UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of:

MEETING: NRC & TVA
re: 10 C.F.R. Part 50,
Appendix R Issues

Pages: 1 through 120

Place: Rockville, Maryland

Date: March 9, 1988

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Appendix R Issues

Wednesday,
March 9, 1988

Room 8-B-11
11555 Rockville Pike
Rockville, Maryland

The above-entitled matter came on for hearing, pursuant to notice.

MEETING ATTENDANCE:

From the NRC:

T.P. Gwynn
C.L. Miller
George Hubbard
David Notley
Dennis Kubicki
B.D. Liaw
E.C. Marinos
Charles Ader
George Felgate
E.C. Gilbert
C.E. Mullins
S.D. Ebneter
Pete Hearn
Jack Scarborough
Steven West
R. Aulnek
Steven Richardson
Rex G. Wescott
Robert C. Pierson
Thomas S. Rotella
Barry Zalaman
Hukam Gary
Jane Axelrad

MEETING ATTENDANCE (Continued):

From TVA:

R.P.Levi
N.D. Black
R. Gridley
R.W. Bass
R.J. Hansen
H. George
T.A. Keys
Nick Fioravante
Robert C. Williams
Jimmy J. Pierce
Edward A. Connell
R.H. Bryan
James T. Springfield
P.J. Polk
C.H. Fox
John Hosmer
John Henry Sullivan
Frank A. Koontz, Jr.

From Knoxville News-Sentinel:

Richard Powelson

From Bishop, Cook:

Dan Stenger

From Impell:

Steven Whitsert

From House Interior Committee:

Richard H. King

Others:

Andrew Bartlik
Lynne Bernabei
M. McGarry
Kevin Elle

PROCEEDINGS

MR. RICHARDSON: Good afternoon, I apologize for the crowded conditions of the meeting room here.

This is a meeting between the NRC and TVA to discuss various issues related to fire protection compliance at the Sequoyah facility. It is a public meeting. A transcript is being taken. I would ask that speakers other than those at the table when you speak or give a comment give a name and get close to a microphone so the conversation can be picked up and transcribed.

There is an agenda for the meeting that has been put together which lists the various technical issues that the staff feels there are still some questions on. The protocol of the meeting is that the staff is going to go through the TVA responses, each of the individual 26 questions that were sent out on February 26th and the answers to those. We are going to go through those in sequential order. There will be a frequent break periodically for members of the public to interact with the staff, any additional questions that they think need to be answered. At the end of the technical discussion there will be a 20 minute period that members of the public will be able to address various concerns for the record.

Any additional comments or questions we need t cover?

MR. ROTELLA: There is attendance list going around.

MR. RICHARDSON: There is an attendance list coming around and everybody needs to sign that.

With that, I'd like the members at the table to introduce themselves.

MS. AXELROD: He essentially just laid out the ground rules with regard to public participation, that this is a meeting between the staff and TVA. Members of the public will have an opportunity, a 20 minute period at the end of the meeting to voice their comments or questions. Questions should be directed to the staff.

MR. RICHARDSON: I'd like to take a minute and go around the room and introduce everybody. I am Steve Richardson, Director of the TVA Project Division.

MR. WESCOTT: I'm Rex Wescott, Office of Special Projects.

MR. PIERSON: I'm Bob Pierson, Plant Systems Branch Chief.

MS. HANSEN: Rebecca Hansen, TVA Manager Staff.

MR. FOX: Charles Fox, TVA Office of Nuclear Power.

MR. HOSMER: I'm John Hosmer, Project Engineer, TVA Sequoyah.

MS. AXELROD: Jane Axelrod, Deputy Director, Office of Special Projects.

MR. GARG: -- Garg, Office of the Special Project.

MR. ROTELLA: Tom Rotella, Sequoyah Project Manager for Unit 2.

MR. MARINOS: Angelo Marinos, Chief of Reactor Operations Branch, TVA Projects.

(Whereupon, others in the room gave their name and affiliation)

MR. RICHARDSON: Thank you. I'd like to turn the meeting over to Bob Pierson who will start through the questions and TVA responses.

MR. PIERSON: The agenda we would like to follow today is to work through question by question the request for additional information which we sent to TVA on February 26, 1988. TVA replied on March 2nd. It is not my intention to cover every question, but only those questions which the staff has questions about.

What I would like to do is start with number one, which discussed providing calculations for the reactor coolant system, water and containment. I don't want to discuss that question now. I want to come back to it later, depending on what your answers are to subsequent questions.

Question number two, which is the question concerning the task group's conclusion of boiling of the spent fuel pool is not a technical concern. I don't have any questions for that.

Mr. Wescott, do you have any questions concerning this issue?

(No response.)

MR. PIERSON: The next question is question number three. Question number three concerns procedure review. And again, I don't have any questions for that. I would like for you to understand that we are reserving the right to come back to some of these questions because it really depends on subsequent answers.

The first question I would like to discuss in detail is question number four, which describes the standard operating instruction 26.3, revision one, and provides adequate boron concentration for cold shutdown condition after a worst case appendix R fire.

Our ledger talked about a concept called pressurizer level fluctuation as a methodology for depressurizing. TVA replied in their response that pressurizer level fluctuation was not used in SOI 26.3 Region 1. However, the response that I am looking for more than that is do you use a concept of pressurizer level fluctuation? Is there such a concept? What is it? Do you use it in your procedures?

Who in TVA addresses question number four?

MR. FOX: Our speaker on that question is John Henry Sullivan. John Henry is the Supervisor of the Plant

Operations Review Staff at Sequoyah. He is our former Appendix R project manager at Sequoyah also.

MR. PIERSON: The first thing is this concept of pressurizer level fluctuation. Then how does that work, and how do you accomplish the depressurization sequence to get on RHR?

The point that we're trying to bring out here is that you need to have your Appendix R protected depressurization mechanism. I am not quite sure by your answer that that is addressed.

MR. SULLIVAN: To directly address the question on pressurizer level fluctuations, it is not taken credit for in any of the procedures or analysis for depressurization of the RCS.

MR. PIERSON: What does that mean?

MR. SULLIVAN: I am assuming what is meant by pressurizer level fluctuations is you somehow try to cool the vapor space in the pressurizer to decrease pressure.

MR. PIERSON: But you don't use that as a depressurization method?

MR. SULLIVAN: That is not a proceduralized method and there is no credit taken for that.

MR. PIERSON: Do you take credit for one trail of RHR to cool the plant to less than 200 degrees fahrenheit?

MR. SULLIVAN: Yes.

MR. PIERSON: Your response indicates that you've requested an update on an analysis that Westinghouse performed on July 21, 1975, and you will provide those results as soon as possible. Could you discuss why you feel it's appropriate to use one train of RHR cooldown if you don't, what information do you use to substantiate that? Why do you think it's a viable method of cooldown? What I'm reading here says to me that it doesn't look like you have an analysis to support that.

MR. PIERSON: We do have an analysis from Westinghouse that supports shutdown in the plant, cold shutdown using one train. If you back up into the old single failure criteria and get out of the R space, you're guaranteed to be able to shut the plant down with one train of RHR. It just takes a little longer than the normal two trains do.

We have an updated Westinghouse analysis which I believe has been supplied to you. I don't know if you received it and had a chance to review it.

MR. FOX: TVA provided at your request a list of all pertinent documents and calculations and so on that were germane to this issue that were referenced in our response. You should have gotten that earlier this week.

MR. PIERSON: We got two binders this morning and we got some last week. We haven't completed our review of

that.

MR. FOX: John Henry, why don't you give them the reference. It is in your package. I'll confirm that.

MR. ROTELLA: That's the March 8th submittal or the earlier submittal?

MR. FOX: There were three submittals. I think this package should have come to you yesterday.

MR. PIERSON: It was delivered this morning. We have just completed a preliminary review of the package delivered this morning.

MR. SULLIVAN: There is a Westinghouse letter to TVA dated March 4th, TVA-88-561, and it deals with the one RHR pump to two RCS co-legs at a tech spec minimum required flow rate of 2500 GPM and gives us performance curves on RHR cooldown to cold shutdown.

MR. PIERSON: The last statement in the response on the March 2nd says that pressurizer heaters, auxiliary spray, and normal spray are not required to support safe shutdown. Could you describe how you accomplish safe shutdown without pressurizer heaters, auxiliary spray, and normal spray?

MR. SULLIVAN: Pressurizer heaters is really addressed in a different question. Basically there is, who has the question on pressurizer heaters?

MR. PIERSON: The question is an operational concern. You have the statement, pressurizer heaters,

auxiliary spray, and normal spray are not required to support safe shutdown, so presumably you have some shutdown scenario whereby you can accomplish it without those three items, and I would just be interested in your discussing that.

MR. SULLIVAN: The safe shutdown logic does not require pressurizer heaters. It was in the original analysis and there were I believe three locations, two locations, where you lost pressurizer heaters. We based our response to the question I believe in the Task Force Resolution Report that loss of the pressurizer heaters does not mean you have lost your bubble. You still have a bubble in the top of the pressurizer. There are special tests that were run during the startup phase of Sequoyah. There are other St. Lucie vents that Westinghouse Owners Group I believe has documented that shows the relationship, RCS pressure and decay of pressure versus time and loss of heaters.

MR. PIERSON: That assumes that you don't have a spurious actuation of the pressurizer port, is that correct?

MR. SULLIVAN: Yes. I think all the analysis did not assume any sort of transient going on at the same time.

MR. PIERSON: I'd like to have it noted, we'll have to come back to that because we do have some questions concerning spurious actuation of your pressurizer port which may impact on the response that you gave to question number four.

Does anyone from the staff have anything to say?

MR. MARINOS: I have a question, clarification on these three items. You said you don't need the heaters, you don't need the emergency spray, and you don't need the normal spray for the pressurizer. How do you maintain pressure control? The pressurizer is not utilized at all for pressure control?

MR. SULLIVAN: Yes. The vapor space in the pressurizer is still utilized for pressure control. It has a certain amount of internal energy and will be there for a certain finite period of time.

MR. MARINOS: But you are using no sprays and no heaters to maintain that control. How are you going to do that? Are you going to pop the PORV?

MR. SULLIVAN: We prefer not to pop PORVs, safety valves, or do anything like that to challenge the system. Charging pumps are used for charging. The steam is steam from the generator to maintain a certain cooldown rate. Without going into a lot of detail on it, you make up to the plant, you maintain your pressurizer levels, you can bring the pressurizer level up to help collapse, help compress your bubble a little bit more. I think it was something like a ten percent increase in level gave you 100 PSI. Don't quote me on that one but I believe that is about a correlation where you can increase the level to help get pressure back up

should you lose pressure. That was all documented in our resolution of the issue of the interactions where we lost pressurizer heaters.

MR. ROTELLA: In other words, you use CBCS?

MR. SULLIVAN: Yes. Charging pumps.

MR. ROTELLA: Charging pumps and letdown.

MR. MARINOS: It is not clear to me how you are going to maintain the bubble in the pressurizer without any of the control systems associated with the pressurizer.

MR. ROTELLA: What he is saying is he's going to lower the level by increasing letdown.

MR. SULLIVAN: We'll lower level by cooling the plant down and shrinking the plant. Adding water through a CBCS.

MR. BARTLIK: You mean not using letdown, just to correct that statement.

MR. ROTELLA: You mean it's not necessary to use letdown.

MR. BARTLIK: I didn't say that.

MR. PIERSON: One point here. The staff is allowed to ask the questions. We are not set up to allow the public to address questions. The public can address questions of the staff at the intermissions or following the meeting. We will address them at that point.

The next question is question number five, and the

question, to paraphrase, asks you about taking credit for pneumatic systems for control during Appendix R events. You reply that you don't take credit for pneumatic systems except for one key. We asked for clarification on that and you stated that you took manual control of some HVAC dampers.

My question with respect to that is, if you're taking manual control of these HVAC dampers, are they covered in procedures, are they accessible?

MR. FOX: Bob Bryan is the Staff Specialist, Accident Evaluation as it deals with containment systems in the Nuclear Technology Branch, in the Division of Nuclear Engineering.

MR. BRYAN: The answer is yes, specifically in our procedure SOI 26.2. These dampers are provided and discussed and the operator is informed that if he loses automatic control of them he can go out and manually take control of them.

MR. PIERSON: And you substantiated that as opposed to some plants I've seen that they are in fact accessible and he doesn't have to carry a step ladder with him?

MR. SULLIVAN: The main control room HVAC dampers are all located in the mechanical equipment room adjacent to the control room and they are accessible.

MR. PIERSON: Thank you.

To continue on with question five, this touches on

another issue. You stated that a preliminary separation analysis on Unit 2 indicates that either a head vent or pressurizer port letdown path is available for all scenarios that may require water solid operations.

We have done a preliminary review of the submittal this morning and we are going to take some issue with that statement. I'll be coming back to that later.

But the question I have with respect to this, is TVA taking credit for using pressurizer 4 where a reactor event, as a means of recovering from an Appendix R event?

MR. RYAN: At the current time, no.

MR. PIERSON: The answer to that question is no?

MR. RYAN: That is correct.

MR. PIERSON: Thank you.

Then I think we can go on to question six. I have some subsequent questions with respect to that answer.

Does anybody on the staff have a question about number five?

MR. HUBBARD: George Hubbard, OSP. I guess if that preliminary separation analysis you are not taking credit for then, we wouldn't be expecting to see a final analysis on that?

MR. RYAN: Not at the present time, no.

MR. PIERSON: Okay, we'll move on to question six. Question number six concerned why the primary plant will not

lose a pressurizer bubble in a fire scenario such that 19 hours is the conservative value for requiring the availability of RHR.

We in the staff have discussed this, and we understand how you came up with 19 hours and why you consider it a conservative value. We don't have any argument with that per se. But we do question whether you will be able to maintain primary plant pressure in light of the fact that it's not clear to us that the pressurizer PORVs are protected. I don't need to address it under this question because it's going to be addressed in other questions later, but we do have some questions concerning whether you are going to end up in a solid plant condition and what you're going to do, and why you can take 19 hours credit for that.

So with respect to that I'd like to move on to number seven.

Number seven, TVA states that, we asked TVA to provide justification for repair times of flow control valve 74-1 and 74-2. Those are the series valves for your RHR. We asked why these valves are considered operable for fires inside containment, and TVA replied they consider them operable because they can utilize 72 hours to go in and repair these valves.

I don't have a question per se based on that, however, I do have a concern that if you stated earlier you

didn't use the pressurizer PORVs or the reactor head vent valves as a cooldown mechanism, which seems to me contradictory to some of the replies you made later. Maybe they were questions that you used that as a possible means but you didn't take credit for it. But if you do use reactor head vents or pressurizer PORVs and you do end up in a situation where you are blowing down RCS into the containment, we are concerned as to how you could access the containment. What calculations are used to justify that the containment is accessible to repair, among other things, these valves, or else show to us that these valves, it's not credible to have a fire in those areas where you could have a blowdown, say if a pressurize PORV reactor head vent valve, and as such the one event excludes the possibility of the other.

It's not clear to me, going back to your first question, as to how you could justify access to the containment if you took credit for that. Since you didn't take credit for it I'll move on, but I think there are other statements where it implies to me, at any rate, that you did take credit for it.

MR. ROTELLA: During a phone call a couple of days ago, we had understood TVA Licensing and Engineering to tell us that indeed you do protect PORVs and block valves. You separate where necessary, you wrap where necessary. Why

would you do that if you don't need them for fire? Why isn't that inconsistent with the submittal we got today?

MR. FOX: I'm not sure what the conversation was. Who was the conversation with, Tom?

MR. ROTELLA. Licensing was Mark Burzynski, and Engineering was, was it Frank?

MR. KOONTZ: This is Frank Koontz. I think I can address that.

MR. FOX: Frank Koontz is our Assistant Branch Chief in Nuclear Technology Branch. He's also our Safe Shutdown Specialist.

MR. KOONTZ: We were doing a preliminary analysis to see if we did have the availability of the reactor head vents or the pressurizer PORVs. That analysis at the time we were discussing it was still in its preliminary stage and it was being finalized. Since that time the analysis has been finalized and it's been documented. We do not have a problem that I'm aware of, providing that analysis to the staff if they would like to review it. However, our position today is we still do not take credit for the use of the head vents or the PORVs to cool down the plant. I need to emphasize that.

MR. ROTELLA: Is that a change in the design basis then?

MR. KOONTZ: No, we did not credit the use of the head vents or the PORVs before.

MR. ROTELLA: So Rev 6 of the calculation doesn't have PORVs?

MR. KOONTZ: Right.

MR. ROTELLA: Rev 8 does not either?

MR. KOONTZ: That's correct. It does not.

MR. PIERSON: If I could interject, Jane Axelrod has come up with a very good suggestion. She says we have a bigger room. I want to break and move. I suggest that's a good idea. The question is, where is the room.

(Whereupon, a brief recess is taken)

MR. PIERSON: The meeting will continue.

We were on question seven and I'd like to continue with question seven.

We were discussing the RHR valves, FCV 74-1 and 74-2, and their accessibility with respect to a fire inside containment.

The question I have is are the RHR valves protected? Are they considered Appendix R equipment? Do they have separation, a one hour barrier, detectors, or whatever?

MR. SULLIVAN: Please ask your questions one at a time.

MR. PIERSON: Are the RHR valves Appendix R protected equipment? That's 74-1 and 74-2?

MR. SULLIVAN: Yes. They are cold shutdown

required equipment.

MR. PIERSON: How is that Appendix R protection provided?

MR. SULLIVAN: It's provided by using the 3G requirements for cold shutdown. Basically for a fire outside containment we have a couching procedure that will repair the valve and can get 74-1 and 74-2 open without entering containment.

For a fire inside containment there is no significant fire loading around the valves. One of the valves is located in accumulator room four, and one is under steam generator four. Fire hazard analysis has been done. So a fire inside containment will not damage the valve unless the fire is in the valve or the control circuitry to the valve, in which case that fire will be limited to within that valve and will not damage other equipment. Containment access, normal letdown, everything else would be available. No spurious PORV or head vent operation is considered.

The conclusion is cold shutdown is achievable for our shutdown logic with those valves protected the way we have.

MR. PIERSON: So you base that on a fire hazards analysis then?

MR. SULLIVAN: Yes sir.

MR. PIERSON: We have that fire hazards analysis?

MR. SULLIVAN: Yes sir. I should also point out that the valves, there was I believe a question at one point on the EQ qualification of these valves.

MR. PIERSON: Yes.

MR. SULLIVAN: The valves are qualified on a temperature profile that peaks at about 300 and then maintains about 200 for 30 days.

MR. PIERSON: So the valves are essentially qualified for end containment local conditions?

MR. SULLIVAN: Yes.

MR. PIERSON: Thank you.

Does anyone from the staff have any further questions on question number seven?

(No response)

MR. PIERSON: Now I'd like to discuss quickly number eight, which discusses the possibility of lubrication oil from the main coolant system pumps being thrown beyond the oil collection system.

I don't have any questions concerning this. Does anyone from the staff have any questions?

(No response)

MR. PIERSON: We'll move on to question nine. Describe the protection and provide a copy of the fire hazard analysis for steam generator PORV controls.

From the response from March 2nd it appears that

you have done what you need to do. I don't have any questions on number nine. Does anyone from the staff have a question on nine?

(No response)

MR. PIERSON: We'll move on to question number ten. Describe the effects of a main steamline break and the resulting steam generator PORV opening spuriously. Describe the environmental qualification of PORV including seismic. Is the PORV single failure proof? Discuss whether Appendix R functional criteria specifically call for no bore down of any steam generator.

I'd like for TVA to start with describing what your single failure criteria is.

MR. BRYAN: Bob Bryan. In addressing what our single failure criteria is, basically we feel we follow standard industry practice. Specifically for seismic events, our safety-related equipment is designed to be seismic so we don't expect it to fail in seismic events. We also do not consider multiple failures of non-seismic components during a seismic event.

Specifically for the case of the main steamline break that we were talking about in question ten, we consider that an independent initiating event. We take a loss of off-site power if that is the worst assumption. We take a single failure, either one active failure immediately or a passive

failure 24 hours later, and for this event we do not couple a seismic event with the MSLV since we consider those independent events.

MR. PIERSON: I see. So what you're saying then is from your response, that the actuating circuit, the closing solenoid is environmentally and seismically qualified, and the valve is not seismically qualified and it's not a problem in your single failure criteria?

Mr. BRYAN: The actuating circuit is not environmentally qualified. A portion of the controller's circuit has been moved out of the vault, but the closing circuits have been environmentally and seismically qualified, and they are provided for remote manual actuation from the control room. The operator can override all the automatic control functions and can run that valve closed if it should spuriously open.

MR. PIERSON: I don't have any more questions on number ten. Does anyone from the staff have questions on number ten?

MR. FOX: Was that answer satisfactory? Do you have a question about standard industry practice? I have consultants lined up to speak to that if there is a further question.

MR. PIERSON: No, I don't.

The next question, number 11 was very straight

forward. Provide assurance of the pressurizer block valve when closed against full reactor coolant system pressure. I think Mr. Hubbard requested a completed maintenance instruction. Did you get that complete instruction?

MR. HUBBARD: Yes, I did, Bob.

MR. PIERSON: Then I have no questions about number 11.

MR. FOX: Have you had an opportunity to review that instruction, and do you find it satisfactory?

MR. HUBBARD: I briefly looked at it and it appears that it will be satisfactory.

MR. PIERSON: Now we come to really what I consider the crux of the meeting which is question 12, which is provide an explanation of how Appendix R related cables are provided protection from spurious actuations, and particularly define the grounding mechanisms of these cables; do cables of a train for various required components share a common ground? If so, is spurious actuation from a wire to wire short between different cables prevented? Were credible faults considered between individual conductors within a cable, or cable to cable?

You have since revised your response on this. We have conducted a preliminary review on it this morning. We got the response this morning. I think the staff has several questions regarding that submittal.

I think what I'd like to do is let Mr. Garg ask some questions if he has some, and then I have some additional questions following his.

MR. GARG: The question I have is how do you justify not considering the cable to cable fire? I think you did an industrial study and I think most of the utility outlets have been this. I don't see what basis you have for not considering a cable to cable fire.

MR. PIERSON: Would TVA like to make a presentation on this question and then let us respond to it?

MR. FOX: We would like to present our response to this entire question, if we could, since it is the principal point of contention. Thank you.

Our speaker on this subject is John Henry Sullivan.

MR. SULLIVAN: Thank you, Charlie.

Spurious actuation of type two associated circuits is the concern here. These circuits required for safe shutdown and those not allowed to spuriously operate were all analyzed as required circuits. In general, required circuits and these type two associated circuits were protected by separation or fire barriers in accordance with G-2. Where separation did not exist, interactions were identified, we analyzed those interactions, and provided dispositions to each one of them.

Alternate shutdown capability is provided for areas

where we considered cable to cable faults credible, namely the main control room, the cable spring room, and the auxiliary instrument room. These areas have a large congestion of cables and cable to cable faults. Maybe credible.

Sequoyah utilizes an ungrounded DC control --

MR. MARINOS: Are you going to be able to explain to us later what you call credible and not credible faults? You just indicated whenever you decided that a cable to cable fault may be credible, or however you phrased it. Could you tell us how you made that judgment?

MR. SULLIVAN: Yes, I will try to get into that right now.

We utilized an underground DC control system. We also have an ungrounded AC control system off control transmitters on the 480 volt grounded AC system. This is unique in some respects that our AC control power system or essentially all of our motor operated valves and MOV boards are off controlled transformers and is ungrounded.

This means that spurious actuation from any device not fed from a common power source, would take multiple faults.

Additionally, we did a separate look back at the high/low pressure interfaces based upon the criteria in 531 of Generic Letter 86-10. We relooked that reactor vessel

head vents, the RHR letdown path, the OCS normal and excess letdown, and also pressurizer relief pacts. In only three cases in this look back did we find that the cable to cable fault, had it been considered, would have resulted in a problem and therefore, we did not meet that. The literal guidance given is such in 531.

MS. AXELROD: When did you do this look back?

MR. SULLIVAN: This look back was completed over the weekend. These three cases deals with the pressurizer PORV, cable to cable fault, multiple faults such that you hot up on a separate cable. This assumes spurious operation.

MR. GARG: There are two issues here. One is the high/low interface, and the other is for any other subject. But high/low interface, you have to consider the multiple chart. For any of the separates, you have to consider if there is any --

MR. SULLIVAN: I point out here that we identified these interactions and our disposition of cable to cable shorts was submitted to the NRC. I think we brought that out in the submittal that you got this morning. This was reviewed by the NRC at the time of our reevaluation. NRC stated that we had taken appropriate corrective actions for these interactions. However, we did go back and reevaluate due to your additional request with respect to the high/low interfaces, and provided the results of that review this

morning.

MR. PIERSON: If I could interject, it sounds to me like you are saying that you have three cases where you have a cable to cable interaction problem. One is the pressurizer PORVs; one is the reactor head vent valves; and one is with respect to the RCS letdown path. Is that a correct statement?

MR. SULLIVAN: Would you repeat the first sentence of that question?

MR. PIERSON: I said it appears to me that you have three places in your containment where you apparently haven to considered where you have a problem with cable to cable faults.

MR. SULLIVAN: No. The three problems that I point out here in meeting the literal requirements of 531, all three of them deal with pressurizer PORVs in three separate locations.

MR. PIERSON: All three deal with pressurizer PORVs in three separate locations.

MR. SULLIVAN: Yes.

MR. PIERSON: I'd like you to turn to Attachment 5, a March 8, 1988 submittal. Could you elaborate on statement number four. "The reactor head vent valves are obviously not separated because they are physically located together near the reactor vessel head to satisfy reactor pressure vessel

boundary considerations." What have you done to prevent spurious actuation to reactor head vent valves?

MR. FOX: You're going to need to rephrase your question.

MR. PIERSON: Have you found Attachment 5?

MR. SULLIVAN: I've got it now. Will you repeat your question?

MR. PIERSON: On question four you said that the "reactor head vent valves are obviously not separated because they are physically located together near the reactor vessel head to satisfy reactor pressure vessel boundary considerations."

What does that mean? Does that mean that you provided the cable wrapping? You provided the separation criteria? Obviously it didn't meet the separation criteria, so what have you done?

MR. SULLIVAN: There is another attachment in here if you give me just a minute. Attachment 2, Roman Numeral I readdresses in a very similar fashion how we initially addressed this issue in December 2, 1982, which I believe that letter was provided as enclosure Attachment 1.

MR. PIERSON: Okay, now there is a problem with that response based on what you said earlier in the meeting, because you said you didn't take credit for reactor head vent valves operating spuriously or operating in a fire for

pressure control. Yet in the second paragraph here you say "Even if spurious operation did occur, it will not result in depressurization of the RCS because a shutdown logic separation analysis ensures a CCP is available for makeup. Because two valves are in series, a single set of two on this ungrounded DC circuit from an external cable will not result in a loss of the high pressure interface."

So what it's telling me, if I'm reading this correctly, is you're saying we don't care if the valve is open. We've got the centrifugal charging pump to provide makeup. Is that what you're saying there?

MR. SULLIVAN: What we're saying, to address the earlier response that we gave you, is that we do not take credit for reactor head vent system as a letdown path or a depressurization path.

MR. KOONTZ: This is Frank Koontz. I think there is a confusion about whether we worry about the thing spuriously opening when we don't want it to be open versus whether we take credit for it as a letdown path so that we can open it and can close it when we want to.

MR. PIERSON: I guess I am confused then, because Appendix R says that essentially if something can spuriously actuate, you've got to provide some sort of protection against it. That's what a high/low pressure interface is all about. That's what generic letter 8610 considers. So if

you're telling me in one place that you don't consider it and then the other place you're saying if it happens we can provide makeup, there is a problem.

MR. FIORAVANTE: Nick Fioravante. He's saying that they don't utilize the head vents for the PORV as letdown path. That doesn't mean they don't consider it. They don't utilize it as part of their shutdown equipment. They have reviewed it as part of the spurious actuation parts, part of the associated circuits.

MR. ROTELLA: So it is protected against.

MR. FIORAVANTE: It is addressed, but it's not utilized.

MR. PIERSON: You're saying it's addressed but it's not protected. You don't take credit for it in your analysis, is that right? If you take credit for it it has to be protected.

MR. SULLIVAN: We do not take credit for head vents as a required circuit.

MR. FIORAVANTE: Protection is beyond just cable right. Protection can be provided that you looked at it and it doesn't spuriously actuate. Protection can be defined as you looked at it, it spuriously actuates, it opens, but it's not a problem. Try to separate in your mind something that needs to open and close and the type of protection you provide for that and something you are only worried about if

it spuriously actuates.

MS. AXELROD: What kind of protection did you provide here, I think, is the other part of Bob's question. What did you do to prevent a spurious actuation?

MR. SULLIVAN: To summarize what we've said in Attachment 2 here, there are fuses that can be pulled by the operator should the thing spuriously operate and the valves will go closed. That is from an internal cable fault. External cable faults were dispositioned here as not being credible, well the hot/short being credible from an external cable, but since it had to happen to two valves it would take multiple combinations of the two hot/shorts and therefore that was not credible.

MR. GARG: That's what I have a problem with. If we look at 8610 for high/low interfaces, you have to consider the short for all the high/low defenses. But anything beyond the high/low defense you have to consider a single short.

MR. WILLIAMS: This is Bob Williams, TVA. We looked at those valves and the basis for our conclusion was if you pull those fuses, it takes multiple shorts on two different valves. It will take at least four shorts of the proper polarity to actuate two valves and give you a path. With the random laying cable, we considered that to be an incredible event. You've got to get four off the same instrument bus or transformer together in the same tray and

short them with the proper polarity to have that event occur.

MR. GARG: I'm not sure why you would need four.

MR. WILLIAMS: You have to have the positive and negative of two different circuits together to actuate two vessels.

MR. GARG: That's the two shorts.

MR. WILLIAMS: That's four conductor shorts of the proper polarity.

MR. GARG: Yes, but that is considered --

MR. WESCOTT: But that is in addition to the one we've already mitigated.

MR. MARINOS: Do you know how many shorts or faults are required for low to high pressure interface? Is there more than one, less than four, what is the number?

MR. WILLIAMS: In this particular case we're discussing, the original short can be, it would take a short to the positive side which is a single event. We can mitigate that by pulling the fuses. In addition to that, we would have to short additionally two more cables, both positive to positive and negative to negative, to initiate that event. So there is a minimum, it would take a minimum of three.

MR. MARINOS: If you have two or less it will be unacceptable.

MR. WILLIAMS: No.

MR. GARG: Your comment about three, that's considered for the high/low defense. My question is, -- I'm not sure how you can operate this.

MR. WILLIAMS: No, we did not remove the fuses. What we said was that if it does spuriously actuate we can pull the fuses and mitigate that event. If we pull the fuses, then it takes two additional shorts on two valves to cause them to spuriously open again. What we said in the analysis was that having those valves spuriously actuate is within the design basis of the plant.

MR. GARG: So you indicated that three is a credible, three independent faults you are talking about, or more. You say four.

MR. WILLIAMS: If you pull the fuses it would take four conductor to conductor shorts with proper polarity. It could be two cables to cables.

MR. GARG: Pulling the fuse is in your procedure?

MR. SULLIVAN: The form on the fuses is in the procedure for the backup control room, abandonment of the main control room, single procedure for the plant fires outside the control room at this time.

MR. PIERSON: I'm sorry. I missed something there. Can you repeat that please?

MR. FOX: Repeat the question, please.

MR. PIERSON: I heard something about something

wasn't in a procedure, and I'm not sure what that referred to.

MR. FOX: What was your question?

MR. GARG: My question is pulling the fuses out in the procedure, the norm, and he is supposed to take out the fuses. I mean if you take the credit for that.

MR. SULLIVAN: We'll put in that in SOI 26.2 right now is currently in AOI 27 on abandonment of main control room.

MR. PIERSON: So in effect you're saying that's a fix as a result of what you've done in the past few days?

MR. SULLIVAN: No, it's an enhancement based upon a relook at what we told you December 2, 1982, based upon our relook. Our disposition in December 2, 1982 basically said, and I'd like to put this on the record, is that there is a three-eighths inch flow restrictor during this line, that charging pump can maintain RCS pressure with that flow restrictor, and it's not defined as a loca in accordance with 10 CFR 50 because we can provide the makeup and do a normal shutdown in accordance with --

MR. PIERSON: And you can assure me that since it has nothing to do with your flow control valves for your RHR system, the RHR system is independent of this so you can always access your RHR valves even if you did have some leakage?

MR. SULLIVAN: We think that appropriate mitigative action would have been taken to stop this spurious actuation of the valves once the operator had found it, and there would never have been any adverse effect on 74-1 or 74-2.

MR. PIERSON: I'd like to talk more, are we finished with this question now?

MR. GARG: No, I have some more questions.

MR. SULLIVAN: We had an open question I believe that you said we were to get back to on number, dealing with the RHR valves. We didn't address that at the time. You said we would discuss it later in the presentation. Would you like to discuss that?

MR. KOONTZ: I believe that was question seven, Bob.

MR. SULLIVAN: Were you satisfied with our response on seven?

MR. PIERSON: Let's go ahead and talk more about spurious actuates. We've still got pressurizer PORVs to talk about and we've still got RCS letdown. When we finish that then we can come back to that.

MR. GARG: Okay. I think the question I still have is that you pull the fuses for all the high/low interfaces? Is that what you are doing?

MR. WILLIAMS: We're only pulling the fuses if that valve spuriously actuates.

MR. GARG: That has to be that.

MR. WILLIAMS: What I want to make clear is we're not pulling the fuses in advance of the event. They are not being pulled now.

MR. GARG: No, but you have a procedure before -- You will have the instructions for the operator that if he detects -- that he will pull the fuse, for all high/low differences.

MR. WILLIAMS: For the reactor head vent.

MR. GARG: No, I'm talking about all high/low differences. There are four or five identified, right?

MR. SULLIVAN: Only on the reactor head vents. The internal letdown, if you go through Attachment 2 in the submittal that you received this morning, it goes through in detail all four of those and what we've done. The reactor vessel head vents we stated in Attachment 2 that the operator could pull the fuses, and that is what, we already had an AOI, abnormal operating procedure for the operator to verify the valves closed. We'll go on and enhance that one step further and tell them if it doesn't close we'll pull the fuses. We'll go ahead and put in an SOI 26.2 and identify that those fuses need to be pulled in the event of a confirmed fire to protect the plant and equipment.

MR. PIERSON: How long does it take for the operator to do that?

MR. SULLIVAN: The fuses are two doors away from the control room, about 100 feet. When he knows they're spuriously opened and he has pulled out his procedure and is ready to go, ten minutes would be a very conservative estimate.

MR. GARG: If you look at it, two shorts are incredible. Again, I have a problem there.

MR. MARINOS: Are you modifying the statement to say by applying the removal of fuses you will increase the need for failures to cause you the inadvertent actuation? The statements say two shorts are incredible. But what I have heard here, it will require more than two shorts in order to cause the inadvertent situation.

MR. WILLIAMS: No sir. It takes one short to inadvertently actuate. Pulling the fuses causes at least two more.

MR. MARINOS: That makes it three.

MR. WILLIAMS: Right. But it only takes one to initially make it actuate, and then it takes two more to bring it back open again.

MR. PIERSON: If I could interject here, you're saying then that it takes one short to spuriously actuate the reactor head vent valves?

MR. SULLIVAN: That's due to an internal cable fault. The same power force. You pull the fuses in that

event.

MR. PIERSON: How does that meet generic letter 8610?

MR. SULLIVAN: We performed the further evaluation and documented that evaluation to you that said that that line being restricted by a three-eights inch orifice which separates reactor coolant system piping from non-reactor coolant system piping, was not a loca, was within the makeup capability of the centrifugal charging pump, so we could proceed with a normal --

MR. PIERSON: So I can infer from that that your centrifugal charging pump is in your Appendix R safe shutdown evaluation, and all the control circuitry, and you've established that that is going to be operable in the event you have this spurious actuation?

MR. SULLIVAN: We will always have a centrifugal charging pump that satisfies the shutdown logic requirements.

MR. GARG: I think I'm still looking for an answer on Item 3, RCS is nominal and accessibly done.

MR. SULLIVAN: In Attachment 2?

MR. GARG: Yes. Here you make a statement that it would take two shorts of the proper polarity without grounding, and each of these --

MR. SULLIVAN: Let me explain this. There are two pipe and flow paths--normal and excess letdown. In similar

ways, head vents, you have two flow paths, an A train and a B train. Head vents have two valves in series. We just went through all that. That's why it takes the four hot/shorts of the proper polarity to get those things open. In this line you have three valves in series in each of the two paths. So it would take three hot/shorts, two hot/shorts of the proper polarity, to get all three of those valves open.

MR. GARG: Is it three, or three paths?

MR. SULLIVAN: There are two paths, three boundary valves in each path.

MR. GARG: Three in each path. And they have no problem.

MR. SULLIVAN: Right. They are normally fail close valves, and you would have to hot them up and have air supplied to them at the same time to get all three valves up.

MR. PIERSON: You're talking about the RCS letdown path?

MR. SULLIVAN: And excess letdown.

MR. PIERSON: One other question I've got is in terms of availability of RCS letdown. Have you considered all your spurious actuation circuits to verify that in all conditions you're going to have RCS letdown available?

MR. SULLIVAN: RCS letdown availability is not guaranteed by the shutdown logic and Appendix R analysis.

MR. PIERSON: We talked earlier about the

pressurizer PORV and these interactions that you consider on the pressurizer PORV. Could you elaborate on where they are and what they are?

MR. SULLIVAN: This is from memory. Two locations in the annulus of Unit 2, Unit 1 has not been looked at; two locations in the Unit 1 annulus, one involves each of the PORVs. A PORV may spuriously open there, considering the hot/shorts from the cable. No internal cable hot/shorts would cause the valve to open.

MR. PIERSON: Cable to cable fault you're talking about?

MR. SULLIVAN: Yes, it has to be a cable to cable fault.

MR. BLACK: Norman Black, Electrical Group at Sequoyah. That's correct. The three interactions or identified concerns, two of them are in the reactor building Unit 2 annulus, and one is in the emergency gas treatment area where we have a situation where the PORV cable is tray routed in close proximity to a block valve which we have identified. It happens to be the train B block valve associated with that train A PORV valve.

MR. PIERSON: Do you consider this cable to cable interaction a problem?

MR. BLACK: On that particular circuit?

MR. PIERSON: Are you planning on doing anything

about it, or are you just telling us it exists? What is your answer with respect to that?

MR. SULLIVAN: Let me try to address that.

We're currently relooking at both the spurious cable to cable concern and also the letdown concern. We have not decided what to do about them or made any decisions. In this particular case Norm's talking about, it's emergency power supplying the block valve that's in question. If you're sending the cable to cable fault, the emergency power from the diesels to that valve may not be available. If off-site power was available the block valve would be available to close. That was our problem.

MR. PIERSON: It sounds to me like there's a problem there that we need some additional information before we can resolve. Is that a correct assumption on my part?

MR. FOX: Can we take a five minute caucus? I'm not sure, we've got too many people speaking to the issue. Could we take a few minutes to caucus and then give you a coherent answer to your question?

MR. PIERSON: Yes. Make it ten minutes.

(Whereupon, a brief recess was taken)

MR. HOSMER: Let me answer the question by first starting with a little bit of history.

The majority of the Appendix R work on Sequoyah we reconvened a team and did our, well let me go back even

further.

The NRC confirmation letter was sent to us in 8/84 saying "confirm you meet Appendix R 3GJLL." We formed a team, we completed our work, and we completed that work with the submittal to NRC in December 1984. So the history is we had completed our work and submitted that to you the end of December 1984. Generic letter 8610 obviously was issued after that.

I would like to read from the cover letter of the generic letter a couple of sentences. "This package represents recent staff assessments of these questions and provides guidance as to acceptable methods of satisfying commission regulatory requirements." Attention to the next sentence. "Other methods proposed by a licensee for complying with commission regulations may also be satisfied and will be considered on their own merits." We proposed, and we feel you have accepted, other methods.

Our basis that we presented to you for other methods of compliance with 8610 and particularly this issue of cable to cable interaction, were low probability of interaction for ungrounded DC systems, and the fact that we had ungrounded AC systems and had low probability of interaction. That was our basis and that is what we believe you have accepted. It is documented in a December 21, 1984 letter to the commission. Your acceptance enclosure of that

is documented by at least three inspection reports; at least two that I have access to today, 8741 and 8640.

In conclusion, we meet 8610. We meet it by approved alternate exceptions.

MR. PIERSON: I've looked at the inspection reports and I'm not sure that I can agree with what you say. This is probably the wrong forum to take that up. What we'll do is we will understand what you have done with respect to spurious actuation cable to cable. I think we can understand that you essentially have not done it in accordance with 8610 literally, but you feel like the exceptions that you do have have been evaluated by the NRC and accepted by the NRC. Is that a correct synopsis?

MR. FOX: Again, I want to make the statement that 8610 is not a set of requirements. It is merely guidelines and it allows alternate means.

MR. PIERSON: I understand that.

MR. FOX: We feel like we meet it per the alternate means.

MR. PIERSON: I understand what you're saying, but I am not telling you that I am accepting what you're saying.

Are there any more questions with respect to spurious actuation?

MR. GARG: Just for the record, I want to know, we have talked about high/low interface, and we haven't talked

about any other subjects. Have you considered any other subjects besides high/low interface for this?

MR. WILLIAMS: Let me try to address that. Specifically to address cable to cable, the answer is no. But much of the analysis that we did with Appendix R and our calculations bounded the cable to cable case.

For instance, in the main control room, the spreading room, the auxiliary instrument room, we looked to see if we had an alternate path for any device that faulted. We didn't consider the mechanical means for the basis for that fault, we just said that we had a faulty device and do we have an alternate.

If you look at things like the short circuit calculation and some of the coordination studies, basically they did the same thing. They considered like a three phase fault, regardless of how they got it, whether it was conductor to conductor or cable to cable. So there is much in the analysis we feel is bounded the cable to cable case, even though specifically we did not address it that way.

MR. PIERSON: Could you discuss the RCS letdown path in terms of reactor coolant system letdown in the event of an Appendix R event? It says on your Attachment 5, "Further analysis being performed that will result in an RCS letdown path." Can you amplify on that statement and explain what you mean by that?

MR. SULLIVAN: You're referring to the preliminary work that had been done?

MR. PIERSON: On Attachment 5 of your submittal today.

MR. FOX: Give us just a minute. Attachment 5?

MR. PIERSON: Attachment 5 to the submittal you gave us. It's on the same page that we talked about with respect to pressurizer PORVs and also the reactor head vent valves. He said, "Further analysis is being performed that will result in an RCS letdown path."

MR. SULLIVAN: That analysis is in its preliminary stage right now. I think it's being reviewed and checked, is that right Norm?

MR. KOONTZ: No, we have the analysis right here.

MR. PIERSON: May I ask what does that mean? What is that analysis to accomplish?

MR. SULLIVAN: That analysis ensures that a pressurizer PORV or a head vent path is available for letdown from the RCS.

MR. PIERSON: I'm confused then. Is that strictly for a fire, or is that --

MR. SULLIVAN: This was done for a fire. It's not a current requirement of our shutdown logic or safe shutdown to have a letdown path. This evaluation was done to see if the plant in its physical layout had any problems in it where

you would not have a letdown path.

MR. PIERSON: What does that mean with respect to the statement you said earlier that you didn't take Appendix R approved path for letdown then for vent valves or PORVs?

MR. SULLIVAN: As I stated, in the current shutdown logic for safe shutdown, letdown is not identified and we do not take credit for it.

MR. PIERSON: Then why are you doing this letdown analysis?

MR. SULLIVAN: A question was asked to us concerning letdown and we went off and looked at the cables that we already had plotted because we had to ensure letdown would isolate. This was sort of the flip question, now can you ensure a letdown path is available. So we had all the cables plotted. We just went out and looked at what they were.

MR. PIERSON: So you're telling me that in all cases you've got an RCS letdown path available?

MR. SULLIVAN: No, I'm not telling you that.

MR. PIERSON: Okay. You're telling me as a result of that that you've done an analysis to show that your pressurizer PORV and your reactor coolant system vents can be used as a letdown, is that correct?

MR. SULLIVAN: No. We're saying we've done an analysis to see if they can be used as a letdown path.

MR. PIERSON: So what is the conclusion? Do you have a letdown path?

MR. SULLIVAN: In all but two locations which are in the annulus area for Unit 2. I don't know about Unit 1. We could have a letdown path.

MR. PIERSON: And you're going to address those two locations to provide to us with this analysis you've got here? Is that what you're doing?

MR. FOX: Yes, we will.

MR. PIERSON: Are there any other questions with respect to question number 12?

(No response)

MR. PIERSON: I'm going to move on then, to question 13. I don't have any questions about question number 13. Does anyone in the staff have a question about number 13?

(No response)

MR. PIERSON: Question number 14.

MR. GARG: I want to ask one question on question number 12 again. You have not considered the internal circuits for the cable to cable interaction?

MR. WILLIAMS: Yes, we have considered internal.

MR. GARG: I mean the two cables. I mean the circuits connected to the common bus could be shorted by one single short. Have you considered that?

MR. MARINOS: This is in connection with your statement earlier about the ungrounded AC and DC which is a legitimate electrical engineering argument, but if you had, that is true perhaps, for circuits that come from independent sources. If they are ungrounded, yes, it is a legitimate argument. But if the circuits are coming from the same common bus, have you addressed [illegible] It will not be.

MR. WILLIAMS: In the [illegible]inal analysis, the cable to cable short was not considered. The basis for not considering the cable to cable short was the fact with the ungrounded system and the kind of the random arrangem[illegible] we've got in cables and trays, the fact that it does take something on a common bus or a common transformer to cause that short, that we considered that a much less likely event to happen than having conductor to conductor shorts within a cable. For the case that you brought up for the high/low pressure interfaces, we did in fact go back and evaluate those four cable to cable shorts.

MR. GARG: No, but for the circuits besides high/low, you have to consider single short and if it can cause a spurious acuations.

MR. WILLIAMS: The way the analysis was done within the main control room, the spreading room, and the a[illegible]xiliary instrument room, we bounded that analysis by making sure we always had an alternate path. Outside the high/low pressure

interfaces and outside those three areas we have not specifically looked at cable to cable shorts. But we do not think from the basis of our system that that's really a credible event.

MR. GARG: Well, you are not in compliance with 8610.

MR. ROTELLA: Have you responded to 8610?

MR. HOSMER: We have never been asked to.

MR. GARG: Aren't you supposed to respond to generic letter?

MR. FIORAVANTE: Could you just please explain why you are interpreting them as not in compliance with 8610?

MR. GARG: Because 8610 requires that for any, -- high/low interface you have to consider if a single short can create those --

MR. FIORAVANTE: Isn't it also in 8610 that it says for ungrounded DC you don't have to consider --

MR. GARG: If you are a common bus then there is a case. If you are ungrounded, separate circuit then you don't. Then you don't have a scenario.

MR. FIORAVANTE: I guess I'm a little confused. Where in 8610 does it say anything about a common bus?

MR. GARG: In 8610, I think that was referenced to the separate circuit.

MR. MARINOS: You can only take credit for

ungrounded system if it will be two separate sources. If it is the same one it doesn't matter whether it's grounded or ungrounded, if it is the same circuit.

MR. PIERSON: We will discuss this later.

MR. McGARRY: This is Mike McGarry. I just want to make one comment.

8610, so there is no confusion, did not require that a utility respond to 8610. It was put on the street to assist utilities and provide guidance. In this situation Sequoyah had already formed its fire hazards analysis in advance, prior to the issuance of 8610.

MR. PIERSON: I understand that.

Has everyone signed the attendance sheet? If you haven't I'll pass it down.

I'd like to continue on with question 14 if that takes care of the questions on number 12.

MR. WESCOTT: I would like to speak to someone on question 14 if they would be willing to address it.

MR. PIERSON: What is your question?

MR. WESCOTT: I spoke on the phone with Jimmy Pierce and we discussed the various situations where you actually have a non-ducted damper between a wall, and there was one item here that I can't remember us talking about and that was where you had fire detection on both sides and automatic suppression on only one side. That may have been

mentioned, but I didn't hear it at the time.

I'm a little bit concerned about this particular situation and I'd like to ask two questions about areas where you have this particular type of setup.

First of all is the manual suppression. Can one get to that without going through the room where the fire is in all cases?

MR. PIERCE: Yes. The manual suppression is in some auxiliary instrument rooms, I believe, aux shutdown boards, and the actuation of those circuits are in another room.

MR. WESCOTT: The room where the major fuel load is, the significant fuel load, that has an automatic suppression I assume in all cases?

MR. PIERCE: Yes.

MR. WESCOTT: And the rooms that do not have automatic suppression have very limited fuel load.

MR. PIERCE: The only fuel load in there is the insulation on the cables in the trays, and those trays are coated with pneumastic. We've got ionization smoke detection in that room and manually actuated suppression.

MR. WESCOTT: Thank you.

MR. PIERSON: Any other questions with respect to 14?

(No response)

MR. PIERSON: Let's go on to question 15. Provide the fire interaction study for a fire in the immediate vicinity of the pressurizer. That comes back to the questions we discussed earlier in question 12, and I think we're going to have to address that in some other format. We understand what your position is, and we'll have to come back to you later.

So I'd like to go on to question 16. TVA has provided us this list which is requested in question number 16. I'll go on to question 17.

Question number 17 is with respect to passing of liquid through a pressurized or code safety valve and the resultant erosion and subsequent ability of the valve to reseat. This question and many of the questions that we've covered seem at face value to be outside the context of Appendix R, but the way some of these questions were developed was on the assumption that some of the scenarios would be applicable, and in that event these questions necessarily would follow through. This is, of course, coming from where the pressurizer, your system becomes solid and you use a code safety valve as a pressure control mechanism. It wasn't clear to us, and may not still be clear to us, that that doesn't occur.

You've provided a list here that talks about the EPRI test, and I understand that code safeties are not

necessarily designed to pass water, although some of them will up to a point. But I don't think there is anything more to be gained by asking you any more questions with respect to that one, so I'd like to go on to question 18.

MR. HOSMER: Can I ask a question?

MR. PIERSON: Sure.

MR. HOSMER: Would it help if we explain to you why we do not believe it will go solid?

MR. PIERSON: Yes, but let's wait until we go through the questions. I think there is another question that addresses that specifically.

Number 18 is provide rationale for protection of centrifugal charging pump cavitation from a spurious actuation in the volume control tank isolation valve.

I'd like to talk to you a little bit about that. I'm not quite sure from talking to Mr. Koontz and Mr. Burzynski, it's my understanding that if you do have a spurious actuation of that isolation valve, that you still have the ultimate charging pump available, is that correct?

MR. SULLIVAN: The approach to the charging pump suction is to either remove power by opening the breaker on the board, transferring suction to the RWST and removing power from its breaker so you don't have the same problem again, or stopping the pump by the operator in the control room. This is all proceduralized in the SOI 26.2 to be done.

MR. PIERSON: Do you have any sense of how long you've got before the charging pump cavitation results in inoperability of the charging pump?

MR. SULLIVAN: I'd like to address that question by making the statement that we have done an evaluation and determined that for a fire in the area we should have at least ten minutes to perform these actions before the valves go closed.

MR. PIERSON: Ten minutes before the VCT isolation valve goes closed?

MR. SULLIVAN: Yes.

MR. PIERSON: How would the operator know that a fire started? Why would he know there was a fire in that area?

MR. SULLIVAN: Fire detection, fire suppression actuation, the fire alarm system.

MR. PIERSON: So when a fire occurs in that area he secures that charging pump and volume control tank and shifts the suction to the RWST tank?

MR. SULLIVAN: Yes.

MR. PIERSON: Is there any credibility or any possibility that the same fire that would affect that volume control tank isolation valve could also affect the standby charging pump?

MR. SULLIVAN: I believe when you get to some of

your end devices such as your MOV boards where power to the valves comes from, that's a possibility. Down locally at the valves and throughout most of the plant, no, that is not credible because the valves are in a room by themselves, charging pump cables don't go in that room, and to address a little further about the MOV boards for the valves to go closed, it would almost have to be a fire internal to those boards.

MR. PIERSON: Which wouldn't affect the power to the charging pump?

MR. SULLIVAN: Which wouldn't affect the cable trays in the area. That's not the approach we took. We looked at that. We took the approach of getting the operator to get power off the valves which was consistent with what the rest of the industry has done to address this generic Westinghouse type question.

MR. PIERSON: Did you provide that analysis to us in one of your submittals?

MR. SULLIVAN: Which analysis?

MR. PIERSON: What you're talking about, this approach you're talking about here.

MR. SULLIVAN: I think you've got a copy in SOI 26.2.

MR. PIERSON: All right.

MR. WESCOTT: What type of fire detection do you

have in that area, do you know?

MR. SULLIVAN: Just ionization alone.

MR. PIERSON: One other question. The tripping mechanism of the centrifugal charging pump, is that protected so the same fire couldn't wipe out the volume control tank isolation valve and the tripping mechanism to the pump? Would it be a case where you couldn't isolate the pump?

MR. SULLIVAN: There are three alternates involved. He can move power from the VCT outlet valve, such that they will not go closed. He can transfer suction, or basically open the RWST valves and remove power from them so they will not go closed. Or he can trip the pump. So there are two backups in case he cannot trip the pump. I cannot address that. I'm sure you can build a fire in a certain place and you couldn't trip a pump, but I cannot address if that's the same fire that would cause a problem with these valves.

MR. PIERSON: But you're sure that you still have at least one remaining pump operable, the standby pump?

MR. SULLIVAN: What I'm trying to say is we have two other methods that the operator has in a situation that should he not be able to stop the pump he can remove power from the VCT outlet valves or he can go ahead and open an RWST supply valve and remove power from her.

MR. PIERSON: Any more questions about question number 18?

MR. NOTLEY: This is Dave Notley.

A couple of weeks ago we had a fire protection engineers meeting in Atlanta. One of the questions that came up was sending out a fire brigade immediately upon receipt of fire alarms. The response was that most plants send a runner down to establish that there is a fire before they call the fire brigade and dispatch them.

Do you do the same thing, and what you were just talking about? You have ten minutes to take action and prevent damage to the pump, and you were asked does the operator perform this action immediately upon receipt of the fire alarm. I think I heard you say yes, but I want to make sure you don't send a runner down to establish that there is a fire before you start this kind of action.

MR. ROTELLA: If there's a fire you're going to shut the plant down with boron coming from the RWST.

MR. SULLIVAN: The way we normally do it is if someone calls in on 6299 which is the plant fire alarm, all the fire brigade will respond. I know that for a fact. The fire brigade leader is the man responsible for notifying the control room when there is a fire affecting plant equipment. If it's a cigarette smoldering in a corner in a turbine building somewhere and the fire alarm comes in, we're not going to go through this scenario. The fire brigade leader is responsible for notifying the shift supervisor in the

control room who is in the command function when there is a fire affecting plant equipment, he knows the location of the fire, we go to our fire interaction manual, you open it up for that location, and it will tell you for that location what might happen and what action he needs to take.

MR. NOTLEY: I think your answer is yes, that you do send someone down on receipt of automatic fire alarm to establish that there is a fire.

MR. SULLIVAN: True.

MR. PIERSON: You need all the ten minutes, right.

MR. SULLIVAN: I'd like to add a concluding comment. Our response to this condition which is generic to a lot of other Westinghouse PWR's is consistent with what they're doing, and we think we've taken the appropriate action in this area consistent with other safety requirements to protect the charging pump from loss of suction.

MR. PIERSON: And you're sure that you have the remaining charging pump. There is nothing in your procedure that tells the guy to secure the one charging pump and then turn on the B charging pump on the same suction and destroy it as well, is that correct?

MR. SULLIVAN: There is nothing in the instruction for that.

MR. PIERSON: Good.

The next question is question number 19. The basis

for fire protection of Appendix R shutdown systems inside the containment. We addressed most of the questions with respect to this in question number 12, spurious actuation. I don't have anything else to add to this. Does anyone else have something they want to talk about with respect to question 19?

(No response)

MR. PIERSON: If not, I'll go on to question number 20. Question 20 discusses the possibility of two low pressure signals causing an actuation of the safety injection system. Sequoyah says safety injection is not required for safe shutdown at Sequoyah. I don't have any questions with respect to your response here. Does anyone on the staff have anything they want to address?

MR. ROTELLA: I have a question back on 19. for the RHR valves that we talked earlier, on 74-2, you stated that you've done a review of the area and have determined that you can't have a fire that is going to propagate from the motor on that valve, and that there are no surrounding or intervening combustibles. I guess I need to ask the question then, do you intend to submit a deviation for that condition?

MR. PIERCE: No, we had not planned on submitting a deviation on that. What we were looking at is the guidance you had given in 8610 said we could do a fire hazard evaluation in the area as long as it's done by appropriate

people, i.e., fire protection engineer and systems engineer, and provide that information to you for review. If you agree, and it's intuitively obvious that conditions we describe are as they state so we don't have to submit a deviation.

MR. ROTELLA: I'd like to ask the staff, Dennis Kubicki, if he could respond to that. Is that true?

MR. KUBICKI: This is Dennis Kubicki. Do I understand your question that you're asking me whether they have to submit a deviation for this condition? If 8610, the premise that I'm going to be basing my answer on is that if 8610 establishes means for satisfying 3GJ LNO of Appendix R, and if they don't conform with that guidance, then a deviation is appropriate. I think in this particular case we should avoid the semantical distinction and say that if they've got a condition that doesn't literally conform with the explicit guidance in 8610, then they should provide the justification to us and we should review it without really calling it a deviation or whatever.

MR. GEORGE: This is Hank George. The condition we're talking about here is one where what was evaluated was whether these are components that would be susceptible to fire damage. Where the evaluation says that, basically concluding that you can still get in there and manually operate these valves, it's not an engineering evaluation to

justify adequacy of separation which is the 3G item that Dennis is referring to. So this engineering evaluation is not one that relates to a demonstration of meeting 3G. It's just whether these components could be damaged by a fire. Since they couldn't, these are valves that have manual operators on them. Even though they are motor operated, there are still hand wheels on them. That function is what was concluded as still being operable for fires in that area.

So under that, I think our interpretation would be that that is not an item requiring an engineering evaluation per 8610, or a deviation request.

MR. McGARRY: I want to agree with Dennis Kubicki in that let's put the semantics aside and get down to what is really the substantive issue. But 8610 does state in page 14 the question, if a utility determines that a deviation from a guidance document exists, then an exemption request needs to be filed. If so, what is the legal basis for this requirement? The response is no. In other words, you can have a deviation from 8610 and you don't have to file an exemption.

MR. PIERCE: Let me just say, we have provided you with that evaluation. If you've got any questions concerning that evaluation we'll be glad to talk to you.

MR. ROTELLA: That was the March 8th submittal, the one we just got?

MR. PIERCE: Yes.

MR. ROTELLA: Thank you.

MR. PIERSON: Okay, we'll go on. I think we're on question 20. I don't have any questions on question 20. Does anyone in the staff wish to address question number 20?

(No response)

MR. PIERSON: Question number 21, has TVA evaluated effects of fire on instrument sense lines? Provide the results of the evaluation on the functional analysis report.

We have some information from TVA with respect to fire effects on instrument sense lines, and I think we still have a few remaining questions. Mr. Garg, do you have questions still with respect to instrument sense lines?

MR. GARG: Yes, I have a couple of questions. One is I think on your document QYR SQP SQN 38, on Item 4 and 5, there is a statement that -- nothing inside -- I think we talked to somebody in here to explain why it wasn't done. I would like that information to be put in the record.

MR. PIERCE: I'd like for Ed Connell, one of our fire protection engineers to address that for you.

MR. CONNELL: The basis of the question was regarding whether or not a fire inside containment would make the containment untenable for manual operation of the valve. The evaluation in the areas of these penetration boxes concluded that a fire inside the penetration box could damage

the cables inside that box and therefore we would not be able to operate the valve outside containment. A fire in this box would certainly be a small fire, would not cause the spurious operation or release of any kind of RCS volume into the containment, and the manual operation of the valve could still be achieved.

MR. GARG: Okay. Another question I have is, I think the analysis you gave on the document SQN 00D052 EPM ESC 011888 did address only the pressurizer and -- instruments. My question is, have you considered all other instruments for which you take a credit in the Appendix R?

MR. CONNELL: This particular analysis dealt only with steam generator and pressurizer level instrumentation.

MR. PIERCE: Let me interrupt right here and give you a little background on that. We wrote a CAQ back in early 1987 that said instrumentation sense lines had not been adequately reviewed for fire fix. As a result of that CAQ we did an Appendix R separation analysis on instrumentation sense lines. The result of that CAQ was another condition adverse to quality that identified four areas where we had interactions in which the sense lines did not meet Appendix R separation criteria. The fire hazard analysis evaluation was done to address those four areas where adequate Appendix R separation did not exist for those sense line instruments that were identified in that CAQ.

MR. CONNELL: The conclusion regarding the level indication for pressurizer and steam generator concluded that we would have at least one level indicator for each steam generator and we would retain one level instrument for the pressurizer, for any fire inside the containment.

MR. GARG: My question is not with your analysis on this. My question is do you have any document that you don't have any of that problem with the instrument lines?

MR. PIERCE: We documented where we had problems. I don't think we have to document where we don't have problems. We did an evaluation and found out where we did have problems, and then addressed them.

MR. GARG: You are saying, where you have addressed your evaluation, where can I find your evaluation on the instrument lines?

MR. PIERSON: What Mr. Garg is asking for is where do you have the evaluation that says the only point in containment where you have a problem is with respect to the steam generator level and the pressurizer levels?

MR. PIERCE: The corrective action CAQRASQP 870857.

MR. PIERSON: Do we have a copy of that?

MR. PIERCE: We gave you that CAQ. Then CAQR 870151 identified where we had interaction specifically.

MR. PIERSON: We'll look at that. I have one other question. Did you discuss pressurizer or steam generator

pressures? I heard levels. Is a pressure required?

MR. SULLIVAN: Steam generator pressure is outside containment. It was provided separation by the original -- saw a reevaluation of the 84-85 time frame.

RCS pressure was your second part of that, is that correct?

MR. PIERSON: Yes.

MR. SULLIVAN: There are three RCS pressure channels, two of them are par instrumentation that are routed outside to the auxiliary building, and the other one is off which is wide range RCS, the other one is off the pressurizer.

MR. PIERSON: So you have three instruments, is what you're saying?

MR. SULLIVAN: Three instruments.

MR. PIERSON: You're confident that --

MR. SULLIVAN: We're confident we have separation between the two pans and the one over on the pressurizer.

MR. PIERSON: I'm sorry, I missed something there.

MR. SULLIVAN: The requirement being a 20 foot separation inside containment.

MR. PIERSON: So you met that 20 foot separation is what you're saying?

MR. SULLIVAN: Yes.

MR. GARG: How about instrument line outside the

containment? Did you consider those?

MR. SULLIVAN: Yes, by the electrical engineering branch, and I am not sure we submitted that calculation, but we will give you that information. We don't have it with us right now.

MR. LIAW: This is B. D. Liaw.

With regard to what you said, Mr. Sullivan, about CAQR and another, have they been closed for restart?

MR. PIERCE: Yes, they were determined to be restart, and they are already complete. Corrective action of those has been complete.

MR. PIERSON: Do we have any other questions on number 21?

MR. HUBBARD: George Hubbard. I have one quick question on that. He referenced a CAQR 870151. In looking through the documentation this morning, I didn't find that particular CAQR.

MR. FOX: We'll get it to you.

MR. PIERCE: I apologize for that. I thought we had sent that to you.

MR. PIERSON: Any other questions on sense lines, number 21?

MR. GARG: No, I don't have any.

MR. PIERSON: The next question I'd like to talk about is question 22. I'd like to point out something.

Within the response with the exception of number 12, the response to number 22 is very difficult. It dances around the issue, and I think I understand what you're trying to say, but it's misleading. Explain why the fire in containment would not affect the instrumentation as discussed in the task group deposition of issues in B2 used by the operator. Distinguish between a fire and a loca. You talk about what you take credit for here, and then you go into a list of instruments there without differentiating which of those instruments are Appendix R instruments, which of them are safety grade instruments, it's just a list of instruments. It's difficult to make any sense of that. But I talked to your staff and I think I understand where I can expect an answer from you with respect to that question. So I don't have anything to address on that, but I did want to make a comment there.

Would you like to say anything?

MR. HOSMER: We apologize for confusing you.

MR. SULLIVAN: Do we owe you something on this one?

MR. PIERSON: You told me you were going to take this list of instruments and tell me which were EQ and which were safety related and which were fire protection instruments.

MR. SULLIVAN: Okay. We have a list of those that are EQ. As far as addressing the safety related and

distinguishing between a fire and a loca, we can explain that to you also.

MR. PIERSON: We'll listen.

MR. SULLIVAN: This question is tied into 20 and 26 as well. It is possible for two low pressure signals to cause a spurious SI in this plant, we believe, but SI is not required for safe shutdown.

Narrow range RCS pressure is also not required by our analysis. The fire that's inside containment, we have wide range RCS pressure which is located in the auxiliary building, elevation 690; and some outside containment radiation monitors, 9106 and 112 which sample inside containment. Also containment pressure differential transmitters which measure containment pressure that are located in the annulus. All these things are principally outside the reactor building itself where we believe they would be available post-fire.

Additionally, as we have mentioned earlier, we'll have pressurizer level available and we'll have steam generator level, one for each of the steam generators. Thus the SI termination criteria that's specified for the operator to use which states that sub-coolant has to be greater than 40 degrees since he has RCS pressure and since he has temperature in two of the four loops, he can satisfy that point of the four point termination criteria.

The second point being RCS pressure stable and increasing. He can satisfy that for his spurious SI. And with steam generator level greater than a 10 percent narrow range in at least one steam generator, he can verify that as well.

The last item is pressurizer level being greater than 20 percent. Since pressurizer level is guaranteed, he can check that.

The operators have the appropriate training to know and apply this SI termination criteria. Additionally, simulator exercises are planned to start I believe next week. That's going to address fire scenarios. We're going to take this fire interaction manual that I've talked about, and we're going to start failing instruments for a fire in a given area and see if the operator can respond to it properly.

MR. PIERSON: That's a good idea.

MR. SULLIVAN: In conclusion, the operator's got sufficient information to check the SI termination criteria. He'll be able to distinguish between a loca and a fire, identify spurious SI, and terminate the spurious SI and proceed with mitigating the effects of the fire.

MR. PIERSON: Thank you. I don't think you need to say anything more on that particular question.

I'm ready to move on to question number 23 unless

someone has other comments.

On question 23, discuss how steam generator overfill from the main feedwater system is protected against fire in the control building. In particular, address response times for feeder line isolation following loss of control building.

The question that we're really asking here is in the event that you have a, how do you guarantee that you can complete this response here? You say that AOI 27 provides that before the main control room is abandoned the reactor is tripped and the MSIV's are closed. Have you provided some evaluation of your control power to MSIV's to state that they can or cannot be operated? Could you elaborate on that?

MR. SULLIVAN: Yes, I can.

For a fire in the control building that affects plant equipment and that requires control room abandonment, operators are going to be automatically dispatched out to the auxiliary control room to start their process. AOI 27 is the plant procedure for abandonment of the main control room and it requires the operator to do these two things before he abandons the control room.

MR. PIERSON: Are you sure the circuits would be available to accomplish that?

MR. SULLIVAN: Let me get to that, please.

He's going to trip the reactor and close the MSIV's

prior to leaving the main control room. Note that closing the MSIV's isolates steam flow to the main feed pump turbine which is going to terminate your feed water flow and avoid steam generator overfill.

Normally there is a manning overlap between the aux control room and the main control room, and when we get to the aux control room which is only two doors away, about 150 feet, so it's less than two minutes we think he's going to get there, once the aux control room is manned, the operator places a transfer switch in auxiliary which removes the damaged circuits in the control building complex and ensures the MSIV is closed.

MR. PIERSON: Could you repeat the last please?

MR. SULLIVAN: Once the operator is in the auxiliary control room and he takes the transfer switches and puts them in auxiliary, the damaged circuits that are in the control building complex are then removed from the circuit. Should there have been a spurious signal over there, the MSIV, that will be isolated from the circuit and the MSIV will close.

MR. PIERSON: You're saying that's accomplished in two minutes?

MR. SULLIVAN: Less than two minutes.

MR. PIERSON: You've actually tested that two minutes?

MR. SULLIVAN: No sir. I'd like to add a little bit more to this.

The MSIV's are fail close valve. They have dual train solenoids. They have an A train solenoid and a B train solenoid. There is diverse isolation mechanisms provided in the safe shutdown logic for fires outside the control building. That diverse mechanism is basically steam load isolation in the turbine building, i.e., the trip valves, throttle valves from the main turbine, the reheat valves. The trip valves on the turbines to the main feed pumps.

On the feedwater isolation signal it's 60 percent steam generator leveled. Feedwater reg valves are going to go closed. There would have to also be some sort of spurious signal that causes the feedwater reg valve to stay open. In addition to the spurious signal that you've already assumed that keeps the MSIV open with dual trained solenoids.

Additionally, when a steam generator level gets to 75 percent, you get the engineering safety feature actuation which closes all four steam generator feedwater isolation valves and trips the main feed pump circuit.

One third signal that could come in, since we've already tripped the reactor, if you get the low TI, which you will because you're steaming the power to the main feed pump to feed the steam generators at 554 degrees, you'll pick up another feedwater isolation signal.

MR. PIERSON: Thank you. I don't have any more questions about that issue.

MR. FOX: We have the CAQR with us, 870151. We'll be happy to provide this to you now and follow it with official docketing, if you so choose.

MR. PIERSON: I would appreciate that. We received a copy of this document that Mr. Fox just mentioned.

The next issue is question 24 which talks about reactor coolant pump seal integrity. The concern here was that during a fire you couldn't maintain your reactor coolant pump seal integrity and you could possibly end up with a loss of coolant accident to your reactor coolant pump seals.

You implied that you had talked to Westinghouse personnel and they indicated that a one hour value applies to both qualified and non-qualified elastomers within your reactor coolant pumps, and that you have in your procedure that you isolate that in an event that it's lost.

I'd like you to comment on that. In particular with respect to this qualified and non-qualified elastomers. I'm not sure I understand. It's my understanding from looking at that that it talks about high temperature elastomers. I'm not sure whether that's a qualified or whether that's a qualified and a non-qualified elastomer.

MR. KOONTZ: We have really reviewed the WCAP in question and also talked to Westinghouse personnel. There

are two basic types of elastomers that are discussed in that document and they are both called high temperature elastomers. One is called a qualified high temperature elastomer, and the other one is called an unqualified high temperature elastomer. Basically they are different manufacturer model numbers.

What we have at Sequoyah is equivalent to or better than the Parker E515-80 elastomer which is called a high temperature unqualified elastomer. Both cases in the WCAP, and this was confirmed by talking to Westinghouse personnel, both of those type of elastomers, both whether they're qualified or unqualified, will last for the first hour. They do degrade differently later on, though, if seal cooling is not available.

MR. PIERSON: Do you have something you're willing to provide to us to substantiate that? A letter or something like that?

MR. KOONTZ: I think what we provided was a reference to the WCAP. Would you like us to provide a letter? We can get Westinghouse to write a letter to TVA which we could provide to you if that would help.

MR. PIERSON: That would be better than what we've got here, because we've got something that's confusing to me with respect to what's a high temperature and what isn't a high temperature elastomer.

MR. KOONTZ: We'll take that as an action item.

MR. PIERSON: So your contention then is that your procedure tells you to isolate the reactor coolant pump? Are you assured that the circuits that are available to isolate that, you can do that in these fire scenarios?

MR. KOONTZ: I'm sorry, could you repeat that?

MR. PIERSON: This one hour time frame that you've got for your reactor coolant pumps, you say that's a windmilling pump as I understand it, is that correct? The pump is de-energized, is that correct?

MR. KOONTZ: The pump is de-energized for one hour, a one hour interval, yes.

MR. PIERSON: From your procedure you say that you're going to secure the pump. My question is, are you assured that the power that's required to secure the pump, to operate the control circuits or whatever, is available?

MR. SULLIVAN: The trip breakers for the reactor coolant pumps are located in the turbine building in a separate environment and a different direction from where the fire is that takes out the charging pumps.

MR. PIERSON: How long would it take you to operate the trip breaker there? How long would it take you to do that?

MR. SULLIVAN: An ASE is stationed in the turbine building and he's called our turbine building ASE and he's

about 50 feet from the pump, fro. ..e breaker, from the board. A couple of minutes.

MR. PIERSON: That's to rack out the breaker or trip the breaker? What are you talking about doing there?

MR. SULLIVAN: Trip the breaker locally at the 6900 volt board.

MR. PIERSON: That's just a switch to operate. You don't have to rack it out is what you're saying.

MR. SULLIVAN: It's a switch on the board, on the compartment.

MR. PIERSON: Does anyone else have any questions about this issue?

Number 25. This considers spurious opening of the pressurizer PORV and that's the same thing we talked about earlier. We really probably are not going to get anything additional from this question. It's just essentially with a different nuance. I don't have anything with respect to this question I need to ask. Does anyone have anything they want to talk about?

(No response)

MR. PIERSON: We'll go on to question 26. Question 26 is a narrow range reactor coolant system pressure sensors, all the narrow range reactor coolant pressure systems are included in the Appendix R analysis. I think you've already addressed that earlier. We'd ask additional questions about

spurious actuation possibly causing an operator to think a loca was in progress. We talked about that earlier. RCS depressurization from a fire, spurious failures, and that's been addressed in question 12.

I don't have any direct questions with respect to that. Does anyone have any items they want to address with respect to question 26 from the staff?

(No response)

MR. PIERSON: In that case, why don't we take a short break, say a ten minute break, and then we'll come back for public comments or TVA comments or both.

(Whereupon, a brief recess was taken.)

MR. PIERSON: We have a few issues we want to talk about, and then we'd like for TVA to talk, and then we're going to let the public have a comment.

Mr. Kubicki has indicated that he'd like to clarify one statement that he made earlier in the meeting, and I'll let him start out with that.

MR. KUBICKI: I'd like to preface my statement by saying that the issue concerns when TVA would have to request approval for a deviation from the criteria of GJ&O. What I was trying to say earlier is that when it comes to a particular condition in the plant, if that condition is not in conformance with 3GJ&O as identified in the supplemental guidance document of 8610, then that condition should be

identified as a deviation and a request for approval sought.

For example, if you have a situation within containment where you have certain cables that you're claiming are not going to be fire damaged, if the basis for claiming that no damage is going to exist is not in conformance with the separation criteria of 3G, then that's a deviation from 3G and should be so identified.

What we have here is we have a couple of situations where you are taking credit for an internal analysis that purports to demonstrate that certain components were not going to be damaged by fire, and yet the basis for such is not the separation criteria of 3G, so therefore that is a deviation and you should be proposing a deviation for that.

Is that clear? There are certain conditions that represent deviations and should be so identified.

MR. PIERSON: Would TVA like to comment on that now? I don't think that is consistent with what we were talking earlier.

MR. EBNETER: We don't need to comment on it. That's staff's interpretation right now, and we'll get back with you on it.

MR. PIERSON: I'd like to move on then.

We skipped over a couple of issues in the questions. One concerned solid plant operations; one was letdown; and one was this question number one which has to do with the

contamination in containment. What I'd like to do is talk a little bit about SOI 26.3 which allows, is your shutdown procedure. It says there that you need to be within 200 degrees of, is it 15 hours? T=15 hours? Is there someone that can comment on that?

I have this document that was given to me earlier by Mr. Fox that says 200 degrees in 21 hours. I'm just a little bit confused about what the situation is.

MR. SULLIVAN: Is that the Westinghouse motor?

MR. PIERSON: Yes it is.

MR. SULLIVAN: Your question again?

MR. PIERSON: It's got a graph and it shows about 200 degrees in 20 hours, 21 hours. I remember earlier that you took credit for 19 hours and some place it's 16 hours. I'm confused about your cooldown sequence for SOI 26.3. How long is it going to take you to get to that point? And how are you going to accomplish letdown to do that if you possibly don't have pressurizer heaters or sprays? In other words, to provide boration to the core.

MR. SULLIVAN: There are three or four questions embedded in that, I believe. I'll try to sort them out.

I would like to go through a little bit about depressurization first, and how we would expect to depressurize the system, and then get to the second part of the question.

When we're cooling down the plant, feeding off the feedwater to the steam generators and steaming, steam from the steam generators, the primary side energy is being removed and the primary side is shrinking. RCS temperature obviously decreases and cold RWST water is provided as makeup. There is going to be a certain amount of thermal losses from the pressurizer during this period of time. Thermal losses from the pressurizer vapor space would be expected.

Should pressure not come down, the SDA can determine that if with the current RCS temperature and boron concentrations, if sufficient boron is in the core to just sit there until pressure decays on down. A realistic approach, there are many ways to remove that excessive amount of energy, pressure in the core. Obviously the technical support center and operational support center is going to be manned post-fire. It's affected the plant in this way. We made some real unlikely assumptions through all of this that the boric acid transfer system, the letdown system, is all not available; that we've not been able to supply the 20,000 PPM boron from the boric acid tanks; that the only water supplied is the 25,000 gallons that you normally make up when the RCS shrinks to a normal cold shutdown condition.

Only if all those cases are required and also the worst case conditions for the reactivity analysis that we've done, and I'd like to go through some of those worst case

reactivity assumptions. I think this was quoted as the worst case Appendix R fire. It has done all the things I have just mentioned, plus it assumes this scenario.

The plant had been at 100 percent power. There is a reactor trip. There is a post-trip review conducted and a fast restart decision made. Maximum delusion is started in order to try to fast restart the plant, at the same time xenon is peaking. Xenon peaks somewhere between nine and ten hours after a 100 percent trip. This analysis assumes we're reaching 100 percent power with boron reaching its peak, which is obviously not possible. This gives you the minimum boron concentration in the core, and that will give you the initial condition for the worst case Appendix R fire.

In reality, in today's world, if you have a trip and you go through and do a post-trip review, you're not going to get it done and get the plant restart decision made prior to xenon peaking. You're not going to be reaching, even if you tried to go back into core, you're sure not going to be getting significant power levels up to get to 100 percent power with xenon peaking.

Additionally, should all of that happen, in four hours you've brought xenon out. Your reactor flux has already burned that xenon out and you're back down to equilibrium xenon. So we're only talking about a four hour period after all these initial conditions have occurred on all this matter

that we don't consider to be a realistic assumption for a -- which I think quite in the beginning of -- you're supposed to look at the probability and consequences of the fire. We've taken such an improbable initial condition and then tried to design a plant for it after a fire that it's just not consistent with other safety requirements. We've gone beyond what we do for other Chapter 15 -- accidents. We don't go into that amount of depth.

This was also done for the worst point in the fuel cycle. In other words, for different cycles BOL, EOL, or whatever point in between, you had to be at that point in the fuel cycle, that one point in the fuel cycle.

Again to summarize, boric acid makeup and boric acid tanks are unavailable, normal RCS letdown is unavailable, excess RCS letdown is unavailable, reactor head vents are unavailable and didn't spuriously open or anything, pressurizer PORVs are unavailable, and boric acid makeup and the refueling water storage tank is your only boration source. We're relooking at that scenario to see if it's appropriate to be part of the design of the worst case Appendix P fire.

MR. PIERSON: So can I infer from that that you assure letdown?

MR. SULLIVAN: No. Letdown, again, is not a requirement in the current shutdown logic.

MR. PIERSON: The reason it's not is because you

feel you still envelope whatever consideration you'd be in because of what you just said.

MR. SULLIVAN: Right.

To address the second point about depressurization a little bit more, there are lots of ways to get that energy out of the core. Like I said, the technical support center and the operational support center is staffed. We've gone through various drills at Sequoyah. An accident never happens, especially a fire, the way you predict and think it's going to happen, so we're going to take credit for the people, the staff that's there, and we're going to assess the consequences and make the best decision at that time.

For example, with portable nitrogen bottles we could go in and get auxiliary spray reestablished to the pressurizer if that method is the most desirable.

Another example, a pressurizer PORV could be opened by wiring in a temporary 125 volt DC power source at the containment penetration such that you could open the PORV with that method for a short period of time to depressurize, to get RHR cut on.

MR. PIERSON: Does anyone have any more comments from the staff about this matter?

(No response)

MR. PIERSON: I'd like to go on and ask a couple of other things.

You don't need to address it right now, but in your water solid condition I do want you to talk about the likelihood of a pressurized PORV opening and putting it in a solid plant condition and how you plan to respond to that solid plant condition when you come to your discussion.

MR. KOONTZ: I can address that a little bit. I can't address it from the operating procedures standpoint. But if you were to spuriously open a pressurizer PORV, what would happen to the reactor coolant system is you'd lose mass and inventory through that PORV.

MR. PIERSON: Right.

MR. KOONTZ: Once the operator took action, and I think you had us consider two cases in here. One was if you took action in the control room, then that action would take place fairly quickly and he would move to close the block valve and terminate the event.

There was a second case that was questioned, and that was if the fire was in the control room, what would the operator do? And for that event, the operator would have to go down to the auxiliary control room and/or the MOV boards and cause the block valve to be closed.

In both of those events, though, what you end up with is an RCS that has somewhat less inventory in it once the vent is closed.

As you continue to cool the system down on the steam

generator, and you use natural circulation or whatever means of cooldown, the bubble in the pressurizer should reform because the RCS is connected to itself in the steam generators. The pressurizer is over there essentially at a dead end leg at that point, so the bubble should reform.

MR. PIERSON: Do you have an engineering evaluation of this, or is this just engineering judgment?

MR. KOONTZ: No, that's engineering reasoning, analysis.

The second thing, the only way we could determine that you might lose a pressurizer bubble was if you had a spurious safety injection which would then fill the pressurizer up with water.

What we looked at there was the charging flow rate, because our safety injection pumps don't pump in at 2250 psi which is normal RCS conditions. So you'd have charging flow at approximately 100 to say if both trains were on maybe 300 GPN, and you'd have approximately 10-20 minutes before you'd eliminate the pressurizer bubble. So the operator would have time to go take action and terminate that spurious safety injection.

MR. PIERSON: What sort of actions would he take?

MR. KOONTZ: He would just have to go down and secure the charging pumps and turn them off temporarily. We've got that in, have we got some operating procedures?

MR. SULLIVAN: E-0 contains, or one of the emergency procedures, I think E-0 refers you to it, contains the SI termination criteria and also the steps the operator goes through to terminate the SI. It tells them what to do if the response is not obtained.

MR. BRYAN: This is Bob Bryan. The other thing that is important is we have assured the instrumentation necessary for him to know that he has a spurious SI and terminate the event quickly.

MR. KOONTZ: As a minimum, remember that we assured pressurizer level so that would be available.

MR. PIERSON: Okay. Rick Wescott has got a question about your HVAC systems and some of the performed calculations he'd like to ask.

MR. WESCOTT: When we asked you question 14, at the time basically our concerns were regarding heat transfer due to a fire through open dampers, walls, and that type of thing and possibly affecting required equipment in adjacent rooms. We have expanded the concern to include equipment that would require for a safe shutdown any place in the plant.

In other words, could a fire take out the HVAC in such a manner that you would have equipment required for safe shutdown exceeding their qualified temperatures and therefore, would be inoperable?

MR. PIERCE: I want to make sure I understand what

you're saying. We've got a fire in say room 8, and circuits for the room coolers, for room B are in there. Will the equipment that we were relying on in room B continue to operate?

MR. SULLIVAN: That's correct. That would be one scenario, yes.

MR. PIERCE: Okay, and correct me if I'm wrong, John Henry, but we have gone through and any place we required room cooling we made sure that that room cooler was available.

MR. SULLIVAN: The shutdown logic already contains the HVAC that is currently necessary and has provided a separation for that HVAC.

MR. WESCOTT: Okay, and I assume when you say room coolers you're talking about area coolers as well, cooling a large area like I think in the vicinity of the auxiliary feedwater pumps as I recall, that's one place that's area cooled, I believe.

MR. SULLIVAN: I'm not sure what the HVAC requirements are in that area, but right now the current shutdown logic does not include HVAC for that area as being qualified. It's not in the current shutdown logic.

MR. WESCOTT: So does this imply that you made calculations that show that even under worst case conditions you do not need those coolers? Is that what you mean when you're saying your HVAC system is not qualified for that area?

MR. KOONTZ: Generally what we do is they take a look at the electrical heat loads in a given area, and if it turns out that you can fail the HVAC in that area due to a fire and still not exceed reasonable qualifiable temperatures, again we don't EQ qualify for fires, but if you look at the temperatures that that room goes to and it stays within reason, then we assume that the cooling is not necessary for that room.

If the temperature goes on up and continues past a reasonable temperature for equipment in that room, what that indicates is that the cooling must be available in that room and we have to provide HVAC separated cooling or some other alternate means of getting cooling into that room. Maybe portable fans, whatever.

MR. ROTELLA: Did you document that analysis?

MR. KOONTZ: Yes. That's documented and it goes into the safe shutdown logic calculation as an input.

MR. WESCOTT: Could we get a calculation number for that?

MR. KOONTZ: I think it's 195. I'm not sure. I'd have to get back with you on the number.

MR. FOX: Has that information been provided to them in this package we sent?

MR. KOONTZ: No, that is a separate package.

MR. FOX: Are you also asking us to provide this

calculation?

MR. PIERSON: Do you need that, Rex?

MR. WESCOTT: Yes, if we could have it we'd like to have it.

MR. KOONTZ: We'll take that as an action item.

MR. PIERSON: Is that all you have on that, Rex?

(Pause)

MR. PIERSON: Mr. Wescott wants to continue on with questions on the HVAC.

MR. KOONTZ: Let me clarify one thing too, Rex. Let me tie up a loose end. As you're probably aware if you read the previous final report from the task team, the HVAC issue related to the calculations was one of the open issues that we were dealing with as a free restart issue. That is still ongoing. What we will provide for you is the current version of the calculation that goes with Rev 6 and then as soon as the new one is out we'll provide that one also for you to look at.

What may come out of the new calculation is some portable blowers may be required in certain areas, and that will be incorporated at that time into SOI 26.2.

MR. WESCOTT: I do have a question.

Have you in fact found, using the existing calculations, that some of the room coolers as presently designed, failure of these would in fact result in

temperatures exceeding the qualification limits of required equipment?

MR. KOONTZ: There are several room areas and I didn't bring the calculation with me today, but I remember one room area went to approximately 118 degrees, I believe, after a fire, which was above the previous temperature for that room. It was an aux instrument room, I believe.

For that area we've asked the electricals to go back and look at the equipment in the area and see what temperature the equipment was qualified to or purchased to to see if it could be reasonably expected to survive that event. We found that the temperature was something like 120 degrees, I believe, in that area, so we would expect the instrumentation and the components in there to survive.

Now some areas would exceed the room temperature after 72 hours, so what we've got to do is we've got to go in for those areas and put in somewhere in the operating procedure, specifically the fire procedure, for the operators to take action to assure that those rooms stay in a reasonable temperature range after 72 hours.

MR. WESCOTT: This would be equipment then that was required to bring the plant into shutdown, but not required for fire chart cooling.

MR. KOONTZ: Yes.

MR. WESCOTT: When you're saying heated up, you mean

actually exceeded the qualification temperatures on the equipment, is that what you're saying?

MR. KOONTZ: It would have heated up in some areas above say 130 degrees after 72 hours, which we would consider unacceptable and we would need to go in and do something.

Beyond that, I don't have enough knowledge of the calculation with me here today to go into the specifics, but I can provide it to you and I can provide the new calculation and you can review those.

MR. WESCOTT: Will we be notified as to the findings of your review and the calculations?

MR. KOONTZ: Yes.

MR. WESCOTT: Thank you.

MR. PIERSON: I'd like to go on and talk about one other thing. I'm a little bit confused about SOI 26.2 and I'd like you to reiterate I think what you've already said, that in the event that you have a situation that you lose one centrifugal charging pump, say from a VCP isolation valve shutting spuriously, do you have the other pump available? Is the additional pump there available? Do you know that for a fact? Have you looked at the interaction study or whatever to say that?

MR. SULLIVAN: We have not looked at the interaction study with the objective of making sure the other pump was not damaged in the fire area. We went through the interaction

study with the intent of ensuring that the existing pump that was sitting there operating at the time did not get damaged.

MR. PIERSON: If you essentially say that the existing pump was not damaged, then you're telling me that if the bond control tank isolation valve shuts the pump can sit there and spin?

MR. SULLIVAN: No sir, I'm not. The operating charging pump will not be damaged by spurious closure of the VCT outlet valves because we will take appropriate action before those valves close.

MR. PIERSON: I'm afraid I'm having a hard time agreeing with that for the simple reason that you told us earlier that you don't consider the fire to exist until you send a runner down to identify the fire. So we could have the valves shut during the time a man goes down, looks, verifies the fire, and comes back. I don't think that a charging pump will operate without a suction.

MR. SULLIVAN: I hear you. The charging pump will not operate with the suction valve closed. We know that, the vendor has told us that. Our whole intent is to ensure that the appropriate action is taken prior to spurious closure of these valves. It takes a finite amount of time to get cable damage.

We have an analysis of that.

MR. PIERSON: Have you provided an analysis to us?

MR. SULLIVAN: We will, if we have not provided it.

MR. PIERSON: I'd like to look at that because I'm concerned about that.

MR. SULLIVAN: I'd like to emphasize again, in case I wasn't clear before, there are three things the operator can do. He can open the AC breakers on the DCT outlet valves, so they won't spuriously close. He can open the RWST supply valve and open its breaker so it doesn't spuriously close, a similar problem to the one that had ben previously identified on the VCT. He can trip the centrifugal charging pump until one of the above is completed. So he has three things in there he can do to ensure that the operating pump is not damaged.

MR. PIERSON: I understand what you're saying. I'd like to see the analysis or calculations you've got that shows the expected amount of time before the fire is detected and the action is taken to isolate that pump.

Does anyone else on the staff have any questions we want to ask? We still need to talk about solid pressure, solid plant ops.

George Hubbard?

MR. HUBBARD: I've got just one point for clarification was earlier they had mentioned the CAQR 8700857. I looked at the data which they listed out the information they provided us, and that CAQR has not been provided, so that

would need to be provided to us. That was relative to question 21, CAQR 870857. That along with the 870151 which you have given us now.

MR. FOX: Yes.

MR. HUBBARD: The one other question with regard to question 22, in your response you indicated that for information notice 8409 that you were in compliance or had approved deviations. I think in telephone conversations we asked that you identify the specific equipment which you utilized to be in compliance with the 8409, and also to identify what the approved deviations are. I think there are a couple on there, I've run across a few. Also, which of the equipment was environmentally qualified.

MR. FOX: Okay. We have taken a copy of the appendix to the shutdown logic calculations, and we have checked those items which are 5049 EQ'd and I'll provide that to you now for information, and we'll put it on the docket of forms coming back.

MR. KOONTZ: George, I think the approved deviations are in an NRC letter, and we can provide the reference for that.

MR. HUBBARD: I do have one letter on approval of deviations. I have a May 29, 1986 which gives some deviations.

MR. PIERCE: There was another one I believe in

October of '86 that was on lack of TECo instrumentation in the auxiliary control room.

MR. FOX: October of '86?

MR. PIERCE: I believe that was the date.

MR. FOX: We will confirm that.

MR. KOONTZ: I believe those two constitute the approved deviations for instrumentation.

MR. HUBBARD: So any deviation that would have been approved by the NRC.

MR. KOONTZ: Yes.

MR. PIERSON: Is that all?

I'd like you to speak about solid plant operations for a minute as we discussed earlier.

MR. FOX: Okay, I would like to review the bidding right now because there are several things we want to do to close out our part of this presentation today. We will cover depressurization, we'll cover the water solid, we also want to run through the action items to make sure we have a clear understanding of everything you've asked for here today. I've tried to keep up with it, but I'd like at some point before we turn the meeting over to public comment to run through those.

MR. PIERSON: That's fine.

MR. FOX: We'd now like to have John Henry Sullivan talk about depressurization.

MR. HOSMER: Before we do, I'd like to add a comment

on the charging pump question we brought up. I asked for this, as project engineer in Sequoyah I asked for this task force to be formed to look at these issues. One of the things I asked be done was an industry survey in particular on the charging pump issue because this is a Westinghouse plant with charging pumps of the type provided by Westinghouse.

What we found on this issue is what Sequoyah is the doing is the norm for Westinghouse plants. It is in NTOL's as well as older vintage plants. Our approach is consistent with what they are doing, and more conservative than some.

MR. PIERSON: Could you supply, we need something, that's not in the submittal that you gave us.

MR. HOSMER: I don't know how to name plants, give you a list of plants.

MR. GARG: I think it's in Appendix A.

MR. HOSMER: I believe it's in an attachment.

MR. KOONTZ: The industry survey on issue A-15 in the testing report.

MR. PIERSON: Thank you.

MR. FOX: Okay. We'll go ahead and cover water solid now then.

MR. KOONTZ: I think we've covered water solid from the standpoint of spurious safety injection being one clause; opening of the PORV being another clause; and I think we've gone into the depressurization a little bit. If you've got

some further questions, for example, on issue A1 on the dose or any of that, we can cover that.

MR. PIERSON: It appeared to me from your earlier submittals that you were taking credit for pressurizer PORV operation for reactor head vent valves in event of a solid plant operation, and as such I was interested in what would happen in terms of contamination inside the containment and how that would affect your accessibility to operate the RHR valves.

You told me in the meeting that you don't take credit for pressurizer PORV valves opening or reactor head vent valves opening, and presumably you've got the flow control valve or the RHR valve adequately protected such that a fire isn't going to destroy it such that you can't repair it within 72 hours. I don't see access to the containment as a problem per se, provided that you're not going to be leaking reactor coolant system coolant into the containment. If that's true, I think we can probably get around question number one.

I need some response rather than shaking your heads here.

MR. BRYAN: That's correct. We do not need access to the containment when we would have a release from the RCS.

MR. PIERSON: So what you're saying is when you have a release from the RCS you're in a loca and your hot shutdown

sense?

MR. KOONTZ: No, remember the reason that we would need access to the containment was to go in and repair, to manually open the valve door to repair the wiring or the motor on the valve. A study was done to show that there was not a fire loading in there that would cause those valves to be damaged other than the wiring or the motor itself. If the wiring or the motor to that valve was damaged, then we would not have had a spurious SI and we would not have had contamination inside the containment. That's the argument.

MR. BRYAN: And normal letdown would be available.

MR. PIERSON: We think you're going to have to supply us a deviation on that analysis for those flow control valves, because you're not taking the normal 20 foot separation on that.

MR. KOONTZ: We provided the drawings on those valves I think in the last submittal.

MR. PIERSON: Is there a 20 foot separation?

MR. KOONTZ: That I don't recall. One is inside the crane wall on the floor and the other is up in an accumulator room.

MR. PIERSON: We can address that later.

MR. PIERCE: Can I get a clarification? Are you saying the separation between the 74-1 and 74-2?

MR. PIERSON: Yes.

MR. PIERCE: Are you saying the separation between 740-1 and 74-2 and --

MR. PIERSON: What I'm talking about is you're saying that the only fire there in terms of 74-1 and 74-2 is going to affect the motor operator of the valve as well as I remember, so it can only affect that valve. But I thought I understood from that that as a result of that fire hazard analysis you did, that you didn't meet some of the separation criteria that you would normally have to meet for Appendix R. If that's the case, then we need to have some sort of a deviation or something on that. I may have misunderstood that, but that was my understanding earlier in the meeting.

MR. HOSMER: We'd like a couple of minutes here just to caucus on that a second.

(Pause)

MR. BRYAN: What we want to clarify is, we don't see, it appears that you're asking us for a deviation request because you say we don't have 20 foot separation.

MR. EBNETER: Let me cut that off. We'll tell you formally whether we want a deviation on anything at all, but I don't want to debate it in this meeting.

MR. PIERSON: Is that acceptable? We'll take it up in a later issue.

MR. BRYAN: Okay, that's acceptable.

MR. PIERSON: Any other questions?

(No response)

MR. PIERSON: Does TVA have anything else to say in their response with respect to some of the other issues?

MR. KOONTZ: Let me ask if you had any further questions on number one, the off-site dose calculation?

MR. PIERSON: Possibly. It depends on something to do with the RHR valve, but I think we can work around that later. I don't think that's worth discussing now.

I'm ready to close the NRC's portion of this meeting.

MR. FOX: I would like to run through the action items as I have them identified, and if NRC staff has one that's not on the list, please call it out.

The first one is the docket CAQ 870151. Also we've been asked to docket CAQ 0857 in reference to question 21. 870151 was, I guess, one of the others.

We've also been asked to docket the list of Appendix R equipment that's 5049 AQ'd. I handed George Hubbard a marked up appendix to the calc that was provided opposite question 22. We will formally docket that.

Also we need to provide you with, relative to question 24, the reactor coolant pump seal, we'll get a letter from Westinghouse and we'll provide that to you. It has to do with elastomer seal integrity.

We also will provide you the revised procedure to

pull fuses. That's SOI 26.2.

We will also provide you the HVAC calculation, both the old calculation and the new calculation when it's finished and we'll advise you of any actions we feel are appropriate to take with regard to providing localized cooling.

We also need to provide you an analysis assuring the operating charging pumps integrity, survivability.

Are there any other items?

Instrument lines outside the tank.

MR. PIERSON: We may have some other requests with respect to the pressurizer PORVs, the assured letdown, and the protection for your flow control valves, your RHR flow control valves.

MR. FOX: Okay. You haven't made your mind up on those yet?

MR. PIERSON: Well, I have to look at the transcript and discuss it with the staff.

MR. FOX: Okay.

MR. PIERSON: The second thing we need to reiterate is, I was a little bit remiss, and I wasn't keeping track of the items and there may be other items in the transcript and we'll ask for them.

MR. FOX: We'll scan the transcript. These were things that, with one exception, that we felt like you wanted fairly quickly and we're going to go ahead and initiate action

immediately to get those in and get them on the docket.

MR. PIERSON: We appreciate that.

MR. EBNETER: Before we close I'd like to make one comment. I'm somewhat concerned in looking at the chronology of events that TVA identified a problem with these calculations some time ago and the NRC wasn't aware of it until December. Is that true? In looking at your chronology, DNE calculation programs, identification documentation in December of '86. Should we have been notified?

MR. FOX: You're referring to the second --

MR. EBNETER: Part of your presentation.

MR. FOX: Well part of the handout we gave you.

MR. EBNETER: Right.

(Pause)

MR. HOSMER: Are you referring to the 12-86 date?

MR. EBNETER: Yes.

MR. HOSMER: That came out of the calc regeneration effort, a concern about unverified assumptions. I think we made it visible and apparent to you in Knoxville as part of audits. Can you help me, Mr. Koontz?

MR. KOONTZ: Yes. That whole program was audited by the NRC.

MR. EBNETER: Who was that, do you recall?

MR. KOONTZ: Gene Embro was in charge of that audit on calculations, and I believe the NRC reviewers took a copy

with them of the CAQR that reported that calculation was in error.

MR. EBNETER: Okay. I'll retract my remark. That must have been one of Gene's first DVBP inspections, is that right?

MR. FOX: I think part of the problem is that 86 should be 87.

MR. KOONTZ: Maybe that's part of the problem. There's a typo in there.

MR. FOX: No, that's out of sequence again.

MS. AXELROD: Are you talking about a recent inspection by Gene Embro?

MR. KOONTZ: This is the whole calculation verification program where they came in and they audited the civil, electrical, mechanical, nuclear calculations and they closed out the issues on the nuclear and mechanical calculations. The review team consisted of Embro, Ron Parkhill, and others.

MR. EBNETER: That slide is in sequence and it says 12-86.

MR. KOONTZ: That's correct.

MS. AXELROD: When did Mr. Embro do his inspection?

MR. FOX: I guess the best thing for us to do is to get with the people that were involved and we will take that as an action item to provide an explanation.

MR. EBNETER: If that is the case when it was identified, and particularly an Appendix R error, that thing should have been reportable, I believe. If it was not, and we didn't discover it until a year later, whether through an inspection or through an alleger, I still have some concerns about it. That's all I want to comment about it. But I will check back with you on that.

MR. HOSMER: Let me provide one piece of information. I think you're aware as part of a very massive calculation regeneration effort one of the things that TVA identified were numerous unverified assumptions. This was one of hundreds of unverified assumptions that were being monitored, tracked to closure. It was viewed as not a technical issue or a safety issue. It was viewed as needing to establish as built documentation. It was tracked and monitored as part of a program to close all of those issues prior to restart.

MR. EBNETER: Okay. I just wanted to let you know I have a concern about it.

MR. FOX: We'll get you the explanation of the events.

MS. AXELROD: I'd like to ask one question. What is the status of Rev 8 of the calculation? I've heard you might be working on a Rev 9, is that true?

MR. PIERSON: We have Rev 8.

MS. AXELROD: Are you working on a Rev 9?

MR. KOONTZ: Yes. Revision 9 will be out, I don't know what the date scheduled for it is, and it will incorporate the new results of the HVAC analysis and these other issues.

MS. AXELROD: Can you give me an approximate date, when you expect it to be out?

MR. KOONTZ: I can't at this time, but we can get the date for you.

MS. AXELROD: Do you expect it to be out prior to restart?

MR. KOONTZ: I would expect the HVAC issue and the new revision out prior to restart, yes.

MR. PIERSON: Unless someone on the staff has some additional comments, I'm going to turn the meeting back over to Mr. Richardson, and Mr. Richardson will close it out to public comment.

Any questions?

MR. RICHARDSON: This is the portion of the meeting on the agenda that has been reserved for public comment period. Are there any members of the public that wish to make a statement?s

MS. BERNABEI: My name is Lynn Bernabei. I'm attorney for Andrew Bartlik who has raised many of the concerns that are being discussed here today.

I'd like to make two comments that I think are integrally related to the technical issues that have been discussed. One has to do with Mr. Bartlik's charges of harassment and intimidation. Essentially he has charged that his contract was terminated because he identified these safety issues which cite management and upper level TVA management attempted to suppress. I think the NRC staff has to address that issue because the Commission has stated in no uncertain terms that if there has been intimidation of engineers and employees it is a very serious bar to the flow of safety information to upper TVA management and to the NRC.

The second issue that I think the staff should address is why we're all here today on the eve of restart days or weeks before the Commission is about to vote on restart, debating very serious safety issues. I think the only conclusion you can come to is that basically these problems which have been identified in internal memoranda in August of this year were withheld from the NRC so the staff could not complete a complete review at that time.

I think the reason people are scrambling right now is because that information was withheld. And given the seriousness of the problems and the likely reportability under NRC regulations, I think the staff should explore what happened that these issues were reported to you not by TVA but by a former TVA engineer.

Mr. Bartlik has a number of concerns that he wanted to talk about in terms of the technical issues, but I would urge the staff to review those two things before coming to any recommendation on the technical issues or on restart.

MR. RICHARDSON: Thank you.

MR. BARTLIK: My name is David Bartlik. I'd like to talk about a few things.

First I'd like to read a statement. I think the discussions here have shown that there are many unresolved problems pertaining to Appendix R of TVA's program. I would like to focus on a few of the areas. I believe it's clear that TVA does not meet NRC Appendix R requirements, and this has not been discussed in sufficient detail in all the areas I am concerned with, although the staff has made a reasonable attempt to do so.

First I'd like to talk about SOI 26.3. Mr. Sullivan today was alluding to all the excess conservatism they have used in this calculation. I wish to point out that that SOI 26.3 is TVA's basis for establishing long term reactivity control, and that is what their calculations for ensuring the core will be maintained in some critical conditions is based on. It is based on the establishment of a letdown path through the RHR system at T=15 hours or 16 hours. If TVA intends to use this procedure, it also requires the RCS be cooled to 200 degrees F. If they intend to have the RCS

cooled to 200 degrees at T=15 hours, I would suspect the RHR valves would have to be opened well before eight hours.

TVA is relying on repair procedures, but by their own admission it takes up to 19 hours to get the valves fixed. Clearly these valves have to be fixed for periods as early as eight hours.

In addition to that, TVA has had previously not had any information from Westinghouse regarding how long it would take to cool the plant with a single train of RHR coolers available.

As it turns out, when this analysis came in from Westinghouse, they have determined that it takes over 20 hours, I think it was 25 hours if we look at that graph, to cool the plant from hot standby conditions to 200 degrees. So it's essentially that calculation from Westinghouse that shows that TVA is not able to cool the plant down to 200 degrees within the allotted time. Therefore, they cannot meet the reactivity control requirements as specified in SOI 26.3.

In addition to that, TVA is relying on seal integrity for, it's relying on seal injection for seal integrity in a large number of fire areas. As a matter of fact, according to their safety position statements there is only one plant area in which they're relying on CCW to the thermal barriers as a means of maintaining seal integrity. Ultimately seal injection will result in the overfill of the

RCS and you must establish a letdown path. TVA's own calculations have shown that this establishment of letdown path for providing control is required at T=19 hours. That's where the original 19 hours came from. Again, they have not ensured this ability.

Again, at T=19 hours, they are not able to have opened up the RHR valves and cooled it down sufficiently to use TVA's own designated method of letdown.

In addition, there has been some debate whether these part 100 limits are accurate, or part 20 limits. I wish to point out that this Appendix R is not an accident and part 100 limits are only applicable to accident scenarios. TVA submitted calculations showing they are within their part 100 limits, as opposed to part 20.

TVA's letdown scenarios also dump water either to the floor, to the reactor building floor, or sometimes the auxiliary building floor. It is not clear to me that the part 20 limits can be maintained with dumping water to the floor as they are currently planning, especially considering that the necessary HVAC systems that normally clean up such radioactive spills are not included in the analysis.

TVA also makes an interesting statement regarding water solid operations. They say that under water solid operations they will slow their cooldown rate. I guess they don't have to minimize any transients. It's interesting to

note that if you're cooling slowly that is clearly not in accordance with SOI 26 which requires a prompt cooldown.

Also TVA used the justification for not training operators on water solid operations that it's a low probability event. It is not necessarily such a low probability event. Also, loca, steam generator tube ruptures are also low probability events, and we certainly train operators on these. It's been noted that one of the most likely current concerns for core melt accidents is a fire-initiated event, so that they don't train to ensure they don't do something to endanger the public is beyond me.

It's also interesting to note, Bob Bryant, I know I talked to Bob many times about the issue concerning the steam generator PORV and blowdown of multiple generators. I was essentially the author of the CAQR that TVA references allegedly resolving the problem, they distributed the CAQR and said therefore, we don't have a problem.

It turns out that before I issued that CAQR, TVA's, I guess what I consider TVA's leading expert on single failure criteria, Harry O'Brien, had been fully consulted on that matter and was in full concurrence with me. Harry O'Brien is documented, saying that in a memo. Also I feel Doug Wilson considers him as expert because when I raised the CAQR, TVA, the first thing is Doug Wilson disagreed with my interpretation of the rules and the first person Doug Wilson

ran to was Harry O'Brien. He advised me that I should talk to Harry because I obviously don't know what I'm talking about. I responded I had fully coordinated with Harry O'Brien, and it has been supported.

I kind of wonder why TVA hasn't brought Harry O'Brien to discuss this matter, because I know he has a little bit different opinion that Mr. Bryant.

One interesting point, I don't want to get into all the technical details contained within that CAQR because it would really take more than 20 minutes to adequately discuss it, but I understand TVA has made some statements that they could always close that pressurizer PORV. I want to point out that if you have a steam generator tube rupture and that PORV is open and you take the failure of that closing solenoid as your single active failure, that PORV will not close. That will most clearly increase the significance of a steam generator tube rupture because TVA's current analysis assumes that that PORV is promptly closed. They will not be able to do that and it will delay operator action, and therefore, it will increase the amount of RCS that gets into the steam generator because it will be lower, steam generator pressures. It will also increase the amount of release because the valve will be open longer.

Again, it just shows how the failure of the PORV creates a beyond design basis event. A failure of this

control circuitry the way they have these non-qualified circuits influencing the position of the PORV.

I also wish to point out that from my understanding from John Henry Sullivan's discussion is that they are relying on a factor, they're saying that a VCT isolation valve will not close before ten minutes and give the operators time to do things like rack out the breakers so the valve will not close, or open the RWST. There is one other thing he was relying on. None of these methods being assured available from a fire.

I also wish to point out that an analysis of that nature is not currently allowed by Appendix R and would require a deviation request in my estimation. I understand TVA has not submitted the same, also.

Another concern that was not really thoroughly touched on is if we have a spurious safety injection signal as TVA has admitted may occur, that will start both charging pumps. TVA has not ensured that the RWST will be properly aligned and this may result in the charging pumps being left drawing suction from the VCT. That will promptly deplete it and this will result in the charging pump sucking on hydrogen which will also promptly destroy both charging pumps as well as the SI pumps which are also aligned at that time.

In addition, TVA has not ensured the prompt availability of RHR. They rely on repair procedures. This will also mean that it may very well be that the RHR pumps are

disabled. They may be left with absolutely no way to get water in the core in this event. I think we should examine this a little bit more closely.

I'm also pointing out, it was demonstrated in discussion today that there is no method assured by TVA to terminate feedwater flow, main feedwater flow to the steam generators in a control building fire and they are ultimately relying on action in the auxiliary control room. I am unaware of any calculations to determine how much or whether these generators won't back to overfill before they get down there.

Also, I understand TVA is taking credit for very short operator responses. Normally speaking, the NRC allows ten minute operator response for actions within the control room. I think a two minute operator responses currently called for might be over-stretching the operator's capabilities, especially considering he may not exactly appreciate what if anything is happening. I'll get into that a little more with regard to spurious SI a little later.

Also similar problems with the pressurizer PORV in the aux control building fire. Obvicusly, if you made your mind up and you say to the control room "Go, close that valve." You can get there in two minutes. I think that's about the extent of the analysis. However, you've got to keep in mind the operator may not really know what he has. I'm going to ask these things in question form because that's how

they're written to save time, but I'm really not expecting a response at this time.

How does TVA know in fact that the PORV is open? Do they have any position indications assured that they're going to receive that the PORV is in fact open? Any pressure indication that they know they're going to receive hat the RCS pressure is dropping?

If the operator receives indication that the RCS is depressurizing and it receives a fire alarm, does he use his EOIs and follow them until he reaches the appropriate exit point? Or does he go to an AOI for control room abandonment? How are these procedures coordinated?

Will it take longer than two minutes to exit the EOI? How could they close the block valve before this time? If it takes ten minutes to close the block valve, what will the RCS conditions be? Is the situation currently analyzed?

Obviously if the PORV is only open for two minutes, the RCS conditions are not going to degrade that much. Normally safety injection comes on in a minute or thereabouts. Two minutes, I will acknowledge that there won't be much change in the RCS conditions, and I agree with Frank Koontz if they get there in two minutes it's not too much of a problem. Unfortunately, I believe it may take 10 minutes or 15 minutes to really figure out what happened. Ten or 15 minutes, you've lost substantial inventory and you are beyond your design

basis. You've gone into degrading of steam generator loops.

I believe this is unanalyzed at this time. I think the NRC staff should be very careful before they allow TVA to take credit for two minute operator response on an event of this nature.

In an actual loca if the operator receives a fire signal, this is not a real fire, by the way, just something caused as a consequential failure that occurred due to the loca. Maybe the diesels didn't start properly, maybe it was a voltage spike like we were talking about. I understand some people have raised that concern. That might have done something funny to the fire detection system that a false alarm comes in. Does the operator go into his loca procedures or does he go to his ALI's? Obviously, fire protection takes lower priority and the operator is going tc stick with his EOIs first until he's absolutely positive he does not have a loca before he starts thinking about fires.

TVA also made statements today that they don't care if safety injection signals actuate. I want to point out that this is different than their 1984 position where they say it will not occur. I refer staff to the safety position statements. I can't put my finger on it exactly, but Mr. Pierce, I'm sure, could confirm that. We discussed that item at one point or another.

I've got questions with this spurious SI again. If

the operator really isn't sure what he's got, I believe the prudent thing would be to keep that SI flow going, and it may take all of 20 minutes to figure out that he doesn't have a loca and has a fire. Keep in mind, although TVA has said they have ensured a pressurizer level sensor available, the failure mechanisms of these pressurizer level sensors could be that you would have some of them failing on scale in intermediate values. The operator may be faced with two pressurizer level sensors, off scale load, the majority of his pressure sensors including his narrow range and some of his wide range indicating low pressures, pressurizer level indicating low, and then he sees one lone pressurizer level set lifting up kind of slow looking like it might be failing. What's he going to listen to? The weight of the indication that may indicate a loca and it may take him substantially longer than 20 minutes.

I also want to point out that TVA responded in the recent correspondence to the NRC that an analysis on Bellafont was done and showed that the operators would in fact respond. I wish to just for the record state that I performed that analysis and I realize what the flaws are, not that they're flaws, but what the limitations are, I should add. That analysis also showed that in some areas it would be likely for the reactor to be driven more to solid. In those particular scenarios around Bellafont, we assured that we didn't have to

go into containment, that we didn't mess up the environment. I don't think we've done that at Sequoyah.

Also, TVA makes statements that they believe there will be sufficient indication available. Again, before we made those statements on Bellafont, we made specific looks at what instrumentation were lost, we made judgments as to whether it would be sufficient indication left over, and then we tested the operators. Per discussions with Ed Sheehy at TVA, we went over some scenarios where we lost tremendous amount of indication with a 20 foot Appendix R fire. With that indication in our opinion, it may be survivable, but it would certainly require some special operator training which is contrary to what TVA is currently considering to do.

(Pause)

Also I would like to talk about the main steam isolation valves. I know we talked about so much redundancy in separation. I'm not sure about TVA's specific design, but all the other plants I worked on, the main steam isolation valves, this is pro-Westinghouse, generally requires power to trip those valves although they are fail-close valves. The closing solenoids are usually, generally, this could be verified with Mr. Hosmer shaking his head no, but my understanding is the circuits that actually close the solenoid, that actually bleed the air require power. There are multiple solenoids, granted, but they do require power.

Again, I may be incorrect at TVA because I have not reviewed those specific circuits.

MR. RICHARDSON: You have a couple of minutes left in your allotted time.

MR. BARTLIK: Yes sir.

TVA mentioned they will trip the breakers, they would just hit a switch at the local control center. I wonder, hitting that switch, is that possible that the control power has been disabled? Has TVA shown that control power is available to trip the RCP breakers, or is TVA going to have to rely on winding up those breakers with the reach rods? I'm not sure what exactly TVA has to do to trip those RCP motor control centers.

I'd like to talk a little bit to RCS depressurization. John Henry Sullivan mentioned a lot of methods in which to depressurize the RCS. I wish to point out none of them are currently in the Appendix R shutdown logic. That was originally one of my concerns in that it wasn't there and it was unclear if the RCS would be able to be depressurized in a reasonable time frame, in the time frame required for SOI 26.3.

Although we may be able to get in there and put air bottles and do a number of different things, those are currently not reflected in procedures as required by the law.

MR. RICHARDSON: Do you have any closing comments,

Mr. Bartlik? You've come to the end of the allotted time.

MR. BARTLIK: You said you might give me a little more time. If you can give me about two more minutes --

MR. RICHARDSON: Please wrap up within that time.

MR. BARTLIK: Yes sir.

AOI 27 which deals with pulling control fuses for the pressurizer head vents, I mean the RCS head vents, the head vents may open for numerous other fire areas and AOI 27 I believe pertains strictly to the control room, so this procedure currently does not reflect the need to disable power to these valves.

I have no further comments. Thank you.

MR. RICHARDSON: Thank you very much.

MR. BARTLIK: I would like to say if any of the staff needs my help to discuss any of these items, for further clarification, I will be available.

MR. RICHARDSON: Thank you. Does TVA have any brief comments?

MR. FOX: Yes. TVA does not agree with a lot of the statements that were made by Mr. Bartlik. We'll be happy to address any of the questions that NRC staff feels are appropriate and need to be addressed after reviewing the transcript.

MR. RICHARDSON: Thank you, we appreciate that.

MR. PIERSON: Thank you for your participation.

(Whereupon, at 5:16 p.m. the meeting was adjourned.)

REPORTER'S CERTIFICATE

DOCKET NUMBER:

CASE TITLE: MEETING: NRC & TVA re: 10 C.F.R. Part 50, Appendix R Issues

HEARING DATE: March 9, 1988

LOCATION: Rockville, Maryland

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the hearing in the above case before the ADVISORY COMMITTEE ON REACTOR SAFEGUARDS.

Date: 3/9/88

Margaret Daley

Official Reporter

HERITAGE REPORTING CORPORATION
1220 L Street, N.W.
Washington, D.C. 20005

MARCH 9, 1988 MEETING

AGENDA FOR APPENDIX R DISCUSSION

BETWEEN NRC AND TVA FOR SEQUOYAH UNIT 2

OPENING REMARKS (MEETING FORMAT)	S. Richardson/S. Ebneter
BACKGROUND	R. Pierson
DISCUSSION	Staff/TVA

TVA will be asked to address staff questions on various Appendix R issues including the following:

- Spurious actuation
  - HI/LO pressure interface
  - Associated circuits
  - Ungrounded DC circuits
- Effect of fire on instrument sense lines
- RHR cooldown with one train
- Spurious actuation of specific components (PORV's, Reactor Head Vents, etc.)
- Solid plant operations
- Single failure criteria
- Instrumentation requirements of IN 84-09

PUBLIC COMMENT	20 Minutes
CLOSING REMARKS	S. Richardson

Relative to Q-22 Sentence Calc

ADD'L INFO

✓ - END DEVICE IS IN THE EQ PROGRAM (e.g., PT, LT, TE etc.)

OTHER ITEMS MARKED "NOT IN EQ PROGRAM" ARE NOT IN PROGRAM FOR VARIOUS REASONS: (EXAMPLES)

a) MILD ENVIRONMENT
b) ESSENTIALLY MILD
c) CATEGORY "C"
d) NON-SAFETY RELATED LOOPS
ETC

THIS MUST INDICATES SOME EQUIPMENT DIFFERENCES EXIST BETWEEN EQ AND APP R AND SHOULD NOT BE A BIG SURPRISE.

EQUIPMENT REQUIRED FOR SAFE SHUTDOWN
DURING A DESIGN BASIS FIRE

SQN-SQS4-0127

Prepared by/Date R. Rockwood 2/

Checked by/Date R. L. Clark 3/10/8

APPENDIX D

APPENDIX D - INSTRUMENTATION LIST FOR MAIN CONTROL ROOM

Indicator			Description
LI-68-339			Pressurizer Water Level
LI-68-320	One of three		Pressurizer Water Level
LI-68-335A	(68-335)		Pressurizer Water Level
PI-68-342A			RCS WR Pressure
PI-68-66A	One of three		RCS WR Pressure
PR-68-69			RCS WR Pressure
PI-1-2A	Either one	Two Loops Required	SG-1 Steam Press
PI-1-2B			SG-1 Steam Press
PI-1-9A	Either one		SG-2 Steam Press
PI-1-9B			SG-2 Steam Press
PI-1-20A	Either one		SG-3 Steam Press
PI-1-20B			SG-3 Steam Press
PI-1-27A	Either one		SG-4 Steam Press
PI-1-27B			SG-4 Steam Press
LR-3-43			
LI-3-174			
LI-3-164			
LI-3-38*	Either one		SG-1 NR Level
LI-3-39			SG-1 NR Level
LR-3-43	43		
LI-3-156			
LI-3-173			
LI-3-51*	Either one		SG-2 NR Level
LI-3-52			SG-2 NR Level
LR-3-98			
LI-3-172			
LI-3-148			
LI-3-93*	Either one		SG-3 NR Level
LI-3-94			SG-3 NR Level
LR-3-98			
LI-3-175			
LI-3-171			
LI-3-106*	Either one		SG-4 NR Level
LI-3-107			SG-4 NR Level

✓ means 50.49 EQ'd

Prepared by/Date R Eckl 2/19/87

Checked by/Date R.J. Clark 2/19/87

APPENDIX D

APPENDIX D - INSTRUMENTATION LIST FOR MAIN CONTROL ROOM

Indicator		Description
TE's		
TR-68-1 (Pen 1)	Two loops required	RCS Loop 1 Hot Leg
TR-68-1 (Pen 2)		RCS Loop 1 Cold Leg
TR-68-24 (Pen 1)		RCS Loop 2 Hot Leg
TR-68-24 (Pen 2)		RCS Loop 2 Cold Leg
TR-68-43 (Pen 1)		RCS Loop 3 Hot Leg
TR-68-43 (Pen 2)		RCS Loop 3 Cold Leg
TR-68-65 (Pen 1)		RCS Loop 4 Hot Leg
TR-68-65 (Pen 2)		RCS Loop 4 Cold Leg

Source Range Flux Monitor

NI-92-31B	Either one
NI-92-32B	

Condensate Storage Tank Level

1.	LI-2-230A	Either one for Tank A (Note 1)
2.	LI-2-230D	
3.	LI-2-233A	Either one for Tank B (Note 1)
4.	LI-2-233D	

Chemical and Volume Control

1.	LI-62-129 (Tank Level-VCT)	Note 2
2.	FI-62-93A (Charging Flow)	Note 3

Note 1: If MCR indication is not available, local monitoring of tank level or AFW suction pressure is acceptable

Note 2: Refer to key 4 for actions if this level indication is not available.

Note 3: This indicator is only required if the normal charging path (Rev 1 2/19/87) is chosen in key 2.

*Denotes steam generator level transmitters whose sense lines have been verified as being unaffected by a fire inside containment (B29 880120 001). Only the sense lines are Appendix R equipment (i.e., the cabling was not evaluated).

APPENDIX B

EQUIPMENT REQUIRED FOR SAFE SHUTDOWN
PER 10CFR50 APPENDIX R

Prepared by/Date RA Ellis 2/10

SQN-SQS4-0127

Checked by/Date RJ Uhl 2/10/88

APPENDIX E

Appendix E - Instrumentation List for Auxiliary Control Room:

Pressurizer Pressure and Level

Level

not in EQ pgm

1. LI-68-335C Either one
2. LI-68-326C

Pressure

not in EQ pgm

1. PI-68-336C
2. PI-68-337C One of three
3. PI-68-342C

Reactor Coolant Hot Leg Temperature

1. TI-68-1C (Loop 1)
2. TI-68-24C (Loop 2)
3. TI-68-43C (Loop 3)
4. TI-68-65C (Loop 4)

All four loops ~~Any two loops used for cooldown~~ Rev 2/11/88

Steam Generator Pressure and Level

Pressure

not in EQ pgm

1. PI-1-1C (Loop 1)
2. PI-1-8C (Loop 2)
3. PI-1-19C (Loop 3)
4. PI-1-26C (Loop 4)

All four loops ~~Any two loops used for cooldown~~ Rev 2/11/88

Level

1. LI-3-164C (Loop 1)
2. LI-3-156C (Loop 2)
3. LI-3-148C (Loop 3)
4. LI-3-171C (Loop 4)

All four loops ~~Any two loops used for cooldown~~ Rev 2/11/88

Source Range Flux Monitor

not in EQ pgm

1. NI-90-210

Level Indication for Tanks

Volume Control Tank

not in EQ pgm

1. LI-62-129C

3534F/JMS

INSTRUMENTATION REQUIRED FOR SAFE SHUTDOWN
PER 10CFR50 APPENDIX R

SQN-50S4-0127

Prepared by/Date R. A. Edwards 2/11/88

Checked by/Date R. T. Clark 2/10/88

APPENDIX E

Appendix E - Instrumentation List for Auxiliary Control Room:

Diagnostic Instrumentation for Shutdown Systems

Auxiliary Feedwater System

1. FI-3-163C (Loop 1)
2. FI-3-155C (Loop 2)
3. FI-3-147C (Loop 3)
4. FI-3-170C (Loop 4)

All four loops ~~Any two loops used for cooldown~~ RWE 2/11/88

EM NOT IN EQ PGM

5. FI-3-142C (Aux FPT Disch)

Chemical and Volume Control Tank

not in EQ PGM

1. TI-62-80C (Ltdn Ht Exch Outlet)
2. PI-62-92C (Chg Hdr Press)
3. FI-62-93C (Chg Hdr Flow)
4. FI-62-137C (Emer Boration)

Safety Injection System

not in EQ PGM

1. FI-63-91C (RHR Pmp A-A to RCS 243 CL)
2. FI-63-92C (RHR Pmp B-B to RCS 144 CL)

Either one

Essential Raw Cooling Water

not in EQ PGM

1. FI-67-61C (ERCW Supply Hdr A)
2. FI-67-62C (ERCW Supply Hdr B)

Either one

Residual Heat Removal

not in EQ PGM

1. TI-74-38C (RHR Hex A Outlet Temp)
2. TI-74-40C (RHR Hex B Outlet Temp)

Either one

TVA Nuclear QA Record

CAQR 8/21/87 AUG 21 1987 REV. 2

CAQR NO. SQF870115

RIMS ACCESSION NUMBER 805 '87 0821 384 805 '87 1109 307

PART A DESCRIPTION OF THE CAQ

PLANT/PROJECT SQN UNIT 2 VENDOR

SYSTEM 63.3 VENDOR'S ADDRESS

COMPONENT INSTRUMENTATION ASSOC WITH THE RCS AND SDE CONTRACT NO.

ASME? YES ☒ NO ☐ REFERENCES

REQUIREMENT VIOLATED SEPARATION OF ESSENTIAL SHUTDOWN SYSTEMS FROM THE EFFECTS OF FIRE

SOURCE OF REQUIREMENT VIOLATED APPENDIX R TO 10CFR PART 50

DESCRIPTION OF CONDITION

ADEQUATE SEPARATION OF INSTRUMENTATION ESSENTIAL TO SAFE SHUTDOWN IN THE EVENT OF FIRE HAS NOT BEEN ACCOMPLISHED. THIS CONCERN IS DETAILED IN THE ATTACHED SHEETS.

RECOMMENDED CORRECTIVE ACTION (OPTIONAL)

RELOCATE AND/OR PROTECT THE AFFECTED INSTRUMENTATION CABLES AND SENSE LINES SUCH THAT COMPLIANCE WITH THE FUNCTIONAL CRITERIA IS ACHIEVED

CAQR INITIATED BY AJ BARTLIK CR Smith DATE 8/21/87 TEL. NO. KNOX-6822

INITIATOR'S ORGANIZATION MEB DATE/TIME CAQ DISCOVERED 8/10/87

MANAGEMENT REVIEWER SD Cook SD Cook DATE 8/21/87 TITLE ENG SPEC (FP)

RESPONSIBLE ORGANIZATION ~~MEB - Regina Thomas~~ MEB - Pat Luke "COORDINATED WITH R McCOLL AND F. TANNER 8/20/87

POTENTIAL AFFECT ON OPERABILITY

OPERABILITY OF NUCLEAR UNIT IS ☒ IS NOT ☐ AFFECTED. IF 'YES', INDICATE AFFECTED UNITS.

BFN 1☐ 2☐ 3☐ COMMON☐	SQN 1☐ 2☒ COMMON☐
WBN 1☐ 2☐ COMMON☐	BLN 1☐ 2☐ COMMON☐

CAQ COORDINATOR

DATE RECEIVED 8-21-87

PROCESSED BY W. F. Estep DATE 8-21-87

TRENDING CODES

SALP (1) (2) ACTIVITY (1) (2)

DETAIL DESCRIPTION (1) (2) ROOT CAUSE

ARRR CAUSE ORG (1) (2)

EQUIP IDENT — SQN WBN BFN: PLANT - UNIT - FUNCTION - SYSTEM - ADDRESS - SEPARATOR

BLN: PLANT - UNIT/SYSTEM - COMPONENT - ADDRESS - SEPARATOR

PROCEDURE VIOLATED

MANUFACTURER

REDUCTION ONE EQUIPMENT

DISTRIBUTION

ORGANIZATION/MGR.			PLANT BF	BL	SQ	WB
DNQA, DIR	☐	SITE DIR.	☐	☐	☐	☐
DNE, DIR	☐	PMO	☐	☐	☐	☐
DNC, DIR	☐	SITE QA	☐	☐	☐	☐
DNS, DIR	☐	DNE-PE	☐	☐	☐	☐
DNSL, DIR	☐	DNC-CE	☐	☐	☐	☐
NSRB	☐	DNC-MOD	☐	☐	☐	☐
ONP, MGR	☐	DNSL	☐	☐	☐	☐
RIMS	☐	NRC RES	☐	☐	☐	☐

ORIGINATOR

OTHER

RIMS ACCESSION NUMBER

TVA 19584 (ONP 1-87)

Nuclear QA Record

CAQR

AUG 12 1987

REV. 0

RIMS ACCESSION NUMBER 3305 '87 0812 303 CAQR NO. SQF87015 1

PART A DESCRIPTION OF THE CAQ

PLANT/PROJECT SQN UNIT 2 VENDOR N/A

SYSTEM 68.3 VENDOR'S ADDRESS N/A

COMPONENT INSTRUMENTATION ASSOC WITH THE RCS AND SG CONTRACT NO. N/A

ASME? YES ☒ NO ☐ REFERENCES SQP 870857

REQUIREMENT VIOLATED SEPARATION OF ESSENTIAL SHUTDOWN SYSTEMS FROM THE EFFECTS OF FIRE

SOURCE OF REQUIREMENT VIOLATED APPENDIX R TO 10CFR PART 50

DESCRIPTION OF CONDITION

ADEQUATE SEPARATION OF INSTRUMENTATION ESSENTIAL TO SAFE SHUTDOWN IN THE EVENT OF FIRE HAS NOT BEEN ACCOMPLISHED. THIS CONCERN IS DETAILED IN THE ATTACHED SHEETS

RECOMMENDED CORRECTIVE ACTION (OPTIONAL)

CAQR INITIATED BY A.J. BARTLEY AJ Bartley DATE 8/12/87 TEL. NO. 6822-KNOX

INITIATOR'S ORGANIZATION MEB DATE/TIME CAQ DISCOVERED 8/10/87

MANAGEMENT REVIEWER S.D. COOK S.D. Cook DATE 8/12/87 TITLE Elec. Supv. (E.E.)

RESPONSIBLE ORGANIZATION MEB - GPC / SSP COORDINATED WITH R. McCOLL ON 8/12/87

POTENTIAL AFFECT ON OPERABILITY

OPERABILITY OF NUCLEAR UNIT IS ☒ IS NOT ☐ AFFECTED.
IF 'YES', INDICATE AFFECTED UNITS.

BFN	SQN	WBN	BLN
1☐ 2☐ 3☐ COMMON☐	1☐ 2☒ COMMON☐	1☐ 2☐ COMMON☐	1☐ 2☐ COMMON☐

CAQ COORDINATOR

DATE RECEIVED 8-12-87

PROCESSED BY W.A. Estep DATE 8-12-87

TRENDING CODES

SUB (1) (2) ACTIVITY (1) (2)

DETAIL DESCRIPTION (1) (2) ROOT CAUSE

APPD CAUSE ORG (1) (2)

EQUIP IDENT — SQN / WBN / BFN: PLANT - UNIT - FUNCTION - SYSTEM - ADDRESS - SEPARATOR

BLN: PLANT - UNIT/SYSTEM - COMPONENT - ADDRESS - SEPARATOR

PROCEDURE VIOLATED

MANUFACTURER

REDUCTION ONE EQUIPMENT

DISTRIBUTION

ORGANIZATION/MGR.			PLANT BF	BL	SQ	WB
DNQA, DIR	☐	SITE DIR.	☐	☐	☐	☐
DNE, DIR	☐	PMO	☐	☐	☐	☐
DNC, DIR	☐	SITE QA	☐	☐	☐	☐
DNS, DIR	☐	DNE-PE	☐	☐	☐	☐
DNSL, DIR	☐	DNC-CE	☐	☐	☐	☐
NSRB	☐	DNC-MOD	☐	☐	☐	☐
ONP, MGR	☐	DNSL	☐	☐	☐	☐
RIMS	☐	NRC RES	☐	☐	☐	☐

ORIGINATOR

OTHER

RIMS ACCESSION NUMBER

TVA 19584 (ONP 1-87)

CAQR

REV. C

RIMS ACCESSION NUMBER 88 05 '87 1109 307 (1) CAQR NO. SQF87 0151

PART B EVALUATION

AFFECT ON OPERABILITY

DOES THIS CAQ IMPACT UNIT OPERABILITY? YES ☐ NO ☐

IF 'YES' NOTIFIED PLT. MGR. AND/OR OPERATIONS AT _____ TIME ON _____ DATE

SIGNIFICANCE/REPORTABILITY

	SIGNIFICANT CAQ	REPORTABILITY	REVIEWED BY	DATE
PORS	YES ☐ NO ☐	YES ☐ NO ☐		
RESPONSIBLE ORGANIZATION	YES ☒ NO ☒ REDH	YES ☐ NO ☑	Glenn M. Morton	11/5/87

IF REPORTABILITY BLOCK IS CHECKED 'YES' IN ITEM 3B, GIVE A COPY TO THE ORGANIZATION RESPONSIBLE FOR DETERMINING REPORTABILITY IMMEDIATELY: SENT TO _____ DATE _____ TIME _____

GENERIC REVIEW

A REVIEW FOR POTENTIAL GENERIC IMPLICATIONS IS ☑ IS NOT ☐ REQUIRED.
(ALWAYS REQUIRED FOR SIGNIFICANT CAQ'S AND CAQ'S AFFECTING OPERABILITY)

COPY OF CAQR SENT TO _____ ON _____ FOR PERFORMANCE OF A GENERIC REVIEW.

EVALUATED BY

Glenn Morton 11/5/87
NAME DATE

ONE-MEB
ORGANIZATION

ROOT CAUSE ANALYSIS/RECURRENCE CONTROL

ROOT CAUSE ANALYSIS REQUIRED? YES ☑ NO ☐
RECURRENCE CONTROL REQUIRED? YES ☑ NO ☐
(ALWAYS REQUIRED FOR SIGNIFICANT CAQ'S, NRC VIOLATIONS, AUDIT FINDINGS, CAQ'S AFFECTING OPERABILITY.)
IF EITHER ARE REQUIRED, FILL OUT PART D OF THIS CAQR.

APPROVED BY

[illegible] 6 Nov 87
NAME DATE

Principal Engineer
TITLE

PART C REMEDIAL CORRECTIVE ACTION

DISPOSITION METHOD

RETURN TO VENDOR ☐
REWORK ☐ REPAIR ☐ AP 7/11/88
ACCEPT-AS-IS ☑ SCRAP ☐
OTHER (DESCRIBE) ☑ See C/A

OTHER INFORMATION

NO TAGS PLACED None
REPAIR/REWORK PROCEDURE NO. N/A
WAS ENGINEERING REQMT VIOLATED YES ☐ NO ☒
REFERRED TO ONE/ONS TO DETR DISPOSITION YES ☒ NO ☐

DESCRIPTION OF PROPOSED DISPOSITION

See attachment

ORGAN RESPONSIBLE FOR C/A ONE-SQEP-M2
SCHEDULED COMPLETION DATE 2-10-88

VERIFICATION REQUIREMENTS: RETEST ☐ REINSPECT ☐ AUDITOR FOLLOW-UP ☐ QA REVIEW ☐ SUPV. REVIEW ☒ OTHER (DESCRIBE) ☐

APPROVALS	NAME	DATE	NAME	DATE
PROPOSED BY	David A Boyd	1-11-88		
SUPV. APPROVAL	[illegible]	11 Jan 88		
ONE/ONS APPROVAL	R. E. Davis	1/11/88		
AIA ACCEPTANCE				
QA APPROVAL			B29	
OTHER APPROVAL				

APPROVAL
N/A
PORC REVIEW DATE

N/A
PLANT MANAGER DATE

88 0114 001
RIMS ACCESSION NO.

VERIFICATION OF REMEDIAL C/A	NAME	DATE
APPROVED CORRECTIVE ACTION HAS BEEN COMPLETED AND IS READY FOR VERIFICATION		
VERIFICATION COMPLETE		
ALL TAGS REMOVED		
CAQR SHEET 2 CLOSED		

RIMS ACCESSION NUMBER

CAQR, SQF-870151
PART "C"
DESCRIPTION OF PROPOSED DISPOSITION

A fire hazards analysis walkdown has been performed by a fire protection engineer to determine if the minimum required number of instrument sense lines required for appendix R will survive any creditable fire without adverse effects on instrument indications. The sense lines involved are for the steam generator level indicators and for the pressurizer level indicators. It has beendetermined that at least one steam generator level indicator per steam generator loop will survive any creditable fire. These are level indicator loops 2-LT-3-38,51,93, and 106. These instruments are to be added to the NEB calculation SQN-SQS4-0127 on revision 8 which is to be issued by 2-5-88. At least one of the three sense lines for the pressurizer level indicators will survive any creditable fire. This will be documented in a formal fire hazards analysis calculation and in a Safety Function Position Statement scheduled to be issued by 1-20-88. No field work is required and the sense lines are acceptable for use "as is". Calculation SQN-SQS4-0127 revision 8 is not required for restart.

NRC was provided this SQN-CO-D052, EPM-EAC-0011888 as referenced in response to Question 15.

Nuclear

CAQR

RIMS ACCESSION NUMBER ➡

REV.

CAQR NO. SQA870151

PART D ROOT CAUSE ANALYSIS/RECURRENCE CONTROL

ROOT CAUSE OF THE CAQ

Design criteria and appendix R documentation did not consider sense lines to vulnerable to fire damage because they are essentially noncombustible tubing or pipe. The effects of a fire on the fluid inside the sense lines was not considered, and thus is the root cause of this CAQR.

PROPOSED RECURRENCE CONTROL ACTIONS

NEB calculation SQN-SQS4-0127 revision 8 is being prepared for issue by 2-5-88 and includes a requirement that all sense lines be evaluated for fire effects.

ORGANIZATION RESPONSIBLE FOR RECURRENCE CONTROL NEB

SCHEDULED COMPLETION DATE 2-10-88

VERIFICATION REQUIREMENTS: SUPERVISOR REVIEW ☒ | QC INSPECTION ☐ | TEST ☐ | AUDITOR FOLLOWUP ☐ | QA REVIEW ☐

OTHER (DESCRIBE) ☐

APPROVALS	NAME	DATE	NAME	DATE
PROPOSED BY	David A. Boyd	1-11-88		
SUPV. APPROVAL	[signature]	1/11/88		
ONE/DNS APPROVAL	R E Rhoades	1/11/88		
QA APPROVAL				
OTHER APPROVAL				

APPROVAL N/A

PORC REVIEW N/A DATE

PLANT MANAGER DATE

B29 880114 001

RIMS ACCESSION NO.

VERIFICATION OF RECURRENCE CONTROL	NAME	DATE
APPROVED RECURRENCE CONTROL COMPLETE-READY FOR VERIFICATION		
VERIFICATION		
CAQR SHEET 3 CLOSED		

RIMS ACCESSION NUMBER

TVA 19584 (ONP-1-87)

5QFB70151

) A FIRE IN THE VICINITY OF STEAM GENERATOR 4

A FIRE IN THE AREA SHOWN ON ATTACHED SKETCH 1 MAY CAUSE THE LOSS OF RCS TEMPERATURE SENSORS TE-68-43 & 93 (LOOP 3) AND TE-68-65 AND 93 (LOOP 4) AND STEAM GENER LEVEL SENSORS LT-3-39,42,43,164 AND 174 (LOOP 1), LT-3-55,56 AN (LOOP 2), LT-3-97,98 AND 148 (LOOP 3) AND LT-3-107,110,111,17 AND 175 (LOOP 4).

ALLOWING CREDIT FOR APPENDIX R INSTRUMENTATION LOOP TWO IS THE ONLY LOOP WITH INTACT STEAM GENERAT LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THE FUNCTION CRITERIA REQUIRES 2 LOOPS WITH INTACT STEAM GENERATOR LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THEREFORE, THE PLA CONFIGURATION IS NOT IN COMPLIANCE WITH THE FUNCTIONAL CRITERIA IN THIS AR SIMILAR UNACCEPTABLE INTERACTIONS (SOMETIMES INVOLVING FEWER INSTRUMENTS) E IN THE VICINITY OF SG 4 UPTO AZ 15°. ALSO, SIMILAR INTERA MAY EXIST BETWEEN CABLES IN FAN ROOM #1 AND SENSE LINE LOCATED WITHIN THE CRANE WALL. IF THE CRANE WALL IS ASSUMED TO BE AN EFFECTIVE RADIANT ENERGY SHIELD.

2) FIRE IN THE VICINITY OF THE PRESSURIZER

A FIRE IN THE AREA SHOWN ON ATTACHED SKETCH 2 MAY CAUSE THE LOSS OF PRESSURIZER LEVEL SENSORS LT-68-320, 339, RCS TEMPERATURE SENSORS TE-68-1 AND 18 (LOOP 1) AND STEAM GENERATOR LEVEL SENSORS LT-3-42, 43 AND 174 (LOOP 1), LT-3-94 AND 172 (LOOP 3) AND LT-3-107 AND 175 (LOOP 4).

THE LOSS OF THE ABOVE MENTIONED RCS TEMPERATURE SENSORS AND STEAM GENERATOR LEVEL SENSORS ARE NOT A CONCERN BECAUSE SUFFICIENT INSTRUMENTATION IS AVAILABLE ON LOOPS 2 AND 4. ALLOWING CREDIT FOR APPENDIX R INSTRUMENTATION ONLY, ALL PRESSURIZER LEVEL INSTRUMENTATION WOULD BE LOST. THIS IS IN VIOLATION OF T-E FUNCTIONAL CRITERIA.

SIMILAR INTERACTIONS EXIST IN THE GENERAL VICINITY OF THE INTERACTION DISCRIBED ABOVE.

SCE87C151

3) A FIRE IN THE VICINITY OF RCP 2

A FIRE IN THE AREA SHOWN ON ATTACHED SKETCH 3 MAY CAUSE THE LOSS OF PRESSURIZER LEVEL SENSOR LT-68-320, RCS TEMPERATURE SENSORS TE-68-1 AND 1B (LOOP 1) AND TE-68-4 (LOOP 2), STEAM GENERATOR LEVEL SENSORS LT-3-55,56 AND 173 (LOOP 2), LT-3-94,97,98,148 AND 172 (LOOP 3), AND LT-3-107 AND 175 (LOOP 4) ~~AND SOURCE RANGE NEUTRON MONITOR NE-32~~ OR 8/2/87

THE LOSS OF LT-68-320 IS NOT CRITICAL BECAUSE ITS REDUNDANT COUNTERPART (LT-68-339) IS NOT AFFECTED.

ALLOWING CREDIT FOR APPENDIX R INSTRUMENTATION ONLY, LOOP 4 IS THE ONLY LOOP WITH INTACT STEAM GENERATOR LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THE FUNCTIONAL CRITERIA REQUIRES 2 LOOPS WITH INTACT STEAM GENERATOR LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THEREFORE, THE PLANT CONFIGURATION IS NOT IN COMPLIANCE WITH THE FUNCTIONAL CRITERIA.

SIMILAR INTERACTIONS EXIST IN THE GENERAL VICINITY OF THE INTERACTION DISCRIBED ABOVE.

IT SHOULD BE NOTED THE ABOVE ANALYSIS ASSUMES THAT LT-3-97,98 AND TE-68-1 AND 1B CAN BE AFFECTED BY THE SAME FIRE. PRELIMINARY INFORMATION INDICATES THESE INSTRUMENTS MAY HAVE SUFFICIENT SEPARATION. HOWEVER, DUE TO UNCERTAINTIES CONCERNING THE EXACT INSTRUMENT LOCATION IT HAS BEEN ASSUMED THAT THESE INSTRUMENTS INTERACT UNTIL EXACT LOCATIONS HAVE BEEN DETERMINED.

SQFB70151

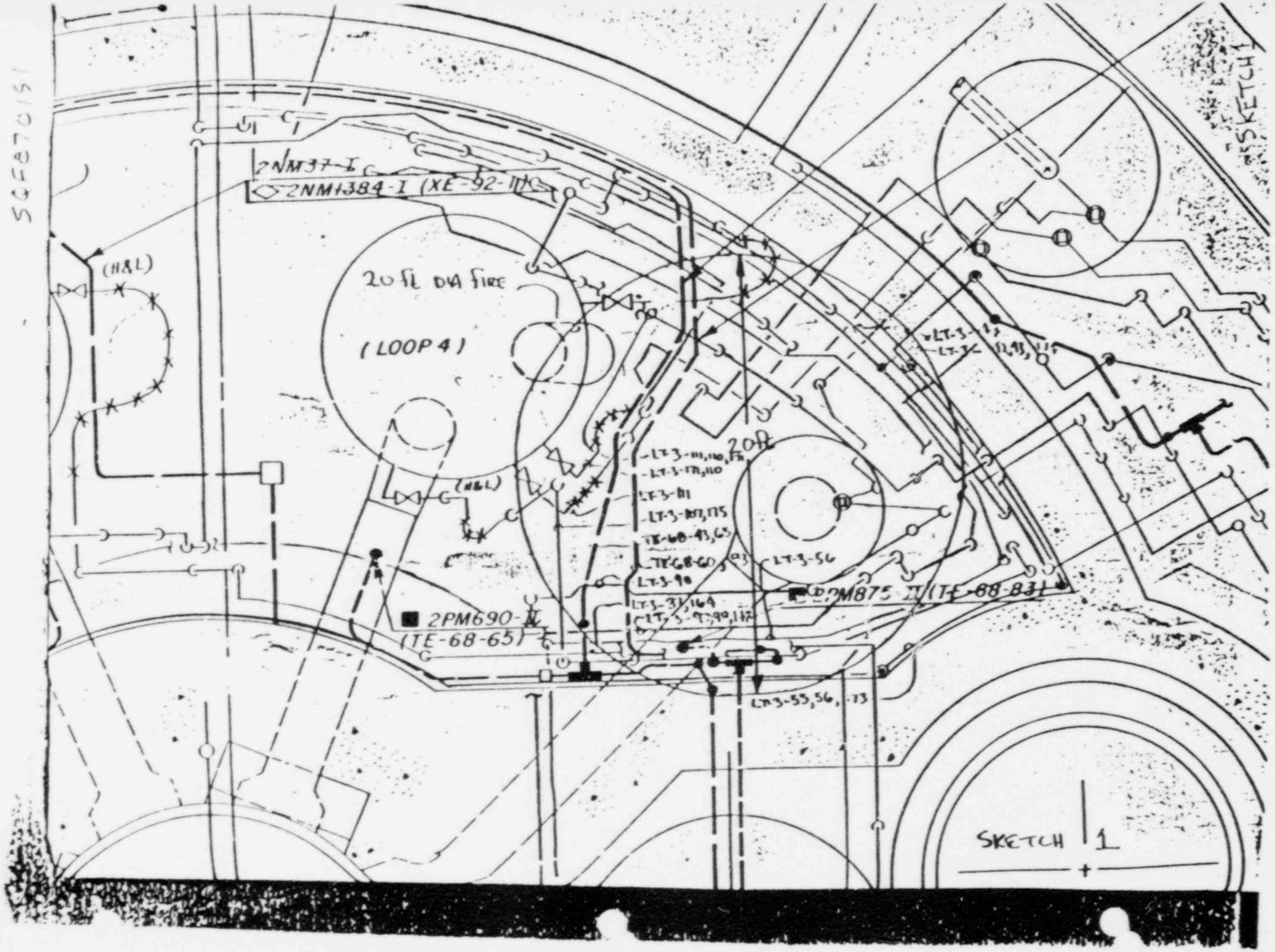
4) FIRE IN THE AREA BETWEEN STEAM GENERATOR 2 AND 3

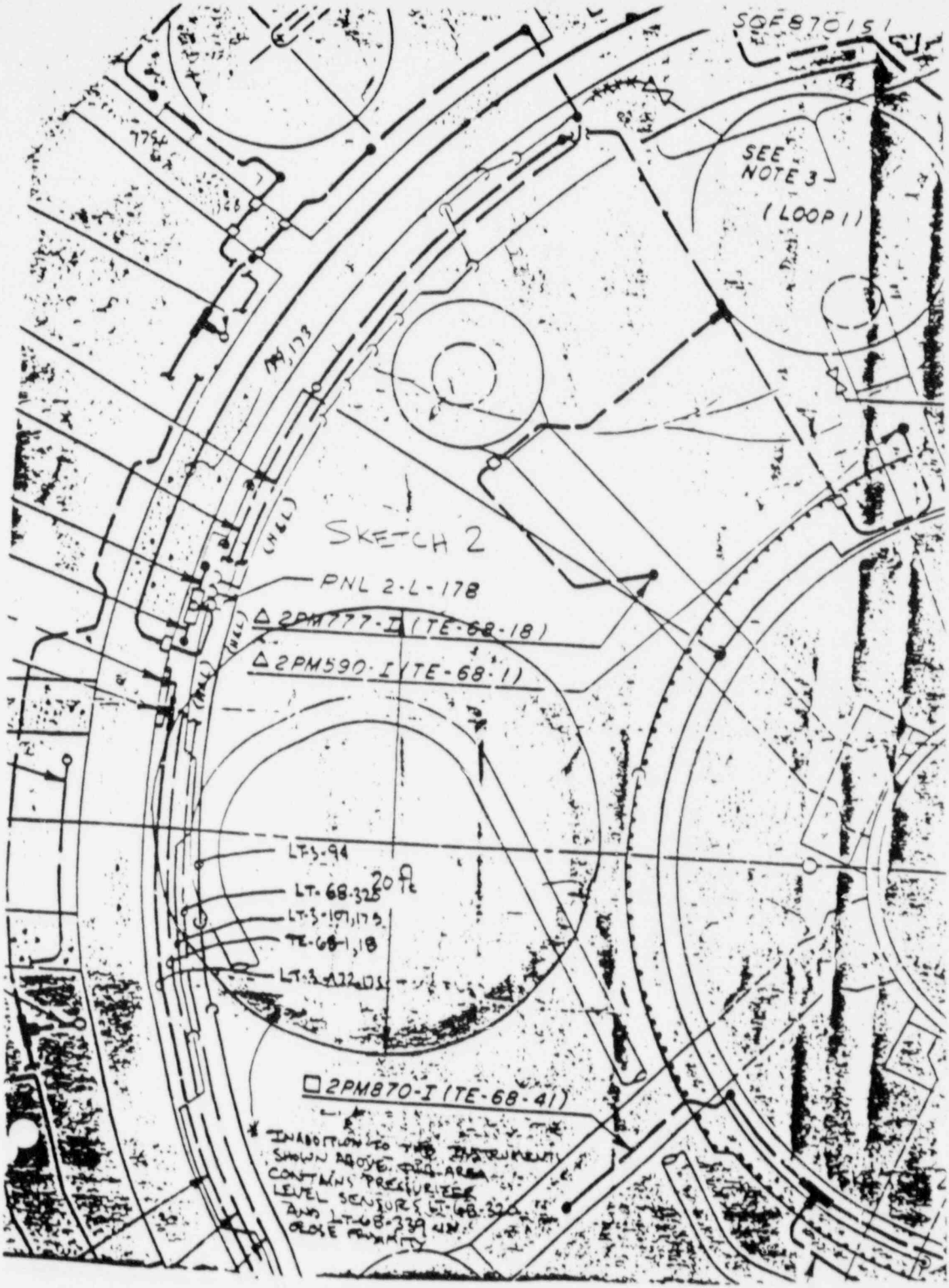
A FIRE IN THE AREA SHOWN ON ATTACHED SKETCH 4 MAY CAUSE THE LOSS OF PRESSURIZER LEVEL SENSOR LT-68-320, RCS TEMPERATURE SENSORS TE-68-1 AND 19 (LOOP 1) AND TE-68-24 AND 42 (LOOP 2), SOURCE RANGE NEUTRON MONITOR XE-92-2 AND STEAM GENERATOR LEVEL SENSORS LT-3-51,52,55,56,156 AND 173 (LOO LT-3-93,94,97,98,148 AND 172 (LOOP 3) AND LT-3-106,107 AND 175 (LOOP THE LOSS OF LT-68-320 AND XE-92-2 IS NOT CRITICAL BECA THEIR REDUNDANT COUNTERPARTS (LT-68-339 AND XE-92-1 RESPECTIVELY ARE NOT AFFECTED. LOOP 4 IS THE ONLY LOOP WITH INTACT STEAM GENERATOR LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THE FUNCTIONAL CRITERIA REQUIRES 2 LOOPS WITH INTACT STEAM GENERATOR LEVEL SENSORS AND RCS TEMPERATURE SENSORS. THEREFORE THE PLANT CONFIGURATION IS NOT IN COMPLIANCE WITH THE FUNCTIONAL CRITERIA IN THIS AREA.

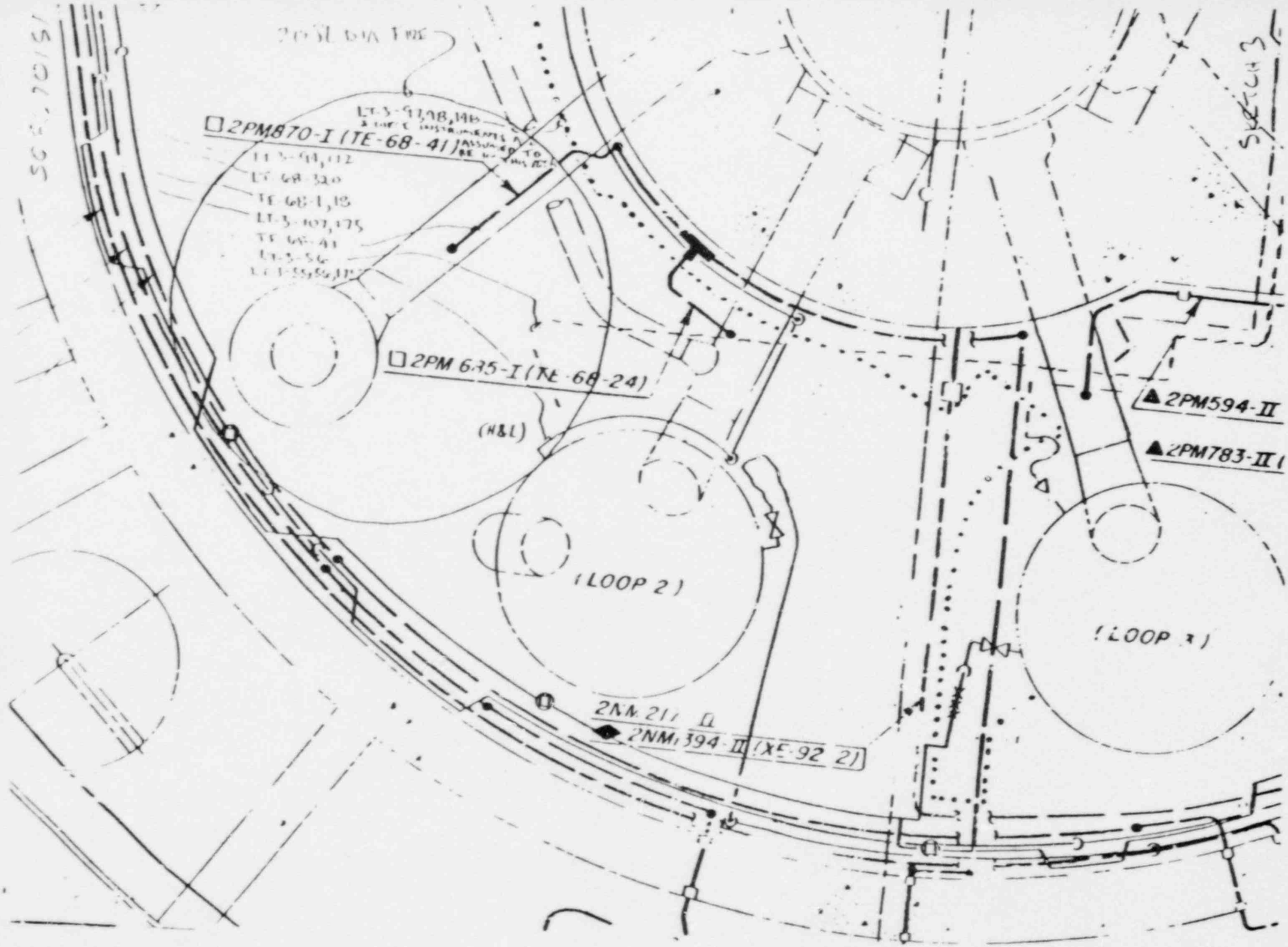
SIMILAR INTERACTIONS EXIST IN THE GENERAL VICINITY OF THE INTERACTION DISCRIBED ABOVE

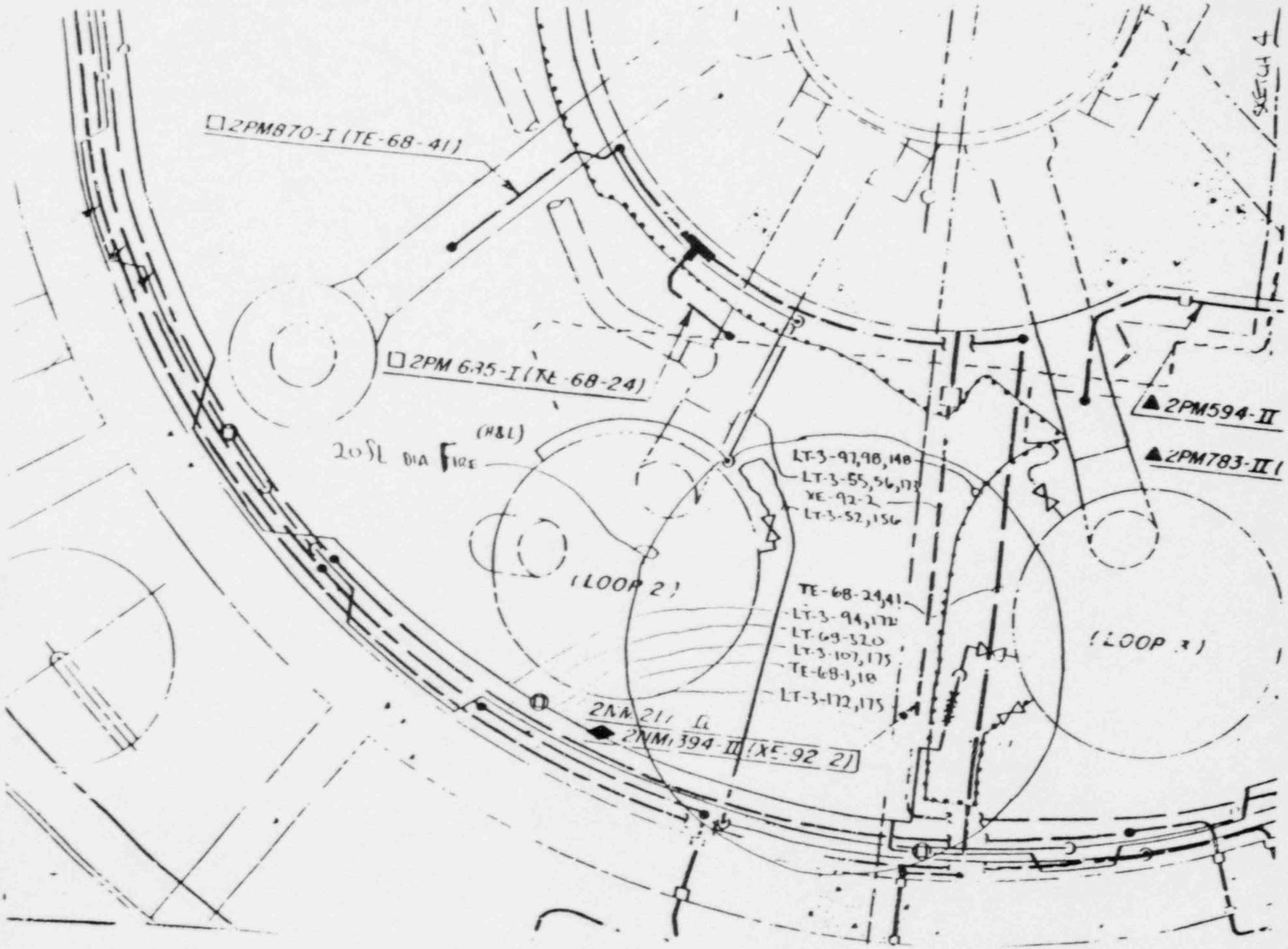
SQF87C151

NOTE: THE INSTRUMENT SENSE LINE ROUTING INFORMATION ON WHICH THIS CAOR IS BASED WAS TRANSMITTED TO MES IN A PRELIMINARY FORM. SOME ERRORS WERE DETECTED AND CORRECTED BASED ON DISCUSSIONS WITH THE ELECTRICAL DESIGNERS INVOLVED. IN ADDITION, THE ROUTING OF RCS PRESSURE SENSORS PT-68-66 AND 69 (THESE ARE THE RCS PRESSURIZER PRESSURE SENSORS CALLED FOR BY THE FUNCTIONAL CRITERIA) WERE NOT INCLUDED IN THIS PACKAGE. PRIOR TO CLOSE OUT OF THIS CAOR FINAL INSTRUMENT ROUTING INFORMATION WILL HAVE TO BE TRANSMITTED TO MES IN A "QUALITY FORM" INCLUDING THE ROUTING OF PT-68-66 AND 69. THIS INFORMATION WILL THEN BE COMPARED AGAINST THE PREVIOUSLY ISSUED INFORMATION TO ENSURE THE INTERACTIONS IDENTIFIED BY THIS CAOR ARE VALID AND NO NEW INTERACTIONS EXIST.


SQF87015
SKETCH 1
2NM37-I
2NM1384-I (XE-92-II)
(H&L)
20 ft DIA fire
(LOOP 4)
(H&L)
LT-3-111,110,113
LT-3-111,110
LT-3-111
LT-3-107,175
TE-68-63,65
TE-68-60
LT-3-90
LT-3-31,164
LT-3-97,99,112
2PM690-II
(TE-68-65)
LT-3-56
2PM875 II (TE-68-83)
LT-3-55,56,73
SKETCH 1


SOE 87015 I
SEE NOTE 3
(LOOP I)
SKETCH 2
PNL 2-L-178
△ 2PM777-I (TE-68-18)
△ 2PM590-I (TE-68-1)
LT-3-94
20 ft
LT-68-328
LT-3-107,117
TE-68-1,18
□ 2PM870-I (TE-68-41)
* IN ADDITION TO THE INSTRUMENTS SHOWN ABOVE, THIS AREA CONTAINS PRESSURE, LEVEL SENSORS LT-68-329 AND LT-68-339 IN OPPOSITE QUADRANTS


2PM870-I (TE-68-41)
2PM 635-I (TE-68-24)
(H&L)
(LOOP 2)
(LOOP 1)
2PM594-II
2PM783-II
2NM 211
2NM 394-III (XE-92 21)


SKETCH 4
□2PM870-I (TE-68-41)
□2PM 635-I (TE-68-24)
▲2PM594-II
▲2PM783-II
20SL DIA FIRE (H&L)
LT-3-97,98,148
LT-3-55,56,173
XE-92-2
LT-3-52,156
(LOOP 2)
TE-68-29,41
LT-3-94,172
LT-69-320
LT-3-107,175
TE-68-1,18
LT-3-172,175
(LOOP 1)
2NM 21 L
2NM 394-III (XE-92 21)

SEQUOYAH NUCLEAR PLANT

FIRE PROTECTION

NRC MEETING

MARCH 9, 1988

MEETING AGENDA

I.	INTRODUCTION	C. H. Fox
II.	SQN FIRE PROTECTION HISTORY	J. B. Hosmer
III.	RESPONSE TO QUESTIONS	
	1, 17, 24. 6, 25	F. Koontz
	2, 5, 10	B. Bryan
	8, 9, 13, 14, 15, 21	J. Pierce
	3, 4, 16, 7, 11, 12, 18, 19, 20, 22, 23, and 26	J. H. Sullivan
IV.	SUMMARY	

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FIRE PROTECTION HISTORY

• 2/80 - 9/81	Operating license SRP, APCSB 9.5-1 Unit 2 condition Appendix R III G, J, L, and O
• 6/84 - 7/84	Watts Bar Appendix R inspection
• 8/84	NRC confirmation letter
• 8/84 - 1/85	Operations and DNE team - Industry issue plus Watts Bar - Team used evolving guidelines generic letter 83-33 and IEN 84-09 - Generic letters 85-01 and 86-10 not issued - 121 interactions 21 deviation requests

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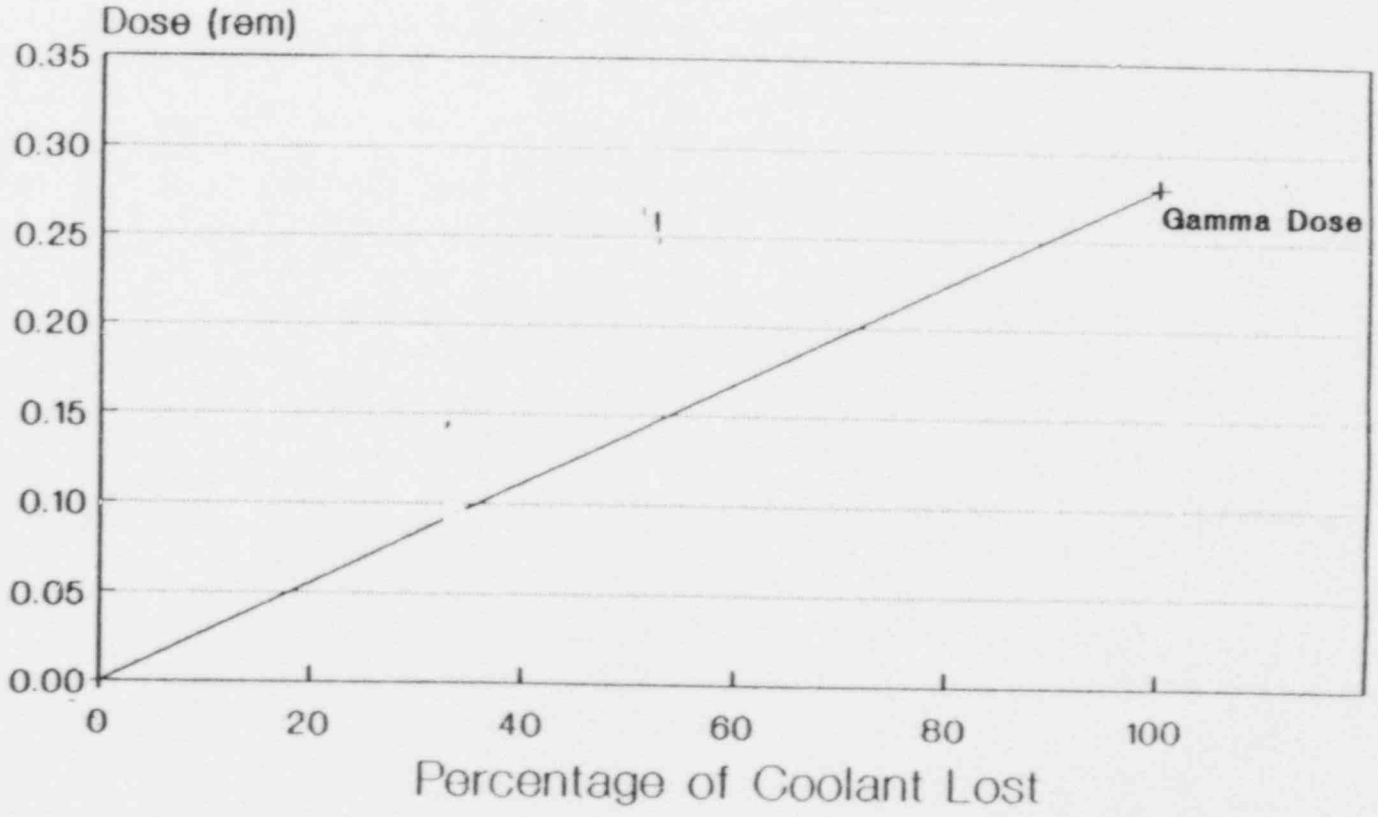
•	1/85 - 7/87	- NRC audits of corrective actions
		- Last audit action closed 7/87
•	12/86	DNE calculation program identifies documentation concern with R6 (shutdown logic)
•	7/87	DNE assumes long-term compliance role
		R7 issued with no operations review
•	10/87	DNE concludes R8 required
•	12/87	Review team formed to address all known concerns
•	1/88	Team issues final report and meets with NRC
•	2/88	NRC identifies 26 questions
•	3/2/88	TVA response to 26 questions
•	3/8/88	Question 12 amplification

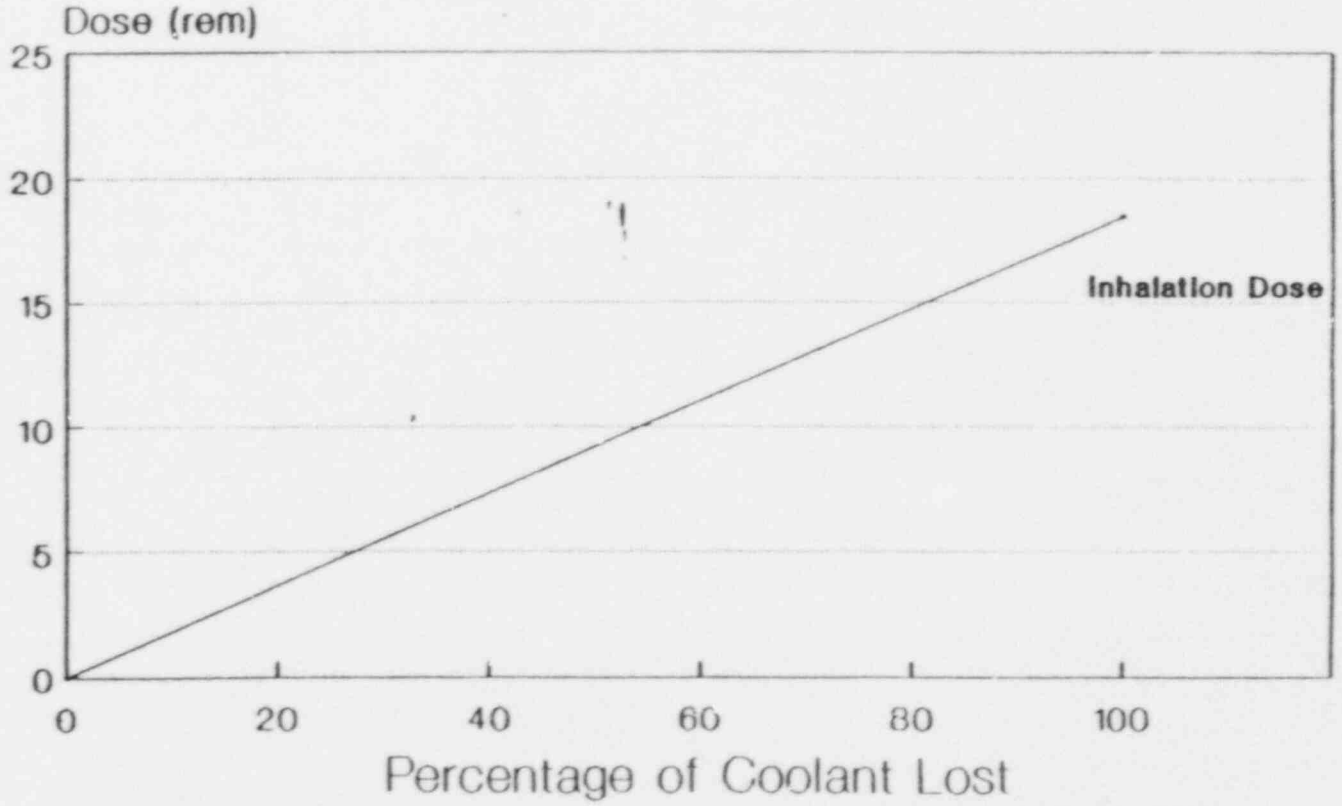
2-Hour SQN Site Boundry Dose
For Various Amounts of Coolant Lost
(Normal Operation)



(10 CFR 100 Limit = 25 rem)

Figure 1

2-Hour SQN Site Boundry Dose For Various Amounts of Coolant Lost (Normal Operation)



(10 CFR 100 Limit = 300 rem)

Figure 2

QUESTION 1

ISSUE: Containment integrity following a fire

RESPONSE: Calculation shows offsite dose within 10CFR100 guidelines

* 0-100% RCS release
* ANSI 18.1 - 1984 activity
* 0.28 REM gamma site boundary (25 limit)
* 18 REM thyroid site boundary (300 limit)

Defense-in-depth

Only practical release path via containment purge

* Connects containment to environment
* Infrequently used at power
* Exhaust line has three fail close valves in series
* HEPA filters and charcoal beds in exhaust line
* Supply line has three fail close valves
* Additional four fail closed dampers in supply line
* Valves and dampers close automatically on radiation signal

Appendix R, Section III.L, does not require containment integrity

CONCLUSION:

* Highly improbable
* Dose within 10CFR100 limits
* Not Appendix R required

QUESTION 2

ISSUE: Fuel pool boiling effects on auxiliary building

RESPONSE:

* No safe shutdown equipment in area except for cables and surge tank
* Cable type qualified to MSLB temperature and humidity
* Nine hours for pool to boil (worst fuel load)
* Boiloff rate - 48 gpm
* Refuel floor volume - 1,000,000 $ft.^3$
* Refuel floor exhaust flow - 28,000 cfm
* General building exhaust - 80,000 cfm
* Auxiliary building general spaces volume - 2,000,000 $ft.^3$
* No fuel failures result - radiation effects from pool boiling not a safe shutdown concern

CONCLUSIONS:

* Significant time for pool to boil
* Minimal impact on environment
* Not Appendix R issue

QUESTION 3

ISSUE: Procedure coordination

RESPONSE:

- Utilize all plant equipment
- Operator trained and experienced
- Procedure hierarchy
  - Emerged procedure
  - Fire-specific procedures
- Operation and training to review procedures
- Not Appendix R requirement

CONCLUSION:

- No significant conflicts identified
- Operator will handle most important event

QUESTIONS 4 AND 16

ISSUE: Adequate Boron concentration

RESPONSE:

- Reactivity calculations
- Attempt normal boration (BAT/letdown)
- RHR letdown to floor drain collection tank with makeup from charging pumps from the RWST
- Equipment list in safe shutdown logic
- Pressurizer level fluctuations not used
- Westinghouse calculation shows single RHR heat exchanger cooldown in 26 hours
- Credit for pressurizer spray, auxiliary spray, letdown and excess letdown not taken

CONCLUSION: The STA will perform reactivity calculations and operators will take appropriate actions to maintain subcriticality

QUESTION 5

ISSUE: Is control air required?

RESPONSE:

- Control air is not required to reach safe shutdown
- Control air used if available
- Manual actions used as backup specified in Procedure SOI 26.2
- Water solid operation unlikely

  Procedures and assured instrumentation prevent water solid operation

  Takes over 10 hours to go solid without letdown and no RCS cooling

CONCLUSION:

- Plant can be shut down without control air
- Manual actions are supported by procedures

QUESTION 6

ISSUE: Water solid operation

RESPONSE: Unlikely event - loss of bubble does not make plant unsafe

* Pressurizer level assured

  Operator would terminate spurious charging

  Time available for action (10-20 minutes)

* Water solid backup

  19 Hours earliest RHR needed (exception Question 4)

  Casualty procedure assures valves ready in 15 hours

  Cold shutdown not NRC requirement before 72 hours

  Safety valve available if PORV/head vent not available

  Procedures and training not needed

CONCLUSION:

* Low likelihood for need

* Means of assuring inventory if necessary

QUESTION 7

ISSUE: Ability to put RHR system into operation

RESPONSE: Valves (FCV-74-1,2) in question can be repaired

- Not needed for hot standby
- Fire outside containment casualty procedure ensures availability within 15 hours without containment entry
- No significant in situ fire load around valves
- Fire inside containment will not damage valve
- For fire in valve will not damage other equipment
- No spurious PORV, head vent, etc.
- Normal access to containment

CONCLUSION: Cold shutdown condition is achievable

QUESTION 8

ISSUE: Reactor coolant pump oil collection system

RESPONSE: Appendix R, Section III.O, requires an oil collection system for reactor coolant pumps to collect oil leaks from the lubricating system

- Reviewed and accepted by NRC
- Recently reviewed by fire protection engineer and determined to be adequate
- Postulated low probability events such as broken shafts are not required by Section III.O of Appendix R
- Sleeve around shaft would contain oil on the shaft

CONCLUSION: Reactor coolant pump oil collection system meets the requirements of Appendix R

QUESTION 9

ISSUE: Fire damage to SG atmosphere power-operated relief valve controls

RESPONSE:

- Modification associated with SGs 1 and 4 ensure that no fire in the area of the PORV solenoids and controller can cause spurious opening of the PORVs.
- Fire hazards evaluation performed for the area containing the solenoids for PORVs 2 and 3 determined there is insufficient fuel load to cause damage to the solenoids.
- For a fire in the auxiliary control room cabinet, spurious action can be mitigated.
- One PORV opening is within the design basis of the plant.
- Boron injection tank and pump and safety injection pumps are not required nor assured for Appendix R safe shutdown.
- Charging pump operability is assured with manual control.

CONCLUSION: Met Appendix R requirements and stayed within the design basis events of the plant.

QUESTION 10

ISSUE: Multiple steam generator blowdown

RESPONSE:

- Not Appendix R - MSLB separate initiating event.
- CAQR issued to document and track.
- Bounded by FSAR analysis - 4.6 $ft.^2$ break
  Flow limiter - 1.4 $ft.^2$
  2 ADVs - 0.4 $ft.^2$
  Valve vault break and 2 ADVs - 1.8 $ft.^2$
- Westinghouse analysis of unisolated blowdown of 2 SG with 2 PORVs open (Catawba, Seabrook) bounds SQN.
- Physical modifications have been made.

  Moved controllers and solenoid out of valve vault.

  Replaced mechanical positioner with more reliable model.
- Operator can manually close ADVs.

  ADVs and closing solenoid are environmentally and seismically qualified.
- ADVs control design consistent with design for all Westinghouse PWRs.
- CAQR postrestart.
- Appendix R criteria do not exclude SG blowdown.

CONCLUSION:

- Plant is safe.
- CAQR postrestart.
- Long-term corrective actions to resolve CAQR being evaluated.
- Not Appendix R issue

QUESTION 10 (Continued)

ISSUE: Single failure criteria

RESPONSE:

* Standard industry practice
* Seismic event
  - Safety-related equipment designed
  - Do not consider multiple failures of nonseismic components
* Main steam line break
  - Independent initiating event
  - Loss of offsite power
  - Single failure
    - 1 Active immediately or
    - 1 Passive at 24 hours
  - Do not combine with seismic event

QUESTION 11

ISSUE: Closure of pressurizer block valve

* Closure at 2500 psid specified
* Tested using MOVATS system per MI 10.43
* Thrust meets or exceeds requirements

CONCLUSION: PRZ blocks closure verified

QUESTION 12

ISSUE: Spurious actuation

RESPONSE: Circuits required for safe shutdown and those not allowed to spuriously operate were analyzed as required circuits

- In general, required circuits protected by separation or fire barriers
- Where separation did not exist, interactions were identified, analyzed, and dispositioned
- Alternate shutdown provided for cable-to-cable areas
  - Main control room
  - Cable spreading room
  - Auxiliary instrument room
- Ungrounded DC control system
- Ungrounded AC off-control transformers
- Separate look back at high/low pressure interfaces
  - Reactor vessel head vents
  - RHR letdown path
  - RCS normal and excess letdown
  - Pressurizer relief paths
- In 3 cases only is GL 86-10 Section 5.3.1 not met

CONCLUSION:

- Met Licensing basis for Appendix R
- Position submitted to NRC
- Reevaluated GL 86-10 5.3.1
- March 8, 1988 submittal

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QUESTION 13

ISSUE: Baseline data - SQN-SQS4-127

RESPONSE: Baseline data provided

- ARSK drawings, block diagrams, interaction studies, safety function position statements, approved deviation requests, fire hazards evaluations, engineering change notices
- Task force performed review of selected issues and this was submitted to NRC
- Numerous audits on electrical calculations

CONCLUSION:

- R6 was the revision that reflected plant configuration
- Baseline data exists
- Sufficient number of audits have been performed and determined appropriate calculation methodology used

QUESTION 14

ISSUE: Fire effects on equipment in rooms adjacent to a fire

RESPONSE:

- Fire dampers ensure physical separation
- Fusible links ensure damper will close in a timely manner
- Contain fire and products of combustion
- Equipment qualifications not required for Appendix R or 50.49 requirements
- Containment

  Outside - Access not required

  Inside - For fires inside containment there are no credible fires that create an adverse environment that requires containment entry to ensure safe shutdown

CONCL SIONS:

- HVAC calculations are not required to demonstrate Appendix R compliance

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QUESTION 15

ISSUE: Fire near pressurizer

RESPONSE: Fire Hazards Analysis

- FHA determined that at least one train of pressurizer level and steam generator level will be available. Insufficient fire load or adequate separation exist for the required instrumentation.

CONCLUSION: Fire in vicinity of pressurizer will not prevent safe shutdown.

QUESTION 17

ISSUE: Validity of passing liquid through safety valve

RESPONSE: Short-term operability has been demonstrated

- EPRI test data supplied

  Crosby 6M6 valve
  Water test
  Some chattering/galling of surfaces
  Summary noted valve closed

- Needed only if
  pressurizer bubble lost
  PORV unavailable
  head vent unavailable
  normal letdown unavailable
  excess letdown unavailable

- Pressurizer level instrumentation assured for fire

  Operator secures charging

- Few challenges anticipated

CONCLUSION:

- Valve will perform as intended

- Not Appendix R required

QUESTION 18

ISSUE: Assuring adequate suction to charging pumps

- Analyzed fire zones
- Identify VCT spurious isolation areas
- Procedurally controlled expeditiously
  - Open 400 Vac breakers
    or
  - Open RWST supply and open its breaker
    or
  - Trip CCP until above is completed
- Isolate VCT on VCT level observation

CONCLUSION: Our response to this condition is consistent with what other utilities have done and we have taken appropriate action, consistent with other safety requirements, to protect the CCP from loss of suction.

QUESTION 19

ISSUE: Basis for fire protection of shutdown systems inside containment

RESPONSE: Appendix R, Section III.G.2.a-f, is the basis

- Shutdown logic review
- Equipment identification
- Plant cables
- Evaluate separation
- Documentation

CONCLUSION: Inside containment has been evaluated consistent with our Licensing position on Appendix R.

QUESTIONS 20, 22, 26

ISSUE: Spurious safety injection, distinguish between LOCA and fire

RESPONSE: Spurious safety injection not prevented and instrumentation provided

- Safety injection not required for safe shutdown
- SI terminated criteria

CONCLUSION: Operator can diagnose event and terminate SI.

QUESTION 21

ISSUE: Fire effects on instrument sense lines

RESPONSE: Effects have been evaluated

- Fire Hazards Analysis done for Appendix R instrumentation
- Adequate separation exists or fire effects will not adversely affect both trains of Appendix R instrumentation

CONCLUSION: Adequate instrumentation available to the operator

QUESTION 24

ISSUE: Reactor coolant pump seal integrity

RESPONSE: Seal integrity assured

- SOI 68.2 operating procedure requires pump trip for loss-of-seal cooling (less than 2 minutes)
- WCAP applies to qualified high temperature and nonqualified high-temperature elastomers

  Sequoyah uses Parker E515-80 or better elastomers

  Immediate seal heatup not expected

  Westinghouse tests indicate two-hour survival (one hour needed)

- Worst case is if seals fail

  21 gpm/pump leak

CONCLUSION:

- Procedure requires pump trip
- Seals will survive

QUESTION 25

ISSUE: Spurious pressurizer PORV opening - block valve closure

RESPONSE: Operator action will mitigate event

- Fire in control building
- Operators dispatched to auxiliary control room
- Staff overlap between main/auxiliary control room
- AOI-27 checks hi/low interfaces

  Isolation as needed
- AOI-18 requires block valve closure if PORV open

  Attempt from main control room, MOV board

  2-5 minute action time
- Terminate SI per criteria
- Similar to stuck open PORV analysis WCAP-9600

  SI initiated if available

  Only charging would inject

  Additional 700 gallon loss (90,000 gallons RCS)
- Operators trained on AOIs

CONCLUSION:

- Operator mitigates event
- Similar RCS response to analyzed event

DISTRIBUTION FOR MEETING SUMMARY DATED: March 22, 1988

Facility: Sequoyah Nuclear Plant, Units 1 and 2*

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3/30/88