ORIGINAL

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of:

DIABLO CANYON
PUBLIC MEETING

Docket No.

50-275

Location: San Francisco, CA

Pages: 1 - 121

Date: ARPIL 19,1983

TAYLOE ASSOCIATES
Court Reporters
1625 I Street, N.W. Suite 1004
Washington, D.C. 20006
(202) 293-3950

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

DIABLO CANYON

PUBLIC MEETING

Nuclear Regulatory Commission
45 Fremont Street
2nd Floor
San Francisco, California

Tuesday, April 19, 1983

The Commission met, pursuant to notice, at 9:00 a.m.

BEFORE:

B. BUCKLEY
A. VIETTE
J. WERMIEL
O. PARR

ALSO PRESENT:

L. DANIELSON
J. SCHLONDKI
D. NIXDORF
B. HAMILTON
J. HOEBEL
R. FOSTER
B. GIFFEN
G. MOORE
G. TIDRICK
C. WARD
E. CONNELL
B. LEW
R. ANDERSON
H. FRIEND
C. COFFER
T. CRAWFORD

P R O C E E D I N G S

9:11 a.m.

MS. VIETTE: My name is Annette Viette for those of you who don't know me and I'm with the NRC.

I know that some of you are aware of some of the questions or problems that we're having as far as getting information. Since I know that some of you have participated in conference calls that we've had over the last couple of weeks and that's why we're out here today to clarify some of the information and for the Staff to ask any additional questions that we might have.

And as we stated earlier, we would like it to be a working meeting. A question and answer and maybe a brief summary from PG&E, but not necessarily any presentations or anything like that.

I guess we should first of all start around the room introducing ourselves, making sure that everybody knows who is who.

Bart, you want to start?

MR. BUCKLEY: I'm Bart Buckley, licensing project manager on Diablo.

MR. WERMIEL: My name is Jerry Wermiel. I'm the auxillary systems branch with the NRC and I'm responsible for the review and evaluation of the Diablo Canyon cooling water system.

MR. PARR: My name is Olin Parr. I'm also from

auxillary system. I'm the branch chief.

MR. TIDRICK: My name is Larry Tidrick. I'm from PG&E and I'm in the mechanical group.

MR. WARD: Russ Ward. I'm in the mechanical group on the Diablo Canyon Project.

MR. CONNELL: Ed Connell, mechanical group supervisor, Diablo Canyon Project.

MR. GIFFEN: My name is Bryant Giffen. I'm with Pacific Gas and Electric nuclear plant operations.

MR. FOSTER: Ray Foster, nuclear plant operations.

MR. LEW: Barkley Lew, licensing, Diablo Canyon Project.

MR. HOBELL: I'm John Hobell, I'm Westinghouse Projects manager.

MR. SCHOLONSKI: I'm Jim Scholorski, Westinghouse fluid systems design.

MR. NIXDORF: Dave Nixdorf, Westinghouse nuclear safety department.

MR. COFFER: Charles Coffer, licensing Diablo Canyon Project.

MR. FRIEND: I'm Howard Friend with the Diablo Canyon Project.

MR. HAMILTON: Mel Hamilton, manager of fluid systems design for Westinghouse.

MR. ANDERSON: Dick Anderson, Diablo Canyon Project.

MR. BUCKELY: Anybody else here to be identified?

MS. DANIELSON: I'm Lynn Danielson and I represent the State of California.

MR. MOORE: Gary Moore, project engineer Diablo Canyon.

MR. PARR: Just to start out, our evaluation of the component cooling water has advanced quite a ways. As a matter of fact, we have a drart of our safety evaluation report which unfortunately you will not get a copy of today. But the reason that I'm bringing it up is the fact that we think we've crystalized where we need information and that is the purpose of the meeting today.

MR. BUCKLEY: Olin says that you weren't going to draft today. You weren't going to draft at any point. You will get a finished product.

MR. FRIEND: For clarification.

MR. WERMEIL: I would like to divide the discussion today into basically two parts and they deal with the two concerns -- broad concerns which are already identified to the Diablo Canyon Project.

The first one being the concern for the seismic capability of the CLoop and the non essential, non safety related components thereon.

And the second involving the concern for determining and assuring proper component cooling water system

heat load performance following the most limiting single failure within the CCW system itself.

So, number one, let's begin with the seismically qualification concern.

The submittals that we have to date indicate that the Diablo Canyon Project is in the process of performing some reanalysis or reverification of the capability of the nonessential components on the C Loop to obtain their pressure boundary following the Hosgri seismic event.

The first basic question is what is the status of that since as I understand it the last letter you sent in indicated that that had not been fully completed for all the components.

MR. CONNELL: Gary, the status is is that it is virtually complete. We have one component left which is the lower bearing oil cooler on the reactant coolant pumps.

The analysis is in progress. We have Westinghouse and the project of getting together tomorrow with the seismic analysts and we're going to discuss further methods to analyze the problem.

It's a little too early to give you a firm date, but I'm anticipating about two weeks from tomorrow.

MR. WERMIEL: Now, let me understand exactly what we're going to have when we're finished. Following the Hosgri seismic event, is it now the Diablo Canyon's plan or

their intent to assure that there will be no rupture of the pressure boundary at all within the component cooling water system?

MR. CONNELL: I think it's too early to say that.

MR. WERMIEL: You don't know yet.

MR. CONNELL: We read our licensing commitment as that system being designed for leakage not to exceed 200 GPM.

MR. WERMIEL: Let me point something out to you then.

If when you are finished, you find that following a Hosgri event, you will be taking credit for a 200 GPM leakage from the system, the operator following this will be required to take a safety action. He's going to be required to assure seismic makeup first of all to the surge tank in order to assure proper functioning of the pumps. And therefore, he is going to need some indication, as I understand it, the normal source of makeup being not seismic must be aligned to the seismic source.

So there's a time factor involved first of all and there is need for qualified indication of when to take that action and there is also need for the proper procedure to tell him to do that before you reach an unacceptable level in the surge tank and potential cavitation of the pumps.

If you can show that you will not get any leakage above what you would normally have within the system, then

this safety action doesn't need to be taken. It certainly doesn't need to be taken right away and we would then consider some long term diagnostic indication to the operator acceptable.

To that of course, the full qualification of the instrumentation will not be required. There's a difference there.

MR. MOORE: Jerry, can I -- This is Gary Moore. I just want to make a clarification in my own mind.

If we abide by the 200 GPM assumption and demonstrate that that assumption is not exceeded, I believe our calculations have shown at least in the past that that allows for 20 minutes -- you know -- if it's 200 GPM leakage, the storage capacity in the surge tank allows a 20 minute period for operator action.

Would it be reasonable to -- as a procedural situation to post seismic event to take the following actions and make it a proactive situation verses reacting to a -- some kind of a signal, if you will, that said you had to take the action?

MR. WERMIEL: Again, if you want to make it proactive you're not going to be able to do that in 20 minutes.

MR. MOORE: Certainly. Saying that the triggering event is the earthquake.

I have an earthquake and then I do action A, B, and

C.

MR. WERMIEL: Well, are you saying that one of those immediate actions will be to switch the makeup source, for example?

MR. MOORE: It could be.

MR. WERMIEL: If that is needed, then I would consider that acceptable so long as whatever is giving the operator the indication, he needs to take that action, is qualified and will be available and is fairly immediate.

In other words, we're not talking oh he gets the signal ten minutes later and then 20 minutes more down the road, the tank is already drained.

MR. CONNELL: We have seismic instrumentation that exceeds the rate value one twelve or whatever the number is that you could use as a trigger.

MR. WERMIEL: Other than say the indication directly on the surge tank, you say?

MR. CONNELL: No, I meant the seismic instrumentation that is required by regulatory guide. One point -- is it one, two.

MR. MOORE: Two nine?

MR. CONNELL: No, no, seismic instrumentation.

MR. WERMIEL: No, no. You're talking about the eccelerometers or whatever they are.

MR. MOORE: Right.

MR. CONNELL: That's right and that's the trigger if you're talking about something --

MR. WERMIEL: And you would be prepared then in your procedure --

MR. MOORE: I'm suggesting --

MR. WERMIEL: -- to which the operator reacts to for that. Takes some action immediately with respect to component cooling water.

MR. MOORE: I'm suggesting that -- I guess I'm really seeking some feedback from you, if that would also be an acceptable alternative.

MR. WERMIEL: That would be an acceptable alternative provided again the procedure told him to react to that and that reaction was related to the component cooling water system.

I don't see a problem with that. That indication would be fairly immediate, I would think.

MR. PARR: It's clear cut that he's got to do those actions. He doesn't depend on looking at anything.

MR. WERMIEL: Then that brings us to the other point.

Since it would be something other than the instrumentation on the surge tank he would be relying on, I would assume then that the surge tank instrumentation would still have a pressure boundary qualified for the event such

that it wouldn't fail.

Has that been folded into this Hosgri reevaluation? In other words, are you assuring that the pressure boundary on the level transmitters and all this sort of thing -- the indicators on the surge tanks?

MR. WARD: Those are seismic -- pressure boundaries.

MR. WERMIEL: We've looked at a schematic drawing for that indication. I have the number here. It's schematic 102033 sheet 19 which happens to show a portion of that pressure boundary as seismic class two.

Is that now a change? Is what you're telling me now a change from that?

MR. WARD: I'm not sure which revision you have.

MR. WERMIEL: It's rev 9.

MR. WARD: That pressure boundary has always been a one, class one C pressure boundary which is a seismic class one.

MR. WERMIEL: It doesn't show that way on this drawing.

MR. MOORE: Can we just stop for a second and can we have that drawing here?

MR. WERMIEL: Do you have it handy by any chance?

MR. WARD: I was just looking at a copy of it yesterday.

MR. WARD: Let me get it then.

MR. WERMIEL: If you can get it, I would sure appreciate it.

MR. MOORE: The classification that you would be looking for, Jerry, would be a one C classification.

MR. WERMIEL: That's correct. I understand the difference between one C and one B, clearly and I now see what you're saying is that this would not be one B, since you're not relying on it to give the operator the information or the immediate indication. You're relying on something else. That is one B. But still the pressure boundary would need to be qualified.

MR. CONNELL: I would like while we're waiting to go back to a previous question or statement that you made.

I think you said that this would involve a safety action.

MR. WERMIEL: Correct.

MR. CONNELL: It's worth pointing out that a reactor coolant pump are isolated on LOCA signal. So there will be if one had a LOCA, where one had, I don't know what you mean by safety action, but one is talking about a loss coolant accident.

MR. WERMIEL: The safety action is assuring the function of the component cooling water system.

MR. CONNELL: I just want to make clear in the postulated case of a loss coolant accident, you don't have

to worry about any leakage because it is isolated. There is no leakage. It's isolated.

There's containment isolation valves on those --

MR. WERMIEL: I was speaking of a seismic event.

MR. CONNELL: Without any other upset.

MR. WERMIEL: Yes, I'm speaking of simply an SSE. We would not compound a LOCA with an SSE.

MR. PARR: Yet.

MR. WERMIEL: Not yet.

MR. MOORE: Jerry, maybe we can move on.

MR. WERMIEL: We can go on, yes. Why don't we go on?

MR. CONNELL: I would just like to leave that by saying that the analysis is not over and it remains to be seen.

MR. WERMIEL: There will obviously be further dicussion on this.

Let me get one thing clear.

MR. MOORE: Jerry, before you move on to the next one, I would like to go back to some of your opening remarks with regard to your summarization of the concerns.

I believe the words that you chose reflected a concern with the seismic capability and if I recall a concern correctly it was the -- the concern dealt with the maintenance of the pressure boundary in association with 200 GPM leak

ssumption and there was several ways to address that concern including isolation of the sea header.

MR. WERMIEL: Yes.

MR. MOORE: That was an alternative.

MR. WERMIEL: The problem with that of course is that the valve -- there is only one valve which I think is what --

MR. MOORE: I just want to make sure for the record that we properly characterize the concern. I think the concern had to deal with the pressure boundary integrity and the 200 GPM leak assumption. Not the fact that the equipment was seismically qualified or not.

MR. CONNELL: Let me say again that for the particular component that we're talking about it isn't that there is just one valve. There is that valve plus the containment isolation valves.

For anything else where you're looking at only one valve that's already been seismically analyzed and found acceptable for Hosgri, so we're past the worrying about one valve. That's not a problem.

MR. ANDERSON: Could you describe this equipment so that everybody understands it a little bit?

It's a cooling coil, three-quarter inch --

MR. CONNELL: We're talking about some very small component that is sitting inside this massive reactor

coolant pump motor. I've got a drawing here. I don't know if you're interested, but you can see this three-quarter inch copper tubing that is inside an oil bath there and there are four or five tumants.

We've already, as I think we stated in our letter, we -- our analysis has already shown that the -- boil cooler itself will maintain integrity. It is simply the piece of the analysis that has been completed yet is whether or not the tubes will develop any leakage or not inside the bath and we'll have to wait and see. Probably a couple of weeks before we get that analysis done and find out.

MR. WERMIEL: Let me ask some more specific questions on this area and then a much broader one.

In looking at the PNID it's difficult to tell whether or not the alignment for makeup to the surge tank is normally from a nonseismic source or from a seismic source.

MR. CONNELL: Normally it is nonseismic.

MR. WERMIEL: It is normally nonseismic. So there is this transfer action that must be taken.

And then one other point of clarification. The -- where was I?

All right, following in SSE, the pressure boundary for the instrumentation on the surge tank is it kept in tact, but as I understand it, the functional capability for the

transmitter would be lost or could be lost because it is not qualified to retain its integrity following an SSE.

Can the operator take some action to restore it so that he can maintain some diagnostic capability on the function of the system following the event?

MR.CONNELL: Jerry, we have conflicting meetings going. We have Cloud in here on what Cloud does and he write now has our instrumentation man tied up.

I would like to defer any detailed questions until this afternoon.

MR. WERMIEL: Okay, we'll raise that again.

Now, a general and rather broad question.

When, you as a designer go back and take a piece of equipment that has been designed and is installed and has a certain pedigree associated with it and you're asked to requalify it, which is the case here, how do you go about assuring yourself that when you do your analysis you are actually making assumptions and analyzing the component as it really is?

In other words, you're taking what are essentially none qualified, non essential components that don't have a particular appendix B or quality group set of paperwork associated with them and you're now trying to upgrade to a certain point for seismic capability.

In other words, to retain their pressure boundary

in a seismic event. What sort of assurance do you have when you do the analysis the materials that you assume in the analysis are really what they are?

MR. CONNELL: It depends on the -- the bottom line is the same. You have a high assurrance. Maybe I can show you with this drawing we have in front of us.

Whether the component is audited as safety grade or not, you've got the materials that are shown on your fabrication drawings.

MR. WERMIEL: In other words, you make an assumption that the materials indicated on fabrication drawings and whatever you have are what they are despite the fact that you may not have a material certification?

MR. CONNELL: We make that assumption whether it is nuclear grade material -- nuclear grade component or not.

MR. WERMIEL: But with nuclear grade material, you probably have a material certification or at least the certificate of conformance and you won't necessarily have that for these.

MR. CONNELL: It depends on the component, but yes we make that assumption in both cases and there is one further thing that we do and we also do this in both cases. Is that not so much on the material, but on the configuration, these have all been -- we have the analyst go to the field and make sure that what he can see he's analyzing what's on

the drawing.

MR. WERMIEL: Okay. So then he will verify the location of existing supports and things like that?

MR. CONNELL: That's correct. Welding attachments and that type of thing. Yes.

MR. WERMIEL: So he does do a physical verification of the as built installation.

MR. CONNELL: That's correct.

MR. MOORE: Jerry, I think it is also very important to remember and we've tried to be careful in our wording so that we don't mislead the staff. We have never in any of these efforts tried to claim seismic qualification in the rigorous sense. We entertain this approach as a way of rigorously assuring people that our original engineering design assumption was a valid one.

So the -- we feel that it's appropriate to analyze, to demonstrate the validity of our assumption verses trying to demonstrate the same bottom line, if you will, that you would do when you were trying to claim something as being seismic category one.

MR. WERMIEL: It think you've just raised a good point.

My understanding is that there really was never any kind of a design approach at all with respect to the C Loop. It was just somebody's feeling that hey following an

SSE, a C Loop would retain its integrity. There wasn't even necessarily anything more than simple engineering judgment. There was really nothing on paper.

MR. CONNELL: That's not correct.

MR. MOORE: I think that that is very dangerous speculation. We here of course were not involved with the original work and so I don't think this group can absolutely speak to what was in the mind of the engineer when he made that assumption, but I would challenge your conjecture that that was not the case.

MR. ANDERSON: Jerry, I made some comments back in a meeting in Bethesda that -- We had worked with PG&E back in the early '70s. PG&E is a company that plans or intends to have earthquakes happen to their plants and they're very concerned about seismic design and equipment mainly from the point of view that they don't want the equipment damaged in an earthquake and they had sent people up to the Ft. Richardson plant after the big earthquake.

We sent people up there too because we designed that plant. And they had been taking data and gathering information. So when you say it was nothing more than a simple judgment, that simple judgment as far as PG&E was concerned was very much an educated judgment as opposed to many plants in the country that ran into seismic design for the first time when they got into nuclear plant designs.

So, it was more than just a judgment and it was more than just a simple judgment. It was an educated judgment. A judgment that was based on what kind of equipment it was. Some of the equipment was qualified for seismic. It was a kind of a hodgepodge of equipment that goes into this kind of a system and they looked at it and they made a judgment that certainly that kind of equipment is not going to --

MR. WERMIEL: Don't get me wrong. I'm not saying that engineering judgment was not valid at all or was wrong or was unacceptable so to speak. That's not what I'm saying. I'm just trying to get a feel for what the basis was originally.

MR. CONNELL: There was engineering judgment which has been proven correct, I would say by these analysis and there has been other things also.

MR. WERMIEL: That's a good point. Has the analysis shown a need for a lot of additional support?

MR. CONNELL: Zero, zero.

MR. WERMIEL: So far there has been zero modifications?

MR. CONNELL: Yes, that's what we're trying to say. This is the only piece that is not complete, this small three-quarter --

MR. WERMIEL: Up to this point, you haven't even necessarily needed any additional weldment or anything like

that.

MR. CONNELL: No, nothing. Just paper.

MR. WERMIEL: Okay.

MR. MOORE: But Jerry --

MR. CONNELL: Excuse me, Gary. Can I finish a thought that there were other things. Virtually all of this equipment if you go back to specification had seismic requirements in the spec even though it is not classified.

In addition to that, the more important pieces, for example, the coolers on your safety injection pumps, those have been carried on this project for ten years or whatever in the same program -- analysis program that you have for a category of one piece of equipment.

There is something like 27 component have been treated from day one as if they were category one even though they are not.

So there has been quite a --

MR. BUCKLEY: What were they designed for? When you say they have seismic specs. Were they designed for point 4 G.

MR. CONNELL: Something on that order, yes.

MR. BUCKLEY: And you do have the analysis that have been done? Someone is looking over them to see if any mods -- you indicate no mods and --

MR. CONNELL: That's correct. We have gone through

and reanalyzed every piece of equipment on this Loop and the analysis is simply not complete for this tubing.

MR. WERMIEL: Did you get something -- a certificate of compliance that assured you that when you did specify a G value the manufacturer did comply with it?

MR. CONNELL: In some cases yes and in some cases it was simply in the spec and --

MR. WERMIEL: And that was it.

MR. CONNELL: There was a mixture.

MR. MOORE: Jerry, if you recall back in our -- I guess it was January discussions with you back in Bethesday, we pointed out that -- I think Ed just said the number is 11 out of 27 were category one of pieces of equipment.

In that case, Bart, there was a full set of analysis that were available. Those full sets of analysis have been carried forward as part of the Diablo Canyon program just because they are category one pieces of equipment which we're obligated to review all of that equipment as part of our program.

Then there is this intermediate set of equipment that was purchased to a -- and considered a seismic level to be designed and manufactured too that often times where you see that is in a specification and you don't have a rigorous analysis in your files to support that all the way

down to, I believe, some of the sample coolers that are quite small showed no evidence of seismic analysis.

So we had that range of seismic review, if I can say it that way, depending -- I guess looking back in hindsight, it indicates to us that based on its function, its importance, its size there is a consistency between largeness or importance or size to degree of analysis that was done.

So there is some logic and some consistency. Now we're deducing that basically.

MR. WERMIEL: So something like the spent fuel pool cooler would have gotten somewhat more attention originally then say this little heat exchanger that you're now having a problem with.

MR. CONNELL: That's correct.

For example on that one, spent fuel pump heat exchanger, that has been carried on our analysis program long before any of these CCW issues came off.

MR. WERMIEL: Okay.

In other words, it was always part of what you wanted to keep track of with respect to Hosgri.

MR. CONNELL: It was treated as if it were category one, though it isn't.

MR. BUCKLEY: But you upgraded it to meet the Hosgri, is that what you're saying?

MR. CONNELL: It wasn't originally --

I don't remember if we upgraded it or if we just did the analysis.

MR. MOORE: I believe in a separate licensing action there was an upgrading that dealt with the spent fuel pool cooling system, if my memory serves me correctly. Separate from the component cooling water.

MR. WERMIEL: Let me ask another question, Gary, the same way.

With this upgrading and it has been a long term program as you pointed out, have these components and has this effort always been under the upgrade Q/A program?

In other words, has it been tracked in the same fashion that you would be tracking your safety related equipment with respect to --

MR. CONNELL: Let me speak to that.

With the 11 items that we -- the 11 out of the 27, that's true. They were treated identically.

Now, furthermore on these items, now the entire 27, we have -- both our Westinghouse and internal project, we have tracking mechanisms for the seismic qualification of the equipment when the response spector changes or this type of thing.

These have all been added to our tracking mechanisms both here and at Westinghouse. So from this day forward they're treated -- if spectre should change, if nozzle loads

should change, these will be -- they're in the cycle and and they'll be reanalyzed.

MR. WERMIEL: And you're able to do that dispite the fact that original specifications for these 11 components may not have required the same pedigree and the same degree of paperwork?

MR. CONNELL: Yeah, we're doing the analysis independent of the vendor here.

MR. WERMIEL: And the Q/A program is basically independent of whatever vendor paper existed for any of these components?

MR. CONNELL: Well, the Q/A program for the analysis is the same as it is for any other category one item for the whole project.

MR. MOORE: For any other work done by the project. Our procedures really in many respects don't differentiate between class one or non class one. We have the same requirements as class one throughout.

But I'm a little bit confused. We don't want to mislead you here. You can not retrofit quality assurance.

MR. WERMIEL: I understand that. That's why I think on this line of questioning --

MR. MOORE: And we don't want to give you the impression that we're trying to do that. We -- and it's very similar to the situation we had with our intake structure

which started out as a class two structure that ended up holding class one equipment and so just as other utilities have done, you make the best situation out of what you have.

So everywhere that it is possible to establish a level, you do so and on those areas that are impossible, you don't do so.

MR. WERMIEL: When you get to the point where you don't have something that tells you what you need to know as part of the seismic requalification and I speak of requalification of something and you have to make assumptions. Do you tend to make a conservative assumption in order to assure yourself that if you err, you err on the side of foregiveness?

For example, I don't know what this material is and I'm not even sure that what I've got inthere is what's on the drawing, because the drawing doesn't really tell me much. It says it's steel, stainless steel.

It doesn't tell me that it's 304 or 316 or whatever. From the standpoint of seismic requalification, would I make a conservative assumption?

MR. CONNELL: In general, what we would do is we would look at the drawing and say for example I told you it was three-sixteen, but it didn't give you the grade, we would -- in general, we would after taking a look at it, if it wasn't obviously -- or something, we would assume

that if it looks like steel it is three-sixteen.

We don't know what grade it is and so we would go to the ASTM standards and we would take the grade with the lowest allowable. In fact that question just came up with Cloud and that's exactly what we did on a component that they asked about. We didn't know the grades, but we took the least.

It turned out later that we knew the grade.

MR. MOORE: We did know the grade.

MR. CONNELL: We did it anyhow and the and the analyst didn't ask the right question, so he used the lowest allowable.

MR.MOORE: I would like to point out, too, that the scenario that you proposed, Jerry, is -- I don't and we'd have to go back to the analysis group and ask the question, but I don't think that we have run into cases as you speculate. I mean our equipment is -- it is clear at least in terms of design documents what material was used. We may not know the grade, but it is not the subject that we have no information about this piece of equipment.

MR. WERMIEL: All I'm saying is that it sometimes gets to the point where the information you have because you don't have standard traceability could be considered to some extent nothing more than hearsay.

In other words, you've got the piece of paper that

is telling you something and you're using your judgment that that is what it is. You don't have anything more.

MR. MOORE: Maybe this is something that I should point out also. Our documentation requirements with regard to design documents, not certificates of conformance or things like this, material certs, are identical for class one and class two equipment.

So when this equipment was bought, there wasn't two different documentation standards applied to the equipment. Often times you asked for more information for the class one equipment and it ended up in the areas of material certifications and things like that.

But in terms of outline drawings and material identification, you really need that information just to maintain the equipment in the field to prepare properly.

MR. LEW: Jerry, to get back to your question, I think the project is always using good engineering judgment and good engineering practice and so in response to your question, it would be an unqualified yes.

MR. WERMIEL: Okay. All I'm doing is just trying to get an understanding of something that is not normally a part of my review. It is handled by other people, but in this kind of an effort where my branch of systems is involved, I guess it is important for us to try to understand when we ask for requalification and then you volunteer

such a thing, we understand what it constitutes and what it involves.

MR. BUCKLEY: Let me ask a question.

In terms of traceability on Loop C, do you feel that you have good traceability the quality of material that is in the type?

MR. MOORE: Not in all cases, Bart.

MR. BUCKLEY: How many?

MR. MOORE: There are 11 that were bought as class one pieces of equipment.

MR. CONNELL: What I was really saying there is that 11 that had been carried in the analysis program as class one pieces of equipment.

MR. ANDERSON: On the other hand we have a high degree of confidence that the equipment that is purchased is furnished with the material specified. We don't have all the paperwork that would be associated normally with category one kinds of equipment. We have a very high degree of confidence that the material that is shown on the drawings is there.

If it isn't fully identified as Ed said we make a conservative assumption, but if it is identified, we use that and that seems to be like a perfectly reasonable thing to do for this kind of analysis under these conditions.

MR. MOORE: Bart, to go back to your question about

traceability, though, if you're line of questioning is traceability of material, okay. If it was not purchased as a class one piece of equipment, it might very likely not have that kind of traceability.

MR. BUCKLEY: Let me ask you this. What -- I think about six or eight months ago, you submitted a Bechtel. report on Q/A. I forget the number. B top 3 or Rev 3 or something.

Are you using that Q/A program now, let's say on Loop C?

MR. MOORE: The project is - - Now, you've got to be careful. The project home office -- the construction site operates under the PG&E program, but the Diablo Canyon Project as it is consisted in this office operates under the Bechtel, I believe some kind of a modified form of Bechtel topical Q/A program.

That was submitted and approved by the staff.

MR. BUCKLEY: Let's say that you have to put in one inch bolts to add some support to the sample core, just as an example. Who checks out that the one inch bolts have in fact been installed? Is there a Q/A construction activity or group that verifies that in the field?

MR. MOORE: Well, there are several groups. There is a program to assure the quality of the construction. And I would just as soon not go in to very much more than that,

because that's outside of our area or responsibility.

In terms of our design control, we have an engineering manual procedure, 3.6 ON that is how we change design and as a part of that system, we have a confirmatory step where the construction says yes I built it like you designed it or I built it like I've marked it up in this as-built drawing and then that's returned back into the system and incorporated into the final drawing and then they are issued to reflect the as-built condition of the plant.

As a part of that procedure, engineering must accept that change technically.

MR. WERMIEL: Just one more question, then, Gary, on this.

When you take a piece of equipment that wasn't originally intended for seismic qualification and you requalify it with this procedure that you've been speaking of. When you're done and you've assured yourself that it has seismic integrity now, seismic category one integrity, do you label it seismic category one?

MR. CONNELL: No.

MR. MOORE: Jerry, I tried to clarify this. I really object to your use of the term qualify.

Our goal here is to demonstrate pressure boundary integrity which is different from -- it maybe different from

seismic category one requirements and no we are not reclassifying this equipment.

MR. WERMIEL: When you use the word seismic category one then, you do attach some Q/A or some quality group to it?

MR. MOORE: Certainly if you were to go out and buy a category one piece of equipment, part of that definition carries with it a set of quality requirements and it also carries with it a set of technical requirements and when we classify something seismic category one, that defines number one what type of seismic events it must be qualified to and it defines a whole set of codes allowable stresses that may be used. It's a whole package that has very specific meanings of Diablo Canyon.

MR. WERMIEL: So what category does this go into then? Is it categorized in some fashion?

MR. CONNELL: Jerry, let me answer that.

These are class two components as opposed to class one. It's roman numeral. I think your question was, what do we do after we've analyzed it.

We have a calc for example for the stuff we're doing there on project. That's one example.

There's an exact same or similar class one components and what we do, you can see in that calc if you take a quick glance at it is that this tells you how we

track these things after we've analyzed them and it's treated the same way in analysis that is in tracking for the analysis as category one. We've gone through each of the items. We've put down where they're located. We show what spectra we use to qualify it and we've got that dated.

So anytime that you have an input change, this calc gets updated so that you update the analysis. So it's not category one, because it's function is in category one. In terms of our analysis tracking, it's the same as category one. That is from now until 40 years from now. If you change the input, we've got a track here and we will reanalyze it.

MR. WERMIEL: So it's essentially seismic class two equipment with a pressure boundary qualified for the Hosgri earthquake.

MR. CONNELL: That's correct and its tracks will always stay that way.

MR. PARR: We talk about the types of words that are used to keep our feet of our maths. Is that right?

MR. MOORE: Right. I'm trying -- one of our submittals to you. I can't remember which letter it was. I believe we stated some of those words and maybe we can point to those words.

MR. WERMIEL: It would help.

MR. MOORE: Exactly what we were doing.

MR. WERMIEL: There was a status letter on the

seismic requalification. Maybe that's it.

MR. MOORE: Do you have all the letters, Ed?

MR. CONNELL: Well, I do.

MR. MOORE: Look at the letter on the 18th of March. That wasn't exactly the case that I was thinking.

MR. WERMIEL: That really doesn't have a label associated with it, but I think it states the case, I guess.

(Pause)

MR. CONNELL: I guess that says analysis does not effect -- to the effect the loading the equipment nozzle, these loads are being developed as part of the phase one piping verification program and will be factored into a revised analysis when this information becomes available and I guess what I just showed you was the calc that we are tracking to assure that that statement happens.

It is being carried the same as anything else in phase one piping program.

MR. MOORE: Jerry, I'll keep looking through it to see if I can find the words that I remember.

MR. WERMIEL: I don't know if I have anything else in this part of it.

MR. MOORE: I would like to take it back to an earlier question which you had in regard to pressure boundary classification and implementation.

I guess we identified the same confusion that you

did. We have brought down change nine on the drawing.

MR. WERMIEL: This is what I was referring to.

MR. MOORE: Right.

I know what that means, but probably you don't know what that means and this is the latest revision of that drawing and you see where we have extended this line down to make it more clear what is in one C and what is not in one C.

MR. WARD: That's a draft revision. I don't think that's been approved yet, but you know.

MR. WERMIEL: It's all one C.

MR. MOORE: It's always been one C.

And we can show you evidence of that.

MR. WERMIEL: It's always been one C. So this is just nothing more than an editorial change.

MR. MOORE: It's clarification.

MR. WERMIEL: I'll be darned.

MR. MOORE: I don't know how to explain that we were thinking the same thing that you were thinking.

MR. WERMIEL: And I see here all the wiring here, the electronics here, is --

MR. MOORE: Right and that is the same as the original drawings.

MR. WERMIEL: It's an important clarification, incidentally.

MR. MOORE: When you see this, you will always know that --

MR. WERMIEL: I guess I shouldn't laugh, but it is quite significant.

MR. MOORE: Well, if you're familiar with our schematic system, you don't have a problem with determining this, but it is not explicit -- and we try to clean that up.

The piping connection is clearly shown as class one C and this piping is all continuous.

MR. BUCKLEY: The level controller is also Class B.

MR. MOORE: Yes.

And Tom, I think if you go back and review the transcript of our January meeting. I keep saying January meeting. Am I correct?

MR. WERMIEL: Yes.

MR. MOORE: The January meeting you'll see where in Tom's presentation, that's pointed out.

MR. WERMIEL: Yes, and that's what percipitated the confusion, because in looking at the drawing, it didn't seem to jive.

We're still going to have to get back to that question about -- no, we answered the normal line of diagnosis following an SSE in a long term. Is there someway of regaining the functional capability of research tank instru-

mentation following an SSE even if I didn't need to take credit for its immediate availability.

In other words, I would like to know, I would like to be able to follow the normal course of functioning of the system. What's happening with respect to the surge tank? I think that's the kind of thing that I might like to know. Can I regain that capability?

MR. MOORE: I'm not sure you're going to lose it, Jerry. It was pointed out at one time it was seismically qualified. When it was reclassified to out of the one B category into the class two category, it was dropped out of this tracking system that Ed mentioned we had on the project and its seismic qualification -- it's rigorous seismic qualification has not been carried forward or carried along.

So once again, I think it's speculation on all of our parts to say number one you're going to lose the instrumentation do to seismic event.

The thing that we can't do, though, is take credit for.

MR. WERMIEL: Unfortunately, when it comes to seismic classification or qualification from a system standpoint, it is either black or white. It's either available and thereboy with standard SSE or it's not.

MR. MOORE: I agree if you need to take credit for it.

MR. WERMIEL: There may physically be shades of grey following an SSE. We just don't recognize it. That's all I'm saying.

MR. MOORE: And I guess in our system design, this indication is not a required indication.

There are other class one instrumentation, pieces of instrumentation which are used to monitor the safety related function of this system.

MR. BUCKLEY: If you do have a 200 GPM leak and if you do take credit for makeup and I presume the switching from the nonseismic to the seismic source of makeup in the -- storage tank that there are written procedures to tell the operator that he should do such a thing?

MR. WERMIEL: We've already talked about that Bart and --

MR. BUCKLEY: Well, I want to -- Are there written procedures?

MR. MOORE: I'll defer to the operating group.

MR. BUCKLEY: This has been around for a long time.

MR. WERMIEL: We've got an answer to that and I understand that there are none now.

MR. BUCKLEY: I didn't hear the answer.

MR. GIFFEN: There are procedures that specify if you loose automatic makeup to get manual makeup. It specifies that --

MR. WERMIEL: My understanding though with respect to Bart's questioning though is that none of that has anything to do with the actions or the procedural steps the operator would take following an SSE.

MR. CONNELL: The difference is this, if I understand this Bryant. The operators have a procedure that says anytime that you've lost this makeup capability from the unit -- from the class two source, then you switch over to class one. That's what we've got.

Now, what we were saying earlier was that the -- the question was, does it say in their procedure when an earthquake of such and such magnitude should it arrive go do hat without even checking to see if have a velocity class two. That we don't have.

MR. WERMIEL: That's what we're really talking about and we haven't gotten to that point yet.

MR. MOORE: That's right, Jerry.

MR. WERMIEL: That was my understanding, Bart.

They hadn't decided what, if any, leakage would occur from the system following an SSE.

MR. BUCKLEY: Well, let's say they upgrade the Loop C and you don't have a leak, then you don't need makeup. You have a zero leak.

What if you do have a 200 GPM leak and then the question was asked for my benefit. Can somebody answer

again?

Are you then going to qualify the instrumentation in the surge tank to remain functional following the SSE?

MR. MOORE: We have done that, Bart, in our mind, but that does not -- we would not reclassify that instrumentation as class one B or anything other than one C that it is.

That is something that we do as a prudent engineering function, but as we went through during our presentation in January, the -- really the classification that the industry has been mandated to use does not really allow this service to be classified class one.

MR. BUCKLEY: I don't care how you label it. If you need a piece of equipment, it would either be a reanalysis to show that it will remain functional following an SSE or it won't. That's all I'm saying.

I would presume the answer is yes, we would reanalyze to show that it would remain functional if it's required.

MR. MOORE: Certainly. If it's required, we would demonstrate that.

MR. BUCKLEY: Fine, thank you.

MR. WERMIEL: Is there anything else on this area, Bart?

MR. BUCKLEY: NO.

MR. WERMIEL: Okay, let's go on to the second area.

The second area involves the reanalysis or the work that is being done to assure proper component cooling water function, heat removal function, it says, given the most limiting single failure and you have made a submittal on April 4th with respect to this thing and a number of questions have arisen from this submittal and we would like to talk about them now if we could.

MR. CONNELL: Please.

MR. WERMIEL: First of all, let me summarize what I understand your continuing work effort is with respect to this letter.

As part of the concern, we raised a question involving the increased flow that you will have following safety injection signals when all three component cooling water pumps will come on.

And the capability of the system to retain this integrity with its increased flow during the time prior to the operator taking the action to open the valve and put the second component cooling water heat exchanger on line. And you've indicated that there is some work effort underway on this.

Where does that currently stand?

MR. CONNELL: On the question of flow, I think -- I guess we said April 4th or whatever it was.

MR. WERMIEL: Right.

MR. CONNELL: There is some question related to flow that our outstanding in the project. In my mind they are not related to yet has started on these allegations on CCW. As far as what type of flows you see through the heat exchanger when you cut on three pumps rather than two which happens during normal operation is a small increase of flow and as we stated in the letter, when we ordered the heat exchanger, we told them that we were going to have a continuous service of 18,600 GPM or some number roughly twice that for flushing purposes from time to time.

So considering the difference between the three pump flow which was as I understand it the question in the allegation and the two pump flow which happens all the time, there is very little and there is no reason to think in my mind that there would be any reason that the heat exchanger couldn't accept it.

Since it is already in the purchase documents that it should take for flushing purposes a much much higher flow rate.

MR. WERMIEL: And you have flushed the heat exchanger at that point?

MR. CONNELL: I don't know what we flushed it at to date.

MR. WERMIEL: Have you got some assurance from the manufacturer that the flow that you do get when all three

pumps come on can be accepted for 20 minutes? Have you asked him that?

MR. CONNELL: Well, let me get to that.

The assurance we have is this that in the original purchase documents of 13 years ago or whenever it was we told them that we wanted to flush at this -- what's it Chris, 30,000 or something?

MR. MOORE: 37,200 is in the letter.

MR. CONNELL: And that supposedly is what he delivered to us. So I have no reason not to think that that's not acceptable.

Now, we went back to the heat exchanger manufacturer just to revisit the question in a proforma type of thing since we had the paper already in house when he delivered the heat exchanger years and years ago.

And when we did that, we get a letter back from the manufacturer which said that heat exchanger design has evolved a lot in the past 10 or 12 years and there is a new team of standard out dealing with vibration in heat exchangers and if one considers these new team of standards that this possibility that you will have vibration problems develop in the heat exchanger.

Now, I see that as something separate from this question that was raised in the allegation. But it is something that we obviously are investigating and we haven't

yet resolved.

MR. WERMIEL: Are you going to do your investigations solely on paper or has anybody thought or would you intend at anytime to try and simulate the flow and the system functional performance when it does procede the safety injection signal?

MR. CONNELL: Recognizing that this is a working level meeting and this is the topic that is under -- you know, we haven't finished yet, I think that what we are going to do today -- I think we're going to instrument the heat exchanger and see what happens. We have been talking to our research and engineering group about doing just that.

MR. WERMIEL: Just instrumented and actually do a pre-op test?

MR. CONNELL: We'll instrument it and then we'll run -- involvement. Things can change, but what we're thinking of is instrumenting the heat exchanger. We'll run various flows through the heat exchanger and measure the mode shapes and calculate out the stress in the tubes and see if there is indeed any vibration problems.

MR. WERMIEL: And that's in the talking stage?

MR. CONNELL: Yes. In the advance talking stage.

MR. WERMIEL: Is there any plan to expand this to include what might happen to those components throughout the rest of the system?

In other words, do you know that even the A and B Loop of components and the C Loop components should the isolation valve fail to close, can they also -- will they also undergo some unacceptable condition as a result of this increased flow?

MR. CONNELL: Well, I don't -- in my mind, at this time, Jerry, what I see is an answer to the question being no until we run the tests. I think when we run the tests and should we find that there are significant vibration problems which I doubt -- but if that happens, then I think we're going to take a look at the rest of the heat exchangers in the plant, but I don't expect that.

MR. WERMIEL: Would you base the original tests only on what happens with the component cooling water system?

MR. CONNELL: We have no reason to believe that any of the other heat exchangers -- we have no reason to believe that this heat exchanger has these vibration problems other than what the vendor has told us the things have evolved over the years, which is true.

MR. MOORE: Jerry, you know, I think we want to make it very clear. Our original review, we used the documentation that is available to the project which indicated basically that there was no concern in this area.

The project has recently received new information from the manufacturer about a single piece of equipment and

we are obligated to factor that new information into our work. That should not be extrapolated into being construed by anyone as an indication that we might have a problem anywhere else in this system or the rest of the plant.

We don't see any kind of a basis that would tend to go to that line of --

MR. WERMIEL: Let me ask a question.

When you specified flow rate for the other components in the system, what did those manufacturers certify to you or what was the spec for them?

Were they aware of the fact that for a period of time there would be a flow in excess of what you probably specified as design flow on the specification sheet?

///

///

MR. MOORE: Jerry, you know, once again, I -- are you using your --

MR. WERMIEL: Are you looking at --

MR. WARD: Jerry, could I say something? When you look at the problem we've having with the CCW heating system, and depending on what you are looking at in terms of valve alignments, and you get this increased flow through the CCW heat exchanger, I think you've got to appreciate, you know, that that heat exchanger is taking the flow for the whole system.

Now, you may increase the flow through that heat exchanger, let's say 10 or 20 percent or something, and another 10 or 20 percent of additional flow through that component is disbursed through the rest of the component so that each of the individual components to that system does not see 10 or 20 percent. It may see two or three percent, you know, of whatever, depending on the way the valves are throttled for the normal configuration.

MR. WERMIEL: Yes, and that's why, I guess, I'm asking. This is the normal accident design mode to the system. It seems to me the specification should have said this is the flow you will get for a period of time, until we can avert 50 percent of it through the other heat exchanger.

MR. MOORE: Jerry, let's make it clear. I believe

that in terms of the design specification and the certified information from the manufacturer, that is exactly the case.

MR. WERMIEL: Okay. That's what I wanted to hear.

MR. MOORE: But in the spring of 1983, when asked another question, he pointed out some new information, which, you know, I kind of wonder if he's got this new information, why hasn't he told us already.

MR. CONNELL: Excuse me, Jerry. I'm going to show you the answer to Jerry's question. Your answer is directed towards the CCW heat exchanger, correct?

MR. MOORE: Yes.

MR. CONNELL: I'm not sure that Jerry's questioning that. I think he's talking about the other heat exchangers that are in --

MR. WERMIEL: Normally the system is humping along with probably only one pump on it. I get a safety injection signal, which is something that is to be expected over the life of the plant, something that you design for.

Three pumps come on, one component exchanger is valved out, normally. There is now a flow through the system. It seems intuitive to me that that is the flow, with valves wide open. I should have told my manufacturers to give me. Is that the flow those manufacturers are certifying that these components can take, or did you even

test that during the pre-out testing phase, to assure yourself that everything is fine, because this is the way the system's going to work.

MR. CONNELL: We haven't checked all the paper work on each of those components, to be able to answer that now.

MR. MOORE: We have arborated the system, though, with three pumps and service through one heat exchanger, and all the components valved in.

MR. WERMIEL: That would be a very important thing to know, if you did do that.

MR. BUCKLEY: And if they're monitored to see the vibration --

MR. WERMIEL: I'm not sure I even need to have monitored everything, but I do think I would like to know if everything seems to have gone the way it was supposed to. In other words, was the acceptance criteria for that test met?

MR. MOORE: I think that what I'd like to do, Jerry, is have somebody go away and pursue the start-up tests that were performed, and I think we can do that this morning and we'll get back to you on that. Because I think it will be fairly clear that these cases were run.

MR. WERMIEL: That would be extremely useful, and that would allow -- it would certainly take a weight off

my mind. It would allow me to pursue, with the heat exchanger manufacturer, on your own course, whatever resolution you and he feels necessary.

MR. MOORE: Let me suggest something, Jerry. Apparently it was the manufacturer who raised the potential for -- it may be over a longer period of time. It might be a year, we might be talking about months. I'm not sure.

So, now that there is the potential for vibration, I personally think it would be wise to monitor --

MR. WERMIEL: That one heat exchanger, since certainly that one manufacturer has expressed -- that seems to be the most critical component.

MR. MOORE: Let me kind of say the same thing. We will definitely, in a proper technical sense, arrest this -- or put in proper perspective, this new information. Now, whether that's monitoring or some other way -- you know, maybe the manufacturer really didn't understand the situation we had and the 6000 GPM is not real. I don't know, but yes, we are obligated to chase this thing back through the system, if you will, and satisfactorily put a check.

MR. WERMIEL: Did that manufacturer, when you approached him with this question and he gave you this new information, feel the need to file with NRC a Part 21 non-conformance?

MR. MOORE: We have -- that's the question I'm asking.

MR. WERMIEL: It seems to me if he thinks it's that big a deal, he should have.

MR. MOORE: That's right. That is the question that we're trying to -- we're trying to answer your questions first, but that is a question that I have in the back of my mind.

If this is really the case, why didn't you tell us years ago.

MR. WERMIEL: Oh, absolutely.

MR. MOORE: Because we kind of fell into it by chance.

MR. WERMIEL: What you're saying seems to be at variance with what you have taken directly from his information that he had at the time he supplied the heat exchangers.

MR. MOORE: Jerry' I'm personally concerned whether we have a valid situation here or not. You're well aware that the manufacturing facility that built this heat exchanger is no longer in existence, and I believe we're working through another division of the parent company.

MR. WERMIEL: Oh, I see.

MR. MOORE: And the people are not the same people. I mean, you can't go back and talk to the original

designers.

We do know that there is a new code. We do know that there are more sophisticated computer programs being used --

MR. WERMIEL: Let me ask a question --

MR. MOORE: And I don't really understand whether we're seeing a new commercial position from a manufacturer that, if he had to sell something to us today and guarantee it, okay, that that wouldn't be the rating that he would give that piece of equipment.

These are questions that are in my mind, and that's why, I think, Ed is giving you a correct impression: the vote's still out on this one.

I want to make it clear that I am not sure we have a problem here.

MR. CONNELL: Well, I'm not, particularly in light of when this heat exchanger was bought in the inlet side, we put a flow diverter section, particularly because some earlier heat exchangers had some problems. And that was specifically designed so we wouldn't get in the same vibration problem.

MR. WERMIEL: Well, when you speak of this new information and new sophistication, my experience has been that when new sophistication is imparted into codes and standards of manufacturing, they tend to be less conservative

in previous practice, so I'm not sure that this new sophistication doesn't make the case more liberal, say, in that the original design was probably more conservative.

MR. MOORE: Well, when you get more sophisticated though -- Jerry, you know, that's speculation on your part. I think when you put it in -- I think when you characterize it as Bart has, if that 6000 GPM is for 40 years, that's one thing. But is it for some period of time that someone would assume that you would have safety injection signals operating.

MR. WERMIEL: I'm assuming that when you approach the question with your manufacturer, you indicated that this time frame is the 20 minutes that you're taking credit for, prior to putting the other heat exchanger on the line.

MR. BUCKLEY: I think that 20 minutes may have come up after they purchased it. I'm guessing, but probably after they purchased.

MR. WERMIEL: Then you ought to make sure that the response you're getting from the manufacturer is to the question you really want answered.

MR. BUCKLEY: I think we're beating this to death. We can't speculate, and we just have to find out is there a problem, or isn't there a problem.

MR. ANDERSON: At this point, there's no indication of a problem. The system's been run, and we can

just go back and verify that.

Again, we have to be careful, if this meeting is being transcribed, that we don't leave loose statements on the transcript. We have to come back and cover those kinds of things. We're going fast, and we may forget that some things are being said that are not quite accurately said, and we need to recover that.

MR. BUCKLEY: Could you give me an example?

MR. ANDERSON: Well, we often say things like do you have any similar problems, when we have just gone through the fact that we don't think we have a problem. On the transcript that comes out, you know, we're trying to say -- if we want to response to that properly, we're trying to say that yes, there was a problem.

We want to be careful that we get this on the record properly.

MR. BUCKLEY: Well, right now we don't know if there is a problem, so we can't say either way.

MR. ANDERSON: We have no indication right now there is a flow problem, because we have tested the system and we will go back and take a look at that.

MR. BUCKLEY: Picking up again, Ed, do you -- Jerry asked you a while ago, do you plan on assuming single failure in group "C", going your pre-OP? Is that what you're contemplating?

Are you going to let "C" open when you run the pre-pumps? If you are, do you plan on doing any monitoring of that?

MR. CONNELL: Well, we haven't gotten that far in our test plan, but off-hand, I'd say that that's -- I don't know if that's relevant. You know, we're going to be looking at flow regimes -- I don't know. We haven't gotten that far.

MR. BUCKLEY: Is it standard operating procedures when you run a pre-OP to assimilate the single failure criteria?

MR. CONNELL: Oh, yes. That's standard, but I'm not talking about a pre-OP test. What I'm talking about is instrumenting the heat exchanger.

MR. BUCKLEY: I'm calling it pre-OP.

MR. CONNELL: That wouldn't be a -- the pre-OP test would be where one would measure the parameters that one would need on the system level. You would measure the flow. But this is instrumenting the particular component to get mode shapes. That's different, and I'm not sure what range of flows we will go through to get the mode shapes.

MR. BUCKLEY: But you are going to confirm that whatever flow you use to demonstrate heat movement capabilities are, in fact, achieved?

MR. MOORE: Yes, Bart, and I believe, you know -- I can't give you an exact answer.

If we could break for a coffee break here, I will get people working on getting the start-up tests reports, but I think in those test reports you will see where the system has been tested whenever possible to demonstrate that it meets design.

Obviously, you have trouble some of the heat loading situations during a pre-OP test, but with regard to flow, I believe -- now, I'm going to confirm that as soon as we get the results of the test reports -- that the various scenarios that this system has to operate under were tested.

MR. BUCKLEY: Do you plan on doing the flow test on both component cooling heat exchangers, or just one?

MR. CONNELL: I believe the pre-OP's already been doine.

MR. BUCKLEY: The pre-OP's have been done on both, I'm sure, okay.

The new test -- call it what you may -- do you plan on monitoring both heat exchangers for --

MR. CONNELL: If we are -- off-hand, I would say not. If you're talking about -- we're perhaps getting these tests mixed up. As far as measuring the flow in the system, then yes, you do that for the whole system which includes

both heat exchangers in different operating configurations.

But as far as we're talking about, a test specifically to look at this vibration concern, and that -- I would think off-hand, since the heat exchangers are made the same way, that you would do it on one heat exchanger. The idea would be to measure the mode shapes, and from that go back and calculate the stress of the tube, and from that calculate, you know, if it's a fatigue problem, what the effect on the life of the heat exchanger is. And that you would only have to do on one.

But as far as something on a pre-OP test, where you're measuring the whole response of the system, then you do it on both heat exchangers.

MR. BUCKLEY: But you're still developing, you're thinking about it. You're not really quite sure?

MR. CONNELL: No, we've talked on and off a couple of days ago when we were with our -- well, they call them research and engineering people. We're still planning.

MR. BUCKLEY: Do you think this is a complicated test, or do you think it's a pretty simple test? It doesn't sound complicated to me.

MR. CONNELL: No, I think the test is fairly straight forward. There are some interesting questions, you know, where do you measure, and this type of thing, but it's not.

MS. VIETTE: Okay. Do you want to take a ten minute coffee break?

MR. CONNELL: I do.

MR. MOORE: Yes.

(Short recess)

MR. WERMIEL: Back in the April 4, 1983 letter, where you identified Case 3 as the most limiting case from the standpoint of heat injection, heat performance for the component cooling water system, on table 1 where Case 3 is identified -- in other words, I think this was meant to be a sort of failure modes and effects analysis, and you identify there what Case 3 was; what it constituted.

The number of component cooling water pumps that was assumed there is three, and the single failure that was taken is in one of the auxilliary salt water pumps.

It's my understanding that the tech specs allow one component cooling water pump to be out of service indefinitely. What would be the difference in Case 3 from the standpoint of heat load, if only two component cooling water pumps were operating?

As I understand it, the limiting conditions for operation are geared only to two out of the three component cooling water pumps, and that one can be down indefinitely.

MR. BUCKLEY: We realize that this will require

some thought on your part. You may not be prepared to answer right off the bus, but perhaps you may.

MR. CONNELL: I appreciate that, because I'm thinking right off the top of my head here, and it's subject to rethinking later.

It seems to me that if your flow is going to be less, "C" heat transferrence system's going to be less.

MR. BUCKLEY: So we may actually have a higher temperature than what was assumed?

MR. CONNELL: Wait a second.

MR. MOORE: Let me suggest that we take that question, and at lunch we'll have a caucus with the Westinghouse fellows and the budget fellows to think that through, and give you something a little bit more than just right off the top of the head.

Maybe we can also take advantage of this time, though, to explain, if you have any questions, on how we arrived at this case. We've got a lot of people here to explain that, and if I could ask the group to kind of be thinking in the back of their mind about the question that was asked, we'll pick it up a little bit later.

MR. WERMIEL: I think we'd like to hear it, just for our own information.

MR. WARD: Well, obviously if you have two pumps you're going to have less flow, right, through the CCW

system. However, if you look at -- if you draw a picture of a system curve for the system, and you draw -- superimpose that over a set of pump curves, you'll see that with two pumps in operation your flow is not going to drop significantly over -- or less than the three pump operation. We didn't analyze for that, so I can't tell you analytically what effect that's going to have on the temperature exactly. However, the flow is not appreciably less. I can tell you that much.

MR. WERMIEL: Okay. Since that can't be answered right now, why don't you just go ahead and tell us what went into determining that Case 3 was most limiting?

Can you summarize the analysis that you went through in order to answer the question that was asked, on determination of the most limiting single failures, from the standpoint of rejection capabilities?

MR. WARD: Okay. In general, what we tried to do and what these four cases are representing is, we're trying to look at single failures that would either, one, add heat to the CCW system above the original design case; two, decrease the heat removal capability of the system; or three, do some combination of both.

Now, if you look at Case 1, that's basically the original design case, if you want to go back and reverify that.

Case 2 is the single failure of one containment spray pump. And that, in effect, causes indirectly more heat to go into the CCW system, as much as the CCW containment heat removal system and the containment spray system, in conjunction to take heat out of containment post loca.

So, by taking part of the containment spray system out of service, the single failure, you're essentially adding to the burden of the CCW system.

On Case 3, that would be a limitation of the heat removal capability system, where you've got the five fan coolers operating without the single failure of the containment spray. You do have the two containment sprays, and with the simultaneous failure -- single failure of an auxilliary salt water pump, which is the heat rejection portion of the system. So, we wanted to consider that.

Case 4, we looked at to determine the effects of the C-header loads, C-header heat loads on the CCW system. We did that by the failure of the electrical bus "H".

Simultaneous with that Case 4, since, you know, that bus also had a containment spray pump on it, which would then again cause more heat to the CCW system. So, that's basically the four cases we looked at.

As far as input to the analysis, we would go through and we would provide -- we would determine the flows

for the number of CCW pumps that were in service, determine the flow for the number of ASW pumps in service, and we provided this information to Westinghouse and they did the analysis on it.

Now, maybe Jim would like to talk about the analysis a little bit.

MR. SCHLONSKI: For each of the cases that he described, Westinghouse ran a coco computer on it, and determined the pressure and temperature that we would get inside the containment for each of those cases.

It should be noted that the Westinghouse Coco model, or computer model, is an NRC approved code that was used in the Diablo Canyon FSAR.

The analytical model, the input in the assumptions, we assumed that the mass and energy release into the containment -- we looked for the worst case condition for an accident, which turned out to be a double-ended pump suction piping guillotine break. We looked at steamline break and it was less limiting as a condition for accident.

Other assumptions in the code, such as the performance of the spray system, the fan cooler performance and the heat sinks that we take credit for inside the containment, were the same assumptions that we used in the FSAR analysis.

As Chris pointed out, the component cooling water

system performance parameters, such as the flows and the salt water performance parameters, was based on the various cases that we analyzed, whether or not it was two pumps in service or one pump.

The -- basically, the Coco computer model conservatively then predicts the pressure transient and the temperature transiet inside containment for each of those cases. And that data from the code, then, was used to calculate the component cooling water supply temperature transient, the results of which we reported to you.

Through the calculation method that we used, basically the fan cooler heat load is a function of the temperature inside the containment, and the supply temperature to the fan coolers. Okay, that determines how much heat input from the fan cooler system.

And we started out initially with an initial component cooling water supply temperature of 80 degrees, which is the maximum expected steady state operating temperature in the component cooling system that you have normally, prior to any accident.

We would add to that, then, that the head load from the fan coolers would be added to the head load from the other users in the component cooling water system, and we would calculate then a supply temperature to the component cooling water heat exchanger.

Knowing the supply temperature for the component cooling water heat exchanger, the service water temperature and the tube size, and also knowing the flows through that heat exchanger, both on the shell side and the tube side, the UA heat exchanger, we can then calculate the exit from the component cooling water heat exchanger, which is again, the new supply temperature now, the higher supply temperature now, to the various users as well as back to the fan cooler.

A calculation was done to determine how long it would take for the entire loop to heat up, and the conservative estimate of loop transport time was made as three minutes. So then the calculation was repeated then, each three minutes thereafter, out until 1200 seconds, which corresponds to the 20 minutes that we are using here for operator action.

MR. BUCKLEY: This is using three pumps?

MR. SCHLONSKI: The analysis was done for each of the cases, and I'll go through those cases.

So, basically then, we came up with results for each case -- a plot of the temperature versus the time, the supply temperature transient.

Case 1, which basically is the same case that appears in the FSAR in terms of single failure assumption; it's the failure of a diesel to start, coincident with the loss of off-site power, it verified the limit that was

indicated in the FSAR; that is, component cooling water supply temperatures maintained below 120 degrees.

Case 2, which was the failure of a single spray pump, turned out to be less severe than case 3, which was the failure of a single salt water pump as the single failure.

Case 4 was very close to case 3 in terms of the temperatures, just slightly less than case 3. Case 4 was the single failure of one of the busses, considering the bus as the single failure. Assuming off-site power was available for that case, adding into the calculation the head loads that we would get from the C-header, which were higher than the -- the additional heat load would then be higher.

However, case 4, as a result of bus failure, there was only four fan coolers in service, so that that case did come out slightly less than case three.

That was basically the results and the analytical methods we went through to calculate.

MR. WERMIEL: So, you have assured yourself that case 3 bounds the others? In other words, case 3 --

MR. SCHLONSKI: Case 3 is definitely the bounding case, or gives you the highest supply temperature, which is on the order of 132 degrees.

MR. WERMIEL: Okay. I understand that.

There are two more things that relate to that. They are not specifically involved, I guess, with the analysis that was done as much as some of the assumptions that went into it, and the first of that has to do with something we've talked to Buckley and other people on the phone about. That seems to be apparent change in the assumption for auxilliary salt water temperature, and that's ocean water temperature.

The requalification that I understand you're going through now, based on case 3, has assumed an ocean water temperature of 64 degrees, which results in a peak bulk supply temperature for component cooling water of 132.

The original assumptions in the FSAR were for 70 degree ocean water temperature which, under the case 3 assumption, as I understand it, result in a bulk supply temperature for component cooling water of 137.

But I understand that 132 is the number that you now want to assume as most limiting, and that will mean that the 64 degree water temperature for the ocean must be submitted and approved by the appropriate people of the staff, the NRC staff.

MS. VIETTE: Before Jerry can accept the information that have here, if you plan to change that ocean water temperature to 64 degrees as opposed to 70 degrees referenced in the FSAR, our hydrology people are going to

look at that and we're going to have to have them look at records, ocean water temperature records, and the in-take cove and recirculation effects before Jerry can even approve what you have here.

MR. MOORE: I'm confused. The licensing basis for this system is very clearly spelled out in the FSAR, okay, and it is the case, I believe, if I remember correctly, case 1, which had a full set of assumptions identified. We selected the worse case scenario and that's the licensing basis.

Additional questions were asked, okay, and we felt it prudent, as engineers, to review those questions, and we felt -- to satisfy everyone that there was not a safety concern or an issue about the plant. We have done that. I don't think the project has ever committed to change the licensing basis for this system, okay.

Now, if we're proposing to do that, then we would have to not look at 70 degrees and 64 degrees, but the entire section that addresses this system.

Now, once again, I look at these analysis as being further, more rigorous confirmation of the original system design; not a design basis analysis by which the plant is licensed.

MR. WERMIEL: I'm confused now, Gary. I thought that's exactly what we were doing here. The design basis

in the FSAR for the component cooling water system indicates that given a single failure, I can supply proper component cooling water system temperature, or whatever I need, to safely shut the plant down. I can take a single failure following following a loca in an auxilliary salt water pump, and as I understand it from your analysis, I'll get a temperature.

I must now assure myself that with that temperature, I can safely shut the plant down, and I thought that's exactly what this was trying to prove to me.

MR. MOORE: And we feel that we have provided that assurance that is different from, okay, this being the design basis, or the licensing basis for this system.

MR. WERMIEL: And again, I don't understand that. The licensing, as stated in the FSAR, is that if I take a single failure somewhere, the component cooling water can do it's job and safely shut the plant down.

MR. MOORE: It is not that loosely stated, Jerry. It is very clear what the basis is. In the worst single failure, it was not in the component cooling water system, but was taken on a unit basis.

MR. WERMIEL: Okay. Then pardon the staff. The staff unfortunately made an error in it's original review, because it obviously did not pick up this particular point that has now been picked up, and must now assure itself

that given this single failure, the system will do it's job.

MR. MOORE: So, you're asking us to change the licensing base of this system? That is news to me.

MR. WERMIEL: I sure don't see it that way, but if that's the way you guys see it, then that's fine.

MR. PARR: That is not what we're asking.

MR. WERMIEL: What I'm asking is, as I understand it, I thought, and I believe that was what the staff thought when it approved the component cooling water system, was that following a loca, given a single failure, whatever that might be, the component cooling water system can perform it's safety function and assure a safe shut-down.

That's the way it's broadly worded in our evaluation. If we have erred in our broad evaluation, we must correct that.

MR. MOORE: Well, I guess where I'm coming from is we feel we've done that, and we have done that in a fashion that we have used, not FSAR design basis, but a set of rational assumptions to demonstrate rigorously to the staff that we feel we don't have a concern here.

MR. BUCKLEY: Well, I think that's where we're coming from; to give that rationalization, you ought to be able to support the 64 degrees instead of 70. I think that's what we're asking for here.

In other words, some meteorological or hydrological measurement showing that the ocean water -- in your environmental report, you had about four years of data in there that shows that the temperature of the water was 61 -- the maximum temperature was 61 or 62; I forget.

We need some sort of confidence that the 64 degrees is the maximum ocean water temperature.

MR. MOORE: We'd certainly supply that.

MR. BUCKLEY: I thought that's what we were asking.

MR. ANDERSON: We don't want that to be considered the licensing basis. We're looking at things beyond the licensing basis as conditions beyond the licensing basis. We are looking at additional accident scenarios than were described in the FSAR -- if we are, we ought to be able to use reasonable information and data in evaluating those conclusions.

MR. WERMIEL: You will have to explain to me why any single active failure following an accident is beyond your licensing design basis.

MR. MOORE: Okay. To be very simplistic, Jerry, it's my understanding that the licensing basis is as described in the FSAR. Now, I may be mistaken in that, but that was a set of assumptions that were -- or scenarios that were mutually agreed upon, in some fashion, between

the applicant and the NRC. Now, I did not participate in those and I don't know everything that went into that.

MR. WERMIEL: I didn't either.

MR. MOORE: But I'm assuming that the people that put that package together were prudent and did it correctly, and that's why I call that the licensing basis, and we assume, you know, that's where our starting point is from, and we're not being asked to go back and recreate the situation. The plant has an operating license.

MS. VIETTE: When you submitted this new data, you changed -- you changed it from 70 degrees to 64 degrees. Why did you change it?

MR MOORE: Because we also changed the accidents that we're analyzing, the conditions.

MR. BUCKLEY: I think getting back to the question --

MR. WERMIEL: You will provide the support for the 64 degree temperature. We just need to see that, okay, so that the right people can look at that.

That answers the question.

And then we'll go to the last one. In the April 4th letter, there's some interesting discussion in there relative to assurance of adequate NPSH with the component cooling water pumps, and I believe it's based on a return water temperature of 216 degrees; something like

that.

Can we see a little more specifics on the calculation that went into verification of the NPSH, available versus that required for the pumps? Is some of that information available?

MR. CONNELL: Sure.

MR. WERMIEL: I think I'd like to see that.

MR. WARD: You can see any of our calculations. I've got the calculation right here.

MR. WERMIEL: Okay.

MR. WARD: I'd be happy to answer any questions about it.

MR. WERMIEL: I'm really mostly curious, I guess, about what the friction loss is in the -- up from the sewage tank up through the suction of the pumps itself.

MR. WARD: Okay. Well, maybe if I described it to you it might be a little easier than --

MR. WERMIEL: Okay.

MR. MOORE: Chris, when you're drawing the picture, please make it clear where the flow occurs and where the flow doesn't occur.

MR. WARD: Yes. I'm not putting any detail in the rest of the system, because that's not really what we're concerned about here.

The CCW surge tank, which is right here, is up

on the roof of the auxilliary building, and -- let me just change this a little bit.

Now, the flow in the system goes through this piping down here. There's no flow in this line here. This is basically a static line.

MR. BUCKLEY: We're not talking about the water in the surge tank?

MR. WARD: No, there's no flow here. This is just basically a static line. The entire purpose of the surge tank is to pressurize the system so all points of the system are under certain pressure, and also take expansion and contraction of the cooling system when it gets hot or cools down.

This tank is dented up here.

When I did the calculation, the calculation is based on the low water level of the surge tank. I don't know what the number is -- a 170, or something like that.

So, basically what the surge tank does is it gives you constant pressure from this part of the system, and if we take -- neglecting any friction losses for the time being -- now, they're included in the calculation -- what you've basically got is 171 feet up here and 75 feet down here, so that gives you 95 feet, 95 feet of static head and suction, that pump neglects friction losses.

This is extremely favorable suction conditions

for -- not only this pump, but for any pump you'd want to put in the system. So, in the calculation what we did was we looked at the flow from this point here, which I'd say is the constant pressure point, took the friction loss up to the pump suction and then we used this standard NPSHA type calculation to subtract off the vapor pressure at any other terms in the equation.

And I think you'll find from the calculation that the pressure dropping here is fairly small. I don't want to give you any numbers, but it's not of large value.

MR. MOORE: Chris, can we just take the time to get that number of the calculation?

MR. WARD: The frictional?

MR. MOORE: For the record --

MR. WARD: Okay. The calculation doesn't have specific numbers for the friction loss. Okay. We've got --

MR. MOORE: Maybe you can just write down the equation.

MR. WARD: The total friction loss is -- oh, I'll write down the NPSHA. All right. This is basically your static head term. This term subtracts off your vapor pressure, and this term subtracts off your friction losses.

This number is very small, because these flows we're talking -- I did this compilation for the flows -- in excess of any actual pump flow -- let's say the flows were

zero to 15,000 GPM, which is -- the manufacturers certify the pump curves go up to about 15,000 GPM. So you can see that this friction loss term is just going to be fairly small. If we had a calculator, we could put some numbers in there.

MR. MOORE: Maybe we could just bound that. Does somebody have a calculator?

MR. WARD: I think we have some curves here which show the kind of margin we have on the NPSHA pumps, and the curves really speak for themselves. I'm going to draw you, so everybody can see it -- does anybody want to look at this anymore?

MR. MOORE: 4.7?

MR. WARD: I'm going to show you basically what this NPSH curve looks like. Here's flow, and here's NPSH. I've got the vendor's NPSH curve on here. It looks something like this. And what I did was I looked at a number of different return temperatures. I just wanted to get bounding cases on here.

And if you go to -- let's say we start at 100 degrees farenheit, this would be the available curve and this would be the point.

In my calculation I considered all the way from 100 degrees to 250 degrees return temperature. In the CCW system, 250 exceeds absolutely any value that we would have

in the system.

The 250 curve -- in the 250 degree case, it comes down something like this. Now, for any of the conditions that we analyzed, or any condition you're going to have in the CCW system, your pump will be operating back on it's curve somewhere, and you can see that anyplace below this 15,000 GPM, you've got an extremely large margin of NPSH available, above the NPSH requirement for that pump.

This surge tank up here puts enough static pressure on the system, on that pump suction, that you'd recover way in excess of what you'd ever need for that system.

And I'd also like to add that this surge tank does another thing, which is to submerge the suction of these pumps. There is no case where you're ever going to have to worry about the air -- these things are always going to be flooded.

MR. MOORE: Jerry, to answer your specific question when you started up, if you'll accept the friction drop -- not the term, the factor, but the drop, that works out to be about 11 feet.

MR. WERMIEL: Just 11 feet?

MR. WARD: I used 15,000.

MR. WARD: So, I don't know if you have any specific questions about this, but, you know, we have looked

at this and there's really no problems.

MR. BUCKLEY: Could I ask you a question? Is the temperature at the exit tank cooler -- 216 degrees. How many degrees are you sub-cooled at that elevation?

MR. WARD: I don't know. It's in the FSAR, chapter 9. I don't know off the top of my head.

MR. BUCKLEY: Apparently, it would not be flashing?

MR. WARD: No.

MR. WERMIEL: This draws pressure off the pump?

MR. MOORE: It's basically -- the head that you have, it's the differential head between the fan cooler discharged and the surge tank, is the head that you have to work with.

MR. WARD: I would like to add in the FSAR, they do take, you know, they don't consider the temperature down here. They do consider the temperature right there at the exit of the CFC's and at the elevation of fan cooler.

MR. MOORE: And I believe that the situation at the discharge of the fan cooler is a different case than we've been studying here. It goes back to the original licensing basis, for fear of upsetting Jerry again, of three fan coolers. You get a higher discharge temperature when you have the three fan coolers than when you have the five fan coolers.

So, with regard to that little part of the

problem, that's an area that was more severe or limiting.

MR. BUCKLEY: I guess -- let me ask you this question. If it is 216 degrees, there is a sufficient pressure drop to cause flashing, and I am told the answer is no, it will not flash.

MR. CONNELL: That's correct. As Chris was saying, it's in the FSAR, and we looked at the calc that supports the FSAR.

MR. BUCKLEY: Thank you.

MR. MOORE: Jerry, were you satisfied in our resolving what looked to be an apparent discontinuity between some numbers in the FSAR? I think it was really reflecting two different situations.

MR. WERMIEL: Yeah, I understand now that, again, "the design basis" for which you originally licensed, or assumed licensing for the plant, is different from that which is assumed now. And, therefore, cooling water temperatures will, of course, be different.

Let me just read this part of the letter one more time, to make sure there's nothing else.

Gary, just to make sure -- case 3 of the new analysis, the exit temperature from the fan coolers is 210, as opposed to the 216 for that case in the FSAR, is that correct?

MR. MOORE: Yes.

MR. WERMIEL: Okay. I just wanted to make sure I understood that.

MR. MOORE: And we did not -- did we give them a new temperature for the mixing case?

MR. WARD: No, it's in the FSAR. I didn't feel it was necessary to go over that again.

MR. WERMIEL: That being the same, of course? That case has not changed?

MR. WARD: No. You mean the case that's given in the FSAR with three fan coolers, and the discrepancy between the fan cooler outlet temperature and the CCW heat exchanger?

MR. WERMIEL: That's right.

MR. WARD: That would still be valid.

MR. WERMIEL: In other words, that's -- the mixing is caused by -- maybe you can refresh my memory, I don't recall.

MR. MOORE: Three-fifths flow split.

MR. WARD: Basically on a LOCA signal, you've got five fan coolers available. The original FSAR single failure assumption took two of those out of service, in terms of their motors operating and removing heat.

Now, the CCW system is insensitive to that kind of a failure. It's going to supply each fan cooler with it's design flow. So, essentially you've got three fan

coolers with their full design flow, mixing with two fan coolers that have a full design flow but no additional temperature, and those are going to mix on the way out.

MR. WERMIEL: Okay. And that's where the 171 degrees, I believe, comes from?

MR. WARD: Yes.

MR. WERMIEL: Okay. Now I understand.

MP. MOORE: And the five fan cooler case is essentially the discharge temperature of the fan coolers. If there is some fraction of flow that doesn't go through a fan cooler, that mixes back in, but it's relatively insignificant.

MR. WARD: It's just the pump coolers, basically.

MR. MOORE: Jerry, getting back to your earlier question, and I don't know if this changes your question, and maybe the Westinghouse fellows can correct me, and maybe this isn't the same thing you were saying earlier, Chris, that you hadn't calculated it, but maybe Westinghouse has calculated the number.

Their case 1 was two component cooling water pumps, and the flow was 11,300 GPM's. The case 2 and 3 were three component cooling water pumps, and the flow was 11,600 GPM.

Do those numbers allow us to say now that the difference in flow between the two pump case and the three

pump case is 300 GPM?

MR. WARD: Yes, fine. I'm just saying that we haven't analyzed the temperature part of it on a lower flow.

MR. MOORE: I'm wondering if that changes Jerry's question at all, when we point out that the flow difference is 300 GPM out of roughly 11,000?

MR. WERMIEL: There's only a 300 GPM difference between two and three component cooling water pumps operating?

MR. MOORE: That's correct. And just on an engineering judgment basis, that small percentage change in flow, I would not expect a significant difference in temperature results, even though we haven't calculated it.

MR. WERMIEL: I wouldn't either, but why is it so small? Is that because the piping is so oversized?

MR. WARD: No. Let me show you that also.

MR. MOORE: I'm just wondering; maybe you don't want to ask the question anymore, based on this new information?

MR. CONNELL: That's a good thing to bring up, because I guess I was having a hard time understanding when we were talking about the flow -- maybe Chris can show you this, but the difference in the flow between two and three as it goes through the single, is -- granted, it's a few GPM, but relative to a piece of equipment, it doesn't

make any difference.

MR. WARD: When you've done a calculation like this, when you use a system resistance curve, that system resistance curve will increase the flow. Your pressure will increase as the square of flow, and with our pump curves with the CCW pump, what's happening is your curve is steep enough -- your Q square curve is steep enough that, you know, the difference between one, two and three pumps is not that widely disbursed.

That's why when you get up to the two and the three pump case, you're not significantly increasing the total system flow.

MR. MOORE: Jerry, to answer your question, yes, the piping in the equipment are very close to their maximum flow capability, and even though you provide another pump to the system, the system's operation doesn't reflect, you know, a one-third pumping addition, and it's because of where you are in the system characteristics.

MR. CONNEL: Let me tie that in to the earlier question of the flow through the heat exchanger on the C-loop.

You asked the question have we gone through and tabulated each of those components to see if it was specified with the three pumps pumping rather than the two, and my answer was I didn't know, and I guess -- I hadn't

gone through and tabulated it because I know as far as a heat exchange is concerned, the difference in flow is small enough so that it's not going to make a difference to the component.

I mean, you're talking, you know -- I don't know what the numbers are -- 11,000 versus 11,300, or something like that. You're talking two, three, four percent.

MR. WERMIEL: With that in mind, I can see where you're somewhere or some way on the way to answering both concerns with flow and with the temperature in case 3, with only two component cooling water pumps operating. It's an essentially negligible difference.

I didn't realize the system curve was so steep at that point, and that, I gather, was by design?

MR. WARD: I couldn't answer that. I don't know.

MR. MOORE: Once again, not having been a part of that, I'm not sure what you gain --

MR. WERMIEL: Well, I guess I do know what you gain with three pumps. What you gain is from the standpoint of your tech specs. It allows you to have one down indefinitely.

MR. WARD: That's correct.

MR. WERMIEL: Gary, I'd appreciate something that explains that, since I perceived it as an oversight, and apparently it wasn't necessarily an oversight, and even if

it was, it's not significant, and I sure would appreciate some explanation of that.

MR. MOORE: So, you would like to have us add an additional -- let me just think out loud.

You're interested in some words that would address an additional case --

MR. WERMIEL: Or how about case 3 with a note relative to the third column on the number of pumps? And that would involve, both from the standpoint of two versus three pumps having insignificant effect on CCW performance for this design case, because the system curve is such that heat load is not effected and flow is not effected.

MR. MOORE: I'm looking to Ed to make sure he's --

MR. WERMIEL: That curve, from the calculation, would be highly helpful.

MR. CONNELL: That's really what you want, to get on the blackboard with something that says --

MR. WERMIEL: I don't think I -- usually -- particularly when you're trying to gain some heat transfer capabilities with three pumps, it's usually much more broad

MR. BUCKLEY: I thought you were going to have 18,000 GPM's.

MR. WARD: Now, there's something that is a little different here.

This case assumes that the C-header isolates, all right? Now, your normal system configuration has a C-header, and the system curve is much more strung out, all right? But now when your C-header isolates, which is this case 3, that changes your system characteristic and does bring that curve way up because your flow path is drastically changed. You've got much less, or many less components which you're providing flow to.

MR. MOORE: A smaller system.

MR. WARD: A much smaller system, right.

And if you didn't have the C-header, the curve would be flatter on that.

MR. WERMIEL: That would be very useful. And, of course, that would explain away the problem that was noted with respect to the tech spec not governing the operability of three pumps.

MR. MOORE: So, we ought to give this as just additional information. We ought to try to tie in the tech spec, and we ought to also try to see if this addresses the incrumental flow increase on other components?

MR. WERMIEL: Yes.

MR. MOORE: Okay. Maybe we can use this additional information to answer those three questions.

MR. WERMIEL: Okay. I guess -- let me make sure, now. Normally, only one of three pumps is operable, right,

is operating?

MR. MOORE: Yes.

MR. WERMIEL: Okay. So, from one to two there will be some difference, but that, of course, -- and two to three will be somewhat more, but that part being insignificant, the increase from one to two would still need to be accounted for.

On a safety injection signal, all pumps come on, although, you know, the increased flow going from two to three may not be a significant contributor, when the second pump comes on the 20 minutes prior to opening the other heat exchanger, that flow needs to be accounted for, correct?

MR. MOORE: In terms of flow --

MR. CONNELL: Oh, yes. I agree.

MR. MOORE: I was going to ask the same question, just to make sure I got what Ed got.

We're not going to address the one to two case with regard to temperature.

MR. WERMIEL: No.

MR. MOORE: So, we had those three questions. We need to get Gary Tidrick back down here if we want to pursue a little bit more -- I want to make sure that we understand exactly what you'd like to see from us on the 64 degrees, you know, for additional information.

MR. WERMIEL: Hopefully, the licensing people ca help me out there.

MR. MOORE: Right after lunch -- let's not do it now. Let's get the guy down so we can hear.

We're pursuing start-up tests right now. That's what he's doing. That's why he's not here.

What else did we have in terms of action items before?

Of course, we have the pressure bound -- the remaining component that has not -- the pressure boundary --

MR. WERMIEL: The pressure boundary question, I guess we'll call it, and associated question with instrumentation.

MR. MOORE: And that we sti-l owe you, and depending on how that comes out, we'll owe you whatever that results in. I don't know what that's going to come out to.

MS. VIETTE: I realize right now I don't expect you to give me a schedule of when you're planning on submitting these, but I assume that you will be sending me something with a schedule of when these will be coming to NRC, so that we will know when we will be able to resolve the entire CCW matter?

MR. MOORE: Okay. We did -- we left it open-ended in our last submittal with regard to the one component, if

I'm not mistaken?

MR. CONNELL: I'm predicting two weeks from tomorrow. I don't know what I said earlier.

MS. VIETTE: We're just seeing those for the first time. We had not received that April 15th letter.

MR. MOORE: Okay. I couldn't remember. I thought we left it open-ended, and we did. Ed hinted at maybe we're looking at two weeks, and we will send you a submittal outlining our schedule for this additional information.

I would also like to raise before the group an idea. What I would be proposing on this next submittal is to try to separate old from new, and encroach our submittal in the sense that this information completes the request for additional information with regard to the original concerns raised in the allegation, and hopefully, that will be the complete package. And then have a separate series of communication to address these new issues that have been identified in the resolution of those older issues. kind of separate the two areas.

If that's acceptable, we would also propose to do that.

MS. VIETTE: Yes, it is.

MR. WERMIEL: You and I talked about this, Gary, and I don't see a problem with that. I think again, we're

going to have to consider that, but I don't see that that approach causes any difficulty.

MR. BUCKLEY: That's fine.

MR. MOORE: You don't have any problem with that, do you?

MR. LEW: Well, I guess I'd like to get some agreement here about what are the old issues. I think we generally know what those are; and what are the new ones, so that we can at least agree here on what the split is and that that split is adequate with the staff.

MR. MOORE: Let me propose that. That's a good point.

One of the issues being what is -- perform further analysis to determine the worse case condition of component cooling water temperature, due to a new set of signal failures.

MR. BUCKLEY: Are we talking about old now?

MR. MOORE: Yes. These, in my mind, are the issues that comprise old; namely, study the whole area of excess heat loads.

Study the validity of our 200 GPM leak assumption and the pressure boundary question; that's two.

And I would propose to answer the flow question with regard to the old issue as putting forward the certified manufacturers information that were part of the

design; namely, the 18,000 GPM.

New issues being how we're going to address this new information we've gotten from the manufacturer, the 6000 GPM, and the issue of neumatic operated valves.

I think that's it, isn't it, Ed?

MR. BUCKLEY: And the 64 degrees.

MS. VIETTE: The 64 degrees.

MR. MOORE: The 64 degrees would have to be part of the old, right. You've asked for our basis for 64 degrees.

MR. WERMIEL: What's the neumatic valve question?

MR. MOORE: Well, it has to do with -- we're looking at -- there are some neumatic valves that are within the system, that it's not clear today their operation on loss of off-site power, and in terms of how that effects systems flows, and we're looking at that.

MR. CONNELL: We're looking at that, I guess, on a plant basis. We're looking at that on a generic basis throughout the plant. CCW will happen to be one system, so that's involved.

MR. WERMIEL: It has to do with assumed failure mode on loss of air? Is that it?

MR. CONNELL: It's how quickly it gets to the failure mode. How that effects the flow.

MR. WERMIEL: Okay.

MR. CONNELL: I guess that's it. We're not questioning the failure mode itself, but what happens to the flow.

MR. MOORE: Once again, Jerry this is an attempt to put to rest once and for all, any questions that ever could be asked with regard to this system.

As we mentioned to Tom on the phone the other day, we're trying to make sure --

MR. WERMIEL: That's a noble goal.

MR. BUCKLEY: We didn't let you finish, though, Gary. Were you going to say something else?

MR. MOORE: I see that as being the split, and we -- the latter two issues are the same type of thing that we would be finding on any of our work, you know, if you were to come along and a question be raised on a project. I think, in my mind, it's clearly separate.

MR. LEW: I was going to bring up the 64 degrees again, and let me try to clarify the situation.

First of all, setting aside the question of whether 64 degrees is changing our licensing basis or not, I think is probably best left with attorneys who specialize in that type of thing, but as part of our requirements to satisfy Regulation 50/71E, which is the FSAR update, there states -- there are two sentences in there which are particularly relevant. It says -- I'm paraphrasing now --

the emphasis of our update shall contain all changes necessary to reflect information and analysis submitted to the Commission by the licensee.

In addition, it says the FSAR update shall provide all analysis of new safety issues performed by or on the behalf of the licensee at the Commission request.

So, I think it's clear, in terms of being in -- satisfying our regulatory obligations, that the information we're discussing today on CCW, whether or not it is part of our licensing basis, will be included as part of our FSAR update. And in particular, it will be consistent with the form and depth of the FSAR.

I hope that clarifies.

MS. VIETTE: Yes.

MR. LEW: If this is an appropriate time to break, Gary, we've arranged for a buffet across the street, 77 Beale, room 301. I guess they're set-up for noon. Would we propose to be back by 1:00?

MR. WERMIEL: That would be fine.

MR. LEW: What does our agenda look like in the afternoon?

MR. MOORE: I just want to make sure that we have a clear understanding of the information that the staff is looking for on 64 degrees, and I think we've kind of answered the two pump, three pump case, or at least we have

a way of answering that question. Then I would be prepared to answer any further questions the staff might have, after lunch.

MR. CONNELL: You know, Gary, I never got a chance to get my two cents worth in on this 64 degrees.

MR. MOORE: All right. Go ahead.

MR. CONNELL: We'll send the information, but I just want to leave -- I don't want to leave the impression that this is going to be some kind of fantastic gymnastics to support 64. It's clear from the record that this is an appropriate temperature to use, and we'll simply submit to you the record over a number of years where --

MS. VIETTE: That's exactly what we need.

MR. CONNELL: All right. I just want to let you know that what you're getting is going to, you know, it may not be the highest temperature that it's absolutely possible to get out there, but looking at the record, you won't see that temperature out there too often. You won't swim in this water. This is cold water.

MS. VIETTE: That's exactly what we need. We need temperature records at the in-take cove, and this is probably information that you do have available to you just to send in and evaluate the effects of recirculation.

MR. CONNELL: Yes, we have -- there's model studies on recirculation, and there's temperature records on

there, and of course we looked at them before we picked this number up.

MS. VIETTE: This was brought up in the environmental report and in the hearing before.

MR. WERMIEL: I just had a thought. When you supply that curve on the flow for one, two and three pumps, can you also show on that curve the difference with the C-loop not isolated?

MR. MOORE: Just the curves?

MR. WERMIEL: Yes, and appropriate discussion of what difference that makes with respect to flow rate through the system. I understand what difference it makes with heat load.

MR. MOORE: If the staff wouldn't mind, what I would propose we do is to pull that together, put our words together, and then place a conference call with the staff and read to them the description that we're proposing to put in, and make sure that we haven't lost something in the translation.

MR. WERMIEL: That's fine.

MR. MOORE: We'll make sure we do that.

MR. WERMIEL: That also may reflect whatever additional consideration, I guess, was going into this new issue with respect to what does the flow mean, and I will keep that in your new category.

MR. MOORE: What I'm proposing is when we pull this next submittal together, is to place a phone call and discuss it prior to us submitting.

MR. BUCKLEY: Should we break?

MS. VIETTE: Yes.

MR. BUCKLEY: We'll return at 1:00.

(Whereupon, at 11:50 a.m., the meeting was recessed, to reconvene at 1:00 p.m. the same day.)

AFTERNOON SESSION

1:10 p.m.

MS. VIETTE: We're ready to begin now. Were you able to gather some information for us over the lunch hour? Were you able to --

MR. CONNELL: I was trying to get ahold of the instrumentation engineer to talk about Jerry's earlier question. He's meeting with his chief right now. He'll be back -- not on this topic but something else. I don't know when he'll back, whenever he gets out of there, so presumably within an hour or something like that.

If I understood your question correctly, Jerry, you wanted to know that, on these level indicators on the surge tank, notwithstanding that they meet REG Guide 197, you're saying if some seismic event caused them to be inoperable, how would you restore them, is that right?

MR. WERMIEL: Yes, I guess, assuming that when you finish the analysis for the requalification for the C-Loop, you don't need to take credit for operator action performing a safety function. In otherwords, assuring availability of make-up to the surge tank, but that the indications, the level of instrumentation on the tank only has to retain its pressure boundaries.

Eventually, you're going to want to know or want to diagnose the level in the surge tank and how the component

cooling water system is behaving. Can you somehow restore to functionality --

MR. CONNELL: I'm going to have to leave that specific question to him but if I understand correctly, what is there, a sight glass on the tank?

MR. GIFFEN: There's also two sight glasses, one on each side.

MR. WERMIEL: Okay, is that what you think you might do, is just have somebody periodically look at the sight glass, something like that?

MR. CONNELL: Certainly, that's a possibility?

MR. WERMIEL: Okay, that's what I think we would just want to know, I guess as, you know, what means is available for say, keeping track of the surge tank, following an SSE, given that the functional capability of the automatic instrumentation isn't apparent or is not accounted for or is not going to be available. The sight glass I assume would be there because that's part of the pressure boundary. You have to have fluid in it so, I assume it would have to be.

Are there sight glasses going to be qualified?

MR. WARD: Actually, the sight glasses normally, we show it as normally valve --

MR. WERMIEL: Would you then do something to assure that they would be available?

MR. WARD: Well, you'd have to, I mean, if you want to go up there and use it you'd just valve it in when you wanted to use it. Obviously if it were broken or something --

MR. WERMIEL: Oh, you'd just replace it.

MR. WARD: Open the valves up and --

MR. WERMIEL: So you would just replace the glass?

MR. GIFFEN: Yes, the valves are normally shut both of them and it should be the code bound reactor valve.

MR. WERMIEL: Yes, that's correct. It should be. The valve should be qualified.

MR. BUCKLEY: Is there any reason why it is valve qualified? I'm just curious.

MR. GIFFEN: Probably because you can't qualify the glass. That's a guess. I'm not sure.

MR. WERMIEL: I'd be surprised --

MR. GIFFEN: It's a remote sight glass.

MR. WERMIEL: Usually they use plastic now, right?

MR. CONNELL: Of course, on the other hand, all you have to do is turn on your make-up supply. Then you know you've got it.

MR. WERMIEL: Okay well, all right, the automatic level control system will also not be available now, right?

MR. CONNELL: No, we weren't talking automatic now, right? You were saying some long term, right?

MR. WERMIEL: Well, all right, yes, but now, somebody is going to have to keep track of make-up, assuring he has enough make-up, assuring I guess that the tank level is where it's supposed to be. Is there going to be some means and what exactly is it that will utilize it for a longer term.

(Pause.)

MR. CONNELL: There are so many things you can do here in the system. It's hard to answer this question. One thing, you still have your flow indication in the CCW System itself which tells you if you're losing water in the system itself.

MR. WERMIEL: Would there be sufficient time to react to a condition like that, restore additional make up or take whatever action is necessary once you've got that indication?

MR. CONNELL: Certainly it's my judgement but I don't know exactly what the events are you're postulating.

MR. WERMIEL: All I'm really postulating is just a simple case where functionally the instrumentation normally available to the operator that he's used to having is not going to be available following an SSE and for some time he's not going to know readily what's going

and I'm just really asking after some time, what can he do or what would he do with whatever instrumentation is available to assure himself that he has properly operable component cooling water system and I'm thinking mostly from a standpoint of the surge tank since that's the, such a major part of what constitutes a good operation in the component cooling water.

MR. CONNELL: The indication that the system itself is full, is seismically qualified and it's 1-A components, I believe, that is -- I guess that's pressure and flow.

MR. WERMIEL: Off the pump.

MR. CONNELL: Yes. That tells him the system itself is working. You know, beyond that, to keep the surge tank full, if you wanted, as I said, you can always just cut in, you can look on the sight glass, if the sight glass isn't there you can open the valve and see if you've got water in the tank. You can put in your category 1 make up supply.

MR. WERMIEL: What you're saying is, you really feel then that there is sufficient instrumentation available for performing diagnosis in the long term following an SSE?

MR. CONNELL: It sure looks to me --

MR. MOORE: Certainly, Jerry, the sight glass alone

by virtue that it's 1-C has to maintain its integrity so you always have this direct indication.

MR. BUCKLEY: That was slightly different from what I thought I just heard and that is the sight glass may not be there and that's the reason that it's valved out. Now, can someone correct me if I'm wrong?

MR. WERMIEL: No, I think what they said, Bart, was that if it wasn't, they would replace it. They already said that.

MR. BUCKLEY: Well, I didn't hear that part of it.

MR. MOORE: Bart, I would have to go back and look at that drawing that we had this morning, but I believe the 1-C boundary went around the whole gang of instruments. That would tell me that mechanically, if I could use that term, that pressure boundary has been maintained.

MR. BUCKLEY: I thought I heard a different response a few moments ago. I asked the question, why was it valved out? The valves are shown as closed and the response I thought I heard was that the gauge glass may not be --

MR. GIFFEN: Yes, it was may not, did not say yes or no, felt that maybe the reason that it's valved out is because it may not be and I did not know the

qualification of the sight glass, per se.

MR. BUCKLEY: And the latest information on the drawing indicates that that whole little rectangle, the transmitter level indicator and the level of signal are all class 1-C and are seismically qualified?

MR. MOORE: Qualified to maintain pressure boundary.

MR. BUCKLEY: Right.

MR. MOORE: That's what I believe. Do we still have those drawings there?

MR. BUCKLEY: Yes, that's what I understand.

MR. MOORE: Is there something else shown on those drawings?

MR. CONNELL: No, Gary.

(Pause.)

MR. MOORE: I stand corrected, Bart. The sight glass is -- I stand corrected. The sight glass is Class 2. So it's valved out because it isn't seismically qualified so I stand corrected. I was in error.

MR. WERMIEL: So in order to use it you'd have to replace it again, is that what you're saying?

MR. MOORE: If it fails.

MR. CONNELL: Well, obviously if the sight glass failed and you opened that valve, you would know wnether the tank was full or not. You may not know the level but

you know --

MR. BUCKLEY: That it's a low level.

MR. CONNELL: Right.

MR. BUCKELY: I would presume, would it be correct to say that if there was a leak, that a chap was going out to check to see if the gauge glass is working, that he would also detect a leak? Is there any -- I mean, would he just go up to the surge tank and see if the, opens up the valve to see if water comes out, he only knows at that point in time that the tank is full, right? Are there any procedures for him to inspect around it?

MR. GIFFEN: If you're losing level in the system without being able to say what the procedure is -- that stands like good operating practice that if you're losing water, that the supervisor is going to send the operator out to find out why so he can isolate that component and continue saving the water.

MR. CONNELL: To go back to that procedure we talked about this morning, the procedure does say that when you've lost, I don't know if it's pressure or flow in the system itself that you cut in, that you bring in your back up.

MR. GIFFEN: Yes, it says that.

MR. CONNELL: Could you put it in your category on make-up?

MR. GIFFEN: If you're losing for whatever reason water or pressure, then you check and assure that the automatic actions have taken place -- if they have not, then you go and use the manual actions which would be to cut in the seismically qualified back up, make-up water supply.

MR. CONNELL: So the procedure does in fact cover this?

MR. GIFFEN: Yes.

MR. CONNELL: Jerry, we had something that we were thinking might have been said this morning. We're not sure it is but we want to clear up the record if it needs to be and that is on how many pumps are operating during normal operations.

MR. GIFFEN: It seems like you said one component cooling water pump is running.

MR. WERMIEL: I think that's what the FSAR says.

MR. GIFFEN: Well, operating procedure says that two will normally be running and one pump an automatic standy-by.

MR. WERMIEL: I see. Because I think that the FSAR says one is normally operating, as I understand it. So you're saying two will normally be operating with one on automatic stand-by?

MR. GIFFEN: Correct.

MR. WERMIEL: That's difficult to meet based on the current tech specs which allow one to be down indefinitely, right?

MR. GIFFEN: Well, it's three pumps.

MR. WERMIEL: Right, but if one is down indefinitely then you don't have one on automatic stand-by.

MR. GIFFEN: The procedure says, I believe, I don't have it in front of me but it says, in the normal operations, two component cooling water pumps will be running and the third a stand-by.

MR. FRIEND: You guys better back up and clarify that. You've got -- apparently we have contradictory statements.

MR. WERMIEL: I've got the FSAR section here. Let me point out where I thought where I saw the words.

MR. FRIEND: I'm not saying that you're incorrect but if you're correct you need to modify the FSAR.

MR. MOORE: You're not looking at the note on table 92-7, are you?

MR. WERMIEL: I don't recall, Gary. Let me take a look. Yes, on page 9.2-8(d), item 1 at the bottom of the page, normal operation. "During normal operation, all loops are in operation. One or two component cooling water pumps and one component cooling water heat exchanger are in use and are capable of serving all operating

components." Are we now saying it should just say two?

MR. GIFFEN: No, no. It says during normal operation, we normally run with two but that does not prohibit us then from running one.

MR. FRIEND: You were just clarifying what you would normally be doing in the normal configuration of a plant.

MR. GIFFEN: Yes.

MR. MOORE: Jerry, I think as we talked about it this morning, the tech spec will let you operate indefinitely with one of the three pumps out of service, the design basis being two, the second pump being -- is there to provide redundancy. The system only needs one pump to operate correctly. I believe that's a correct statement.

There is a preference to have more than one piece of equipment in service at the same time because it helps you on cool down rates, I believe, but only in the sense of how long it takes you. It's not a required type of situation. I think that we're not in conflict. I think one is a clarification of the other or how the operating department actually shows to implement this licensing basis.

MR. BUCKLEY: Let me ask you one question about that. When you say one or two component cooling water

pumps are running during normal operation, normal operation could be during shut down where you might require two pumps whereas, at full power you may only require one pump. Is that a --

MR. MOORE: I believe you only are required to have one pump --

MR. WARD: Yes, I mean, it's desirable during shut down to have two pumps. However, you can cool the plant down and like Gary says, it takes longer but you can cool the plant down with one pump.

MR. BUCKLEY: Let me ask you again. Are there two pumps running during normal full power operation?

MR. GIFFEN: Yes, normally. The tech specs, I believe says that's a two operable train of vital equipment. The technical specifications say that you will have two trains operable.

MR. BUCKLEY: Are you reading into that then, that both pumps are running because I could read --

MR. GIFFEN: Available. I believe operable, the definition is that it must be available.

(Pause.)

MR. WERMIEL: I have nothing else.

MS. VIETTE: Gary, do you have a person here from hydraulogy that --

MR. MOORE: Well, he's not from hydraulogy but I

wanted to make sure that everyone was clear on what it was that we were going to supply the staff that was the basis for our 64° temperature assumption and maybe Ed can propose what he thinks is needed and Gary, I think the data is probably going to come out of your work or in your area so I wanted you here to hear this, so Ed, why don't you go ahead and describe what you're posing to send in.

MR. CONNELL: We have a record that indicates temperatures being taken in the cove as well as a nearby area over some period of years and we're simply going to send you that record that gives you temperatures versus how often they're sampled and up until after the FSAR was submitted, no temperature ever recorded was a size 64°. After that there's one excursion where they get up to a couple of degrees higher than that when there were some Ecuadorian currents came North for whatever reason and we're going to describe that to you in the duration and also a description of the location of the census and the fact that some of the census's were measured via surface water so it was higher than, presumably higher than what you'll see.

MS. VIETTE: Will you also be taking into effect an analysis or sending in an analysis on recirculation effects?

MR. CONNELL: I think, Gary, maybe you should say something but we had some early model studies over at Berkeley where we did, as you probably know the in-take/ discharge structures are relatively well separated and there has been some model studies on that that show there's insignificant mixing. Maybe you can say something a little more, Gary.

MR. TIDRICK: Yes, there's two different patterns to the ocean currents. During part of the year there's ocean currents that move from South to North so they move in the direction from in-take to discharge. Those are during the warmer water months. And during the colder water months, they're moving the other way so you could have waters that could move from the discharge in the direction of the in-take. The NPDES hearings that we had about a year ago, we had the person that operates the model and was responsible for the design of that answering questions about recirculation for the regional water quality control board. His judgement was that during the time when there was some possibility of recirculation, that it would be a very minor effect and might result in some increase over non-recirculation and maybe a fraction of a degree but as I said, that's during the cold water months. During the warm water months when we're talking about temperatures in the low sixties or

something like that, there's no recirculation so if you take that basis, the most conservative you don't need to consider recirculation.

MS. VIETTE: Okay, all right. But we would like you to send that in, exactly stating that.

MR. MOORE: Ed, just to make sure. You mentioned this record. Is this data that was collected as part of some program? Can we identify the data a little more precisely than taken for the record?

MR. CONNELL: Sure. Chris, you want to?

MR. WARD: Some of the data will be from environmental reports, which the DER, Department of Engineering and Research for PG&E has put together. I did talk to those people yesterday and I don't know if I can tell you exactly what document that data comes in, however, they do present this document to whoever state regulatory boards they report to on water temperatures in the Diablo Canyon area and they do have data from a number of different stations including the station that we are using to represent in-take water temperatures.

MR. MOORE: So it's data taken as part of our environmental impact program that's an ongoing monitoring program?

MR. WARD: Yes, it's an on-going monitoring program and we'll be monitoring it through the life of the

plant. I'm sorry, I can't give you the exact title of this document but it's all document.

MS. VIETTE: That's fine.

MR. BUCKLEY: Do you plan on extracting some of that data and attaching it as an appendix?

MR. WARD: If you wanted to we could do that.

MR. BUCKLEY: I think that would be --

MR. CONNELL: Attached to what?

MR. WARD: To this letter we're sending.

MR. CONNELL: To the letter.

MS. VIETTE: Right.

MR. MOORE: And we'll reference the document that it came out of.

MR. CONNELL: We have one other thing.

MR. WERMIEL: Yes, you were going to look back I think on some of the pre-op test data and information.

MR. CONNELL: I guess we have two other things. That wasn't the one I had in mind.

MR. WERMIEL: I remember, Gary, you said you might be able to find something.

MR. MOORE: We'll have to ask --

MR. TIDRICK: I talked to the resident start up engineer just after lunch and they went back and checked the records. The testing of the CCW system, they didn't test it in the mode of operation of three pumps running.

However, in the testing of the safety injection system they did have the three pumps running in that case, the difference being they weren't fully instrumented to measure operating pressures and flow rates for the safety -- the CCW System for the safety injection test but they did verify that it was lined up so that all of the flow was through one heat exchanger and that three CCW pumps were running which is the case we're talking about. We didn't have any major time duration of the operation but probably they would have been something like five or ten minutes. That was just his estimate. It was done probably four or five years ago, would be my estimate.

MR. WERMIEL: And as far as you know, none of that was by any chance done with the C-Loop not isolated?

MR. TIDRICK: He would have the conditions under which it was run, all the valve alignments. I imagine it was isolated but I'm just wondering.

MR. MOORE: Why don't we go ahead and get the copy of that report and summarize the start up procedure as it was run and explain the tested conditions that we're aware of and their durations and things like that as a demonstration that the design has been operated in some of these configurations.

MR. WERMIEL: I think that would be useful, at least to know what was done.

MR. WARD: My question is, what are we looking for when we tell you that. Are we looking for just the max flow through the heat exchanger?

MR. WERMIEL: This is going back I guess again to the question of the design basis for the flow through the system. In what way did you assure yourself that the flow rate that you will actually see following the safety injection signal is that which the heat exchangers have been qualified or verified to accept functionally.

MR. WARD: So you're talking about all the heat exchangers in the system or basically the CCW heat exchanger?

MR. WERMIEL: We're talking about the CCW heat exchanger and the remaining ones in the system. Primarily I'm concerned I guess with the CCW heat exchanger but I think we also need to know about the others and of course, if I take a single failure that will include those on the CD, which should be isolated but which may not be.

MR. MOORE: Chris, I think the other component as far as Conne answered in two pieces the way I see it, the start up test is one demonstration of that and --

MR. WERMIEL: Plus whatever comes out of this.

MR. MOORE: Right.

MR. WERMIEL: That's right. That is an additional piece of information that you'll be supplying as I understand it with hopefully supporting engineering discussion.

(Pause.)

MS. VIETTE: And did you say there was one more thing?

MR. CONNELL: Let me say it differently. There's at least one more thing. We talked about -- we've got our instrumentation engineer here, Tom Crawford and perhaps you could, although I think I've told Tom the question, maybe you could restate it one more time and let him have a try at it.

MR. WERMIEL: Okay, I guess this goes back to the original assumption that assuming that in the end product of the result of the requalification of the equipment in the component cooling water system, assures you that you will get no leakage from the system following an SSE and therefore the 1-C classification for the surge tank instrumentation does not change. Following an SSE, it's pressure boundary may be maintained but the functionality of it will not be and I'm just asking the question, what does the operator have to assure himself that the component cooling water system is still functioning

satisfactorily following an SSE even though he doesn't need to take any immediate actions to do anything, he's still going to want to know in the long term that a surge tank is doing okay and the normal means of providing him that information is not available.

MR. CRAWFORD: Okay, first off, we have all of the instrumentation which meets the requirements for Regulatory Guide 1.97 for monitoring the functionality of the system and by that, we monitor the flow and the temperature. Monitoring the surge tank level doesn't tell you anything about the functionality of the system. It tells you about whether it is on a trend that will allow it to continue to be functional. In otherwords, you lose the level in the surge tank, the system still works up until some point you continue to lose level until you no longer have it. The regulatory requirement is to monitor the operability of the system, not the potential of the failure of the system. We have the capability with qualified equipment which meets all of the regulatory requirements to monitor the functionality of the system. What, in actually by the design of the equipment we also have the capability although not classified as such because of the regulatory classification to monitor the surge tank also but in terms of the classification point of view and what we consider maintained

official qualifications of that equipment, there's no requirement to monitor the surge tank level. That just tells you about the potential for the loss of the system. It does not monitor the condition of the system itself.

MR. WERMIEL: Let me ask you the second question. If that instrumentation which is qualified, the flow indication, the pressure indication, that type of thing, does tell you you're starting to have a problem, do you have sufficient time to take appropriate action?

MR. CRAWFORD: It depends obviously to the extent of the problem. If one has got an integral system, the design of the system is such that one has long term single passing failure proof system that is isolated so the design basis of this system is such that once they're isolated like that, you can lose one train.

MR. MOORE: This is the ability and I believe we described this operational line up and how the system accomodates long term passing failures is by dividing loop A from loop B which makes it in all respects a completely redundant system and I believe that's what Tom is referring to.

MR. CRAWFORD: Yes, that's exactly what I'm saying.

MR. MOORE: Including the make up system -- if that surge tank, although it looks calm and it is separate.

MR. WERMIEL: I don't have anything else on that. Do you have anything else?

MR. CONNELL: No, I don't/

MR. WERMIEL: I don't either.

MR. CONNELL: I'd just like to say maybe in closing that I think we've answered all of your questions except for a couple we've taken home with us but maybe our art of letter writing may not be all it is. It ought to be. I would just like to say if you've got any questions technically about what we're doing, please call us. We welcome any working level meetings and we welcome phone discussions and I want to let you know day to day what I'm doing if you're interested.

MR. WERMIEL: We appreciate that.

MS. VIETTE: Yes, we appreciate that.

I guess if we don't have anything, do you feel that it's necessary to summarize the --

MR. WERMIEL: I think Barclay answered in the affirmative.

MS. VIETTE: Okay, do you want to go --

MR. BUCKLEY: Do you want to start it or --

MS. VIETTE: Why don't you start with what we need as far as technically --

MR. WERMIEL: As I see it?

MS. VIETTE: Yes.

MR. WERMIEL: Okay, eventually you will be submitting the final results of the seismic requalification that is currently under way with any necessary and appropriate commitments to upgrade the surge tank level instrumentation depending on what the results of that requalification come up with.

Item 2, you will be submitting the system and pump curves for 1, 2, and 3 component cooling water pump operation with both the C-Loop isolated and not isolated and appropriate discussion identifying the effects of the flow rates on the system and component performance and I think you were going to include with that some of the information that you've been able to gather relative to the pre-op testing that was done.

Item 3, you will be submitting a letter with appropriate data and supporting justification regarding the 64° ocean water temperature assumed in the heat transfer analysis for the component cooling water system.

MR. BUCKLEY: Are we going too fast?

MR. WERMIEL: Are we?

MR. BUCKLEY: I don't know. I wasn't able to keep up with you.

MR. WERMIEL: And that's all I have in the way of action items.

MR. MOORE: The only thing that I would add to

that, Jerry, is that probably the first thing that we owe you is the schedule in which we're going to provide that information would be the other item that I picked up.

MR. WERMIEL: And I also believe with that you were going to propose your new versus old item identification skills.

MR. MOORE: I thought that when we submitted the information, as we closed basically the whole subject area of the allegation, we'd make a statement that we felt that that issue had been addressed and we felt that it would be closed and then glued to these new areas versus putting it in the schedule letter. That's the only point that I wanted to make a difference on.

MR. BUCKLEY: Jerry, I thought you mentioned pre-ops there. I wasn't sure what you meant. You want the results of --

MR. WERMIEL: Summary and results of what information they do have on the pre-op testing that was done that relates to the concerns that were identified.

MR. MOORE: We've run a series of tests both flushing tests and start up tests for this system and this system in conjunction with testing of other safety systems and we can -- we'll summarize and describe those tests as further evidence of the system and it's proper operation, you know, with the three pump situation and

some of these high flow situations.

MR. BUCKLEY: I presume one of the component cooling water pumps is running right now. Would that be correct?

MR. WARD: That's probably correct. They generally run a pump down there.

MR. BUCKLEY: No, I mean normally just --

MR. WARD: No, I don't know if there's a reason or not but you know. They're generally running a pump.

MR. BUCKLEY: There's no plant equipment like air-conditioning, this isn't required for air-conditioning or control room cooling or anything?

MR. WARD: No.

MR. CONNELL: In the number of times I've been there, a lot of times its running and a lot of times it isn't. Sometimes it isn't.

MR. WERMIEL: Howard, you came at a good time. I think the meeting is --

MS. VIETTE: I think we're about ready to close here unless anybody has any more comments.

MR. MOORE: Just from the project standpoint I'd like to thank you for coming out and I will second Ed's statement that if at any time you have some questions or confusion in your mind whether it be technical or from the project side of the house, please give us a call.

We'll try to address it. Hopefully the other thing that you've kind of seen here that in the attempt of trying to answer all possible questions which is our goal here we have gotten into some areas that we had originally not anticipated and we hope you now better understand why it's taking us a little bit longer than we initially estimated.

MR. BUCKLEY: I would suggest that if you are going to communicate with the Staff, I would appreciate it going through Barclay so that we have a common path.

MR. MOORE: That's how we handle all communications with the Staff.

MR. BUCKLEY: Thank you. Howard, do you --

MR. FRIEND: I guess I want to comment that we were surprised you decided to transcribe this meeting. The evidence that earlier this morning, I'm not going to reiterate it, our fellows get a little inhibited and I hope you were able to get what you wanted inspite of their inhibitions as a result of this. We might have planned our presentations a little differently and so forth had we known and I hope you have gotten everything that you need and I want to reiterate what Gary said. If you haven't, please call, write, phone, send us a telegram, whatever. We want to answer your questions so that you gain the confidence you need in the system. That's

all I have.

MS. VIETTE: Okay, I think we're all set. Thank you very much.

(Whereupon, at 1:45 p.m., the meeting was adjourned.)

CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the NRC COMMISSION

In the matter of: Diablo Canyon Public Meeting

Date of Proceeding: April 19, 1983

Place of Proceeding: San Francisco, California

were held as herein appears, and that this is the original transcript for the file of the Commission.

Margaret Miller
Official Reporter - Typed

Margaret Miller RES
Official Reporter - Signature