection for an extended period of time.

Q You also mentioned yesterday that an operator was considered to have passed in examination if he made 80 percent. Is that correct?

bfm3

A Yes, the new criteria now is on the operator exam -- it needs to be an 80 percent minimum score.

Q Who set that criterion? Is that NRC?

A NRC.

Q Well, what about the other 20 percent that he might not know? How would he handle himself if a situation --

A Mrs. Bowers, you know, the exam takes particular questions and an operator responds to those, but the actual operation in the control room is handled by more than one operator.

I think in a transient condition, if there is only one operator inthere, and he scored 100 percent every time, you would not want to put him in there by himself because there are a lot of actions going on. That is why you have more than one operator available at the site.

Furthermore, I don't -- the exam, granted, it is a very important part. From the standpoint of licensing, it is the final judgment. But the exam is only one piece of what really makes an operator qualified. There are people that just cannot take exams. That is some of the problems that we have.

Good operators, in getting them calmed down enough to take that and sit down and write their thoughts out; some people can write very lucidly, and there are others that can't. So, I think you have to be very careful on extrapola-

bfm4

ting what that minimum score means, as opposed to how that operator can operate.

Q I have one last question. You mentioned yesterday that you understood that you lost some personnel because of the rotating shifts, that this was a problem in family life and that kind of business.

Have you ever experimented with not rotating shifts? Having people go to work the same time every day or night?

A No, we have not. Historically, in the industry, the seven day a week 24 hour a day operation has been a rotating shift that has been varied by how many shifts you put on.

I do not know of anyone who has experimented with covering that kind of an action without rotating. Somebody would have to rotate in order to work the 40 hour work week and cover those 7 days a week, unless you could -- unless you could individuals that were willing to work only two days a week. That would be Saturday and Sunday.

I do not think -- I do not think you are going to find very many people who want to do that. The short answer to your question is, no, we have not experimented with that.

Q You also mentioned that the day shift was the busiest. Now, what is different about the day shift from the other two?

bfm5

A The day shift is when everyone is there, primarily. It is when the major work activities, maintenance activities, modifications, management, personnel are all there. The engineering personnel are there, the quality assurance personnel.

That generates a lot of activity that involves the crew; whereas, on the swing shift and the mid-shift it is a seven to eight man crew. Primarily, what they are involved in is the plant operations and the surveillance testing.

They are not then involved in putting -- so much so putting systems into operation and taking systems out of operation as the day shift is.

MRS. BOWERS: We would like to break for lunch now and be back in an hour.

(Whereupon, at 11:55 a.m., the hearing in the above-entitled matter recessed for lunch, to reconvene at 1:00 p.m. this same day.)

end tP-7

jl flws
tP-8

AFTERNOON SESSION

(1:00 P.M.)

MRS. BOWERS: We would like to resume.

Mr. Baxter has just handed the Board and the parties Revision 15 of D-5, loss of reactor coolant, reactor coolant system pressure. Has CEC had an opportunity to review this or compare?

MR. LANPHER: Yes, ma'am.

MRS. BOWERS: How would you characterize it?

MR. LANPHER: Great.

(General laughter.)

MR. LANPHER: What was the question, Mrs. Bowers?

MRS. BOWERS: Well, Mr. Lewis charaterized it as CEC 43 plus notes that tied in very much with Mr. Rodriguez' testimony.

MR. LANPHER: I would like to mark it as CEC 46. That is the next one along the line. And when my turn comes again, I would like to ask a couple of questions on it. I have relatively few.

MRS. BOWERS: Mr. Baxter, do you have any objection to it being identified as CEC 46?

MR. BAXTER: No. We still have an outstanding offer for 43.

MR. LANPHER: I am proposing then to offer them both into evidence.

MR. BAXTER: I will stipulate at this point to the admission of both of them.

MRS. BOWERS: Mr. Lewis?

MR. LEWIS: No objection.

(The document referred to was marked for identification as CEC Exhibit Number 46, and was then received in evidence.)

(The document previously marked for identification as CEC Exhibit Number 43 was received in evidence.)

MRS. BOWERS: CEC 43 and 46 are admitted into evidence.

MR. LANPHER: I will just propose that I will wait until cross examination, until it works around to me.

Whereupon,

RONALD J. 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:

CONTINUED BOARD EXAMINATION

BY MR. SHON:

Q Mr. Rodriguez, one thing I don't think Dr. Cole really asked you about was, on Page 46 of your testimony,

Board question HC-22, as with the previous Board questions that bear an HC designation, there is a version that we really intended for you to answer, but through our scheduling you have not got that version in your testimony. Have you seen it?

A As I said this morning, I have read through those others. I do not recall specifically what the words are.

Q I will read it to you now. I would like your comment on it. It says "What instrumentation is available to give positive indication as to whether or not the coolant is subcooled throughout the core at all times?" How does that instrumentation work in the event that a non-subcooled condition is indicated? What instrumentation would then give reliable instrumentation on the water level in the core?

I think you have told us what is available to test the subcooled nature of the --

A Yes. What I did not address was how that TSAT meter works, which is part of your question.

I will take that one. There are two separate TSAT meters. The way they are set up is, each meter receives a wide range pressure signal, zero to 2500 pounds per square inch gauge from one channel of the safety features instrumentation, and each TSAT meter receives a T-hot input from each reactor coolant loop, so essentially each TSAT meter has one zero to 2500 pound pressure input, and

two T-hot inputs. The meter itself auctioneers and selects the highest temperature reading that it is receiving, and that is what is put into the computer to calculate subcooling in degrees Fahrenheit. The T-hot inputs cover a range of 120 to 920 degrees. The display to the operator is a display in degrees Fahrenheit subcooling. When that display reaches zero, he has lost the subcooling, at least the indication is telling him he has lost the subcooling.

Q The last portion of the question said, in the event that a non-subcooled condition is indicated, what instrumentation would then give reliable instrumentation on the water level in the core?

A The installed thermocouple instrumentation will provide him with the instrumentation that he has adequate level to keep the core cool or if those temperatures indications are going into the superheat indication that his level is not sufficient to cover the core.

Q The operator would have to make that interpretation himself from steam tables or some such thing?

A Yes, sir, and those steam tables are available to him.

Q Rather early in your cross examination, you said, I thought, something about a new pressurizer level meter or a new pressurizer level indication of some sort. Later on, when you were discussing Page 41 and the list there in

your testimony, you indicated that the pressurizer level had not changed. Has there been any change made in the instrumentation on pressurizer level or did I just mishear you the first time?

A Item 5 on the bottom of page 41 discusses three channels of compensated pressurizer levels. The new channel that has been added is an uncompensated pressurizer level.

Q Thank you. I want to go a little bit deeper into the matter of temperature compensation on pressurizers. Is this accomplished with a reference leg? Is this how it works? Is it a differential --

A Yes, sir. It is a differential pressure detector.

Q Detecting the difference in pressure between the pressurizer and the reference leg of some sort?

A Yes, sir. It has a reference leg which puts a static head on one side of the cell and then the bearing has the level in the pressurizer.

Q What happens to such a device if the reference leg flashes?

A If the reference leg flashes to steam, then that differential pressure is reduced, and the DP cell seeing a lower pressure would then indicate a higher level.

Q I understand that there was for a short while after the Three Mile Island incident some suspicon that this might have happened at TMI and might have been one of the reasons why people thought the pressurizer was overfull when

it was not. Have you heard anything about that?

A Well, yes, sir, I have, in answer to your question. I have heard a number of phenomenon discussed. Some were the possibility of flashing in the pressurizer because -- some flashing in the hot leg or the cold leg because the pressure dropped rapidly in the pressurizer. Also, of course, the contention, and I think it is a valid one, that bubbles were forming in the reactor vessel and that was forcing water back in the pressurizer, and also that high pressure injection did not run for a long time. When it initially started up, it was running for quite a while, and there was a lot of cold water going in there that was being heated up and may have contributed to it, and generally these are the different concepts that the operators -- that were discussed with the operators.

Probably the latter two occurred. I have in my own mind some question with regard to that cold leg flashing because it is out away from the pressurizer. It is not insulated, and it is on the order of about somewhere between 120 to 130 degrees, and the pressure did not drop that low for that temperature water to flash, but that is a phenomenon some people thought might have occurred.

Q You say the new pressurizer level senser is not compensated. Would it not be then subject to the same kind of failure?

A The compensation is a temperature compensation for the water density.

Q And it is automatically carried out by some sort of a --

A The function generator that the temperature goes into and looks at the differential pressure across the cell and from that calculates what the level is based on that temperature.

Q You mentioned at one point in cross examination instrumentation which might have the meter on the XNNI and the transmitter on the YNNI. There is such instrumentation?

A Yes, sir. There is some instrumentation that is powered that way.

Q Doesn't that sort of assure that that meter will go out if either of the power supplies fail?

A Yes, sir, it does.

Q Why is it done that way? It would seem more logical to have two complete sets of instrumentation, each on its own power supply, to protect against single common mode failure.

A I really cannot address the logic in the design of that particular instrumentation. What I can address is the result of the occurrence of a loss of a single power supply, which is what led us into a major modification of

how we provided that power to the NNI, and also led to the modification of providing at least some -- at least that instrumentation which the operator needed to bring the unit to a safe shutdown condition, with power completely separate from the NNI.

Q I would like to direct you to CEC 33 again. Do you have that still with you?

A What is the --

Q It is the human factors review, Page 4-5, Figure 4-5.

Sort of a detail that came out again on cross examination. You described the locations of the two telephones that are in this room, one, as I understand it, at the cooling water panel, and one at the desk.

A I did not mean to imply those were the only two. I did describe those, I guess, from the standpoint of the operator using one to communicate with while he was in front of the immediate consoles, and then one back behind. There is an additional phone in there.

Q It occurred to me that the radiation monitors which are in the adjacent room might be something that an operator might well want to keep an eye on while he was communicating with someone in the plant, since they show what the radiation levels are in the plant, do they not?

A Yes, they do show the radiation levels.

Q How could he do this, that is, say to someone outside there in the plant, the level in the next room to you is such and such, if he does not have a telephone somewhere near the rad monitoring panels?

A If he was going to be there for some time, we do have another phone with a jack that can be plugged in that will reach over there.

Q I see. Thank you.

I am afraid these questions are going to be a little bit random. They are things I noted down while you were being cross examined by the parties. One of them is this. You said that the simulator that you and others have trained upon was a very good simulator, that is, it duplicated many of the phenomena that an operator confronts in running a nuclear power plant. How about some details that are neither directly nuclear nor quite the sort of thing that you might have in the way of piping or thermodynamics or that sort of thing?

As an example, when the flow becomes two-phase in a plant like this, you sometimes get vibration or noise in the pumps. Is this correct?

A Yes, sir.

Q Does this thing simulate that? Are there vibration meters or something that would indicate when it calculates that flow in the primary is two-phase. Would it tell the

operator that his pumps were vibrating?

A No, the simulator at least as of February when I was there last does not have reactor coolant pump vibration instrumentation. That sort of thing is normally provided by the instructor, just like it does not have turbine vibration -- excuse me, it does have the turbine vibration, but the instructor in carrying through the scenario will come into the control room and tell you something or he will get on the phone and call up and say, I am at the AO out here -- I am at the atmospheric dumps and there is a lot of steam coming from somewhere and I cannot see where it is coming from exactly, or the condensate pump is just about ready to walk off its bed plates, and that is the general technique that that kind of information is conveyed to the operator.

Q I see. So there are some phases of operation that the thing does not really duplicate?

A Yes, sir, there are.

Q I would like to direct your attention to CEC 33, which is the thing we have just been looking at, the human factors review, and to CEC 40, which was the group of licensee event reports, in particular, the one dated December 5, 1977, and to Page in CEC 33 -- to Page 7-9, Figure 7-16.

It seems to me that in Figure 7-16, the two

extreme bottom left open, close indicators are the reverse of the rest of them in that row. Is that the kind of thing that happened in this December incident? Are these the same ones? Have they also been changed? What is the situation?

A No, sir. The convention of putting the open on top and the closed on the bottom appears everywhere except on the safety features panel. Figure 7-16 is a safety features panel. The convention on that is that all of the switches on the bottom are white, and they go white in the safety features position, so that the operator can look over there and just run right across the bottom and see all his white lights around, and he knows he is in the safety features position.

These are all in line. They are not staggered. And in this particular case, whatever valve it is -- I cannot identify it -- its safety features position is open, and later on its safety features position is closed.

Q So up and down means okay and not okay in a sense in this configuration?

A The safety features panel, what you are looking for is that straight line of white lights across the very bottom of it?

Q That is interesting. I do not know whether it is really confusing or not. With regard to CEC 33 -- pardon me,

43, and its progeny, CEC 45, I think -- 46. I have not had a chance to compare that these two are exactly alike in this way, but they are certainly very similar. If we are using the CEC 43 version, on Page D-5-1, Paragraph 3.1, under symptoms, says that a symptom of reactor coolant loss is pressurizer level and or reactor coolant system pressure decreasing without associated decrease in coolant average temperature, and it then says on the next page, D-5-2, in a note, that coolant leak systems can be caused, for example, by a steam line rupture.

I think the newer version also mentions other overcooling. Would an overcooling transient give you a drop in pressurizer level without an associated decrease in coolant average temperature?

A In the overcooling situation, without essentially an external loss of inventory, the pressurizer level decrease is due to the increased density in cooling off the reactor coolant system, so if you have the overcooling incident it will cause pressurizer level to decrease.

Q Without an associated decrease in coolant average temperature? Do you see what I mean? I would think the thing you have described in the first symptom here seems truly a loss of inventory.

A Yes, sir.

Q The fact is that symptom complete with the failure

of the T average to change is not symptomatic of an overcooling incident, is it? Isn't this one of the ways you can tell them apart?

A The way to tell this apart is, with regard to a decreasing pressure -- assuming that the decreasing pressure and the decreasing pressurizer level is coincident with either the loss of coolant accident or the overcooling, the difference is the fact that in the overcooling accident, the average temperature would be dropping quite rapidly, whereas in the break situation, the average temperature would not be dropping.

Q That is exactly what I meant, and it seemed to me at least the CEC 43 version of this thing did not make any note about that or did not make that clear. Do you think it makes it clear? I don't. I thought it confused it.

A I guess it was clear to me, but --

Q Okay. Lastly, a sort of a little aside, when you were speaking to Mrs. Bowers about the kind of mindset if you will excuse the term, that operators get about particular accidents, you said you had some worry that the focus on the TMI 2 incident might make people ignore other things that could happen, by concentrating too much on that sequence, or you suggested something like that. Is that true?

A Well, I guess my concern is not so much with the

operator, but how the industry approaches coping with these and generating guidelines that the operator follows, and I think a lot of the guidelines, of course, are generated from the vendors and their engineering personnel looking at a specific kind of accident, and it is very important, I think, that those guidelines get a good input from people with some operating experience, to keep in focus that the operator has a broad spectrum of operating characteristics that he is accustomed to working with and pays attention to, and if you narrowly look at one aspect of it and do not keep your mind open to what he is faced with, you can become so prescriptive as you tie his hands, and that really is what my concern is.

Q It occurs to me that there were two caveats that existed in the nuclear industry a couple of years ago that were pretty strongly impressed on reactor operators, and one was, don't let it go water solid, and the other one was, don't let the pumps cavitate.

Do you think these might have contributed to TMI 2?

end 9
Bob foll

tP-10
flws jl
tP-9

tml

A Like I said earlier, I was not there, so it is really hard for me to make a judgment. I really hesitate to do that, because I have been in -- fortunately, I have never been in a situation of TMI, but I have been in some situation where, you know, things get pretty active.

So, you know, I hesitate to criticize somebody as Monday morning quarterback, because I was not there. With regard to your -- to the two caveats that you discussed, that is true.

There is also one I mentioned earlier about believing your worst indication and keeping the core cooled.

Q Yes, I know.

A So, the fact of going solid, you know, from what I understand there was an awful lot of emphasis on Three Mile Island about solid plant operation. That is from some of the information that I have back in our particular plant.

We did not prescribe procedures for operating solid. Certainly, it was a requirement to maintain a bubble and take action if the pressurizer level was getting high. It was not emphasized, you know, a void going solid at all costs.

Likewise with pump vibration or a pump cavitation, again, the procedures provided for vibration readings and operators taking action on it.

Taking pumps away from an operator in the pressurized

bfm2

water reactor, historically, has put the operator in a condition he does not want to be in. Forced circulation is the best way to cool the core.

At least in our unit, fortunately, we have not had any pumps really go haywire, but we have some pumps where vibration has increased. When it got close before they started turning them off, they were in contact with plant management, the superintendant, myself, or the operation supervisor because of the concern for forced circulation.

So, again, at least in my experience with our operating personnel, it has come across to mean that, okay, they want to protect the pump. But they do not look at that as an overriding thing, that you look at the pump while your core is being --

Q You said something else. You said taking the pumps away from an operator is a serious thing to do because, of course, forced circulation is best.

The new response to high pressure injection does just that, doesn't it?

A Yes, sir. It does. There is very good reason for doing that in the analysis of support step. What I am interested in is that very shortly we are able to put in an automatic system that will take advantage of subcooling because right now the procedures we have do not allow the operator to consider subcooling.

bfm3

He has to trip pumps off slowly. He would be tripping off pumps under certain conditions for an over-cooling situation, which was not causing void formations.

Q Couldn't you rearrance his ground rules so that he could take account of subcooling?

A Yes, sir. You could. I have been unable to do that at this point.

(Laughter.)

MR. SHON: I think Dr. Cole has a question or two on your crew and the numbers of people assigned to various categories.

BY DR. COLE:

Q Just one question I forgot to ask Mr. Rodriguez. Your testimony indicates how many licensed operators you have; how many unlicensed operators do you have in the plant?

A Right now, approximately 30 to 35.

Q How many people work at the plant, total, sir?

A In my department, about 230. Then, there is contractor personnel also, but as far as the operating department, the nuclear operations department, about 230.

DR. COLE: All right, sir. Thank you.

MRS. BOWERS: Mr. Baxter?

REDIRECT EXAMINATION

BY MR. BAXTER:

bfm4

Q Mr. Rodriguez, you were examined about CEC-39, which is a report of an NRC region 5 inspection in response to an anonymous allegation. How many hours did the NRC inspection personnel devote to this particular inspection?

A If you will give me a minute to find that, I am pretty sure that that was documented in there. I think it was 80 hours. The investigation involved 80 hours onsite by both inspectors.

Q What did the inspectors conclude with respect to items of non-compliance or deviation?

A Their results were that there were no items of non-compliance or deviation.

Q You also testified on cross examination that it is possible that an unlicensed operator could be called upon to perform an operation for which he had not been trained and which he had not performed previously.

Are unlicensed operators normally instructed in the performance of an operation before they are called upon to do it?

A Yes, they are.

Q Even if they possibility occurred, would you acknolwedge that an unlicensed operator might be called upon to perform an act that he had not performed previously?

Is it your testimony that none of his training would assist him in such a situation?

bfm5

A No, the training that he had had certainly would assist him in some aspect of that. If he was not entirely sure, and particularly with regard to a valve line-up or a switching arrangement, then that shift supervisor could either send someone out that had done that before or if it is a simple evolution describe to him the procedure to go to and also describe to him the general conduct of carrying out that operation.

Q Do unlicensed operators attend the requalification training lectures which are regularly scheduled for licensed operatoring personnel?

A Yes, they do. When we bring a crew in for attending the requal lectures, we normally bring in the entire crew.

Q I would like to return you also to CEC-33 which is the EPRI human factors review of nuclear power plant control room design.

I think established it during your cross examination, but let me make sure. The plant that is discussed and identified in this report as plant C is Rancho Seco. Is that correct?

A Yes. I think that probably stands true for the whole report. Everything that we have discussed at this point, that described the C plant was Rancho Seco.

Q Turning, in particular if you would, to page 4-8, table 4-1, which entitled control room dimensions. How does

bfm6

Rancho Seco compare with the other four plants for operational panel area?

A Well, they rank these five units one to five with the number one representing the smallest, and number five the largest dimension. With regard to operational panel area, Rancho Seco is ranked number one.

Q How does it compare with other plant in terms of maximum viewing distance from desk?

A It ranks number one.

Q How does it compare on maximum walking distance?

A It ranks number one.

Q What does the ranking number one mean with respect to the walling distance?

A It means that is the shortest distance.

Q How does it compare with the other plants in terms of gross floor area?

A It ranks number two.

Q How does it compare with the other plants on open floor area?

A It ranks number one.

Q Mr. Ellison asked you about figure 4-13, which is on page 4-16, which represents traffic flow paths for a single operator responding to a steam generator tube rupture prior to shutdown initiation inthe Rancho Seco control room, is that correct?

bfm7

A That is correct.

Q On page 4-15, in roughly the middle of the only complete paragraph on that page, what do the authors describe the grouping of functions in the primary area in the Rancho Seco control room?

A The authors state that essentially the primary area functions are well grouped.

A If there are two operators on duty in the control room, is it likely that the operator at the console in figure 4-13 is also going to have to be the operator that makes the trip shown to the radiation monitoring panels?

A What is likely is that one operator will stay at the console and another one will make the trip to read the radiation panels.

Q Turning to pages 4-19 and 4-20, the authors of the report are discussing the supervisor's office. In particular, at the top of page 4-20, what do the authors report with respect to the supervisor's office at the Rancho Seco control room?

A Well, the paragraph essentially starts out by saying that the supervisor may not be immediately available to the trip from his office, causing some delay at four plants; and that the exception to this was plant C, which is Rancho Seco.

They go on to say that -- at the end of that para-

bfm8

graph, that the operators at this plant which I think also is Rancho Seco, expressend strong satisfaction with the design and cited some cases to confirm the advantages of the arrangement that we have.

Q Recognizing that you were not present during whatever interview with the operators that was conducted and with the exception of that observation, do you agree that is an accurate description of that location and features of the supervisor's office at the Rancho Seco control room?

A Yes, that is an accurate description.

Q Turning next to page 4-24, where the report is discussing illumination levels. In the middle of this page, what do the authors of this report conclude with regard to the illumination levels at the Rancho Seco control room?

A It says essentially that there was an elimination variance from some human engineering standard, cited by operators as being a problem with the exception of Rancho Seco, which provided the highest level of illumination of the five units that they surveyed.

Q On page 4-28, the report addresses control room decor and upkeep. Turning your attention to the last paragraph on that page, the authors state in part that with the exception of one plant, control rooms were variously described in terms of bland, drab, dingy, and dull.

At the plant which was the exception, operators

bfm9

were generally pleased with the light blue panels and walls, and dark red carpetting. It may be significant that illumination was bright at this plant. It may not be entirely coincidental that morale at this plant was perceived to be highest.

Given your previous testimony about illumination levels at Rancho Seco and your knowledge of panelling and walls and the carpetting, would you conclude that the authors are discussing the Rancho Seco control room?

A Well, they left out the stereo set, but I think that may have come in after they were there. Yes, that is Rancho Seco.

(Laughter.)

end tP-10
jl flws
tP-11

Q On the question of operator understanding of emergency procedures, is there any confusion or any contradiction between the memorization of immediate reactions and reliance upon written procedures as well?

A We have emphasized strongly to the operators that the immediate actions of the emergency procedures are a requirement to commit to memory. On the other hand, we have also emphasized pretty strongly that we expect the operators to use the procedures, and by that I mean whether they are in a casualty situation or a normal evolution. The procedure should be broken out and gone through to ensure that they have not left something out.

Again, in our examinations, primarily when we asked for details with regard to procedures, we asked for immediate reactions. Then generally the question may ask for an operator to generally describe a procedure, but not the requirement that he have it committed to memory.

With regard to confusion, no, I do not think the operators are confused in whether or not they need to memorize the procedures, or they can use them as a reference when they are going through the evolution.

Q Turning now to the question of adequacy of instrumentation, to diagnose and control feedwater transients, do you feel it would be prudent to install at Rancho Seco a device to indicate the initiation of natural circulation?

A The temperature instrumentation that we have already installed will provide the indication that natural circulation is operative. With regard to some kind of a natural circulation flow indicator, I would assume it would be a delta t device, and we already have that capability.

Q Is there already installed at Rancho Seco a temperature alarm at the outlet of the EMOV and relief valves?

A Yes, there is.

Q What is the temperature set point for that alarm?

A Two hundred degrees Fahrenheit.

Q You were examined about CEC Exhibit 40, which is the selection of event reports submitted by SMUD to the AEC and to the NRC over a period of some five or six years. Are you aware of any analysis or examination which has been made comparing the number of such reports submitted to the AEC and the NRC by operating licensees?

A Yes, I am.

Q And who prepared that report and under what circumstances?

A In the Three Mile Island 1 restart hearing, the NRC has prepared a report as a response to an interrogatory that tabulates and statistically evaluates the numbers of licensee event reports each of 70 operating units has submitted in the period from January 1, 1969, to 31 December,

1979.

That report goes on to describe various levels and statistical analyses and other results of that tabulation.

Q How did Rancho Seco fare in that listing with respect to the total number of reportable occurrences over that period, averaged on a per year basis?

A The average number of reports per year per unit was about 35. Rancho Seco's number was about -- was 19, a little over 19, ranking it 16 out of the 70, where the first unit, the Number One unit had the lowest number of LER's, and the Number 70 unit had the highest number of LER's, in addition -- well, that report, as I recall, pointed out, and I think it was a valid comment, that the differences in technical specifications will impact the number of reports at a particular unit, and as a further comparison in that report I just took, the B&W units since the technical specifications are similar, certainly not identical, but similar, and compared how Rancho Seco compared with the other eight units, and in that case, on an LER per year basis, Rancho Seco ranked first out of the nine.

Q Meaning that it had the lowest number?

A The lowest number of LER's annually.

Q You testified earlier today that you do not have written criteria or a procedure to govern the determination

that a document would be transmitted to operators for their reading and review. Does this reflect any disinterest on the part of Rancho Seco management in providing relevant information to the operators?

A It certainly does not. I have indicated two or three times the individuals that are primarily responsible for doing that screening include myself, the plant superintendent, and the operations supervisor. We are all very sensitive to what an operator is up against, and I think we are qualified to determine what other types of information he needs to know in order to carry out his tasks, certainly in light of Three Mile Island. That has even sensitized us further with regard to providing him the proper kind of guidance and the kind of information that he should have.

At the same time, I am sensitive, and I know the superintendent and the operations supervisor are also sensitive to thevarious things an operator needs to do. We have an extensive surveillance program that he is a part of, and his primary objective is the actual operation and observation of the plant.

So, the kinds of documents and the numbers of documents that we send to them are screened carefully so that we do not try to place any additional burden that is really not directly related to him being able to do his

job properly.

Q Do you have a copy of Procedure AP-25, Licensed NRC Operator Retraining, which has been marked here as CEC Exhibit 35?

(Whereupon, counsel handed the document to the witness.)

A Thank you.

Q I would like to call your attention to Page 7 of this document.

What does the procedure provide with respect to the time interval for the oral examinations for the requalification program?

A The procedure prescribes for an interval of approximately 52 weeks.

Q Has there been an instance in which that time interval has been exceeded to any significant extent?

A Yes, there has been.

Q Would you describe that circumstance, please?

A The re-examinations are given in two groups. It primarily stems from when the original cold license group was licensed, and then the follow-on hot license group, and one group takes their exam in the middle of the year in June, or July, and the other group takes their exam typically right at the beginning of the year, in January.

This last year, there was one operator who did not

get the -- I think there was one or maybe two that did not get the oral exam in January. That exam came two or three months later. The primary reason for that was, we were in that refueling outage, and we were utilizing the personnel in carrying out that effort, and just making the time available did not come about until the end of the refueling outage.

Q This oral examination which is given as a part of the annual requalification program is beyond and in addition to, is it not, the written examination administered by the district?

A Yes, the written examination which is part of the actual code, the law, was given within the time period prescribed in AP-25. The oral exam that is given was the part of the examination that was delayed.

Q Does the NRC require an oral examination as part of the requalification program?

A No.

Q On the question of management competence, would you describe what happens at Rancho Seco for the review of design changes to Class 1 systems?

A Under Engineering Change Procedure Number 1, we had a programmatic technique for approval, initial approval of a design change concept, which we referred to as an ECN, an Engineering Change Notice. What this requires is that

the engineer responsible for the design basically conceptualize the purpose and generally how the design is going to be implemented, but in only general terms, and identify, of course, the system it applies to and how it will function. This document has two levels of review, and it was established some time ago, and that level was essentially a dollar -- an estimated dollar cost which is, I believe, $4,000, and one time I think we determined that, well, $4,000, the smaller jobs could be done without as much review, but since inflation has hit us, there is not too much we can do under $4,000 any more.

What that requires is that the ECN goes to the supervisor of engineering and quality control in the Nuclear Operations Department, and he makes a 50.59 determination, and he will mark that accordingly, either yes or no. Then, that design change notice will proceed to the supervising engineer in the Engineering Department which is responsible for configuration control, for his review and approval, the manager of the Engineering Department for his review and approval, and to the manager of Nuclear Operations for his review and approval.

If that 50.59 determination was initially marked as a yes after those approvals, then the Plant Review Committed will become involved at the point that actual drawing changes are generated to review and pass on the

acceptability of that particular design change. If the supervising engineer in his 50.59 review estimate marks it no and the other three individuals in the chain or if it is less than $4,000 the supervising engineer in the Engineering Department also determines it is not a 50.59 item, then that ECN will go back directly to the design engineer for generation of the specific design changes and implementation into the plant systems.

Q How in your view does this procedure comport with the Rancho Seco license technical specifications governing the role of the Plant Review Committee?

A The technical specifications require that the Plant Review Committee review changes in procedures that affect nuclear safety, and from the standpoint of affecting nuclear safety, those design changes that may degrade the nuclear safety aspects of it. If the supervising engineer or the screening engineer who is the supervisor of the engineering quality control evaluate that that is a potential degradation, if you will, to nuclear safety, then the Plant Review Committee will come in and give it its full review and approval, and make a final determination before the procedure change is actually implemented.

Q Are there instances in which the Plant Review Committee has not formally reviewed technical specification violations and formally reported to SMUD management the

actions required to prevent recurrence?

A Yes, there are, in the context for formally.

Q Would you describe those circumstances?

A In the course of carrying out Nuclear Regulatory Commission unannounced inspections, the inspector has on occasion found violations of the technical specifications. These violations have been brought to management's attention at the exit interview. That is normally attended from the Nuclear Operation Department standpoint by the manager of nuclear operations, the plant superintendent, the chairman of the Plant Review Committee, the maintenance supervisor, the chemistry and radiation control supervisor, the operations supervisor, all of the latter of whom sit on the Plant Review Committee, and there may be other engineering or technical people represented there, depending on what the particular areas are that are being covered.

So, at this point, these individuals who are supervisors, but also function as members of the Plant Review Committee, become aware of what the technical specification violation might be, when the regional office then forwards formally the notice of violation and requests the district to respond with their proposed corrective action, and that corrective action is normally generated by the supervisor responsible for the area in which the

infraction occurred, and again, that individual is one of the members of the PRC.

The actual event report -- the actual corrective action report is also generated normally by the chairman of the Plant Review Committee. The only exception to those cases are cases of security infractions wherein the Security Department then generates those responses. In generating that, the Plant Review Committee chairman and the supervisor act together to generate the response or review it, and it is sent to the assistant general manager and chief engineer, Mr. Mattimoe, for his decision prior to forwarding to the region.

Also, when the report comes in of a violation, copies of that report are transmitted and routed to all of the members of the Off-Site Management Safety Review Committee. Likewise, copies of the response are routed to the members of the Management Safety Review Committee.

In that context -- When I answered my question, that is why I used the word "formally." There are these categories of violation where the Plant Review Committee as a committee does not sit down and review it, but they are certainly involved in it one way or the other in generating the response and implementing the corrective action.

end P11
Su foll.

Q In the case of any violations which are uncovered, however, by Rancho Seco personnel as opposed to by NRC inspectors in such an unannounced inspection, would the Plant Review Committee be involved in a formal way?

A Very definitely.

MR. BAXTER: Those are all my questions.

MRS. BOWERS: Who is for CEC?

MR. LANPHER: I thought we would switch around. I will start this time.

RECROSS EXAMINATION

BY MR. LANPHER:

Q Would you please turn to Page 42 of your testimony, Mr. Rodriguez?

As a preliminary matter, Mr. Baxter, do you have copies of the report which Mr. Rodriguez referred to on your redirect examination?

MR. BAXTER: Which one?

MR. LANPHER: From the Three Mile Island 1 relicensing.

MR. BAXTER: Yes.

MR. LANPHER: Can you make them available?

MR. BAXTER: Yes.

MR. LANPHER: Thank you.

(Pause.)

MR. LANPHER: For the record, Mr. Baxter

has just supplied us with a document which starts at Page 12, or that is the first number on it.

Could you tell us what the first eleven pages were?

MR. BAXTER: I can't be certain this is the exact title, but these are NRC Staff Responses to Intervenor AAMODT's, A-A-M-O-D-T, Sixth Set of Interrogatories, dated March 31, 1980, and frankly, I have not seen the first eleven or any subsequent pages. This is the entirety of the answers to those two questions, and that is all I have with me here in Sacramento.

They are available, I assume, from the staff or PDR in Washington, but I didn't bring them.

MR. BLACK: Mr. Baxter, is it not true, though, that the response starting on Page 12 is a complete response to Interrogatory Questions 25 and 26?

MR. BAXTER: Yes, it is.

BY MR. LANPHER: (Resuming)

Q Mr. Ellison is going to be handling the information on that, but Mr. Rodriguez, this is a fairly large document. If you could identify any particular portions that you were relying on in your answers to Mr. Baxter, then maybe while I am asking you some questions, Mr. Ellison can be reviewing those portions, or maybe you relied on it all.

(Pause.)

MR. BAXTER: I believe, not to testify, but I have been already, it is Category 5 in the printout attached to the answer. You see the ranking on the lefthand side?

THE WITNESS: It is near the back of the -- the back of that tabulation, computer printout, I guess about actually halfway through the tabulation. Each -- every couple of pages they have a category label at the top. You go through and find Category 5. Okay? Now, you just go on down, and you will see all the way on the righthand side, the unit name, and you come on down there to Rancho Seco, which is Number 16. The number 16 is all the way on the right.

MR. LANPHER: All the way on the left.

THE WITNESS: Excuse me. All the way on the left. It's getting late.

MRS. BOWERS: Well, someone has kindly underlined.

(General laughter.)

MR. BAXTER: The industry average is given at the end.

MR. LANPHER: Do you know what the other columns across the top --

THE WITNESS: The other -- the other area that I relied upon with respect to my comments on comparing Rancho Seco to the B&W units is the tabulation in the front part of the report that is titled at the top "Reportable

Occurrences at Operating Nuclear Power Plants, January 1, 1969, to December 31, 1979."

BY MR. LANPHER: (Resuming)

Q Could you turn back to the Category 5 sheet for just a moment, please?

Could you explain what the various columns are on this document. Some of the ones farther to the right, the meaning is not immediately apparent.

A No, I sure wouldn't.

I cannot. I -- If you look on the bottom of Page 1, or the bottom of Page 12 and the top of Page 13, you will see the author's explanation of what those columns are, and I am sure if you will read through them you will understand why I am not going to try to explain them to you.

(General laughter.)

MR. BAXTER: The number Mr. Rodriguez gave of approximately 19 for Rancho Seco is about the third column in. That is the yearly average. The first column appears to be -- Well, Age of Unit is clear, and the next column is the number that he testified to.

MR. LANPHER: In just a little while we will find out how good Mr. Ellison is at reading.

BY MR. LANPHER: (Resuming)

Q Mr. Rodriguez, if we could return to Page 42 of your testimony, Item 10 on that page, the reactor coolant

system loop flow indication, that instrumentation is only for forced flow circulation. Is that not correct?

A The instrumentation is a utility flow instrumentation. The equipment is not interconnected with the reactor coolant pumps. It measures whatever flow is flowing through the pipe.

Q Would this indication be used in a natural circulation mode?

A Well, it's available. It is my understanding that in some of the analyses done in some of the B&W units in a natural circulation mode this instrumentation has indicated flow rates at the low scale, and how accurate it is down that low I don't know, but they might well indicate some flow if the -- particularly early on, when there is a high indicator driving head to drive a good flow through the steam generator.

Q Would Rancho Seco operators rely on this indication to verify -- or this instrumentation to verify natural circulation coolant?

A No, the direction for verification of natural circulation cooling is that the unit is subcooled and that the Delta t across the steam generator is of the order of between 35 and 100 degrees f.

Q In response to a question by Mr. Shon, I believe you stated that it was unfortunate in your view that you cannot consider subcooling in relation to the reactor coolant trip requirement. I don't remember exactly what your words were, but is that roughly accurate?

A What I said was that I would like to be able to utilize subcooling parameter as part of the operator's evaluation of whether or not he should shut off reactor coolant pumps as opposed to using just automatic initiation of high pressure injection.

Q And is the reason for this position of yours that you would like to stay on forced circulation just as long as possible?

A I would like to stay on forced circulation if the unit is in a subcooled condition, yes.

Q Is subcooling an indication that there's no break of any kind?

A No. What subcooling is an indication of is that

you're not forming vapor steam in the reactor coolant system and that the reactor coolant system is in a solid water condition.

Q Could you have the size of break which underlies a reactor coolant pump trip requirement and, at the same time, be so cooled?

A No, that spectrum of breaks, which I believe is from about .025 to about .2 square feet, is of such a nature that you will form vapor.

Q I'd like to direct your attention now to CEC Exhibit 46 which is the Emergency Procedure D.5, Revision 15. Do you have that in front of you?

A I was turning to page 46 --

Q No, CEC Exhibit 46, the D.5 procedure.

A I have it.

Q Has this procedure been put into effect at Rancho Seco?

A Yes, it has.

Q Was it communicated to operators through use of the Special Order program?

A Yes, it was.

Q In earlier questioning you described that question as involving, among other things, the discussion of new procedures between the shift supervisor and the members of his crew. Aside from such discussions, was any other

training involved in the implementation of this revision of the D.5 procedure?

A I can't say, I just don't know.

Q Would it have been normal for the operations supervisor to discuss this procedure revision with all the shift supervisors?

A Yes, it would have.

Q So that the shift supervisors could then discuss it in turn with their crews?

A That's correct.

Q Do you know what instructions or rationale were given to shift supervisors by the operations supervisor relating to this procedural change?

A No, I do not.

Q On the first page of CEC 46 in the block entitled "NOTE" the last sentence states, "Only defeat SFAS when RCS parameters are stable and reactor coolant is at least 50 degrees subcooled unless continued operation of SFAS will result in exceeding the Technical Specifications for pressure temperature limits." Does this instruction mean that if operation or continued operation of the SFAS system would violate Technical Specifications, then under all circumstances SFAS should be defeated?

A The purpose of that note is to reinforce that the unit's operating license has the Technical Specifications,

and they are the overriding criteria with which we operate.

Q I think the first time I didn't phrase it well. Then under no circumstances should they operate the reactor in a manner that would violate the technical specifications?

A That is correct.

Q During the lunch hour I attempted to compare this procedure with Procedure D.5, Revision 14, the preceding one, and it appears that the Case 1. small leak procedure has been substantially expanded and, in certain respects, rewritten from the earlier procedure. Can you explain why that was done? Or first of all, do you agree that it was substantially expanded and rewritten?

A I'd have to go back and take a look at 14 and do just what you did to determine where the expansions are.

Q Can you take a look and refresh your memory?

A The major expansion is in two areas. One to specifically describe to the operator how he should obtain additional makeup water in the event he needs it. And as I said earlier this morning, we changed the procedure to require that he start an additional high pressure injection pump and use SFV-23811 to add additional water to the reactor coolant system through the cooled nozzle. That's the first part of this. The second part was additional or further guidance and direction in the steam generator tube leak program, which as I recall appeared somewhere in the procedure and it may

have been in the Case 2 or earlier.

Q Prior to the change in procedure relating to the HPI, operators would have followed the D.14 procedure which -- I'm looking at page 3 of CEC Exhibit 43, about a third of the way down, one of the immediate operator actions would have been manually trip the reactor and initiate HPI. This is the initial change to not initiate the regular HPI pumps?

A That's correct.

MR. LANPHER: I have no further questions. Mr. Ellison does.

BY MR. ELLISON:

Q Mr. Rodriguez, having attempted to decipher this report, this is the LER report provided by Mr. Baxter a moment ago, I really only have one question on it.

You stated that with respect to all reportable occurrences, Rancho Seco ranked 16th out of 70 plants surveyed. I noticed at the back of the report in Category 6 that all reportable occurrences are broken out by those caused by personnel occurrences. And referring to that chart, it suggests that Rancho Seco ranks in this category of personnel occurrences 41st out of the 70 plants, rather than 16th. Is that correct?

A Well, the Category 6 that I'm looking at, Reportable Occurrences at Operating Nuclear Power Plants, Total Reports"?

Q That's correct, and then referring to the far

lefthand column you find the notation, "caused by personnel occurrences."

A Yes, that's correct, 41st.

Q That's my only question with respect to that.

Can you tell me who designed the Rancho Seco control room?

A The general layout of the control room was determined primarily by the initial individual hired as the plant superintendent by SMUD during the preliminary design review stage. The control cabinets were designed by the architect engineer, Bechtel Corporation, and the actual switches are Bailey Meter Company switches, as are many of the controllers. And I pick out Bailey because most of the items were supplied by them. There are other meters and chart recorders that are supplied by probably 8 or 10 other vendors. But that equipment and its layout was essentially designed -- once the layout was determined, the actual equipment was designed and specified by Bechtel Corporation.

Q If you would, I'd like you to refer to page 12 of your testimony. Beginning at line 9, you describe the individual study assignments in the requalification program. And Dr. Cole asked you a couple of questions about that and I'd like to also ask a couple.

The first one is, with respect to the individual study portion of the requalification program, do operators do

this on their own time or do they do that while on shift?

A Yes, they do it either on their own time or while they're on shift.

(Laughter.)

That's a straight answer. If an individual is on the back shift and it's quiet and he has time and things are quiet, he may well do this. As opposed to if he's on the day shift and busy he may not get an opportunity to do it until he goes home.

Q Is there a specific time that's set out for the operator to do this as opposed to -- or is it pretty much left to his own judgment about when to do it?

A It is left to his own judgment.

Q Is he given a discrete period of time in which to perform this task? Does he have to report back at a certain point that he's accomplished it within a given period of time?

A The training supervisor, when he makes this assignment, puts a cover sheet on it to the operator and normally specifies on that cover sheet a particular time that he expects to have that sheet back with a signature verification that the study has been completed.

Q Is there typically any testing of the individual's understanding of the subjects that he's given to study?

A As part of an audit program, the training supervisor

will occasionally go up and question an operator with regard to the material that's sent to him, but there's no program that quizzes each and every operator on each and every assignment.

Q I believe it was in response to Dr. Cole that you described the number of people in the training department. Can you tell me whether any of these people have responsibilities in addition to their training responsibilities?

A In the refueling shutdown, the training supervisor becomes the clearance coordinator for that period of time that the shutdown is in progress. Other than that time, both the training supervisor and the other members of the training department are devoted full time to the training function.

Q Do any of these people ever stay in shifts operating the facility?

A The training supervisor is a licensed individual, and on very rare occasion, in that he was a shift supervisor early on in his assignment, he did. But for the last two years there has been no one in the training department that has stood regular watches.

Q You mentioned that the reactor had gone critical this morning and that thus far there has been no leakage from the EMOV. Assuming that that remains true, will it be Rancho Seco's procedure to run with the block valve open or closed?

A As long as the valve is functioning and not leaking

through we'll operate with the block valve open.

Q And if it begins to show leakage but within technical specifications for operation, will the block valve simply be closed until the next refueling addage?

A It will be evaluated with regard to how bad the leakage is and how rapidly it's degrading. And at that point, a decision will be made whether or not the block ought to be shut. The block valve will be shut prior to exceeding the technical specification limit for leakage for that valve.

Q Would it be necessary -- strike that. Do you have the LER, CEC-40, with you? I have a few remaining questions with respect to those.

That first one I'd like you to refer to is the one that's dated March 14, 1977, about in the middle of the package.

A Not anymore in my package. It's probably in the bottom. That was March 1977?

Q Right, March 14, 1977. Rather than reading the entire thing, feel free to read it if you find it necessary, but I'd like you to refer to the third paragraph on the first page, the one that begins, "The following day, February 19..."

A I've read that.

Q Referring to the middle sentence it states,"As a result, during the seven hours and nine minute period that P-319 was out of service, neither auxiliary feedpump was

available for safety features start." My question is, first of all, does this mean that during those seven hours there would have been no auxiliary feedwater on the safety features signal?

A There would have been no automatic start of an auxiliary feedwater pump on a safety features signal, that's correct.

Q And that would include both the motor drive and the turbine drive?

A Yes.

Q Is this -- would this have substantially the same effect as the closing of the valves that was involved in the TMI accident?

A Not really, because the operator can start this pump. The turbine drive pump has an electric motor on the other end of it, and he can start that pump, or start that motor and turn the pump and pump water.

Q How is that different from the fact that at TMI the operators could have repositioned the valves, as they did?

A Well, the difference is that at Three Mile Island the operators would have been dealing with valves, and here they're dealing with starting a pump.

I might point out, another difference at Three Mile Island is that the operators had pump running indication that

made them think that they had feedwater running, and in this particular case, he has safety features signal and he wouldn't be having any pump running indication which would tell him to start a pump.

MR. SHON: Was it not also true that the pumps at that point had started on loss of main feedwater and not on safety features actuation, or not on the equivalent of it. Is this true?

THE WITNESS: Are you referring to Rancho Seco?

MR. SHON: No. TMI.

THE WITNESS: I don't remember their pump start scheme, sir.

MR. SHON: I see.

THE WITNESS: I think you're correct, thought, because as I think back, we were about the only unit that had a feedwater system ourselves. I think that day especially there was safety features initiated.

BY MR. ELLISON (Resuming):

Q My remaining questions are with respect to the last three that are related to the civil penalty. That would be the February 6, 1980, which is the first one I'm focusing on.

MR. BAXTER: Excuse me, Mrs. Bowers, I don't know how much longer the examination will go on, but unless it's about to conclude I would like to have a break for the witness

at some appropriate time.

MR. ELLISON: I only have five minutes maybe.

THE WITNESS: I'm fine.

BY MR. ELLISON (Resuming):

Q With respect to the February 6th event, am I correct in my understanding that the problem here was that one of the high pressure injection pumps essentially was going to be taken out of service for maintenance, and that that involved testing of another redundant one to insure that it was operating correctly, and that it was the testing of the second one that actually made it inoperable?

A No. The -- let me read through this and make sure I get the February one straight from the other two.

(Short pause.)

Go ahead and ask your question now.

Q Perhaps I'm oversimplifying, but am I correct in my understanding that this event basically involved the taking of one of the systems out of service for maintenance, and that in doing so, you tested a redundant system for that system to insure that it would be operating while the other one was down, and that the testing operation was performed in such a way that the redundant system was compromised?

A No, that's not correct.

Q Are you aware of that kind of testing error taking

essentially a redundant system or compromising such systems at Rancho Seco?

A What I am aware of, and I think we finally got it straightened out, was the sequence. We had a problem with regard to how our technical specifications had been written in that it said that you take one system out of service and then test the other one. And our concern was that by doing it that way, if you take one system out of service and then you start to test the other one and it doesn't work and at that time you need it, then you're in trouble. And we changed it around so that before we removed one system from service, we test the other one.

And as far as a situation wherein we're starting to remove one system and before doing so we tested the other system and found that it was inoperable, I don't recall that happening to us.

Q Just for clarification, what I'm referring to is not that you discovered that the redundant system was inoperable when you tested it, but that you tested the redundant system, found it operable, but later after you had taken the -- I ought to use A and B systems here to be clear. The A system is the one that's being taken out of service for modification or repair. B system is the one that's intended to be in operation during that period. Presumably, the B system would be tested before the A system was taken

out of service. My question is, have you ever had the experience of testing the B system, finding it operable, taking the A system out of service and at some subsequent period of time discovering that in the testing of the B system, although it operated at that point, that some operational error involved in the testing rendered that system inoperable at the same time that the other one was taken out of service.

A No.

Q Is that a possibility in your mind? Could that happen?

A Anything's possible.

Q My remaining questions are with respect to all three of the recent LER's associated with the civil penalty. You responded, I believe to Dr. Cole, I'm not sure, that when a safety system is taken out of service for modification that there is a dual verification of its return to service, so to speak. Was that in effect and did it apply to these three instances?

A No, it did not, and the reason that system went into effect was because of these three instances.

Q So that system, that dual verification system, is a response to all three of these taken together?

A Well, when that occurred, when the operation supervisor came to me and explained what he had found had happened and my response to him was, how are you going to stop it from

happening and he said I'm going to dual valve verification, and subsequent to that we generated the reports and submitted them to the Commission and the order followed and the fine followed and what have you.

Q I believe I recall yesterday that you testified that -- I believe I asked you something like, do you know whether the same individuals were involved in these instances, in two or more of these instances. And if my recollection is correct, you responded that you didn't know. Do you know whether the same shifts were involved, or the same crews were involved? The reason I asked this question is that I noticed that two of the events occurred on the same day.

A I know that there were different shifts involved. The two that occurred in the same day were the same shift. However, the second of those two was with respect to really a procedural error, that the procedure wasn't up to date that they used, as opposed to -- from a personnel error standpoint, it was that the changes weren't made to the procedure but the individuals that were doing it were operating in accordance with the procedure.

Q You said the same shifts, though? It was the same shift?

A The first two instances, at least in the valve lineup, occurred on the same shift. Now, they were discovered

at different times. Then the third instance occurred with a different shift.

Q I'm not sure if I'm asking the same question or not. Would that mean that that the ones that occurred on the same shift were also by the same crew?

A Yes, that's the same crew.

Q Do you know, do you yourself know which crew that was?

A No, I do not.

Q Do you know whether the people on it were relatively-- relative to the rest of the Rancho Seco operating personnel, relatively experienced or relatively inexperienced?

MR. BAXTER: I object. I don't think he does know what the crew was. I don't know how he can testify as to their relative experience.

MRS. BOWERS: Mr. Ellison, do you want to respond?

MR. ELLISON: I don't believe they're exactly the same question. If Mr. Rodriguez doesn't know he can say so. He testified yesterday if I remember correctly that he spoke to the shift supervisor about this, and the shift supervisor without telling him which crew, -- another question occurs to me. But anyway, he may have said they were inexperienced people.

THE WITNESS: Let me correct that. What you're saying is not correct. I said I spoke with the operation

supervisor.

MR. ELLISON: Okay, that removes my question.

MRS. BOWERS: We don't see how he can answer when he says he doesn't have any information as to the makeup of the crew, who they were. There may be something here that we're not aware of.

BY MR. ELLISON (Resuming):

Q Is it true that you don't know anything about the makeup of the crew?

A That's correct. Well, no, that's not correct. I know the crew has a shift supervisor who has been at the plant for at least six years, because I don't have a shift supervisor that has less experience than that. I know that the crew is comprised of a senior control room operator who's been operating for at least four years because I don't have one that's junior than that. I know it has a control room on it that's been there for at least three years.

Q Mr. Rodriguez, do you recall appearing at a public meeting with respect to these incidents a week ago?

A Yes.

Q And do you recall being asked at that time by the NRC whether these same shifts or the same crews were involved in the three incidents?

A Yes, I do.

Q And do you recall your response?

A My response to that was that there were different shifts.

Q And also different crews, is that correct?

A Yes.

Q Now, I understood your testimony a moment ago that two of the incidents occurred on the same shift, and that that would mean they were also the same crew. Is that correct?

A Yes. In the context of my response to them, it was that there were three instances and there were different crews. The third instance was the other crew. Two different crews carrying out two different evolutions. One of those evolutions involved a condition that caused both a violation and an infraction, two reports. But that was by one crew. And another crew was the one that failed to put the breaker in place when the makeup pump was being returned to its normal service, and that was a different instance.

Q Sir, when you responded that there were different shifts and different crews a week ago, you didn't mean between all three instances, but between one instance that you're referring to and the remainder of them. Is that what you're saying?

A Well, there were two instances. There was one instance of taking the makeup pump and putting it into the configuration, replacing the high pressure injection pump, and that was one crew. But that particular instance involved

the incorrect lineup of one of the cross-connect valves, and it also involved the improper lineup of the nuclear service cooling water system to support the lube oil cooler for that. It involved --

Q Let me interrupt you just a moment. Are those two separate LER's?

A Those are two separate LER's but they're the same instance; the same evolution was involved. And then the other evolution was when the makeup pump was taken out of service -- excuse me, when the makeup pump was returned to its normal service and the B high pressure injection pump was put back in service, and that was another crew.

Q So last week when you were referring to instances, you were referring essentially to evolutions, and in response to my question this morning when you said instances, you meant LER's. Is that essentially what the discrepancy is?

A I don't recognize there is a discrepancy. Maybe in the words I chose or how they're interpreted, but what I'm describing to you is what happened.

Q Just one additional question. With respect to the two that occurred on the same crew, why were they reported as separate LER's?

A I guess I don't have an answer right at the top of my head. Let me look through these a minute and maybe I can recall why we did that.

(Pause.)

Okay. The makeup pump was placed in service in place of a high pressure injection pump on the 17th of December. On the 27th of December is when it was discovered that the cross-connect valve had been shut when it should have been open, and that was corrected. And then on the 9th of January, in bringing the makeup pump back as the makeup pump and putting the B pump back in service, during that evolution it was discovered that both of the nuclear service cooling water pumps -- excuse me. Both nuclear service cooling water supplies had been secured to the lube oil cooler, and then there was a difference there of 22 days. That's why we generated two separate LER's.

Q Because you discovered the errors at different times.

A At different times, yes.

Q With respect to the two LER's that arose out of the one evolution, do you know whether the people who were principally responsible for that were shift supervisors, senior reactor operators, reactor operators or unlicensed personnel?

A The evolution that dealt with failure to generate procedure change, that involved the shift supervisor and the senior operator. Who specifically did the valve lineup, whether it was a senior control room operator or an AO or an EA, I don't know.

Q How about with respect to the third LER? Do you have the same information for that?

A The shift supervisor provided the direction for the lineup, but the lineup was conducted by either the AO or an EA, and I don't know.

Q Do you know whether the directions that were given by the shift supervisor were correct?

A The individual carried out the directions that the shift supervisor had given him.

MRS. BOWERS: Mr. Ellison, --

MR. ELLISON: One more question.

MR. BAXTER: That was 20 ago.

(Laughter.)

BY MR. ELLISON (Resuming):

Q If you know the shifts that were involved and you know that each shift has one shift supervisor, don't you know at least with respect to the shift supervisor, who was involved?

MR. BAXTER: I object that counsel is arguing with the witness. This question has been asked and answered.

MR. ELLISON: I don't think it's been asked or answered.

MR. BAXTER: You asked whether he knew the composition of the shift crew and he said he does not.

P flws.

tP-12
flws SRB-5
ml

(Board conferring.)

MRS. BOWERS: I am not sure the record will show that he did not know anyone who was a part of that shift. I think he said he did not know the make-up of the crew on the shift.

We would like to have the witness answer.

THE WITNESS: No, I do not know what shift it was in either instance.

MR. ELLISON: That is all I have.

MRS. BOWERS: We will take a ten minute break.

MR. BAXTER: Is there going to be any other examination? If not, I just have three questions. We might be able to excuse the witness.

MR. BLACK: I have several.

(Recess.)

MRS. BOWERS: Mr. Black, are you ready to proceed? Mr. Ellison, that concluded all your questions, didn't it?

MR. ELLISON: That is correct.

BY MR. BLACK:

Q Mr. Rodriguez, I would like to again refer you to the answers to the TMI interrogatories that were handed out by your counsel.

MR. BAXTER: Excuse me, Mr. Black. Mrs. Bowers, could I have this marked for identification, please, as SMUD exhibit 20? I described it earlier as NRC Staff's

bfm2

response to interrogatories 25 and 26 of intervenor AAMODT, A-A-M-O-D-T. Sixth set of interrogatories in the Three Mile Island Unit 1 proceeding.

MRS. BOWERS: What number is it?

MR. BAXTER: SMUD Exhibit 20.

(The document referred to was marked SMUD Exhibit No. 20 for identification.)

BY MR. BLACK: (Resuming)

Q Mr. Rodriguez, referring to SMUD exhibit 20, the table designated as category five, do you believe it would be a fair statement to state that the longer a facility is in service, the higher its ranking is with respect to category five, which would be reportable occurrences of all causes on an annual basis?

A I think it might be an oversimplification because the number of reports is very dependent upon how the technical specifications are written and what the requirements are. I think you will notice elsewhere in this report it talks about a particular category.

I do not remember what it is, where it talks about San Onofre having the least and Connecticut Yankee having the next least; but their technical specifications, I think, were written much simpler and with fewer requirements than the follow-on units.

I think that is one of the major aspects of where a unit might rank in here. The other thing is the longer that you operate, hopefully, the more you learn. You can improve performance from your equipment. I could not say that it would be fair to say that I just looked down the list here and there are units that rank lower than we did that have been in operation a longer period of time.

I should say that their number was higher than ours in the ranking that have been operating a longer period of time.

Q Isn't it also true that if you look on rankings, let's say, 50 to 70, that those units have not been in service a very long period of time, relatively speaking?

A I think that is generally true, yes.

Q Are you aware of anybody, whether it is the staff or whether it has been SMUD or whether it has been the utilities that have tried to make a comparison with reportable occurrences as a function of time in service?

A Well, there is a sheet in this report that summarizes all of this. The data is in here for how long a unit has been running and how many LERs they have generated.

The categories they have tabulated here does not incorporate that, but the data is there.

Q The data is there?

A Yes.

bfm4

Q But has anybody ranked that data as a function of time?

A Not that I am aware of.

Q The human factors document which has been identified as exhibit CEC-33, I believe, indicated a perception that employee morale in the control room at Rahcno Seco was relatively high, based on the blue panels and the red carpetting and the high illumination.

Perhaps, as you indicated, morale was high because the stereo was on order.

A I said I am not sure. I think the stereo came after this report.

Q My question is, would you agree with that perception that morale is high in the control room at Rancho Seco?

A Yes, I would.

Q Does that conflict with, I believe, a statement that you made -- I believe you stated this; that unlicensed personnel, the morale was low because the shift work and time away from family and what-have-you?

A Well, no. I said -- at least what I thought I said in that context was the shift work was one of the factors that makes people leave, and made some of the people that left us early in their working history with us, leave.

bfm5

Q What would you -- can you attribute anything in your mind to the high morale in the control room? I mean, is it because of the soft blue walls and the red carpetting and the high illumination, or would you think it would be based on other factors?

A Well, I think the decor that they work in is one input to their morale, but certainly there are other factors that will contribute to their moreale.

Q Do you believe their interrelationship with plant management would be one of those factors?

A I think so, sure.

Q Have you based or can you see any difference in morale based on the equipment with which they have to operate in the control room?

A Definitely that is a factor on their morale.

Q Do you think that one of the other factors may be training that they get?

A Yes. That is going to affect an individual's morale.

Q Do you think their morale may be affected by their perception of their role in the safe operation of that facility?

A In some cases, it may; and in some cases it may not. I think that particular area of the individual's mo[illegible] is dependent upon the individual himself.

bfm6

Q Do you think that their morale would be affected by whether the plant is on line or shut down?

A Yes, I do.

Q Which would cause a higher morale?

A The plant running.

Q Is that a function of boredom versus something else?

A No, I think that is a function of pride in performance. In fact, what they are doing is doing is being productive.

Q I believe it was in response to a board question, but anyway, I believe you stated that generally you try to have operating division hirees have the equivalent of two years of college. Does that apply to all employees in the operating devision, including power plant helpers, auxiliary helpers, et cetera?

A That is right. That is what we generally try to do. It is not always met. Generally that is what we try to do.

MR. BLACK: I have no further questions.

MRS. BOWERS: Well, I have one. Marked for identification is CEC's exhibits 36, 37, and 38, which are the three depositions. Now, how were these three individuals selected? Who decided which three -- whose depositions would be taken, was it CEC?

MR. BAXTER: It was agreement between counsel for the Energy Commission and myself. We made available the names of all of the licensed operators who were not on shift on these particular days.

From that, the list of seven, the Energy Commission selected one shift supervisor, one senior control room operator, and one control room operator. I had just a few.

FURTHER REDIRECT EXAMINATION

BY MR. BAXTER:

Q Returning to SMUD Exhibit 20, Mr. Rodriguez, you testified in response to my questions on redirect from category five, which is total reports, all causes. Is that correct?

A That is correct.

Q Mr. Ellison asked you on recross examination about Rancho Seco's standing in category six, reportable occurrences total reports caused by personnel occurrences. Is that correct?

A That is correct.

Q So, is the data base reflected by category six essentially a sub-set or part of the data base in category five?

A Yes, it is. The category five includes personnel errors and all other areas as opposed to category six, which is restricted to personnel errors.

bfm8

Q You testified from category five the average yearly number of total reports from all causes for Rancho Seco was approximately 19. What is the number indicated in category six for the yearly average of total reports from personnel occurrences?

A I think -- well, I testifed that the yearly average was 35. For Rancho Seco, it was 19. In the personnel for all units -- in the category six, the yearly average for Rancho Seco was 6.4. The annual average for all units was 6.1.

Q So, the personnel caused occurrences represent 6.4 out of a 19.2 yearly average at Rancho Seco. Is that correct?

A That is correct.

MR. BAXTER: I have nothing further.

MR. SHON: I have just one question. Now that you have mentioned it, then kind of drawn our attention to this, I notice that at page 15, discussing whether differences are "significant" or not, the authors say many other units have significantly lower occurence rate than the industry average.

They may be identified in the list on pages 14 and 15 of attachment 2 by units whose value in the column headed ZZ(J) are greater than 9.46.

The sentence has a singular subject and a plural verb, but I think it is uncerstandable. Unless I misunder-

stand that value assigned to Rancho Seco, at the bottom of that table that is just after the category five table, its value is -8.900.

Thus, it seems as if there is some question whether is really is significantly lower than the average, although it is only number 16 out of this rather large number. Do you see what I mean? Am I interpreting these numbers correctly?

end tP-12

jl flws tP-13

THE WITNESS: I am looking at the column with ZZ.

MR. SHON: The bottom of the chart, the complete bottom of the chart --

THE WITNESS: I see.

MR. SHON: -- starts another chart with CC(J), DD(J), and so forth, going up to ZZ(J). What I am saying is, by the criterion they have there, is it true that Rancho Seco's rate is significantly lower than the industry average.

THE WITNESS: As I look on Page 14, what the author is saying is that it identifies those that are significantly lower, as units whose value in the column headed ZZ is greater than 9.46, and when I look in the column, San Onofree, which is called out elsehwere as being significantly lower, as minus 27, which is not greater than --

MR. SHON: In a sense, they mean it. It is a square root which could have either a positive or negative sign. I believe they mean the absolute value, don't you?

THE WITNESS: In that case, it would indicate with a ranking of 8.9 that Rancho Seco would be classified as one of those that is significantly lower.

MR. SHON: No, I think it is absolutely the opposite --

THE WITNESS: Not significantly lower.

DR. COLE: There are only two of the entire list

that are ranked as being significantly lower than the industry average based upon that criterion.

THE WITNESS: All of those above Rancho Seco would fall into that significantly lower category.

DR. COLE: Isn't ZZ(J) greater than 9.46?

MR. SHON: I think they really meant the absolute value on ZZ(J), don't you?

DR. COLE: Maybe I am reading it wrong, but I see only two in that column.

THE WITNESS: That is why I guess I do not want to say one way or the other, because I see Davis Besse as 19, and that is certainly greater than 9.6 and 9.4, but Davis Besse has quite a few LER's. It is probably -- the calculation was probably not QAed properly.

MR. SHON: So at any rate --

(Whereupon, the Board conferred.)

MR. SHON: I think Dr. Cole was looking at Category 6.

DR. COLE: Yes.

MR. SHON: Well, at any rate there is some doubt as to the statistical significance of the fact that it ranks 16th, would you not say?

THE WITNESS: I would not argue with that, Mr. Shon.

(General laughter.)

MR. SHON: Thank you.

MRS. BOWERS: I am going to check briefly. Mr. Baxter?

MR. BAXTER: Nothing further.

MRS. BOWERS: CEC?

MR. ELLISON: Yes, ma'am, we do have some additional questions.

FURTHER RECROSS EXAMINATION

BY MR. ELLISON:

Q Mr. Rodriguez, I would like to return to the discussion we had about your testimony today versus the -- your statements at the meeting here a week ago. Mr. Lanpher is going to provide you with excerpts from the transcript of that meeting of a week ago. I would like to explain for the Board and all the parties that this copy was telexed to us this morning. These are all the pages that we have. The full transcript will be provided to us shortly.

I would like this marked as CEC 47.

(The document referred to was marked for identification as CEC Exhibit Number 47.)

BY MR.ELLISON: (Resuming)

Q Mr. Rodriguez, turning to the page numbered 28 in CEC 47, first of all, are you the Mr. Rodriguez that is being referred to here, to the best of your knowledge?

A Yes, I am.

Q About halfway down the page, at Line 9, Mr. DeYoung, who, according to the cover sheet is from the NRC, asked you the following question. He says, "I guess I have some general comments to make. Before I do that, I would like to ask you a few more questions about the event.

"Whoare the people involved? Were they the same people in all three problems? Was it one individual, two individuals?" According to this transcript, you responded, "No, they were different crews involved at different times." Is that your recollection of your answer?

A Yes.

MR. BAXTER: Excuse me. I would like to have the opportunity to have the witness read all the transcript pages that have been provided before there are any further questions asked.

MR. ELLISON: That is fine.

MR. BAXTER: I would like to read it myself.

(Pause.)

BY MR. ELLISON: (Resuming)

Q Have you had sufficient time to review this?

A Yes, I have.

Q At Line 17 at the page numbered 28, Mr. DeYoung, following your answer, "No, the crews involved were different ones," continues.

MR. BAXTER: Mrs. Bowers, I object to the process

of lengthy reading of this document. It has been identified for the record, and he can ask Mr. Rodriguez questions about it, and we do not need to spend time reading it. We spent about a half hour on these three LER's already.

MR. ELLISON: Mrs. Bowers, this will not be an extensive examination, as the size of this document attests. We have had in this proceeding a number of occasions when we have read witness's statements and asked them to comment on them, and I see no reason that Mr. Baxter's objection should be sustained.

MRS. BOWERS: Why don't you proceed, but we would like you to keep it brief.

BY MR. ELLISON: (Resuming)

Q Mr. DeYoung responds, "First, I guess that was the same crew." According to the transcript, you responded, "Well, the first one occurred on December the 7th, and then the next one, I believe, occurred about January the 9th." Mr. Canter says, "I think it was December 17th," and you respond, "Okay, December 17 through December 7th was the A problem."

Mr. DeYoung says, "Problem B occurred on the same date. It was terminated 23 days late, so it must have been the same shift that started the problem." According to the transcript, you responded,"No. The shifts are rotating shifts. I can't tell you specifically which shift it was."

To which Mr. DeYoung responds, "But they were different shifts." To which you responded, "Different shifts involved." Is that the way you recollect your statements last Friday?

A That is probably the way I said it and it is wrong. Mr. DeYoung's statement that the problems A and B occurring on the same day were in fact the same shift, the other shift, as I discussed here this morning, was really the shift involved with the LER in February.

MR. ELLISON: That is all I have. Thank you.

MRS. BOWERS: Mr. Black?

MR. BLACK: No further questions.

MRS. BOWERS: We have nothing further.

MR. BAXTER: May the witness be excused, please?

MRS. BOWERS: Any objection?

(No response.)

MRS. BOWERS: Mr. Rodriguez,you are excused.

(Witness excused.)

MRS. BOWERS: You did not ever think you would hear those beautiful words.

THE WITNESS: I had some doubts.

(General laughter.)

MRS. BOWERS: We noticed an error on the cover page of CEC 47,before the United States Department of Energy Nuclear Regulatory Commission. We are not part of

the Department of Energy.

MR. BAXTER: Maybe you have been taken over while we have been out here.

(General laughter.)

MRS. BOWERS: Yes. Maybe we haven't heard.

MR. ELLISON: Mrs. Bowers, we would like to call to the stand Mr. Dale G. Bridenbaugh and Mr. Gregory C. Minor.

Whereupon,

DALE G. BRIDENBAUGH and

GREGORY C. MINOR

were called as witnesses, and having been first duly sworn, took the stand, were examined, and testified as follows:

DIRECT EXAMINATION

BY MR. ELLISON:

Q Mr. Minor, I will address my questions to you and you can answer for the panel.

Do you have before you a document entitled Prepared Direct Testimony of Dale G. Bridenbaugh and Gregory C. Minor Concerning Operator Training and Human Factors Engineering, dated February 11, 1980, that was prefiled in this proceeding?

A (Witness Minor) Yes, I did.

Q And did you and Mr. Bridenbaugh prepare this testimony?

A Yes, we did.

Q Do you also have attached to that document a document distributed to the Board and parties this morning entitled Corrections to Prepared Testimony of Dale G. Bridenbaugh and Gregory C. Minor Concerning Operator Training and Human Factors Engineering?

A Yes,one page.

Q And did the two of you also prepare that?

A Yes, we did.

Q Are the facts stated in these two documents true and correct to the best of your knowledge?

A Yes, they are.

Q Do you have any other additions or corrections aside from those that are set forth on the correction sheet?

A I do not believe there are any additional corrections? I should withdraw that. I believe there is one additional correction. I was noticing that one of the references has a redundant notation -- if I can locate it. Reference 21, talking about previous Reference Number 17, Section 2.1.3.B has the same, 2.1.3.B in parentheses following that, and it does not need to be there.

MR. ELLISON: Mrs. Bowers, I would move the admission of these two documents into the record as if read.

MRS. BOWERS: Any objection?

(No response.)

MRS. BOWERS: The documents you have moved will be physically incorporated into the transcript as if read and accepted into evidence.

(The material referred to follows:)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
SACRAMENTO MUNICIPAL UTILITY DISTRICT	)	
	)	Docket No. 50-312 (SP)
(Rancho Seco Nuclear Generating Station)	)	
	)	

Prepared Direct Testimony of Dale G. Bridenbaugh and Gregory C. Minor Concerning Operator Training and Human Factors Engineering

February 11, 1980

Sponsored by the
California Energy Commission

Prepared Direct Testimony of
Dale G. Bridenbaugh and Gregory C. Minor
Concerning Operator Training
and Human Factors Engineering

I. Introduction

Mr. Minor is a partner in MHB Technical Associates, a consulting firm located in San Jose, California. His educational background is in electrical engineering (B.S., University of California at Berkeley, 1960; M.S., Stanford University, 1966). In addition, he participated in General Electric Company's 3-year Advanced Course in Engineering, graduating in 1963. A full description of his experience and background has been provided in response to discovery requests.

During the period between 1960 and 1976, Mr. Minor was employed by the General Electric Company in engineering and management positions involving the design of components and systems for use on nuclear reactors. These systems included reactor monitoring, control, and safety systems. Between 1972 and 1976, he was Manager of Advanced Control and Instrumentation Engineering, responsible for designs of new safety and control systems. These included the design of new control room concepts involving new display and control techniques for use as a man-machine interface. Specific emphasis was placed on human factors in the operator interface.

Mr. Minor is presently a consulting engineer with MHB Technical Associates, consulting on nuclear power issues for public and private organizations at a state, national and

international level. Also, he was recently a participant on a Peer Review Group of the NRC/TMI Special Inquiry Group regarding both the accident sequence and the human factors sections. He is a member of the Nuclear Power Plant Standards Committee for the Instrument Society of America.

Mr. Bridenbaugh is also a partner and technical consultant of MHB Technical Associates. He is a graduate engineer, familiar with the operation of nuclear generating plants, including operating difficulties that lead to reductions in nuclear power plant reliability and operability. He received his Bachelor of Science in Mechanical Engineering from the South Dakota School of Mines & Technology in 1953. From June, 1953 until February, 1976, he worked as an engineer and manager with the General Electric Company on a wide variety of most of the aspects of power generation equipment design, manufacture and operation. During the last ten of those 22 years, he was in management positions in the General Electric Nuclear Energy Division where he had the responsibility to manage the monitoring of operation of nuclear power plants and implement solutions to operational problems. In these positions, he monitored the performance of both boiling water reactors and pressurized water reactors and was cognizant of the performance record of large fossil generating stations. For approximately five years during this assignment, he was also responsible for managing the corrective action programs required to resolve contractual complaints for the commercial nuclear power reactors supplied by General Electric, both domestic and oversees. An additional duty held during this period of time was to develop

a Nuclear Division Master Performance Improvement Plan, aimed at bringing about the long-term improvement of boiling water reactor performance. Prior to the management assignment in the Nuclear Energy Division, he spent several years as a field engineer at the first large scale commercial nuclear plant built by General Electric Company for Commonwealth Edison Company at Dresden, near Chicago, supervising the construction, start-up and modification, and repair of various portions of the plant. He was also responsible during this time for acting as the General Electric Site Manager during the first major refueling and maintenance outage conducted at the Dresden plant.

For the past three years, Mr. Bridenbaugh has been a partner and technical consultant on energy with his consulting partnership, MHB Technical Associates. In this capacity, he has provided technical advice to various governmental bodies and individual groups on subjects primarily related to the design and operation of commercial nuclear power plants. As an example of this type of work, in 1978 he served as a consultant to the United States Nuclear Regulatory Commission to review the NRC Plan for Research to Improve the Safety of Light-Water Nuclear Power Plants, subsequently documented in NUREG-0438, issued April 12, 1978. He has also served in various consulting capacities to the General Accounting Office, the States of New Jersey and Illinois, and Suffolk County, New York, and to the governments of Norway, and of Sweden in the evaluation of nuclear programs.

Mr. Bridenbaugh is a registered professional nuclear engineer in the State of California, holding Certificate No. 973, and is

also a member of the American Nuclear Society. Additional detail of his experience is included in his resume produced in response to discovery requests.

II. Discussion of Operator Training Issues

The purpose of this testimony is to assess the adequacy of the Rancho Seco operators and the adequacy of their training to assure they can perform the actions necessary to deal with normal, abnormal and emergency operating conditions associated with the B&W nuclear system utilized at the Rancho Seco plant. Specifically, this testimony will focus on the issues accepted by the Atomic Safety and Licensing Board's (Board) Order Ruling on Scope and Contentions, dated October 5, 1979, as defined by the following questions:

a. Board Question CEC 1-7.

Do the operator training actions responding to Subparagraph (d) of Subparagraphs a-e for Rancho Seco fail to give sufficient attention to providing appropriate analytical bases for operator actions?

(Subparagraph (d) states: "Complete analyses for potential small breaks and develop and implement operating instructions to define operator action.")

b. CEC 3-1.

Whether personnel adequately understand the mechanics of the facility, basic reactor physics, and other fundamental aspects of its operation?

c. CEC 3-2.

Whether personnel are properly apprised of new information pertinent to the facility's safe operation and ability to respond to transients, particularly information on operating experiences of other reactors?

d. CEC 3-3.

Whether NRC and SMUD adequately ensure that emergency instructions are understood by and are available to plant personnel in a manner that allows quick and effective implementation during an emergency?

e. Board Question Hursh & Castro No. 32.

Rancho Seco, being a Babcock and Wilcox designed reactor, is operated by personnel and management whose competence has not been adequately tested and evaluated; namely, testing has not been conducted as to whether such employees can act responsibly and appropriately to make judgment decisions during a loss of feedwater transient, personnel interviews have not been conducted to properly evaluate the test results with such employees and some employees have never been tested because of grandfathering and, therefore, is unsafe and endangers the health and safety of Petitioners, constituents of Petitioners and the public.

f. Board Question Hursh & Castro No. 34.

Rancho Seco, being a Babcock and Wilcox designed reactor, has not adequately trained unlicensed operators to respond to orders necessary for action which would be required in the event of loss of feedwater transient and, therefore, is unsafe and endangers the health and safety of Petitioners, constituents of Petitioners and the public.

These questions can be more simply stated as follows:

1. Do the operators possess sufficient understanding of the analytical bases of operating procedures and do they possess an adequate knowledge of the fundamental (physics) aspects of plant operation?

2. Is an effective procedure in place to ensure that new procedures and information are communicated to the operators?

3. Are emergency instructions understood and effective?

4. Has individual testing of the operators been adequate to ensure each has proper understanding?

5. Are the unlicensed operators properly trained to respond to emergency procedures?

Each of these fundamental areas are addressed in the following discussion.

A. Analytic Basis of Operating Procedures and Fundamental Understanding of Plant Operation.

It is essential that personnel responsible for decisions regarding plant operation possess a high degree of understanding of the bases underlying the operating procedures. The evident failure of TMI operators to have such an understanding was apparently a significant contributing factor to the severity of the TMI accident. Much discussion and debate has taken place in past years over the question of extensive automation vs. human control. In general, since it is virtually impossible to predict all possible sequences of nuclear plant accidents, the practice has been to automate for approximately ten minutes and to call for operator action shortly thereafter. Since no procedure can ever address all possibilities, the ability to observe and analyze is essential. This requires a thorough understanding of the bases for the procedures developed. This is particularly true after TMI because the procedures adopted since that accident place heavy new responsibility on operators.

Various reports, procedures, training programs, interrogatory responses and depositions have been evaluted to determine if some general conclusion could be reached regarding the understanding of operating procedures to be found among the Rancho Seco operators. The preliminary finding after reviewing this material is that SMUD in general complied with the letter of existing requirements. Numerous records have been produced

demonstrating the attempts to explain the underlying bases of procedures to the operators for the procedures adopted in the post-TMI era. The essential question is, however, have such efforts been successful?

The ultimate answer to that question will only be revealed through time. However, some indications are now available. A caution against expecting too much is available in one study commissioned by the NRC's internal review headed by Mitchell Rogovin. The Human Factors Evaluation conducted by the Essex Corporation[1] finds, for example, that:

> In general, the first (limited) definition of human error holds the operator responsible for most mistakes and has one pervasive remedy for errors - more, and more effective, training. The operator is expected to learn how to operate control panels regardless of the quality of panel design or procedure. However, when errors occur where poor design or procedures are causal factors, improved or increased training will not of itself resolve the problem.[2]

This seems particularly applicable to the issues considered in the first question (CEC 1-7). The evidence indicates that all actions suggested or requested by the NRC Order have been followed, but this still may not be "sufficient" to assure that proper action can be taken in all emergency situations.

A substantial amount of uncertainty and lack of understanding was exhibited in the depositions of the three licensed operators

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1. NUREG/CR-1270, Human Factors Evaluation of Control Room Design and Operator Performance at Three Mile Island-2 (Final Report).

2. Id., p. 110.

conducted on January 24-25, 1980. For example:[3]

- Lack of knowledge concerning length of time in which the OTSG will go dry. (Tipton, p. 16.)
- Lack of knowledge concerning basis for concern re vessel weldments. (Morisawa, p. 72.)
- Uncertainty regarding conflicts between procedures and between procedures and technical specifications. (Morisawa, pp. 66-69 and Tipton, p. 56.)
- Uncertainty concerning need to take action at HPI pump runout. (Tipton, pp. 43-45.)
- Uncertainty regarding action to be taken regarding RCP during an over-cooling transient and effectiveness of natural circulation vs. reflux boiling. (Tipton, pp. 71-75 and Morisawa, pp. 37-38.)

Of additional concern is the attitude that there are no potential problems (the Kemeny Report called this "mindset"). An example of this is contained in Mr. Comstock's deposition wherein he asserts that the B&W system is far superior to the Westinghouse system with regard to feedwater transient response.[4] While each person is entitled to his own opinion, the majority of the opinion at this time seems to view B&W systems as significantly more susceptible to transients. In fact, at a recent NRC Staff review of this issue with the ACRS, statements were made that the B&W design "places so much responsibility on the operators."[5] This implies a need to be doubly sure that B&W operators fully understand that fundamentals as well as the weaknesses of this design.

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3. Examples cited are from depositions of Daniel E. Comstock, Wayne S. Morisawa and Dennis E. Tipton, conducted January 24 and 25, 1980.

4. Deposition of Daniel E. Comstock, January 24, 1980, p. 9.

5. ACRS Subcommittee meeting, January 8, 1980.

In conclusion, we find there is no assurance that SMUD operators have an analytical understanding significantly better than that of the TMI operators.

B. Procedures for Communication of New Information.

SMUD's general procedures for the conveying of new information significant to safety are described in the December 4, 1979, Set No. 2 answers to Interrogatory No. 22.[6/] The weakness in the process described is the apparent lack of a requirement that such information be passed on to the shift crews. For example, the statement is made that:

> Events which occur at other units and come to the attention of the facility management can also be promulgated . . . . (Emphasis added.)

Further, it is stated:

> Significant events or potential problems can also be discussed in the routine retraining program. (emphasis added) and:
>
> The annual one-week simulator course at the B&W Training Simulator provides an opportunity for operators to see and practice transients which have occurred at other B&W units. (Emphasis added.)

The fact that such things "can be" done does not ensure that they are done. This is evidenced again by the operators' depositions where it is found that:

- No transients other than TMI have been discussed. (Tipton, p. 97.)
- Procedure changes are not formally transmitted. (Tipton, pp. 94-95.)

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6. Licensee's Answers (Set No. 2) to the California Energy Commission's First Set of Interrogatories dated November 15, 1979, pp. 18-19.

- No formal discussion or information concerning the September 21, 1979, North Anna event was apparently conducted. (Morisawa, p. 73 and Tipton, p. 97.)

Additionally, it was asserted that:

- No formal procedure exists to ensure that operators actually read the Standing Order (changes). (Tipton, p. 95.)
- No system exists to make NRC (NUREG) reports readily available to the operators. (Tipton, p. 139.)

The system for the communication of operating experience, procedure changes and other information helpful in developing a depth of understanding appears to be haphazard and in need of improvement. At a minimum, there needs to be a means to ensure that new procedures and significant events are promptly communicated to operators in a manner designed to make certain that the events and procedures are thoroughly understood by operators.

C. Effectiveness of Emergency Procedures.

Use of emergency procedures was considered at some length in the depositions of Tipton and Morisawa.[7/] Both of these discussions highlighted the difficulty of dealing with complex emergency procedures while responding to a transient condition. Not the least of the problem is determining which of several procedures actually applies.[8/] It is also indicated that SMUD has committed to the NRC that the operator will memorize the immediate action steps.[9/] It is not clear from the depositions whether the

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7. Ibid. 3, Tipton, pp. 54-59; Morisawa, pp. 66-67.

8. Ibid. 3, Tipton, p. 56.

9. Ibid. 3, Tipton, p. 142.

operators accept that commitment as being a requirement, as heavy reliance on the written procedure is described. At a minimum, all operators should be required to memorize the steps of the main emergency procedures (such as turbine trip/reactor trip and loss of steam generator feed) and demonstrate ability, periodically, to use them and to understand the interrelationship of the various procedures.

D. Effectiveness of Operator Testing.

Some questions must always remain regarding the effectiveness of the operator training testing program. It is not possible to test all operators for all possible sequences under the real environment of time and stress. Criticism has been levied by various review committees. The Kemeny Report found that:

> The agency should be directed to upgrade its operator and supervisor licensing functions. These should include the accreditation of training institutions from which candidates for a license must graduate.10/

The study commissioned by the Rogovin review found that the TMI training was in full compliance with regulatory standards but was still deficient.11/ The implication is that the standards are inadequate or, at the least, inadequately followed.

SMUD's training program is not substantially different from that used at TMI. The same simulator is used and the course content is basically the same. Until new standards are adopted, a question as to its effectiveness must exist. It has been reported

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10. Report of the President's Commission on the Accident at Three Mile Island, p. 63.

11. Ibid. 1, p. 100.

by the NRC that numerous studies and updates of training standards are underway.[12] There is also a study underway by General Physics to develop a performance measurement system for training simulators.[13] This is reported to be a computer based system to evaluate training performance. All of these improvements are needed to make the assessment of training a more exact task. Based upon the information we have reviewed, SMUD operators' training appears to be similar to that received by TMI operators and, accordingly, there is no basis to conclude that they have adequately been trained to respond to off-normal conditions.

E. Training of Unlicensed Operators.

The ability of unlicensed operators to deal with emergency situations received substantial attention in the NRC's preliminary assessment of the TMI accident.[14] As reported therein,[15] the nonlicensed operators may perform many essential and critical tasks such as the closing or opening of safety related valves, transfer of radioactive wastes, etc. There is reason to be concerned regarding the general informality of the training of nonlicensed operators. A good description of the "on-the-job"

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12. NRC Staff Responses to California Energy Commission's First Set of Interrogatories to the Nuclear Regulatory Commission, December 11, 1979, pp. 29-33.

13. EPRI NP-783; Interim Report, "Performance Measurement System for Training Simulators," May, 1979.

14. NUREG-0600, Investigation Report March 28, 1979, Three Mile Island Accident by Office of Inspection and Enforcement.

15. Id., pp. I-2-50-53.

training program is found in the deposition of Dennis Tipton.[16] This "on-the-job" training program means that unlicensed operators may not know how or where to perform certain actions the first time they are called upon to perform them.[17] If the first time is an emergency requiring unlicensed operator action, they may not be sufficiently trained to respond properly.

The issue of nonlicensed operators (as well as nonlicensed management) is continuing to receive much attention in the on-going reviews. It is recommended that these reviews be closely followed, that SMUD commit to improvements in such methods that may be recommended, and that a formal program be developed and documented as soon as practical.

F. Conclusions on Operator Training.

There is substantial reason to judge the operator training and level of understanding at Rancho Seco as inadequate. While SMUD has attempted to demonstrate that the training program meets all industry standards, there is no reason to believe that this produces an adequately trained operator. The general agreement that industry standards in the past have been inadequate, coupled with the greater demands imposed on the operator by the greater sensitivity of the B&W system, point to a substantial need for improved training methods at this plant.

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16. Ibid. 3, Tipton, pp. 109-114.

17. Ibid. 3, Tipton, pp. 113-114.

III. Discussion of Human Factors Engineering Issues

This portion of our testimony will address the two issues designated by Board Question CEC 5-3a related to the adequacy of instrumentation at Rancho Seco, and Board Question Hursh & Castro No. 31 related to the adequacy of the Rancho Seco control room design.

A. Board Question CEC 5-3a.

> Are the special features and instruments installed at Rancho Seco adequate to aid in diagnosis and control after an off-normal condition engendered by a loss-of-feedwater transient?

The instrumentation in the Rancho Seco control room is adequate to meet the minimum requirements for operating the reactor but has several limitations during off-normal conditions. In an effort to improve the ability to respond to a feedwater transient and/or loss of feedwater accident, several instrumentation changes were required to be implemented as a result of the Lessons Learned Task Force (short term).[17/] The effect of these changes is to add information for the operator to use in making his decision about the status of the Auxiliary Feedwater System, particularly during a transient. However, this is not to say that all off-normal conditions are now adequately instrumented. The basic weakness in the instrumentation systems identified by most of the major studies of the TMI accident was the inability to directly know the water level in the reactor vessel or more generally to know when the saturation conditions are reached (i.e., when the reactor coolant starts boiling and voiding).

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17. NUREG-0578, TMI-2 Lessons Learned Task Force Status Report and Short Term Recommendations, USNRC, July, 1979.

The present instrumentation system requires inference from two or more indicators to determine if the reactor vessel is filled (i.e., pressurizer level and coolant parameters). Even if the vessel is diagnosed to be underfilled, this method cannot tell the operator the amount of coolant lost and the actual level in the vessel. Given the intensive focus on the Transient/AFW/PORV/LOCA accident sequence, it is unlikely that an operator will improperly diagnose this particular problem in the near future. But in the long term, the operator's ability to diagnose an off-normal condition involving loss of coolant in the face of a yet-undiscovered series of obscure failures would be enhanced by a direct indication of vessel level during saturation conditions. The NRC Staff, following the TMI accident, recommended that PWRs be provided with a more direct reading of vessel water level.[18/] However, because of the complexity of accurately measuring reactor water level in a PWR vessel, it would be necessary to research this problem carefully to assess the best method for obtaining such a measurement.

Even in the relatively unhurried period of the post accident analyses, researchers had difficulty accurately estimating the core water level history using the recommended measurement technique (i.e., using pressurizer level and reactor coolant parameters) and, therefore, relied on such indirect means as

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18. NUREG-0560, Staff Report on the Generic Assessment of Feedwater Transients in Pressurized Water Reactors Designed by B&W Company, USNRC, May, 1979.

abnormal behavior of in-core neutron detectors to establish level.[19, 20]

The NRC has also required PWRs to install a "subcooling meter" and "additional instrumentation" to detect inadequate core cooling.[21, 22] SMUD has committed to comply with these Lessons Learned Requirements, but the details of the changes to be made and the range of plant conditions the changes will cover are not clear at this time.

Another area of uncertainty in attempting to diagnose off-normal conditions is in attempting to detect with certitude the initiation of natural circulation. Presently, the operators are required to read out several parameters and make a judgemnt as to whether the plant has achieved natural circulation. Unfortunately, these readings are not always reliable or available (e.g., the thermal couples readings rely on computer availability), which makes the operator's task more difficult. The operator would be less likely to make errors in diagnosis if he were provided with a dedicated indication of natural circulation which was reliable under all off-normal conditions. This problem is particularly important on B&W plants which have a lower driving head due to the lower position of the steam generators relative to the reactor vessel.

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19. NSAC-1, Analysis of Three Mile Island-Unit 2 Accident, NSAC, July, 1979, Appendix CI.

20. NRC/TMI Special Inquiry Group, Draft Report, Dec., 1979, Accident Sequence Section.

21. Ibid. 17, Section 2.1.3.b (2.1.3.b).

22. Letter, October 30, 1979, Harold Denton (NRC) to All Operating Nuclear Power Plants, subject: Discussion of Lessons Learned Short Term Requirements, pp. 9-14.

It is our belief that the ability to quickly diagnose the Rancho Seco plant would be enhanced by the foregoing additional types of displays and that without them the present instrumentation and measurements place an undue burden on the operators.

B. Board Question Hursh & Castro No. 31.

> Rancho Seco, being a Babcock and Wilcox designed reactor, has a control room configuration which is poorly and inadequately designed for plant operators to avoid a loss of feedwater transient, and therefore is unsafe and endangers the health and safety of Petitioners, constituents of Petitioners and the public.

Compared to the TMI-2 control room, the Rancho Seco control room appears to have several significant advantages from a human factors point of view.[23/] It also has some weaknesses.

Some of the major differences are as follows: It is less conjested; it is smaller, it has fewer feet of inner consoles and front row vertical panels than TMI; and it has fewer displays; but it has over 100 feet of panels in the back room; it lacks physical diversity in control; it uses very few mimics; and it employs numerous vertical moving-pointer arc-scale meters mounted above eye level. On the whole, it appears that the advantages outweigh the disadvantages, leading to a better design at Rancho Seco than that at TMI-2. However, this does not mean that the Rancho Seco control room is optimally designed for handling feedwater transients or any other upset condition. The design appears to be

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23. We have not had an opportunity to inspect the Rancho Seco control room before preparing this testimony. Thus our views concerning the Rancho Seco control room may change following the scheduled inspection.

optimized for normal operation but may be lacking the needed displays and reliable data to handle upset conditions. The added fact that the B&W design has inherent sensitivity to feedwater transients may amplify the importance of human factors deficiencies in periods of high stress.

In general, essentially all nuclear control rooms are inadequate and poorly designed from a human factors engineering point of view. This view is substantiated by various studies such as the Lockheed/EPRI Study which states:

> The study [of five operational control rooms] revealed both major and minor problems in the design of control rooms which increased the potential for operational errors and unnecessarily added to the training burden and rigor of selection criteria for operator candidates. . . . In short, the control boards reviewed had not been designed to promote error-free operation, especially during potentially stressful circumstances.24/

The Essex Study of TMI-2 was even more emphatic about inadequacies in control room development. Their findings stated:

- Human engineering planning at TMI-2 was virtually nonexistent.
- NRC and the nuclear industry have virtually ignored concerns for human error.25/

Rancho Seco is not identified as being one of the plants evaluated in the above studies.

NRC review of control rooms during the Rancho Seco licensing was cursory or non-existent. The Kemeny Commission called for a correction of this shortcoming in their findings:

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24. Human Factors Methods for Nuclear Control Room Design, EPRI NP-1119-SY, June, 1979, p. 1-1.

25. Human Factors Evaluation of Control Room Design and Operator Performance at Three Mile Island-2, NUREG/CR-1270, Essex Corporation, January, 1980, Vol. 1, p. 99.

> Other safety emphasis should include review and approval of control room design; the agency should consider the need for changes in the overall design to aid understanding of plant status, particularly in response to emergencies.26/

It is our opinion that Rancho Seco should be evaluated against consensus standards for human factors engineering. Also, the on-going NRC funded studies of human-factors and the man-machine interface should be extended to existing control rooms, including Rancho Seco, to evaluate possible enhancement and improvement.

C. Conclusions Regarding Human Factors Engineering.

It is our opinion that operation of the Rancho Seco reactor without direct indication of (1) reactor vessel coolant level, (2) the onset of saturation conditions, and (3) the initiation of natural circulation, and in a control room environment which is not designed with optinimum human-factors considerations, could contribute to errors in diagnosis and control of upset conditions.

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26. Report of the President's Commission on the Accident at Three Mile Island, October, 1979, p. 63.

27. NRC Staff Response to First Set of CEC Interrogatories, dated December 12, 1979, Response No. 13.

CORRECTIONS TO PREPARED DIRECT TESTIMONY OF DALE G. BRIDENBAUGH AND GREGORY C. MINOR CONCERNING OPERATOR TRAINING AND HUMAN FACTORS ENGINEERING

Page	Corrections
6, line 1	"is" instead of "are"
6, line 21	"evaluated" instead of "evaluted"
16, line 12	"judgement" instead of "judgemnt"
16, line 15	"thermocouples" instead of "thermal couples"
17, line 9	"congerted" instead of "conje,ted"
19, line 9	add reference number "27/" after the word interface
8, line 26	second word "that" should be "the"

MR. ELLISON: The witnesses are available for cross examination.

I would like to request of counsel that Mr. Bridenbaugh and Mr. Minor are appearing as a panel. However, questions -- this testimony is divided into two sections, one generally dealing with training and the other dealing with human factors engineering in the control room, and we would request that questions on the training section be addressed to Mr. Bridenbaugh, and questions on the human factors engineering be addressed to Mr. Minor.

MRS. BOWERS: Mr. Baxter?

MR. BAXTER: Mr. Diaz is distributing a document entitled Resume Gregory C. Minor, which we would request be marked for identification as SMUD Exhibit Number 21.

(The document referred to was marked for identification as SMUD Exhibit Number 21.)

CROSS EXAMINATION

BY MR. BAXTER:

Q Mr. Minor, SMUD Exhibit 21 was provided to us by the California Energy Commission during the course of discovery. Do you recognize it as your resume?

A (Witness Minor) Yes, I do.

Q I will start with a very easy one first, on Page 3, where it lists your first degree. Should that be BSCE?

A Yes, it should.

Q Looking at Page 1 of your testimony, the introductory part, in which,Mr. Minor, your qualifications are being discussed, you described your duties at General Electric from 1972 to 1976, as manager of advanced control and instrumentation engineering.

Now, in describing the duties you had under this position in SMUD Exhibit Number 21, you state that your work in the coordination and management of the design and development of control systems, safety systems, and new control concepts was for use on the next generation of reactors. What generation of reactors are you referring to in that statement, in SMUD Exhibit Number 21?

A At the time -- in this period, 1972 to 1976, the reactor vintage that was going through the plant at General Electric was approximately the BWR4 and some of the BWR5 production, and the systems and components that I am speaking of here were being designed for implementation on the BWR5 and generally on the BWR6 reactors.

Q Are BWR5 and 6 reactors, are there any of them in operation now?

A There are no BWR6 reactors in operation, and I believe the only BWR5 that is actually operating is CAORSO, which is roughly a 5.

A (Witness Bridenbaugh) If I may add, I believe

Tokai 2 in Japan is also in operation, which is also probably a 5. Tokai is T-o-k-a-i.

A (Witness Minor) The generations are not always evenly divided across one kind of a number. Sometimes you have a part of one and a part of another in the same reactor.

Q Are there BWR5 and 6 plants under construction in the United States?

A Yes.

Q Further on in this paragraph in SMUD Exhibit Number 21, at the bottom of the page, you stated that disciplines involved in this work involve -- included electrical and mechanical engineering, seismic design, and process computer control programming. Is that correct?

A Those are the types of functions that I was responsible for and had reporting to me in that position, yes.

Q I will turn now to the section of the testimony devoted to operator training issues, Mr. Bridenbaugh.

Mr. Bridenbaugh, have you ever been licensed by the Atomic Energy Commission or by the Nuclear Regulatory Commission to operate a nuclear reactor?

A (Witness Bridenbaugh) No, I have not.

Q Have you ever taken an operator's license examination administered by either the AEC or the NRC?

A No, I have not.

Q Have you ever been trained in a pressurized water reactor simulator?

A No.

Q Have you served on any industry or government body involved in the establishment of criteria for the selection, training, or qualification of nuclear power plant licensed operating personnel?

A Not in any official capacity, no.

Q Have you ever prepared emergency or other operating procedures for an operating nuclear power plant?

A I have never prepared them per se. I have reviewed them and commented on them.

Q Approximately when was MHB Technical Associates retained by the California Energy Commission as a consultant in connection with this proceeding?

MR. ELLISON: I object, Mrs. Bowers. I think that question is irrelevant.

MR. BAXTER: I would like to understand what, if any, role the witnesses had in raising the issues they are testifying to.

MRS. BOWERS: Go ahead, Mr.Ellison.

MR. ELLISON: I don't understand how that is relevant.

MRS. BOWERS: Does staff have any --

MR. LEWIS: I think leeway should be allowed. I think it is legitimate.

(Whereupon, the Board conferred.)

MRS. BOWERS: We are going to expect the witnesses to answer the question, but you know, we spent a long time on voir dire with your questioning to Mr. Webb a month ago or however long ago it was. Now, is this going to be that

MR. BAXTER: No, it is not, Mrs. Bowers, but my cross examination of Mr. Webb lasted approximately six hours. Mr. Rodriguez lasted approximately four days. I don't think we are abusing our right to probe and cross examine the witness's qualifications here and their role in the formulation of issues in this proceeding within the first three minutes, at least, of our cross examination. It will not be exhaustive.

MRS. BOWERS: Do you recall the question?

WITNESS BRIDENBAUGH: Not exactly. Perhaps it could be read back or repeated.

BY MR. BAXTER: (Resuming)

Q Let me ask it in a more direct way. Were either of you involved in advising the California Energy Commission with respect to the issues that they chose to formulate and raise before the licensing board in August of 1979, or did you start your work as a consultant in connection with the case thereafter?

A (Witness Bridenbaugh) The official relationship that we had with the California Energy Commission began -- well, I think the first contact concerning a contract was in December of 1979, and I think the contract was approved in January of 1980. We have had contact with a number of people on Rancho Seco since basically the Three Mile Island accident.

Q Thank you.

I would like you to turn to Page 6, please. In the first sentence of the second full paragraph on this page, you state that, "Various reports, procedures, training programs, interrogatory responses, and depositions have been evaluated" by you. I would like to have a little more understanding of the material you reviewed before you prepared this testimony, which is dated February 11, 1980. Let's start with the depositions.

Who are the witnesses whose depositions you evaluated?

A The witnesses?

Q Yes.

A Well, I am not sure they were witnesses.

Q The people who were deposed.

A Okay, the people who were deposed were Tipton, Comstock, and Morisawa, whose depositions, I believe, are in the system here some place. I am not sure exactly what

the status is.

Q Are any of those three operators a shift supervisor at Rancho Seco?

A I believe that Mr. Comstock is, yes.

Q Is either of the other two a senior control room operator?

A Well, I think just before the break that same question basically was asked, and my understanding was that one of them is a shift supervisor, one is a senior control room operator, and the other is a control room operator or reactor operator. I am not sure exactly what terminology is used.

Q Which one is the senior control room operator?

A I believe that Mr. Tipton is the senior control room operator.

Q Were you present at those depositions?

A No, I was not.

Q Have you read the transcript of each deposition in its entirety?

A Yes, I have.

Q When you say, returning back to the sentence in the second paragraph on Page 6, when you say you evaluated training programs, what training programs are you referring to? For example, the Rancho Seco hot license training program? Or the requalification program? Or both?

A Well, there are several documents that I looked at in preparation, or in the preparation of this testimony, and several of them, I think, have been mentioned today, but yes, I have looked at the hot licensing procedure. I think that is -- that carries the number of T1-76. There is a requalification procedure which I believe is AP-25. In response to the Energy Commission's interrogatories, SMUD also provided information on those programs plus the cold licensing program, and essentially those are the three procedures.

Q Are there any other training programs you evaluated?

MR. ELLISON: Excuse me, Mr. Baxter. Are you referring to any other training programs at Rancho Seco, or just any other training programs anywhere?

MR. BAXTER: Any other training programs.

WITNESS BRIDENBAUGH: Yes, I have looked at a lot of other training programs, because I have been involved in this area of the nuclear industry for approximately 15 years, and so I have watched the evolution of training programs as they develop through General Electric in the nuclear -- in the nuclear work I was doing there, and since leaving General Electric, I have been following training in general and specifically looking at the results of training program evaluations coming out of the Three Mile Island

investigations, so there are a lot of reports that address training that have been issued in the past year, and I have looked at those, yes.

BY MR. BAXTER: (Resuming)

Q Specifically, though, in connection with your preparation of this testimony and what you go on to describe in this sentence as your effort to perform an evaluation to determine if some general conclusion could be reached regarding the understanding of operating procedures to be found among the Rancho Seco operators, did you review any specific training programs other than Rancho Seco's in attempting to perform or attempting to make that evaluation that is described here?

A Yes. I attempted to compare the Rancho Seco training program to the Three Mile Island training programs that have been discussed in recent reports coming out of the TMI reviews.

Q Is the description your understanding of the training program at Three Mile Island, and based upon the reports of various reviewing bodies subsequent to the accident, such as the Kemeny Commission and the Rogovin report?

A Basically that is true, but of course, you have to recognize that the descriptions in the Kemeny reports also were based on other evaluations and specific studies that

were performed for those committees, and specifically I think I referenced at least one of them later in the testimony, and that is a report by the Essex Corporation that was done for the Rogovin Committee. There is a supplemental report to the Kemeny Committee that addressed operator selection and training and qualification at TMI that has a lot of detail in it on the TMI training program.

There are other reports that have addressed this in general. The GAO had a report on it that we did some work on, too.

Q Have you done any firsthand investigation yourself of Metropolitan Edison Companies or GBU's training program other than through the review of the reports of others who have studied their programs?

A I am not sure what your interpretation of firsthand investigation is. I would say my evaluation of the TMI training program basically comes out of reports that are publicly available.

I have not gone to Metropolitan Edison nor the TMI site specifically to evaluate their training program.

Q In the course of the discovery phase of this proceeding, documents relating to the Rancho Seco operator training program were produced at the Energy Commission's request and made available for inspection and copying at SMUD offices from December 20, 1979 through January 17,

1980, and in the case of training material, through January 31, 1980.

Did you ever visit SMUD offices to inspect these documents?

A No, I did not. I obtained them from the Energy Commission files.

Q Have you seen then any of the actual materials that are employed in the classes in the Rancho Seco training program?

A There are, of course, documents that CEC has obtained from SMUD that I am sure are employed in the training programs and specifically I think of the operating procedures. I have seen those documents. I have not been in SMUD's training facility nor observed training classes, nor looked at the documents -- the papers that they give to the operators, no.

Q Have you reviewed any of the lesson plans?

A No, I have not, just the summaries that have been presented.

Q Have you reviewed any of the training records of the operators or the examinations given?

A Yes. The response that SMUD provided to California Energy Commission interrogatories in those responses, there were summaries of test scores and training history for operators.

Q Have you ever reviewed an actual examination given as a part of Rancho Seco's training program?

A No, I have not.

Bob Poll.
end 14

Q Looking at this same sentence, page six, you say that you were attempting to determine if some general conclusion could be reached regarding the understanding of --

A I am sorry, Mr. Baxter, I am not --

Q I am still on the first sentence.

A The same sentence. All right. Okay.

Q You say you attempted to perform an evaluation to determine if some general conclusion could be reached regarding the udnerstanding of operating procedures. Were there any particular operating procedures you were evaluating the operator's level of understanding against? If so, what were they?

A Well, I was looking specifically at -- more of the emergency procedures rather than the standard operating procedures, since the issue that is being discussed here is the operator's ability to respond to abnormal conditions in general.

That is where I focused.

Q Have you ever personally examined a Rancho Seco operator to attempt to determine his level of understanding?

A No, I have not. Not that I am aware of. We did, of course, take a brief tour with you and Mr. Rodriguez of the plant. I believe while we were in the control room, we did have some conversations with people who were in the control room, but I would not characterize that as an exami-

nation, I guess.

Q Have you had occasion yourself to read any of the Rancho Seco emergency procedures?

A Yes, I have.

Q What symptoms would an operator at Rancho Seco observe in the control room in the event of a loss of feedwater flow to one or both steam generators?

A With that, are you speaking of before the trip modifications or after?

Q After.

A Well, a loss of feedwater flow at the present time has some obvious -- obvious symptoms, but there are a number of them listed in procedure -- I believe it is D-14, I think.

It is D-14. Symptoms that would be observed are numerous. One is reactor trip, turbine trip, start-up -- hopefully start-up of the AFW.

(Pause.)

Q How would the operator know in this situation whether he has a loss of main feedwater pump or pumps as opposed to a loss of main feedwater control?

MR. ELLISON: Mr. Baxter, excuse me. Could you explain what part of Mr. Bridenbaugh's or Mr. Minor's testimony yc are referring to?

MR. BAXTER: Yes. The sentence that begins in the second paragraph of page 6, regarding his attempt to

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evaluate the understanding of the operating procedures which he identified to be the emergency procedures to be found among the Rancho Seco operators.

BY MR. BAXTER: (Resuming)

Q Would you like the question again?

A Yes.

Q How would the operator know whether he has "A" a loss of main feedwater pumps, or "B" a loss of main feedwater control?

A Well, there would probably be a number of indications that he could refer to. One obvious one that occurs to me is that he would look at the pump, the feedwater pump indicating lights and see whether the lights are running or not.

That would probably be the first thing he would go to.

Q Would there be any way he could tell whether he has lost one feedwater pump as opposed to both feedwater pumps?

A Well, if he lost both pumps, there would be a very — a larger -- certainly a larger decrease in the amount of flow that he had.

His flow would go to zero, essentially.

Q Would there be a reactor trip if he lost both feedwater pumps?

bfm4

A Yes. I believe there would be now.

Q Would the auxiliary feedwater system start automatically?

A It is supposed to, yes.

Q What are the immediate actions the operator would take after a loss of main feedwater pumps or pumps?

A Well --

MR. ELLISON: Mr. Bridenbaugh, please one moment. I object to the question. There is nothing in Mr. Bridenbaugh's or Mr. Minor's testimony that relates to their memorization of the immediate operator actions, recognizing that were they Rancho Seco operators they would be required to memorize them.

They are not Rancho Seco operators. Their testimony does not relate to tneir memorization of those actions. In fact, in this entire line of questioning, Mr. Bridenbaugh and Mr. Minor have discusses the training program, and have discussed the procedures, but they have not nor are they offered here to testify as to the sub-set of operation or their understanding of the sub-set of operation.

MR. BAXTER: Mrs. Bowers, the witnesses are offered, I assume, as experts. They are reaching conclusions, very firm conclusions about the level of understanding of the operators at Rancho Seco, how well they understand these procedures.

I think it is perfectly relevant in terms of the weight the board should give their testimony as experts, evaluating operators to know whether they know anything about operating a nuclear power plant, and about the procedures themselves.

MRS. BOWERS: Does the staff have a position on this?

MR. LEWIS: Well, I think that the line of inquiry is legitimate. I think it does not require that the witnesses have memorized these things. If they do not have the procedure in question in front of them, then I think it should be provided to them.

I think as long as it is provided to them, it is a legitimate area of inquiry.

MRS. BOWERS: Just looking at the title of "A" on page 6; analytic bases of operating procedures and fundamental understanding of plant operations. That is what you are asking them about?

MR. BAXTER: I believe so. If Mr. Ellison -- he is obviously free to argue in the breif at the end that this is all worthless and if the witnesses do not know, they are free to say that.

I think it is relevant.

(Board conferring.)

MRS. BOWERS: We would like for the witness to

answer the question. Do you have to have it repeated?

WITNESS BRIDENBAUGH: Yes, please.

MR. BAXTER: I would be happy to

BY MR. BAXTER: (Resuming)

Q What immediate operator actions must be taken after a loss of main feedwater pump or pumps?

A Well, I do not know -- obviously, I have not memorized the procedures. I could open to open to procedure D-14 and read to you, but I think it would be more appropriate for me to give you a general response because that is more the level of my review.

Certainly I have not attempted to memorize the procedures to be -- to pass a licensing test on them today. They thing that they would do -- the things that most concern would be to take whatever action is necessary to prevent equipment damage, to make sure that essential cooling is continued in some way so that core damage does not occur.

There are a lot of different steps that they would have to take to do that.

Q You could not elaborate on those steps without referring to the procedure, itself. Is that correct?

A Certainly, I can elaborate on those steps, but I cannot verbatim, you know, give you specific immediate actions that the procedure lists, because I have not memorized that list.

bfm7

Q Do you know what an operator does if he determines that a once-through --

A Mr. Baxter, I'm having a little trouble hearing you.

Q Do you know what an operator does if he determines that a once-through steam generator has gone completely dry?

A I can think a lot of facetious remarks to that.

Q We have had enough of those today, already.

(Laughter.)

A The thing, of course -- you know -- should be the operator's utmost concern. I think Mr. Rodriguez stated this a number of times in the past couple of days, is that somehow, he ensures that he maintains cooling to the core. He takes whatever action he has been trained to.

He follows the procedure and he makes sure that the core is cooled to safeguard it.

Q If he has lost all feedwater to both once-through steam generators and he has high pressure injection at maximum allowed flow, what does he do if reactor coolant system pressure is increasing?

A Is what?

Q Increasing.

A Increasing?

Q Yes.

bfm8

A When you say he has lost all feedwater, I assume you are also indicating that he has no auxiliary feedwater. That is included in all feedwater, right?

Q Yes.

A Okay. He sees the reactor system is increasing. He would open, at some point -- I don't remember the exact point -- the MORV to safeguard the primary system.

Q Would he do anything with respect to the reactor coolant pumps?

A Increasing pressure?

Q Yes.

A I do not believe so, no. Not at that point.

(Pause.)

Q In the last sentence on page 6, you state "the preliminary finding after reviewing this material is that SMUD, in general, complied with the letter of existing requirements."

What specific requirements are you referring to here?

A I am referring to the requirements, as I understand them, that were agreed upon by SMUD in the return to service -- I forget the exact designation -- but the shutdown order. The requirements that were attached to return to service from the main shutdown order, and subsequent requirements that the NRC has placed on the licensees, the operators of B & W

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as a result of the ongoing Lessons Learned reviews by the NRC.

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(Pause.)

Q So you are speaking only of the additional requirements that have been imposed since the Three Mile Island accident, when you speak of the letter of existing requirements?

(Pause.)

A I do not believe that I was thinking of it that narrowly when I wrote this particular sentence. I think I was saying that based on my review of SMUD's training procedures, that I had examined as of February 11 or whenever the testimony was written -- based on my review of the new requirements that NRC had imposed on them, that it appeared to me that they had done everything that they had been asked to do, and I do not think there has really been any disagreement on that.

The disagreement in my view is whether that is enough to ensure that the plant can be operated safely.

Q Maybe it would help if I explained my problem. When I read the words "The letter of existing requirements" I infer from that that there is something rather quantitative against which one can measure something, and that someone has just met the absolute minimum and did not go any further. Is that not what you meant by those words?

A I think that is a pretty fair statement, yes. I think that is a general statement that you can make of the

nuclear industry in general, and certainly that is what the Kemeny and Rogovin reports seem to say, that yes, utilities have met the requirements of 10 CFR 55, which delineates training program requirements, and 10 CFR 55 had some pretty detailed things about they shall do this, they shall have a training program, they shall cover these kinds of subjects, they shall have a requalification program, and so on, and the letter of those has been met, but it has not ensured that the training of the operators has been adequate, and I would just, you know, quote from a report that I just saw yesterday for the first time, and that is Rogovin, Volume 2, Part 2, in which he addresses the TMI training program, and he says the accident at TMI 2 represents a training disaster that they quote, and I think that is where we are in the industry.

Q You mentioned 10 CFR Part 55 and the Commission's May 7, 1979, order.

A I am not certain of the date on the May 7th order.

Q I am.

A Okay.

Q Under review here in this proceeding. What specific other training requirements imposed by the NRC are you referring to subsequent to the accident?

MR. ELLISON: I object, Mrs. Bowers. I think the question was asked and answered.

MR. BAXTER: He just said NRC. He referred generally to NRC requirements since the accident. I am asking for a delineation.

MR. ELLISON: My objection stands. I believe you asked for a delineation earlier and got one.

MR. BAXTER: I did not ask for a delineation. I asked what requirements, and he said NRC requirments imposed since the accident, and now I am asking what ones.

MRS. BOWERS: Does the staff have a position on this matter?

MR. LEWIS: I think he is entitled to know what the specifics are.

(Whereupon, the Board conferred.)

MRS. BOWERS: We would like for the witness to answer.

WITNESS BRIDENBAUGH: I do not have the specific references at my fingertips, but the things I am referring to are the negotiated -- as I understand it, the negotiated commitment that SMUD made in response to the May order, which calls for some training, some commitment to train operators at the B&W simulator within a certain time period, and I think all of this is fairly well spelled out in Mr. Rodriguez' testimony.

In addition to that, there has been a continuing series of orders and directives by the NRC as a result of the ongoing reviews, and the I&E Bulletin 79-, you know,

several of them have impacted on this, the NRC's bulletins and orders, the task force, and I cannot remember all of those things and exactly when they were issued, but those are the requirements that I am addressing in this sentence.

BY MR. BAXTER: (Resuming)

Q When you wrote this sentence, did you actually sit down and compare the material you had available on the SMUD training program to these requirements, or does this reflect your general impression based upon your review of these evolving NRC criteria over the period of the last ten to fifteen months?

A I think it reflects my general impression that the cold license program, the hot licensed program, and the requalification program that I reviewed in the interrogatory responses in general meets the requirements as I understand them and know them to be prior to Three Mile Island. If you look at a utilities training program in general, they all follow the same pattern. They have the same kinds of subjects. They have basically the same number of hours within a certain tolerance, and that is true because they are all working through the same regulations, and the same ANSI standard that was used in the development of those programs.

I think in looking at the actions taken by SMUD since TMI, it appears to me that they got their people back

to the simulator, they did the training they committed to and agreed to, but in total, according to Mr. Rodriguez testimony, there were only 27 hours, I think, of formal training as a result of the TMI commitments, so it is not very extensive.

(Pause.)

Q Is it your impression that Mr. Rodriguez in his testimony is describing the pre-TMI Rancho Seco training programs?

A Yes, of course. The cold licensing program certainly was.

Q Other than that?

A My recollection of the hot license program, it carries a designation of T[illegible]6, and I assume it was issued in 1976. The requalification program, I think, was issued in 1975. All of that is in advance of TMI substantially.

Q I assume from nothing but the dates Mr. Rodriguez' testimony did not play any role in the drafting of the sentence we are discussing on Page 6 of your testimony of the same date. Is that correct?

A I am sorry. I did not catch what you said.

Q I assume your review of Mr. Rodriguez' testimony did not play any role in the drafting of the sentence we are addressing on Page 6 of your testimony. Is that correct?

A That is correct, because I did not have it at that time, although looking at it, it does follow very closely what he said he was going to produce in interrogatory responses. That provides a very good outline for his testimony. There is not anything very new in it.

Q Is annual training on a simulator as part of a requalification program a requirement of the NRC in 10 CFR Part 55?

A No, it is not.

Q Are oral examinations as part of the annual requalification program a requirement of the NRC?

A The requalification program is required by the NRC regulations, and in obtaining an operating license and continuing operation of the plant, the licensee is required to develop a requalification program submitted to the NRC and obtain approval on the program, and I am reasonably certain that that is what SMUD did, and so yes, the program is required. They are required to do what they committed to do.

Q But you discussed earlier the fact that there are requirements for requalification programs and indeed you referred to 10 CFR Part 55, and in Appendix A of that title is where the requirements are set forth. Do they include a requirement that there be an oral examination as part of the annual requalification examination?

A I do not remember if it says there shall be an oral annual examination. I doubt that it does, because generally speaking, they are not that specific. They talk more about qualitative requirements than about detailed periodic requirements.

Q If they are qualitative as opposed to detail and specific --

A Qualitative in that I think there is a two-year period in there. I am sorry.

Q If they are qualitative as opposed to detailed and specific, how does one determine whether a given utility's program merely meets the letter of the requirements?

A Well, I guess the easy answer to that is that it apparently meets the letter of the requirement, because they are operating today, and if it did not meet the words, perhaps that would not be the case. It is obviously a thing of certain judgment. In my review of it, it seems to me that they have, other than in a few instances, not done anything more than everybody else has done, and that is basically the absolute minimum.

Q Could you turn now, Mr. Bridenbaugh, to Page 8 of your testimony? Do you also have copies with you at the witness table of transcripts of the three operator depositions?

A Yes,I do.

Q You testify on the top of Page 8 where you are listing examples of what you describe as a substantial amount of uncertainty and lack of understanding on the part of these three licensed operators, a lack of knowledge concerning a basis for concern with respect to vessel weldments.

I would like you to turn, please, to Mr. Comstock's deposition, which is CEC Exhibit 37, and in particular Pages 42 to 44.

MR ELLISON: Mr. Baxter, you are aware that that is not the deposition that is cited at the end of that statement by Mr. Bridenbaugh and Mr. Minor?

MR. BAXTER: Yes.

MRS. BOWERS: What did you just say,that he was aware that it was not the deposition?

MR. BAXTER: He is citing to the deposition of Mr. Morisawa, and I am referring him to the deposition of Mr. Comstock.

MRS. BOWERS: All right.

MR. SHON: What page was that?

MR. BAXTER: Beginning on Page 42.

BY MR. BAXTER: (Resuming)

Q If you would, I would like you to take a moment to read to yourself Mr. Comstock's testimony beginning on Line 15, Page 42.

A And proceeding how far?

Q Line 4 of Page 44.

A Okay.

(Pause.)

end 16
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Q Does Mr. Comstock say there that he understands the consequences at the bottom of page 43 of exceeding tech spec values for pressure vessel integrity?

A His answer is yes.

Q Would you conclude that on reviewing this testimony we have just addressed that he understands the potential relationships between any problems with vessel weldments and the relationships to technical specifications?

A I do not think I could determine from this deposition that he understands the relationship. He indicates that he is aware that there is a relationship, that he does not seem to feel that that is important for him as an operator of the plant.

That his job is to stay within the technical specifications.

Q Would you expect that the technical specifications would reflect any problems with vessel welds?

A I would hope that they would, although I guess I am not convinced that that is the case. I think that there continues to be skeletons dragged out of the closet, if you will, or new things discovered that require modification to technical specifications.

I guess I have said enough on that. If I may add that to that, of course, this section of my testimony is

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prefaced with fundamental understanding and analytical basis for operating procedures. That is the context in which these particular items were selected by me.

I think it is important that people understand why the technical specifications and procedures are written they way they are, and it would seem to me that this illustrated to certainly, at least, some of the people if they didn't understand them, or were not aware of them in a couple of cases.

Q In the next line, on page 8 --

A We are back to the testimony now, right?

Q Yes, sir.

A Okay.

Q We will be bouncing back and forth, I'm afraid, for a little while.

A I will try to stay loose.

Q You state that there is uncertainty regarding conflicts between procedures and between procedures, and technical specifications. The reference, in part, is to Mr. Morisawa.

A Yes.

Q CEC-38. I would like you to turn to page 68 of Mr. Morisawa's deposition, please. Would you cite --

A Page 68?

Q Yes.

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MR. ELLISON: Pardon me, Mr. Baxter. Mr. Bridenbaugh, if you wish, you should feel free to read all of the pages that you cited.

BY MR. BAXTER: (Resuming)

Q Would you like to do that before I ask my question, or after?

A Why don't you go ahead and ask the question, then I will delay if I need to.

Q Fine. The top line of page 68, Mr. Morisawa states "we are not going to violate tech specs because that is our Bible" whatever. On page 69 line 8, he states, "when it comes down to anything, what you follow is tech specs."

Now, feel free to read the rest of the pages, but I would like to know what your basis is for this statement if this deposition is cited in support of it, but there is any confusion about what to do if there might be a conflict between procedures and technical specifications.

A Yes. I think there is confusion illustrated in this deposition. Mr. Morisawa came to that conclusion after a couple of pages of discussion about problems that he perceived between the tech specs, and what I think was a bulletin, rather than a procedure.

The thing that concerns me is that in -- sitting in a rather quiet room, talking over the table with a couple of people and talking about the relationship, the require-

bfm4

ments of tech specs, it took him several minutes to get his head on straight and say that, "Yes, the tech spec is the Bible."

My concern is if he is confused about it in that rather ideal situation, what is he going to do in the plant when there is a tremendous amount of confusion, alarms, annunciators going off? You know, how does he know?

Is he going to remember that very simple thing or is he not?

Q Let me just make sure I understand. You are referring, when you say the calm atmosphere of a quiet room, you are referring to the deposition hearing with the lawyers and the court reporter?

A That is my reference. I am speculating on that, I will have to admit, because I was not at the deposition.

Q I see.

A I am assuming there were not too many people there. That the atmosphere was quiet. Mr. Ellison is certainly a calm individual. So --

Q If I could testify for a minute, I'm sure he'd much rather would have been at the plant, but we will let that go.

You say it took him a couple of pages to get his head on straight and recognize that he should emphasize the technical specifications. I would like you to go back then

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to the entirety of the testimony you state here, starting on page 66.

Could you review for me, quietly first, then identify for me which of Mr. Ellison's questions he should have answered in that way earlier?

(Pause.)

A I have some trouble making sense out of some of the conversation, as reported in the transcript, here. His basic concern was that he was aware of a conflict between the technical specifications and the NRC bulletin on the operation of the HPI.

That is on line 17 of page 66.

Q Wasn't Mr. Ellison asking him about that apparent conflict, and where it came from? He wasn't asking him what he would do, isn't that true?

A Well, Mr. Ellison's question was asking him about a conflict in violating tech specs, yes.

Q Returning to page 8 of your direct testimony, four lines up from the bottom, there is a quotation there. A recent NRC staff review of this issue with the ACRS, statements were made that the B & W design "places so much responsibility on the operators."

Could you identify who made that statement? Do you have a reference to the page number of the transcript of that ACRS subcommittee meeting?

bfm6

A I do not remember who made that statement. I believe that it was, as I recall -- I think that January 8 meeting was a presentation by the staff to the ACRS. It may have been Mr. Novak -- Dr. Novak. It has slipped my mind.

I, unfortunately, did not put a specific reference down on that.

Q On the top of page 9 you use the terms "analytical understanding." Are we speaking here, again, of emergency procedures?

A No. I think there is some confusion there. Perhaps it is a less than optimum choice of words. I am not exactly sure where it came from.

I do not want to accuse the board of confusing the situation. I am not sure where the analytical understanding term came from.

Q My question was, of what --

A When I was addressing that issue, when I wrote that sentence, I was really talking about the operators fundamental understanding of the system of the basic fundamentals of the plant operation, including the physics, the hydraulics, the thermodynamics to be able to analyze an abnormal situation and figure out exactly where he is, what is going wrong, and what does he need to do? What steps does he need to take?

bfm7

Q In that sentence,are you referring to the level of analytical understanding that the TMI operators had prior to, up to, and including the accident?

A Well, I think that all I have referred to TMI operators in that sentence. It perhaps should not be exclusively limited to TMI operators.

Most of the comparisons that I have made in this testimony have been to the level of training, the level of understanding that my review of the TMI accident gave me.

So, what I am saying here is that looking at TMI before March 28, 1979, and looking at SMUD and comparing the people, the organization, the training program, there is no substantial difference that I can see in the training they went through.

They met the regulations. They were approved by the NRC. I think you could make that same statement, probably about, if not all, most of the utilities with licensed reactors.

The concern I have is really that we did not, in the nuclear industry, -- we did not really think that the operator had to have a fundamental underatanding of the plant.

All he had to do was follow the tech specs and the procedures and he was going to stay out of trouble. I think Three Mile Island and the subsequent reviews have certainly changed that view.

bfm8

(Pause.)

You also, in the question, you asked me, asked me if that was pre or post-TMI. I did not really address that in my answer.

I think another thing that gives me some concern is that here we are, some year and two months, almost, after the Three Mile Island accident. There is still a flood of reports and documents coming out on the analysis of what went wrong and why it went wrong and so on.

This is resulting in changes to operating procedures. I am sure if you go back and check the revisions to Rancho Seco's operating procedures, there have probably been seven or eight or nine or ten of them in many of these critical procedures.

Those have resulted from review by hundreds of the leading nuclear scientists in the country, if not in the world. I think that we are placing an awful lot of responsibility on the poor operator who does not have the benefit of the training, the education, and the participation in these reviews when we are changing the signals on him so fast.

I just think that is a big burden for him to bear.

Q Do you think it owuld be better if the licensed operators around the country join the 100 emminent nuclear scientists who have been developing the criteria and the new

bfm9

requirements for plant operation.

A I do not know what would be better. I have not -- I do not really have a solution to that problem.

Q Focussing still on this sentence, do you feel that you know that the Rancho Seco operators currently have a level of understanding below that of the TMI operators, or is it just your statement that you are unable to be sure how they compare?

Therefore, you do not have a reasonable or you do not have assurance?

A I do not think that I have seen anything in my review of the information that I have been able to look at in the course of the preparation of this testimony that assures me that the Rancho Seco operators have a better understanding than the TMI operators did prior to the accident.

I do not see that they have done anything significantly different than the other B & W plant operators have done since then.

So, I would say, qualitatively, they are all in about the same -- in about the same bag.

Q If you read -- you stated that you reviewed the District's administrative procedure for the requalification program, AP-25 --

A Yes.

bfml0

Q The topographical report on the hot license training program and the generic reports, or studies that have been made of the Three Mile incident.

How does a comparison of those procedures and those documents tell you that the analytical understanding of the Rancho Seco operators is not -- is or is not better than that of those at Three Mile Island?

A It is difficult, admittedly, to really understand the quality of the training that is conducted in the two different operations. There may be some differences there.

Looking at the content of the training programs that the two different operators went through, there is no significant difference between the number of hours that they spent, say, at the simulator. I think TMI 2 operators had, I think, six weeks, and Rancho Seco operators had eight weeks.

The make-up of the classroom instruction and the operational experience at the simulator was basically a 50/50 split. I know in looking at the TMI review committee's analysis, the Essex report review of B & W's conduct of simulator training, they are quite critical of many things that have not really addressed what the operator needs to know.

end t-P17

jl fls
tP-18

Q If you have not read any of the lesson plans used at Rancho Seco or reviewed the training materials used in the classroom and have merely looked at the procedures, isn't it possible that there could essentially be dramatic changes in quality of the training that goes on in the lectures and the kind of materials that are made available to the operators in the level of qualifications of the instructors and the material they present, and you would not have been aware of it from your review of those administrative procedures?

A Well, you said dramatic changes. I am sure there could be dramatic changes in the quality of operator training, and hopefully that is what may be accomplished as we continue in this effort. I think if we look at Mr. Rodriguez' testimony, though, and you know, I refer to the Appendix III -- Roman Numeral III of his testimony,he lists the training that has been conducted by SMUD since TMI, to address the problems that have been identified by TMI and if you add up those hours, it only amounts to 27 hours, and I think, if I recall correctly, there have been something like seven revisions in six months to some of the critical or key emergency procedures during that period of time, and it seems to me that 27 hours is not very much to spend on such a moving target as we have had over the past year.

Q Is it your impression that this Appendix III

represents all of the training that Rancho Seco operators have received since the Three Mile Island accident --

A It is my understanding --

Q Excuse me. With respect to any procedure changes.

A It is my understanding that this is a listing of, shall we say, the formal training that has been conducted, and of course Mr. Rodriguez has addressed the informal training, the discussion of the procedures and other aspects of things by the shift supervisors. I do not think that is a very -- I guess I am suspicious that that rather informal program can produce a quality training job because there is no discipline that assures that the shift supervisors are talking about the same issues to the same depth that they should be doing.

Q If I could refer you back to Page 18 of Mr. Rodriguez' testimony, beginning on Line 22, he identified that appendix as a summary of the special post-TMI training provided to Rancho Seco operators. Is it your impression that the requalification, the ongoing continuous requalification program is in addition to the special training, and that it was not suspended during this period?

A I assume that is correct, and I think either further on or some place in his testimony I remember a question being asked on that, and I think there was something like

two hours on the simulator demonstrating the TMI accident, but yes, I am assuming that the requalification program has continued. I guess I would have some concern about the effectiveness of the rehaul program in this past year, because as Mr. Rodriguez has indicated in his cross examination, there have been a lot of things that he has had to do with his people at Rancho Seco in the past year. There has been a lot of overtime worked, and I am sure that that has interefered, if not with the number of hours spent, at least with the operators' understanding of their requalification program.

Q What is the basis for that speculation? Do you know that that has in fact occurred, or is that just a guess?

A What is that, Mr. Baxter?

Q That the extra work imposed in the last year may have cut into the hours devoted to the requalification training program.

A I did not say that it cut into the number of hours. What I said is that probably the minimum number of hours were put in by the operators. They were brought in early to do what was necessary to comply with the minimum requirements of the requalification program. What I said was that when you have people working a lot of overtime, it is very difficult for them to really focus on classroom type

work and be able to absorb what they need to absorb when they are working as many hours as has been implied that people are working at the plant.

I heard this morning Mr. Dieterich, although he is not an operator, talking about 100 hours per week, and I have worked 100 hours a week in the past, and I am not very effective when I do it.

Q Is there any evidence that Rancho Seco operators have been working 100 hours a week?

A I have none. That is just a -- I know that any time you have a refueling and maintenance outage, everybody ends up working a lot of overtime, and I know that people have been working a lot of overtime to comply with new requirements of the NRC.

Q On the bottom of Page 9, we are now discussing procedures for communication of new information.

A Yes.

Q You cite Mr. Tipton's deposition at Page 97 that no transients other than TMI have been discussed. Would you please turn to that page? Actually, please turn to Page 96, beginning -- Are you there?

A Yes, I am.

Q Beginning on Line 16, Mr. Ellison is asking Mr. Tipton about common ways that transients in other reactors are brought to his attention.

He describes the B&W weekly newsletter that it is in the control room. The question is, "Has your shift supervisor ever discussed a transient at another reactor with you? Yes. Can you recall which transient? TMI. Any other? Not right off the top of my head." Is this the basis for the statement in your testimony, that he could not recall any of the other transients?

A I think there was some discussion in Morisawa's deposition, but I am not positive of that, but this is obviously, as I referenced this page, this was one of the primary cites, and perhaps I should have included in that statement something to the effect that formally or procedurally discussed, and that is what I had in mind.

I have worked on a lot of power plants and operators talk about a lot of different things, and certainly they talk about the things that they hear through the grapevine. They talk about things they read in the paper, and I am sure that there was discussion about a lot of different things. I do not think, however, to leave a B&W newsletter -- and incidentally, I have not had any experience with B&W's newsletters, but I used to write them at GE.

To leave those sorts of documents on the control room desk is a very effective formal way of communicating information to operators of events that they should be aware

of and concerned about.

Q Is that the only way that is employed at Rancho Seco of communicating that information?

A I do not know. I am sure that there may be other informal ways, and my assessment of Mr. Rodriguez' cross examination is that they do have now -- they have a special orders program which apparently they probably now communicate to the operators some things that they view as significant, but it is not my understanding that there is a formal procedure for how this is to be done. It is rather haphazard.

Q Is your criticism on Page 9 that no transients other than TMI have been discussed -- does your criticism go to the fact that it allegedly was only Three Mile Island that has been discussed, or that they are discussing them and that that is too informal a way of transmitting information?

A My criticism basically is that having been in the business of watching operating plant information come in for quite a few years, I know there is a lot of good information that is available to operators and to designers and to people who are responsible for the safe operation of nuclear plants.

That could be utilized in making plants safer and more reliable and making them better. I know you know

there are a number of events that I feel have occurred that are relevant to the TMI accident that would be relevant to Rancho Seco, and I think that those things ought to be discussed or communicated formally to the licensed operators. I think that they should be quizzed on them in some way to make sure that they understand whether they are relevant to Rancho Seco, whether they should be concerned about them, and I think advantage should be taken of that kind of information.

Certainly the NRC has finally agreed or taken action to do that same thing within the past several months. They have started to staff their operational analysis group, and they are going to be doing some of that, too, and I guess maybe I am reacting a little bit and saying I told you so.

I have been telling people this for many years that have not really been paying attention to the operational experience.

MR. BAXTER: I am sorry. I need to wrap up this one line, though.

MRS. BOWERS: Go ahead.

BY MR. BAXTER: (Resuming)

Q Is your criticism that TMI was the only transient discussed or the fact that it was apparently the only formal way of communicating the information?

A I think if I may I would like to put it into priorities. The fact that TMI was the only thing that was communicated to the operators is the top priority. I think that formal procedures are essential, but that does not mean that you cannot communicate information effectively in other ways. I think that is the only safe way -- the only way of ensuring that you do it, so I think that the fact that only TMI apparently was communicated is the most significant failing, and the fact that there is no formal procedure apparently is of the second order.

Q And the conclusion that nothing other than TMI was communicated was based on Mr. Tipton's not being able to recall another transient. Is that correct?

A Basically that is correct, yes.

Q But to return to the bigger point, if you are managing a power plant yourself and felt that a formal way of communicating this information was appropriate to be followed up by quizzes, would you still not feel it would be prudent upon the occurrence of an incident or when management, site management learned about it, that prior to going through this more formal process of writing up a memo or holding a classroom session or a quiz, that the operations supervisor brief the shift supervisors and they immediately start discussing the implications of the lesson learned and this information with the shifts as they

come on crew?

A Certainly, time is important in the communication of information, and in the work that I have done in the past. We have done it both ways. Usually if we became aware of a significant failing, that would potentially affect the safety or reliability of some equipment that we had furnished to a utility, we would get on the phone and communicate it to them informally as rapidly as possible, and then you follow that up as rapidly as you can with written documentation, with more time to think out -- more of the details and what recommendations there may be.

MRS. BOWERS: Mr. Baxter, we talked among ourselves earlier, last night and today, about suggesting that we continue on this evening with these witnesses for a while, and see how well it goes, and then we will talk about tomorrow.

MR. ELLISON: Mrs. Bowers, if I could add something, we would encourage that. It is our belief that based upon representations of the parties, that these witnesses would be finished tomorrow, and if we would either -- we would hope that in order to accomplish that, we would either go late tonight or perhaps beyond -- go tomororw and if necessary go somewhat beyond noon.

Mr. Bridenbaugh and Mr. Minor have informed me that they have commitments that require them to be away

from here Monday and Tuesday, but that Mr. Minor could return on Wednesday or both of them later if we have a June session, but I think if we were to go late tonight or go tomorrow, we could finish these witnesses, which would do two things. It would make sure that there would be no interruption of their examination, and I think it would also go a long way towards ensuring that we finish the hearing in this session.

MR. BAXTER: Can we go off the record?

MRS. BOWERS: Off the record.

(Whereupon, a discussion was held off the record.)

(Whereupon, at 5:00 p.m., the hearing was recessed, to reconvene at 8:00 a.m. the following day.)

end day

This is to certify that the attached proceedings before the

NUCLEAR REGULATORY COMMISSION

in the matter of: SMUD - Rancho Seco

Date of Proceeding: 5/9/80

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: Friday, May 9, 1980

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.

SUZANNE R. BABINEAU

Official Reporter (Typed)

Suzanne R. Babineau

Official Reporter (Signature)