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307TH GENERAL MEETING

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

307TH GENERAL MEETING

Nuclear Regulatory Commission
Room 1046
1717 H Street, N.W.
Washington, D. C.

Thursday, November 7, 1985

The committee met at 8:45 a.m., Mr. Jesse C. Ebersole, chairman, presiding.

PRESENT:

MR. JESSE C. EBERSOLE
MR. DAVID A. WARD
DR. ROBERT C. AXTMANN
DR. MAX W. CARBON
DR. WILLIAM KERR
DR. HAROLD W. LEWIS
DR. CARSON MARK
MR. CARLYLE MICHELSON
DR. DADE W. MOELLER
DR. DAVID OKRENT
MR. GLENN A. REED
DR. FORREST J. REMICK
DR. PAUL G. SHEWMON
DR. CHESTER P. SIESS
MR. CHARLES J. WYLIE

PUBLIC NOTICE BY THE

UNITED STATES NUCLEAR REGULATORY COMMISSIONERS'

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

THURSDAY, NOVEMBER 7, 1985

The contents of this stenographic transcript of the proceedings of the United States Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards (ACRS), as reported herein, is an uncorrected record of the discussions recorded at the meeting held on the above date.

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PROCEEDINGS

MR. EBERSOLE: I call on Mr. Jerry Haynes, of Arizona Power, to do this from 9:10 to 9:40. This is the condensed version of the entire day's meeting.

MR. HAYNES: Good morning. My name is Jerry Haynes. I am Vice President of Nuclear Production for Arizona Public Service Corporation.

The purpose of my presentation is to give you a brief overview of the power ascension testing experience on Palo Verde Unit 1.

I will then turn over the podium to Mr. Robert Butler, Director of Electrical Services for Arizona Public Service, and he will discuss the auxiliary pressurizer spray enhancements and the modifications to enhance offsite power reliability.

The first part of my presentation will deal with the power ascension test program, specifically the schedule ascension test programs.

(Slide.)

This slide shows various power levels, shown on the left side of the slide, as a function of time.

Green represents the schedule we eventually laid out for the power ascension test program. That was based on experience at other CE plants, in consideration of the test program at Palo Verde and the test programs at other CE

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plants.

For Unit 2 we have taken into consideration the actual schedule we achieved at that point and the reduction in testing.

As you can see, early in the test program we had 20 percent power and performed the testing we did, quickly moved ahead of our planned program and went to 50 percent power testing.

At near the completion of 50 percent power testing, we discovered a deficiency in the post-accident sampling system. We committed to correct that deficiency before we came back to power.

We then came back and had a short amount of test at 50 percent power, which completed that phase of the program, then went to 80 percent power.

Two other significant outages shown here were the event that raised questions about their auxiliary pressurizer system. We will talk about that.

The other is the event associated with loss of offsite power. We are also going to discuss the improvements that we have made there.

In summary, even despite six weeks of unplanned outages, we have been able to maintain our schedule pretty well. At the present time we finished, with the exception of one test, the 80 percent power testing, and we will

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expect to run the remaining test next week and then proceed to 100 percent power.

As far as experience goes --

(Slide.)

-- I already described how we developed the test program. The results of the testing have shown that particularly in the physics area the predictions -- the results agree very well with the predictions.

We have had nothing there out of the ordinary in the plant's transient area, with the exception of two tests which resulted in trips. The transients have not interfered with activities, and the plant has performed very well.

One indication of that is that during the now 11 months of testing we have only experienced seven trips. Only two of those were actually during the conduct of the test. I mentioned those in the previous slide, and we will talk about those later.

Two of the trips were associated with loss of the main feedwater pump. One of those was the result of the need for adjustment of recirculation flow, loss of suction pressure of the feed pump, and loss of the pump.

The other was associated with, also, a low positive suction pressure due to a startup strainer that was left in the system.

DR. MOELLER: Excuse me. I don't follow. You

are saying five trips occurred.

Are you saying without the reactor being critical?

MR. HAYNES: No, we had seven trips in total. Two of those were during transient testing. The others were not associated with transient testing.

So it was in effect an unsuccessful transient test.

DR. MOELLER: Thank you.

MR. HAYNES: One of the trips was associated with a CEAC circuit board failure.

Three of the trips were associated with loss of power. One of those was during testing. It was a load rejection test. One was an actual loss of power event not associated with testing. The other was an actual loss of power event during troubleshooting. That trip actually wasn't what I would normally classify as a trip. The reactor was subcritical, and we were not even in the startup phase. The rods were withdrawn, but the circuitry was actually working. The rods did drop, so we classified that as a trip, also.

The last trip which was associated with testing was due to a false steam generator level signal subsequent to a test.

The other thing I would like to mention is that

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in no case have we had an unplanned trip due to operator error. There is no operator error and no maintenance error.

So we -- also, as I am sure you have recognized -- had seven trips during the initial power ascension testing on the first unit. It is certainly not a large number of trips. It is more than we would like to see, but it is lower, substantially lower than most people have achieved.

Any questions?

DR. REMICK: A question on your two main feed pump trips:

Were those cases where one pump tripped or both pumps tripped?

MR. HAYNES: In both cases, as I recall, we were early in power. It was early in the test program, and we only had one pump in service. We lost that pump.

DR. REMICK: You used the word "trip" here.

Are all seven of those unanticipated events? Is that how you are using it? They were not intentional trips?

MR. HAYNES: Those were unplanned.

Are there any questions?

(No response.)

MR. HAYNES: I will turn the program over to Bob Butler, Director of Electrical Services.

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MR. BUTLER: Good morning. My name is Robert Butler, Director of Electric Services for the Arizona Nuclear Power Project.

The purpose of my presentation this morning is, at the request of the subcommittee, to present a brief description of the documentation of the plan of the Palo Verde auxiliary pressurizer spray system.

By way of background, the modifications -- the experience we have had in the power ascension test program on Unit 1, specifically on September the 12th, and we had a load rejection test at 50 percent power.

The plant experienced a loss of charging flow. This was the result of depletion of the inventory of the volume control tank. It was caused by inaccurate level indications to the operators in the control room.

As a result, we took short-term measures, including increasing the surveillance on the VCT level instruments plus administrative and procedural controls.

In the long term, we planned these modifications to address the test experience. These modifications were developed by our engineers and, in addition, discussions with the NRR staff.

(Slide.)

As the viewgraph indicates, this is a summary of the modifications to the plant.

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The first is to add a second diverse reference leg to the volume control level transmitters. This, we feel, addresses the root cause of the September 12th problem during the test.

The second is to provide power to the VCT outlet and refuel water tanks' gravity feed line from a 1E motor control center. The purpose of this is to eliminate the need for the operator to take action outside the control room.

MR. EBERSOLE: May I comment at this point?

You are providing power to those valves; however, they remain not qualified. Am I correct?

MR. BUTLER: That is correct.

MR. EBERSOLE: So I want the committee to observe that.

MR. BUTLER: The third modification is to add automatic actuation of the transfer from the VCT supply to the refuel water supply. This automatic action will eliminate operator action in the event of a loss of offsite power.

The fourth modification is to lock open two normally open valves in the aux spray flow path, one being on the suction line from the refueling water tank, the other being on the discharge of the charging pumps at the containment.

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The purpose of this is to reduce the potential for isolation of the gravity feed or charging lines by spurious actuation or operator error.

MR. EBERSOLE: Mr. Butler, do you intend to show a diagram of this system to the full committee here?

MR. BUTLER: At your pleasure.

MR. EBERSOLE: Let me very briefly comment on what this is. What they have done is use the volume control tank as a source of water for auxiliary spray, that tank being the one which is used primarily for deboration, to go into power.

They thus take suction pumps for two purposes: for the usually charging pump function of keeping inventory up, and this time the same charging pumps are used for the function of spraying water into the pressurizer when the tank is of small volume.

And you have heard the discussion about improving the level check on it.

I want to just call out the fact that the reciprocating charging pumps, of which there are three, now have the dual function of maintaining inventory and the auxiliary function, which is quite important for providing spray to depressurize.

There is no special pump for depressurization. They have taken the edge-up function out of the charging

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pumps.

I suppose you could argue that you could have dedicated pumps to do this spray with considerably more ability.

Am I correct? You have used the charging pumps as simply a convenient source of spray?

MR. BUTLER: Right.

MR. EBERSOLE: With the attendant disadvantages of the small tank, of not having an auxiliary suction line in the event that line fails.

I think the committee would like to see the diagram.

Yes, sir.

MR. REED: I would like to ask a question of Mr. Butler.

Recipient charging pumps are good. They have a long history of not being so good, but I still think they have reached pretty good performance, and of course these will be used all the time to maintain pressurizer levels.

But you have some tech spec commitment one way or the other to availability. I am sure you are not committing all three to be operable all the time when you are in power operation. So you are either down at one or two operable.

In your tech spec commitments, do you remember what you are?

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MR. BUTLER: I believe it is never less than two.

MR. REED: Never less than two. So you have spray of never less than two. You could have one out for maintenance. They generally do have a high maintenance requirement.

Are these Ferry drives or what kind of drives? What is the maker?

MR. QUAN: This is Terry Quan, Arizona Public Service.

The maker or the manufacturer of the pump is Galling.

MR. REED: A Ferry drive or what?

MR. QUAN: I am not sure.

MR. REED: I guess you could visualize that in an instance you might actually be down to one pump.

Does that bother you actually? One pump is satisfactory for your auxiliary spray?

MR. QUAN: Right. The analyses which we require only use one pump.

MR. MICHELSON: One other small matter that was discussed during the subcommittee meeting and should be reemphasized, that although this auxiliary spray function is an essential function, at least as I view it, only a portion of the system being used for that purpose is seismically

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qualified.

MR. BUTLER: The system in its entirety is designed for seismic load.

MR. MICHELSON: Then I got misinformation. I asked about the transfer arrangement, for instance, between the valves. You said that was not a seismically qualified transfer.

MR. BUTLER: In the mechanical pump it is not.

MR. MICHELSON: The pressure boundary. Do I understand that the pressure boundary is seismically qualified, but not the control?

MR. BUTLER: That is correct.

MR. MICHELSON: And of course the control is perhaps more susceptible to seismic disturbance than is the pressure boundary?

MR. BUTLER: I have the diagram up.

Is there anything you would like?

(Slide.)

MR. EBERSOLE: I would like the committee to ask any questions about the diagram. I would just like you to notice the dual suction, the primary suction, the chosen suction, the amount of the value control tank rather than the refueling water storage tank. However, the head suction is from the refueling water storage tank.

MR. REED: It is also important to point out that

in this transfer what they have concluded is that the volume control tank, which is hydrogenated water, is not really the best source of supply in view of its boron concentration changes and feed and so on, and it is hydrogen. It is not the best source of supply for the auxiliary spray when you have an incident.

So what they have concluded is that they want to make a transfer, and I believe they have made it automatic now where a 501 valve will close and a 536 valve will open, putting the suction supply to the refueling water storage tank, which is borated, nonhydrogenated water.

These valves are not parallel, and although the electrical supplies are safety grade, they are not parallel valves.

MR. EBERSOLE: What do you mean?

MR. REED: They are not series parallel arrangements for single component failure.

MR. EBERSOLE: As a matter of fact, if the one under the right tank stays open, that suction will override and defeat the suction you are trying to encourage, is that correct?

So the system is not safety grade.

You will hear later about another adjunct system, which is a different set of valves, that presumably overcomes the nonsafety aspects of this design.

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By the way, are the charging pumps always safety grade?

MR. BUTLER: Yes, they are.

MR. EBERSOLE: Are they used for purposes other than just system makeup? There's other functions for it which are semi-safety grade?

MR. REED: You said you assumed one pump operable with this 44 gallons of fluid. But seals take 20 gallons of fluid, right?

MR. QUAN: Correct.

This is Terry Quan again.

In our analyses we assumed that the seal water to the reactor coolant pumps was being taken from the charging pump discharge. So that is a total of 18 gallons per minute.

When we looked at auxiliary spray, we assumed the 44 minus the 18.

MR. REED: You got down to the bare minimum for the spr .y?

MR. EBERSOLE: So let me just say one more thin,.

This system affords the most rapid form of depressurization if it works. If it doesn't work, then it isn't safety grade.

You will describe later the other system, the

one-inch vents which you use, which is a longer time vent process.

Thank you.

MR. WYLIE: I still have a question on 501 and 536.

Are those individual controls on each valve? Do you control them individually?

MR. BUTLER: Yes.

MR. WYLIE: I am a little puzzled why you chose to put them on the common power supply downstream.

Why did you do that?

Before you made that change, you had them on individual circuits, completely independent except for the control center. They came from a common mode control center, and now you show them tied together.

I am a little puzzled as to why you did that.

MR. QUAN: As far as I recall, with the modification there is the same degree of independence as there was before -- as far as I recall.

MR. WYLIE: Not necessarily, because if you go off the 1E motor you have a common circuit and then you branch out to two wells.

MR. EBERSOLE: When you use this system and you have trouble with it, how long do you try to use it before you invoke the other system which you are going to show us

later? Do you struggle with this one a while before you go and use the other, or do you just jump to this one right away?

MR. BUTLER: I think that has to come from the operator's sense of the situation at the time and what he has got to work with. I believe the process that we did assumed a couple of hours.

MR. ETHERINGTON: When we speak of depressurization, do we mean only to system saturation pressure?

MR. BUTLER: Yes, that is correct.

MR. WYLIE: I am not sure I got an answer. Maybe you don't have one.

MR. QUAN: I guess the diagram that we provided is a simplified sketch and it is not a detailed wiring diagram.

As far as I can recall, we aren't overly compromising the independence of power to those two valves.

MR. WYLIE: Maybe it makes no difference, but the way it shows, the diagram you have provided, is you have a fault because of the tripping of the breakers. It will take out both valve supplies, and then you have no control over either of the valves.

MR. QUAN: That is correct. We would lose that 1E motor control center.

MR. WYLIE: No, just that one branch circuit. You have got two circuit breakers in series on a common circuit.

MR. HAYNES: If you have a slide, I think it is worth putting up because that is a simplified slide.

DAVbur

(Slide.)

MR. WYLIE: On the left is what you have previously from a non-1E motor control center. There's two separate circuits, two separate controls. Over here you are tied together, and both of the controls are on the common circuit and then branch out.

It would seem to me you compromise the independence of the two circuits.

MR. QUAN: As far as I can recall, a fault in either one of these, the breakers are sized such that we would open this breaker before we would lose power to this branch right here.

Also, if we were to lose power to these valves, there would be ample time, adequate time, in which to take manual action to properly align these valves.

MR. WYLIE: So you don't need the electrical controls?

MR. QUAN: We would prefer to maintain control with the rollers. If we were to lose power of these valves, we believe there would be ample time to take operator action to properly align those valves.

MR. EBERSOLE: Could you comment on the potential for spurious depressurization and your realization that it is happening? Do you have flow or other indication that spray flow is occurring, or do you just have the ultimate

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effects of spray?

In short, if I notice them getting depressurized, do I know whether or not it is due to the spray being inadvertently open, or do I simply have to take like a blanket analysis that I am being depressurized for whatever reason?

You know, when you have a nonsafety depressurization system, I think you have to be a little concerned about inadvertent spray, the other side of the spectrum.

MR. HAYNES: Perhaps I can respond to that. There is a flow indication at the charging pump discharge.

MR. EBERSOLE: But it is going to be doing other things besides spraying, won't it?

MR. HAYNES: That is correct. During normal operation, the discharge of course would not be to the spray system.

MR. EBERSOLE: You wouldn't take the common flow as being indicative of just spray flow, would you? Do you have spray flow?

MR. QUAN: We don't have specifically indication of spray flow. We have now position indication within the control room.

MR. EBERSOLE: Just that the valve is open?

MR. QUAN: Right.

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MR. EBERSOLE: Is that direct that the valve is open or just the relay, a secondary indication?

MR. QUAN: I think it is more the latter indication.

MR. EBERSOLE: Of the stem position?

MR. QUAN: Right.

MR. WARD: I didn't get that answer. It is an indication of the stem position on the valve or of the demand signal on the valve?

MR. QUAN: I think it is the stem position of the valve stem. We use the NAVCO limits.

MR. WARD: Does that satisfy you?

MR. EBERSOLE: I would have preferred indication of spray flow.

MR. WARD: Charlie, did you get an answer to your question or did you finish that?

MR. WYLIE: Well, as I understand it, they are not really relying on the electrical operation of these valves. They are saying they can do it manually.

MR. EBERSOLE: Really what is coming out of this, I think, is the realization that although the spray system has been improved here, in the long run it still has some questionable aspects, and I am sure we will get to the other system shortly that backs this up.

MR. WARD: Well, wait a minute. Is the answer

here that mechanically the pressure boundary is fully safety grade; although the control system is not, you do have the ability to operate the system manually from the field as a backup?

MR. BUTLER: That is correct.

MR. MICHELSON: It is not clear the operator can be fast enough in the unlikely event you get an inadvertent retransfer back to the boron tank when it is already empty and it starts sucking hydrogen immediately. It is not clear then that the operator can run down and close the tank to prevent gas binding, to give an example. That takes a spurious operation.

MR. WARD: Is that a reversible situation?

MR. MICHELSON: That is something you have to look at the circuitry to see what the credibility is of getting inadvertent retransfer.

MR. EBERSOLE: Well, if you gasify the pumps that takes a while to clear out, and that can happen really quick.

MR. MICHELSON: It was claimed, I believe, that they had perhaps time. They are providing some better vents, as I understand it, and so forth. It took them quite a few hours the last time. Now, I think they have better vents, as I understand it.

MR. HAYNES: May I respond to this line of

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questioning in general?

We did experience a problem with the charging pumps due to a faulty indication of the level control tank. We corrected that level indication, so the operator has a much better sense of the level in the volume control tank. That is one point.

The second point is we have improved all of our procedures such that if he does get a low level, as indicated either by the level or by charging flow, there are precautionary statements that give him some direction as to what to do.

So in the event you have a seismic event and the system does transfer back to the volume control tank, it is already empty, the operator has some direction.

In this particular case where we did experience gas binding, the operator had no direction, had not experienced that previously, yet was able under the circumstances that existed -- the loss of power incident -- with safety injection initiation to not have a steam generator tube failure. He was able to reestablish charging flow within an hour and a half.

Our analysis did not give the auxiliary pressurizer spray until two hours into the incident, and with that assumption in the analysis they are still well within the radiological offsite limits.

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MR. EBERSOLE: It should be noted, I think, that what is being done here is he is riding up on the limit for direct malfunctions of the system. Should they have trouble with this system, he rides out to the limit and then gets it fixed within the limiting time.

MR. REED: I think it is important, Jesse, as you said, to hear about the other system. The other system has similarities in common mode failure potential. Keep in mind, there is common mode failure potential here because they are just single valves.

MR. EBERSOLE: This is a dual track at least, but one that is orificed.

MR. MICHELSON: And of course, if there is no mechanical damage to the pumps in the process of gasifying. Although it didn't have mechanical damage last time, it is not clear that that would be the same situation next time.

MR. HAYNES: I agree with you, although in the actual incident the operator, given no direction, tried to start all three charging pumps at various times and more than one time, yet before returning to service we ASME-tested all three charging pumps. All three charging pumps showed no evidence of gasifying. Flow was as good as it had been previously.

So they do have some resistance to damage from

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gasifying.

MR. WYLIE: Let me ask you if your indication in your volume control tank is -- I don't know what point you set it at. That is where you do you transfer.

Do you have some link you call for that to transfer?

And those circuits do trip out, and you do not close 501 and you do not open 536.

Do you have sufficient time then to go out and realign those valves?

MR. HAYNES: Yes, we do. We have got two hours from initiation of the incident.

MR. EBERSOLE: We have mentioned that those pumps have low suction trips. So that protects them from that kind of thing.

If there is no further question on this diagram, I think we should proceed to the backup system, which is a dual track, small system that provides a very slow method of depressurization, further challenging this limiting discharge from the steam generator tube failures.

(Slide.)

MR. BUTLER: I would point out that this is not a modification. This is appropriated in the plant as it is now, and it is a fully safety grade system.

MR. EBERSOLE: May I comment on that comment?

DAVbur

What this is is a system that came about as a result of TMI-2 to get rid of noncondensables. I think it was found useful here, as was the charging system, to make it perform an adjunct function of discharging vapor, but at a much slower rate than the other system, an aspect of depressurizing.

So it serves the original TMI-2, a noncondensable venting function and now is being used for another function by necessity of backing up the previous system that we described.

Carry on.

If I am wrong, tell me about it, but that is the way I see it. This was a noncondensable venting system. It is now used, happily, as a backup for the vapor vent process.

MR. REED: Jesse, you might be a little more cool by saying that it is now a mini-PORV.

(Laughter.)

MR. EBERSOLE: I am not going to say that. I don't regard it as such.

MR. BUTLER: What further discussion would you like on the system?

MR. EBERSOLE: Is the system, as seen by the committee here, do they understand that it is a one-inch piping vent as though it were a PORV? It is fully safety

grade.

It has no capacity for fluid flow in a bleed/feed context. It is a slow way of discharging steam. It results in a time to depressurize which is substantially extended above and beyond the prior system.

I believe you have some curves that show those relative depressurization rates.

MR. MICHELSON: Before you go to the curves, let me ask a couple of questions which I didn't ask at the subcommittee meeting.

Do you normally plan on venting to atmosphere or to the reactor drain tank?

MR. BUTLER: The preferred route would be the reactor drain tank.

MR. MICHELSON: How much of the heat load can the reactor drain tank handle?

You talked about 10 to 12 hours depressurization using this device.

Can the reactor drain tank keep up with the heat input from this vent for a 10-to-12-hour period?

MR. QUAN: I think you have to understand, also, that the main pressurizer safety valves also discharge into this tank. We would be depressurizing over a longer period of time, depending on our ability to quench and our ability to drain the tank. We may or may not rupture this.

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MR. MICHELSON: You think you are near equilibrium with the heat input rate, then, but you are not quite sure?

MR. QUAN: Right. We haven't taken that close of a look.

MR. REED: This drain tank has a coolant in it, or is it a fill and drain type of cooling tank?

MR. QUAN: More the latter.

MR. MICHELSON: Does it have a quench tower in it?

MR. QUAN: No, it doesn't.

MR. MICHELSON: Just inventory. Then it has no heat removal rig then?

MR. REED: Only by refilling with cold water and draining out.

MR. MICHELSON: That is not very fast.

But you say it is in equilibrium?

MR. QUAN: I think you have to understand that we would be draining to a tank through -- from our analysis we looked at using the orifice line, which is fairly small. This line isn't as of much concern as far as the tank being able to handle that load.

MR. MICHELSON: It is a simple question. I was just wondering, when trying to depressurize in 10 hours using this device you can go to the reactor drain tank and

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you do not have to go to atmosphere.

Is that your answer?

MR. QUAN: Yes.

MR. MICHELSON: This is a safety grade system, but it wasn't intended to be single failure; even though they are parallel valves, there is of course only one valve to the reactor drain tank?

MR. QUAN: The intention is that it would be single failure proof.

MR. MICHELSON: Not at least to the reactor drain tank?

MR. QUAN: That is correct, but we have two paths or two places to which we could discharge. One would be the reactor drain tank.

MR. MICHELSON: I am assuming one is on one train of power. 106 is on one train and 105 is on another.

The problem I have is: how did you divide this up relative to auxiliary spray? Because loss of power will get auxiliary spray in the single failure points, like valves, for instance.

How did you divide the valve power up on that system versus the valve power on this system?

I don't want to get into details, but I assume you worked that out so that no single power failure would get both this system and the auxiliary spray.

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MR. QUAN: That is correct. No single power failure will totally disable power to the valves and the equipment required for aux spray and affect both vent paths.

MR. MICHELSON: My concern wasn't the vent paths. You might have to go to atmosphere under this circumstance, is that right?

MR. QUAN: We may have to.

MR. EBERSOLE: I just wanted to note to the committee this is a typical four-valve font, guaranteeing opening as well as closing.

MR. ETHERINGTON: That is a pretty small line. Why do you further restrict it with an MRS?

MR. REED: That is the TMI backfit.

MR. QUAN: Just if we did have a failure of this valve, the inventory loss through this could be made up by one charging pump.

MR. EBERSOLE: But you have a backup valve for that?

MR. QUAN: With these three closed, that is correct.

MR. EBERSOLE: Couldn't you just get rid of the orifice and invoke the two valves in series?

MR. QUAN: I am not quite sure. I don't think -- we really weren't looking at taking credit for these valves

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as being redundant isolation valves.

MR. EBERSOLE: If you don't, you are subject to an inadvertent blowdown by a single valve opening right there, RC-103, unless you invoke those backup valves in the vertical lines.

MR. HAYNES: Not shown on the drawing is a code change in the piping.

MR. EBERSOLE: I see. There is a code change to a lower grade pipe. So then you are subject to inadvertent steam blowdown if you have a spurious opening of that, and you run that commercial risk, whatever it is.

MR. QUAN: Also, another point that I would like to bring out as far as this system is concerned, the analyses which we performed assume depressurization that had a discharge through the orifice. If we were to use the three-quarter inch line, the nonorificed line, we would get a depressurization capability that is comparable to the aux pressurizer spray system.

MR. EBERSOLE: Although there is a code change in that one-inch line, that doesn't mean there is any reason to believe it wouldn't hold 2250, or is there?

MR. HAYNES: I am not sure. But, no, there is no reason.

MR. EBERSOLE: You have it closed presumably; it is at 2250 now?

MR. HAYNES: Yes.

MR. EBERSOLE: Any comments on this system?

So you note this is a physically simple miniature PORV design, with zero capacity for mass flow of any substantial amount.

So the residual issue, the major issue about bleed and feed is to whether all we have been talking about is just the transitional operation of going from high to low pressure, its rapidity, and efficiency, and so forth.

Carry on.

MR. BUTLER: Would you like to see the curves?

MR. EBERSOLE: I think maybe some words about the ultimate problem, which is riding up on the dose as you provide the discharge time and the statement that you can afford the legal limit that we have on your radioactive releases, that you can afford to ride up for quite long periods of time.

(Slide.)

MR. BUTLER: This shows the two-hour and eight-hour doses calculated for the aux spray.

The first analysis -- these are the three analyses -- the first analysis is the FSAR, Appendix 15A, with aux spray. That is at 17 minutes.

The next is with aux spray, but two hours.

And then this is with the absence of aux spray

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and the pressurize event at two hours, showing the relatively insensitivity with regard to the dose curve configuration.

MR. WARD: Let's see, Mr. Butler, those numbers assume the pre-accident iodine spike.

Do you have any idea approximately what the numbers would be without that assumption?

MR. BUTLER: Just a minute. We will try and find it.

(Pause.)

DAVbw

DR. MOELLER: While he's looking for that, could we ask the Staff to refresh my memory. They're quoting here the 10 CFR 100 dose limit to the thyroid to the 300 rem, and for, I guess, plants at the CP stage. I realize that's not the case here. You were using the 150, were you not? So could you straighten me out? Does 300 apply in this case?

MR. LICITRA: This is Manny Licitra of the NRC Staff. You're correct that at the CP stage, we do consider the 150 value as a limit just to account for any eventuality of a step in the curve during the construction of the plant at the OL stage. We go to the 300 rem.

DR. MOELLER: And to Chairman Ward's question, do you consider a pre-spike of iodine for the calculations? Is that the standard approach?

MR. LICITRA: It's my understanding that that's what the Staff requires and is considering; yes.

MR. EBERSOLE: May I ask kind of a clarification question.

What is the limit allowed for a full LOCA?

MR. LICITRA: The limit for a LOCA? It's the same thing.

MR. EBERSOLE: What I'm having trouble with. You know two failures are going to occur. We know that LOCAs are not going to occur, yet you have the same limit. I don't understand this. It seems to me, there would be some

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gradation in consideration of the relatively high probability of tube failure, almost a guaranteed case versus a zero case of full LOCA. I can't see how you can use the same number for systems so tremendously different than the probability of occurrence.

MR. WARD: Wait now, Jesse. The LOCA is a different situation.

MR. EBERSOLE: But they're using the same dose limit.

MR. WARD: If you take the chapter -- well, I don't know about that. You don't get numbers anything like this for a large-brake LOCA within containment.

MR. QUAN: This is Terry Quan from Arizona Public Service again. These analyses that we did, these two different rupture analyses assume one full break of a steam generator tube with a loss of off-site power and a fully stuck-open atmospheric dump valve throughout the event. This first set of number is for the FSAR Appendix 15 A analysis, which assumes aux pressurizer spray application of approximately 17 minutes, even generated iodine spike, preexisting iodine spike, for the two-hour and the eight-hour dose.

DR. SHEWMON: Before you leave that, a preexisting iodine spike is what was already in the coolant. Is that one gap, or where was it preexisting?

DAVbw

MR. QUAN: That's right in the reactor coolant system.

DR. SHEWMON: In the water?

MR. QUAN: Yes.

MR. EBERSOLE: That's not a very high probability statement up there, is it?

MR. QUAN: We don't believe so.

MR. WARD: But it's what the Chapter 15 analysis requires; isn't that it?

MR. QUAN: It's what the Staff requested, as far as steam generator rupture analysis.

MR. EBERSOLE: A much more realistic dose is one that would be generated by the event itself. Okay.

MR. QUAN: And as you can see in the lower portion here, this is for aux pressurizer spray, and the numbers would be comparable for the pressurizer event, using the orifice line. It's integrated iodine spike and preexisting. And the numbers are fairly comparable. The point to be made here is, there is a large delay in the actuation of the aux pressurizer spray system.

MR. WARD: Thank you.

(Slide.)

MR. BUTLER: This is the curve we showed the subcommittee to try and put in relative terms the operation of the aux spray. This compares with the operation of the

pressurizer vent, and as you can see, starting at time zero, the operator takes control of the plant, opens one ADV, depressurizes below, the HPSI pumps will come in. The accident analysis assumes the arbitrary two-hour delay. In the real situation, you could expect that that could be faster. The solid line is the case where we bring in the auxiliary space system and the dotted line is bringing in the lower or orifice leg of the pressurizer vent.

If we had used the larger of the two legs, I believe the depressurization rate would be approximately equivalent to that with aux spray.

MR. EBERSOLE: Why do you assume aux spray's initiated two hours? There's no reason not to initiate it right way; is there? You just arbitrarily assume?

MR. BUTLER: That's assumed to give you the time for operator action.

MR. EBERSOLE: Two hours?

MR. BUTLER: You get your valves lined up.

MR. EBERSOLE: Is there any real physical reason that he can't with it in two minutes?

MR. BUTLER: No.

MR. HAYNES: The reason we assume two hours is, the delay of depressurization for two hours, maximizes the two-hour off-site dose.

MR. EBERSOLE: You just did it to display the

the pessimistic case. You notice that the operation of the ADV doesn't depressurize the plant, except down to about 1500. The hot bubble hauls it up.

MR. WARD: Let's see, Jesse.

On our schedule now, do you still want to cover the licensing presentation and the off-site power reliability? We've only got five minutes for that.

MR. EBERSOLE: I think we can do that next.

MR. WARD: We've spent a good bit more time on this.

MR. EBERSOLE: This is the guts of the meeting here.

MR. REED: I'd just like to ask a question. Maybe the reason that you hold up your pressure for two hours, high pressure injection functioning is to better assure decay heat removal by natural circulation to the steam generators; isn't that perhaps the case?

MR. BUTLER: Not in this analysis. It was for the reason Mr. Haynes gave.

MR. REED: If you were to come down using auxiliary spray, the auxiliary spray will bring you to the saturation pressure.

Now the only way you get below saturation pressure is to have natural circulation conduction for the steam generators in to cool the primary mass itself.

I thought maybe you were holding up in order to better assure natural circulation, because there are a lot of questions, and a lot of people have these curves now that the NRC has required. With respect to maintaining overpressure from natural circulation, if you're going to go the steam generator route, in this design now, you do not have a bleed and feed route for decay heat removal.

MR. QUAN: This is Terry Quan again. It is my understanding that the pressure hangs up, basically because high pressure signal injection is making up the primary to secondary leakage. What is happening here is, by use of either the aux pressurizer spray or the pressurizer vent system, that level in the pressurizer is being retained such that the operator has met his criterion in which to throttle the HPSI flow, allowing depressurization of the system.

MR. EBERSOLE: Any further questions?

I would like to move to the next topic, which is going to be very brief, I think.

MR. BUTLER: I think it can be very brief.

I would like to say in summary on this issue that we believe that these modification fully address the experience of the September 12th test results and that they enhance the reliability of the system.

The next topic, I believe, covers the loss of off-site power. I'll get to that very quickly. This had to

do with our multiplexer systems, which had remote operation and indication of the nonsafety equipment, including the nonsafety 13.8 kV switchyard breakers. It is a computer-based system utilizing fiber optics. We had loss of power events on October 3rd and 7th. We believe this was due to spurious signal from the plant multiplexer.

We corrected the problem by taking the multiplexer out of that loop and hard wiring a modification for the control of the 13th breaker.

MR. EBERSOLE: So the essence of this is, you hard-wired it and got rid of the problem. Would you still argue, if your multiplexer had worked, that you complied with GDC 17, even though it's kind of a commonality in electronics to have a very expensive power supply?

MR. QUAN: As far as meeting GDC, yes, we believe that when the high multiplexer, that by design, the off-site power sources did meet GDC 17. The high multiplexer, as far as I understand, is supposed to be fully independent, with redundant computer controls, such that one failure or common failure would not affect both sourcese of off-site power.

MR. EBERSOLE: Your experience has been otherwise, though.

MR. QUAN: Our experience has been otherwise.

MR. BUTLER: What happened was not supposed to happen.

DAVbw

MR. EBERSOLE: Any further questions on this matter? It's been fixed by hard-wiring.

(No response.)

Now we can proceed to the next topic. Thank you.

MR. CREWS: I'm Jess Crews from Region 5.

I want to offer comments regarding the next item on the agenda, which is operating experience on the Unit 1 Power Ascension Test Program. The Power Ascension Test Program on Palo Verde Unit 1 commenced in early June of this year, and when the plant resumes operations, there remains about three weeks or so of testing to complete the power ascension test program.

We've had an opportunity over the past approximately seven months to observe the performance of the operating crews, the technical support organizations and the plant systems themselves, as well as the overall performance of the management systems, not only for the power test program but for the overall contact operations as well.

From our observations and my evaluations to date, I have some comments addressing each of the areas that I spoke of. The operating crews have been challenged rather substantially as you've heard discussed on the events of September 12, in particular, where there's a loss of off-site power, a failure of the charging pumps and

instrumentation failure which further complicated the operator's response in that event.

Under the circumstances, the operators performed, we think, remarkably, realigning power to valves and pumps, restarting pumps, realigning valves, providing suction and alternate suction to the refueling water storage tank and restoring the charging pump's operability within a period of approximately an-hour-and-a-half.

We think that that experience reflects well on the training and qualifications of the operating crew.

We had an opportunity, which I would mention, during the initial criticality low-power testing phase. We had a team of inspectors who spend some time around the clock for a period approximately three weeks at Palo Verde, and at that time, they were favorably impressed with their performance. During the power ascension test program, their performance has been quite good.

So overall, we rate the performance of the operating crew quite high.

The overall technical support organization performance has been acceptable. They've demonstrated the capability to understand the problems encountered during the power ascension program, the procedural actions to correct the problem.

MR. REED: I'd like to make a point.

DAVbw

Regrettably, Dr. Okrent and Dr. Kerr aren't here, but I am trying to sell something, so I'll make the point, that these remarkable operating crews, Mr. Crews is talking about, were POS test selected people, and in some cases, they were pirated people that had been selection-tested for natural ability elsewhere.

DR. SHEWMON: From that we conclude that it was all equipment failure?

MR. REED: I assume we have concluded that.

MR. CREWS: To repeat, we think the overall performance of the engineering support organizations has been acceptable, and in some instances, generally, as appropriate, the vender expertise that was called upon, persists in better understanding some of the complicated problems that have been encountered. Licensee management has taken steps to improve upon the utilization of the technical staff, as the testing program has progressed and experience has been gained. This staff, like that of the operator's, has been challenged rather substantially.

Many have worked long hours. We think they'vemet the challenges pretty well, and their utilization of performance has improved, as experience has been gained, particularly in the area of post-trip and post-event review and evaluation. With regard to plant systems, the reactor controls and instrumentation performed well, as have

reactor protection and engineering safety features, when challenged.

The secondary plant systems have generally performed well and reliably. This is especially true of the main feedwater system and the main feedwater system control.

Some of the systems, however, have not performed reliably. As discussed earlier, the auxiliary pressurizer spray system and that of the multiplexer control for the distribution system have been disappointing.

In the case of the auxiliary spray system, the licensee has implemented procedural changes to minimize the repetitions and problems that have been encountered and proposed design improvements which we feel will substantially improve the overall reliability of this system, which is not fully safety grade.

The multiplexer control system has been abandoned in favor or hard-wired types of controls to important breakers, which we believe will improve the reliability of this system, substantially, as well.

In terms of the overall effectiveness of management systems for the planning and conduct of the power ascension test program and the conduct of operational activities, we have been generally satisfied with the performance, and there has again been a steady improvement.

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Management has demonstrated a health attitude toward critically examining the performance of the programs and the managing systems upon which they must rely for effective control for operational activities.

Steps have been taken to substantially improve, where experience has revealed the need in such areas as I've mentioned, as well as the control of vendor information, particularly as it relates to the secondary part of the plant.

I would point out that the lessons learned during the power ascension test phase in the early operational period of Palo Verde Unit 1 are, in most cases, directly applicable to Units 2 and 3.

This is true, both in terms of the physical plant, which is essentially identical in all three units, and the management systems, as well.

The improvements which have come about, as the result of Unit 1 experience, we feel, should fully expect to result in measurable improvements in the overall performance of Unit 2, as it enters today's startup.

MR. EBERSOLE: Any questions?

(No response.)

MR. EBERSOLE: If not, thank you, Mr. Crews.

And I see no reason for us not to proceed into the licensing status.

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MR. LICITRA: My name is Manny Licitra. I am the NRC Project Manager for the Palo Verde plant. I am here to discuss the licensing status for Palo Verde Unit 2.

I would like to point out that Palo Verde Unit 2 is really the same design as Palo Verde Unit 1. They are all identical, including Unit 3.

We actually reviewed the package as a whole and the previous reviews that we have done for Palo Verde 1. The initial license on 1 also applies to Palo Verde Unit 2. However, there were some individual issues that needed to be addressed for Palo Verde Unit 2 before we would proceed with issuing a license.

I would like to put on the slide.

(Slide.)

What this slide represents is what needs to be done before we proceed with Palo Verde Unit 2.

The three remaining issues are the post-accident sampling system, ECCS reanalysis, and pressurizer auxiliary spray system.

With regard to the PASS, the issue there was the location where the previous PASS system for collecting containment samples, air samples, was located, it turned out to not be feasible for meeting GDC -- I believe it is 17 -- as far as doses to individuals, particularly if you were to postulate a design basis accident and someone would have to

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go to the area than previously chosen to take a containment air sample, and it did not appear feasible that that sample could be taken and still meet the dose guidelines.

So what they have done is to propose a new location. They have submitted information regarding where that location will be. The staff is completing its evaluation, and it appears that we should be able to resolve that issue very shortly.

The next item concerns the ECCS reanalysis. Basically, this concerns potential error that is found in the CE model for evaluating the performance of the ECCS, having to do with the point along the axis where the peak occurred.

They had done some studies -- I guess it was in Westinghouse plants -- and determined that the peak had been in a different location than they previously thought, and when they checked it out with CE plants the same thing occurred.

What this resulted in is that they had reevaluated the peak clad temperature and the revised peak. It would bring it slightly over the regulation limit of 2200 degrees Fahrenheit. I think it is to something like 2203. It is small. It is not a technical issue, but because there are specific numbers in the regulation, in order to say that this plant complies with the regulation we had to have an

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analysis of record with an acceptable mark.

The third item concerns the pressurizer auxiliary spray system which we have been discussing today. Currently, the staff is still reviewing that issue.

On Monday we received additional information regarding this issue. It was in that submittal that they pointed out to us that they had this other means of performing a depressurization in the event you have a steam generator tube rupture.

At this stage, we don't anticipate there will be any problems in completing the review, but it is still under review.

Before we issue a license, as we do with all plants nowadays, we require that the utility provide us a certification that design, construction, and testing of a unit has been completed in conformance with the FSAR and other docketed commitments. This was done on Unit 1, also on Unit 3, and has been done on other facilities.

Finally -- this is not directly related to licensing -- but prior to initial criticality of Unit 2, we would prefer to see that the power ascension program in Unit 1 is complete.

So in summary, Palo Verde Unit 2 is close to licensing. We don't see any problems at this point. As soon as we wrap up our pressurizer auxiliary spray system

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review, we should be ready to reach a decision to go to low power licensing.

MR. REED: I would like to ask -- you were pointing out you think you are going to be satisfied -- are you satisfied with the fact that instead of rapid depressurization, as we have used the words over the years, five years, you are satisfied with the slow depressurization, with this design?

I recognize that the CE design has large water inventory. It has large steam generators, with the issue of steam generator overfill. All the same, there will be radioactivity discharge until the pressures are either equalized or something.

Are you satisfied with this slower depressurization versus what PORV systems do and a more rapid depressurization to saturation?

MR. LICITRA: I can't address the PORV issue.

DR. NOVAK: This is Tom Novak, of the staff.

I think, Mr. Reed, the question you raise is the question that was discussed at length prior to the licensing of San Onofre 2, for example.

I think the staff was of the opinion that the power-operated relief valves would be a beneficial safety feature to a Combustion Engineering design.

The Commission decided at that time that the

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merits of it did not support the equivalent of a backfit to the Combustion Engineering design. That decision, in effect, is in limbo until the decay heat removal generic issue is resolved.

And I think all the discussions we have heard this morning are second order effects with regard to the basic question. The improvements in the auxiliary pressurizer spray system that we feel should be applied now give you the feeling that you have enhanced the reliability over a shorter period of time.

I think we are expecting that by the first refueling of Palo Verde Unit 1 the A-45 issue will be on the table and decisions will be made, and depending on the outcome of that, I think there will be some looking back at some of the specific units.

These are not items -- if you looked at San Onofre 2, the Waterford plant, and you looked at Palo Verde, you would not find identical systems in terms of the charging systems, and so forth. They are different. They do have some different features, and you want to go back and look at all of them I think individually.

At this point in time, the emphasis is on getting A-45 completed.

MR. REED: So really the dominant issue here is not rapid depressurization; it is decay heat removal in

A-45? If PORVs do become a bleed and feed capable requirement, you get rapid depressurization q.e.d.?

DR. NOVAK: That is right, but as long as you talk in terms of the classic spectrum of accident -- steam generator tube rupture and other events -- you can show by analysis that this system can meet the criteria.

MR. EBERSOLE: May I ask a question on this general matter?

I think you did, however, ask for a qualified method of depressurization to low pressure, is this correct?

I am talking about a safety grade type system to get depressurized.

DR. NOVAK: Yes. The answer is: in the event of an accident such as steam generator tube rupture, you must rely on safety grade systems.

MR. EBERSOLE: Would that have permitted, for example, a bunch of hand valves to depressurize?

DR. NOVAK: The first answer: we are, I think, relying on the analysis to demonstrate.

MR. EBERSOLE: Was there a claim that this was a safety grade system, the auxiliary spray system?

DR. NOVAK: Yes.

MR. EBERSOLE: I want to call that out in particular as sort of an administrative problem. I think it has been visible to everybody.

This is clearly a system subject to half a dozen or more single failure points, all of which were missed by both the Arizona Power Company and the staff. That is not something to be overlooked. It was loaded.

What happened here is they reached out and grabbed another system already there and used it for an adjunct purpose not heretofore revealed, not to me anyway, as being useful for that purpose.

Am I correct?

DR. NOVAK: Let me say it this way, I think, Mr. Ebersole:

The licensee, in his documentation, described the auxiliary pressurizer system as a safety grade system. His definition of what constitutes a safety grade system hinged on the staff's requirements for being able to take a plant to cold shutdown using only safety grade equipment.

Now, this position had various acceptance criteria. Depending on the vintage of the plant, you were permitted to take certain manual actions. The Palo Verde application fell into that vintage where manual actions would be permitted to be taken outside the control room if enough time was available.

So that was the window of the Palo Verde unit. When it met that position as far as the licensee was concerned, he had an acceptable safety grade system.

MR. EBERSOLE: So he could have had a faucet on the pressurizer and he could have run up and turned it on and that would have been a safety grade system, is that right, in that context?

DR. NOVAK: You are not going to put words in my mouth.

DR. REMICK: A question. It is my understanding from the subcommittee report that if these three issues are resolved and if you receive the certification from the applicant that the staff would still not allow a Unit 2 startup until Unit 1 ascension tests are completed, is that right?

MR. LICITRA: We would be able to visualize this, but we would not look favorably upon having two units in a transient startup mode.

I think the utility also recognizes that, and they do not plan to do it either.

DR. REMICK: So you are not necessarily preventing them from doing it; you jointly come to that position?

MR. LICITRA: They are going to provide us a commitment to the effect that they will not do that.

DR. NOVAK: I think the position is that when we go forward with the issuance of the low power license the fuel loading can take place. That does take a substantial

period of time.

If the Unit 1 startup program comes close to being on schedule, it would have been completed within that window of time necessary to load fuel.

So the licensee anticipates that he will complete his power ascension programs within the time that Unit 2 completes fuel load.

Our experience has been that while the operators, and so forth, are certainly qualified and there is a sufficient staff to perform these functions, the concern is as you go up into the management of the plant that you are now competing with Unit 1 operation versus Unit 2 operation, and it has just proven out that I think you want to keep them as separate as you can and not overtax your management with competing issues on two different units.

DR. REMICK: I don't disagree with the prudency. I am interested from the standpoint of the authority for this. It seems like this is kind of an ad hoc decision.

When they get more units in operation, they are going to be faced with those same things. There are going to be units refueling, and so forth.

I realize these are the initial stages, and I really don't, as I say, differ with the prudence of it. I am interested in where that decision is made.

Suppose they don't finish the ascension tests for

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Unit 2 -- or Unit 1 when Unit 2 is ready to start its ascension tests.

I am not clear whether the staff is preventing them from starting up, and if so, where is this decision made in the Commission? Is it at the region, at the Office Director level?

DR. NOVAK: In this case, there is agreement both from the Office Director and Mr. Mothami that this would be a prudent action. We discussed it with the management of Arizona Power, and at this point in time it looks like this approach can be accommodated.

Granted, if there was a substantial problem that came up in terms of power ascension, if you had a major outage in the unit with one operation, I think there you could take the other side of the coin. If you had the feedwater pump break down or something or the plant was done and it really didn't represent a challenge to operation, you could perhaps go up in low power testing of Unit 2.

So I think a major delay can be based on facts that can be evaluated at that point in time, but right now it looks like you can clear the Unit 1.

This was kind of the approach that was followed on the Diablo Canyon facility, and we think it is just a very good way to run things.

DR. REMICK: This sounds like the applicant

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apparently has committed to do it.

If you had an applicant who disagreed, what is their appeal process? Has this been faced before?

Maybe it is a legal question that you can't answer.

DR. NOVAK: It has not been faced.

DR. REMICK: Thank you.

MR. MICHELSON: In the ACRS letter of December '81, the ACRS recommended that Arizona Public Service should expand its studies of system interaction and system reliability.

Was there ever any follow-up on that recommendation? If so, what was it?

MR. LICITRA: I am not aware of what Arizona Public Service has done in that regard.

MR. MICHELSON: The staff has not received or seen any materials that might have constituted what would appear to be a system interaction study or a system reliability study?

MR. LICITRA: I don't believe so.

MR. MICHELSON: Did the staff ever pursue this issue, since it was a recommendation in the ACRS letter on Palo Verde 1?

MR. LICITRA: We didn't pursue that. We wrote a letter to the utilities.

MR. MICHELSON: Let me ask, can you answer that?

MR. EBERSOLE: No. I don't think we have ever had any explicit good explanation as to what has been done on this.

As a matter of fact, the indications with the aux spray system indicate that this sort of process has been working very well.

MR. MICHELSON: What bothers me a little bit is do we just just idly make these recommendations? Do we not press one way or the other as to whether or not they are carried out and if they are not, why not?

I mean, why do we make the recommendations if we don't believe it? If we believe it, why haven't we gotten an answer?

MR. EBERSOLE: I wonder if we could get Arizona to comment on the degree to which you do system interaction studies.

MR. WARD: Let's clarify the answer from the staff first.

Mr. Novak?

MR. MICHELSON: I assume our letters are to the staff, in essence, and therefore the staff either goes back and says, no, we are not, or, yes, we carried it through.

DR. NOVAK: I don't think it is quite that way. At least what we would do is ask the applicant to respond

to those issues directly. When we review their response and in our minds -- depending upon the rigor with which you express your desire to reach a conclusion, then I am sure that in a supplement to the Palo Verde safety evaluation we address that concern.

MR. MICHELSON: I have not been on Palo Verde's subcommittee meetings before, so I didn't know the history. That is why I was asking because I assumed it was handled further back.

I wanted to go back and look at these studies relative to the questions of auxiliary spray as well as a couple of other questions. I was really looking at the reference.

And apparently, to your knowledge at least --

MR. WARD: Wait a minute. He thinks there probably was something written in an SER somehow.

DR. NOVAK: Generally speaking, the first safety evaluation supplement that we issue addresses those concerns identified in the ACRS letter. So we do very shortly after the issuance of the safety evaluation meet with the committee. If we have written a favorable letter, then we pursue those comments with the applicant. He would address them, we would review them, and we would follow-up the safety evaluation.

Now, it may not be very specific, but in some

sense it should be addressed.

MR. WARD: Perhaps we could ask the staff to get us a copy of the SER.

Dave, did you have something you wanted to say?

DR. OKRENT: I was just going to repeat what you said. After the break, we ought to have before us just what the staff said.

MR. EBERSOLE: Let me make a comment.

I think it is rather clear evidence in the case of the design of the auxiliary spray system itself that whatever may have been said in general terms the system doesn't reflect a very high degree of system interaction study capability.

MR. MICHELSON: Could we get any comments from the licensee in this regard, as to what studies they might have done on reliability as well as system interaction?

MR. WARD: First of all, I guess, are you familiar with a request from the staff with that recommendation in the ACRS letter?

MR. HAYNES: Personanlly, I'm not. I haven't been with the project that long. I do know that we have accomplished a reliability group. I believe that was established subsequent to the unit one. That group is active in doing reliability analyses on the systems and, in fact, has looked at the auxilliary pressurizer spray system subsequent to September 12th of that. And I have thoroughly evaluated the changes in reliability that result from the modifications that we're doing.

But they're also active in doing reliability studies on other systems. As to responding to this specific item, I'm not aware of the status of that. And, unfortunately, we don't have anyone here with us today who can respond.

MR. MICHELSON: On system interaction, do you have something ongoing? Have you done a system interaction study for Palo Verde, or something of that sort?

MR. HAYNES: I don't think so. I'm sorry that I can't respond more.

MR. EBERSOLE: You would have done of course a study, a system interaction study, that always precedes the occurrence of the event in order to prevent this sort of thing from occurring.

MR. HAYNES: I'm sure if we were requested to do such a study, we would have done it.

MR. EBERSOLE: Any further questions?

(No response.)

MR. EBERSOLE: I think we should have a break before we have a discussion here.

MR. WARD: And I hope we can get the SER supplement. Let's take a 10-minute break.

(Recess.)

MR. WARD: We'll reconvene.

Mr. Ebersole, I guess, first, we would like to hear if there's any information on Mr. Michelson's question in the SER supplement.

MR. EBERSOLE: Mr. Licitra.

MR. WARD: Does staff have anything?

MR. LICITRA: Yes. What I'll do is refer you to supplement number one on the Palo Verde SER. In supplement one to the SER, we did address that comment by the ACRS in the December '81 letter. What I'll do is just read from the documents. First, it says the committee stated that the Arizona Public Service Company should expand its studies of

systems interactions and systems reliability. The response that was provided in the supplement was as follows:

Item A-17 in Appendix C to the SER discusses the ongoing staff efforts to reach generic resolution of the systems interactions in nuclear power plants. It is expected that the development of systematic ways to identify rank and evaluate systems interactions will go further to reduce the likelihood of intersystem failures resulting in the loss of plant safety functions and hence improve systems reliability.

After resolution of this generic issue, the staff will determine whether additional studies by Arizona Public Service Company are required.

MR. EBERSOLE: I think the aftermath of that is the finding that the aux spray system is not working would require investigation of its fundamental weaknesses. At least my response to this meeting would be take a letter of two paragraphs:

"We see no reason to impede further progress on fuel loading or full power for unit two."

The basic issue still remains the same about the PORV versus some other method of cooling in addition to the high pressure cooling and the decay heat removal system, and that we will probably write a paragraph pertinent to the absence of any interactive studies that are going to

preclude any findings on the aux spray system.

Glenn...

MR. MICHELSON: That's only half the answer. A-17 is the reliability study, what did the SER say? You answered it for the interaction study, who asked for two things -- interaction studies and reliability studies. They are quite different.

MR. EBERSOLE: I didn't take them to be different, Carl.

MR. MICHELSON: They're quite different. The interaction study is quite different from the reliability study.

MR. EBERSOLE: Are you talking about direct liability of the direct systems?

MR. MICHELSON: Yes. There's a great difference.

MR. EBERSOLE: What do you have to say about the reliability studies?

MR. MICHELSON: You can have a situation where you have a very unreliable system that has no interaction with other systems.

MR. EBERSOLE: I agree.

MR. NOVAK: This is Tom Novak. I think that the response the staff gave is in the form of if you do a systems interaction study, you learn from it. It follows that you should if you make changes, enhance the

reliability. And that was all that the staff was saying. The staff did not specifically respond to the committee's recommendation that the applicant perform, that he should expand studies on system interaction and systems reliability, and systems reliability.

MR. MICHELSON: The two studies that we asked for, you didn't seem to address very much the latter. If you read the one in RHR, decay heat removal, you will find that you did say you were going to put that in a later SER. So I assume, if you search the SER's, you'll find it.

MR. LICITRA: I think that was addressed in the supplement, supplement one.

MR. MICHELSON: Do you know which one?

MR. LICITRA: I'm guessing. I think it's number five.

MR. MICHELSON: Thank you.

MR. EBERSOLE: Perhaps that can be looked at.

Glenn, do you intend to make a statement?

MR. REED: Jessie, are we sort of wrapping up what we might put in the letter?

MR. EBERSOLE: Yes.

MR. REED: I'll not talk about...I've been involved quite a bit in Palo Verde in the last year. I'll not talk about the good and bad things I've seen. I really have noted a good operating organization. I do agree with

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Mr. Crews. I think there must be some frailties in design thinking and technical support, because it appears to me that this test for electrical continuity and its impact unfolded deficiencies in the auxilliary spray system. And that's not a real engineered way to get to a discovery of the vulnerabilities.

I happen to think that the applicant, the licensee, has made a good point with respect to the need for rapid depressurization versus slower depressurization. As an operator, I perhaps would like to be more able to rapidly depressurize to saturation, to turnaround steam generator tube rupture.

But with their large steam generators at their site, it looks to me that slower depressurization would be okay. I do feel very much that the final wrapup of Palo Verde is tied to what Mr. Novak said.

The A-45 thing we must get on with and we must find out whether the reverse bleed and feed cooling technique is important. I think something to that effect should go in the letter.

I also have been concerned that there are a number of single component failure potentials in the systems we saw today and in other systems, such as auxilliary feedwater and in safety injection.

This comes about from the fact that what I think

I see is a policy on the part of either combustion or Palo Verde to have lots of closed valves.

And I wonder if that shouldn't lead somebody to a limited PRA review of safety systems.

With respect to these closed valves, many of them I think we could leave open. I think we ought to consider whether we should have a mini-system, a limited systems PRA review some time along in the next year or so, to see if there shouldn't be some changes in valve positions to improve our reliability.

MR. EBERSOLE: Any further comments on this?

(No response.)

MR. EBERSOLE: I presume you all know that we are obligated to provide a reply to Commissioner Asselstine about these recent events we've heard about. My position at this time is that we write about a two-paragraph letter that takes up the several matters that we've heard about today, and have it ready for discussion Saturday.

MR. WARD: Let me ask the staff beyond the committee's request and the need to be responsive to the Commissioners, Commissioner Asselstine in particular, does the staff, in terms of licensing the second unit, does the staff see any need for further ACRS comment?

MR. NOVAK: No, sir. We can go forward without a specific letter from the committee on the acceptability of

licensing unit two.

MR. EBERSOLE: This will of course come prior to the next SER, which is like this week.

MR. MICHELSON: Would that statement be predicated on the assumption that you took care of our comments on unit one? In other words, would you proceed without a letter from ACRS on unit two if it did not cover things that the ACRS had asked for on unit one? The system interaction question?

MR. NOVAK: I guess what I perceive from this committee, and I'm prejudging the letter, that the committee would not have written or would not have advised the staff that prior to issuance of unit two, certain things must be completed. I think what the committee is saying, there are some recommendations you're going to make. They do fall in the period of time that goes beyond issuance of the license and commitment has to be obtained from the applicant regarding certain studies.

MR. MICHELSON: Thank you.

MR. EBERSOLE: It's yours.

MR. WARD: If there are no other comments, we'll close out this agenda item then and move on to the next topic.

(Whereupon, at 10:30, the meeting was adjourned and the committee went into an unrecorded session.)

AFTERNOON SESSION (3:25 p.m.)

MR. WARD: Our subcommittee chairman isn't here, but I think we can begin. We will give him the opportunity to say what he wants to say.

But my understanding is that we were going to get some presentations from the staff.

Here he is.

Do you just want to start hearing from the staff, or have you got anything to say?

MR. EBERSOLE: No, I have nothing to say.

MR. WARD: Why don't you go ahead, Mr. Rossi?

MR. ROSSI: I am Ernie Rossi, from the Office of Inspection and Enforcement.

I have a number of other staff members with me today. Rob Hernon, from the Office of Nuclear Reaction Regulation is here, and we have a number of people who are going to make presentations.

We are going to start with a problem that was discovered October 10th in Maine Yankee. It involved improper installation of Rosemont transmitters.

Pat Sears, from the Office of Nuclear Reactor Regulations, will give this presentation.

MR. EBERSOLE: Dave, I want you to hear this. This has to do with the exodus of what you call primaticity. It also relates to what I said earlier that

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you should use a steam genie on every installation to see whether you do a good job for a steam jet.

MR. SEARS: My name is Pat Sears, the Maine Yankee Project Manager.

This concerns improper installation of Rosemont transmitters and certain other problems we found subsequently.

With the plant down for refueling, Maine Yankee discovered that pressurizer pressure, pressurizer level, and steam generator level transmitters had not been installed in complete agreement with EQ test configuration.

The installation was completed in 1982. The transmitters were locked, and Maine Yankee believed that they could be environmentally qualified, and it turned out that, yes, they passed the test. The problem was Maine Yankee did not go back and check to see that the installations were exactly as tested.

It was discovered by an operator who found that he could move fairly easily the leads coming out of one of the transmitters, one of the connectors to the transmitters.

They went around and tightened everything up to the test configuration. Then they started looking for other stuff.

They found two other fairly small problems:

one, drain holes in the bottom of the junction boxes were not drilled. Those are the connectors that are in the junction boxes.

Now, the question I was asked Monday that I couldn't answer for sure is: what relationship do those junction boxes have to the Rosemont transmitters?

The answer is none. They are not connected to them, nor are they part of that.

The junction boxes have power cabling coming into them. Rosemont transmitters, of course, just have instrument cabling coming in. They are physically remote. They are not electrically connected.

The junction boxes carry power cabling, with limit switches for those valves. The junction boxes themselves are not required to be environmentally qualified.

However, in my view, the junction blocks that they are going around are environmentally qualified. The environmental qualifications report requires that the junction box be drilled for pressure equalization and to allow moisture to escape.

MR. MICHELSON: That is the same as saying there are not open terminals or terminal blocks within the junction box, just splices.

Is that really true?

MR. SEARS: There is a person here who can answer that.

Stan, could you get up over there to the microphone?

MR. HERBANOWSKI: Stan Herbanowski. And the question was again?

MR. MICHELSON: What is inside the junction box? Are these just pigtails spliced together with these connectors, or are they terminal strips with screw-down connectors or whatever?

MR. HERBANOWSKI: What is in these boxes are terminal blocks like the one being passed around. That is a single junction point from a terminal block. Typically, terminal blocks will have eight to twelve positions, and similar to the viewgraph that is on the board there.

(Slide.)

MR. SEARS: It is not a very good viewgraph, but it is the best I can do.

MR. EBERSOLE: That is a nonseal block, correct?

MR. HERBANOWSKI: Yes, sir.

MR. EBERSOLE: Therefore, if it is initially cold, it suffers from condensation upon steam reentry into the box. That means it suffers from voltage leakage to some greater or lesser degree from pole to pole and pole to ground?

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MR. SEARS: Yes.

MR. EBERSOLE: Has it been tested for that condensation leakage condition, and has it been shown that in a dirty typical condition there will not be excessive short-circuit currents?

MR. SEARS: Can you answer that?

MR. EBERSOLE: This is the classical question.

We had all thought hermetic sealing of electrical apparatus was mandatory. We found that this situation has been compromised in numerous places in which open terminals have been exposed to this transient condensation and leakage currents do flow as a result of the initial condensation phase.

MR. MACHINTONI: I am Armand Machintoni, from the Equipment Qualification Branch.

The concerns you are voicing are a concern in low current type circuits and surfaces of that nature.

Now, I am assuming that these terminal blocks were used in control and power circuits; whereas, the small leakage currents that have been observed as a result of the steam impinging on these terminal blocks would not be a problem In this application.

MR. EBERSOLE: There is a notorious report from Sandia that says in the testing of these in various laboratories they have gone so far as to preheat these

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terminal blocks before spraying steam on them, thus precluding any condensation phenomenon.

I ask you, have these terminal blocks been subjected to the initial normal condition when they are cold and then submitted to a steam environment wherein the maximum condensation rate takes place?

MR. MACHINTONI: I can't answer that. I haven't seen the qualification reports.

MR. EBERSOLE: We need to get an answer on that.

MR. MICHELSON: When the qualification testing was done, was a hole drilled in the junction box that was tested? Did they just drill them in the field, or is this a new feature added without going back on the test?

MR. SEARS: The qualification test report from Weidmuller, the manufacturer, required that they be vented.

MR. MICHELSON: They did include venting when they did the testing.

Thank you.

MR. EBERSOLE: Could the required testing then be done with an initially cold condition with a steam environment imposed upon this vintage construction?

MR. MACHINTONI: As far as I am aware, the terminal blocks were in the normal ambient status before the test. They were not preheated.

MR. EBERSOLE: They were in a normal ambient

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status and then the leakage currents were measured; is this what you are saying?

MR. MACHINTONI: From what I recall, yes. I do not recall the terminal blocks being preheated.

MR. EBERSOLE: I think we would appreciate a confirmatory piece of paper referring to this. I think it is a universal problem and a rather critical one if we are faced, you know, with excessive short-circuit phase-to-phase/phase-to-ground current.

DR. SHEWMON: Jess, did you agree that if these were power cables that the condensate leakage currents would be a "no, never mind," whereas with instrument systems they would be a problem?

MR. EBERSOLE: I don't know. I don't know if they would be a "no, never mind" or not.

MR. MICHELSON: They could be in both cases. Clearly, in the switched gear cases excessive condensation leads to a flow of current around.

MR. EBERSOLE: Some of these currents might be as high as 4.0, mightn't they?

DR. SHEWMON: How could a cable with condensate carry as much current at 440 volts?

MR. EBERSOLE: If it is dirty and the poles are closed, it will do it.

DR. KERR: Mr. Chairman, if we are really

designing a qualification test, it seems to me we ought to do this at a separate meeting, not at this one. If there is some serious concern about the qualification test that is being used, then it seems to me that ought to be taken up by a subcommittee.

MR. MICHELSON: It was, except they didn't have the information that they are now giving us.

DR. KERR: But I am suggesting that the kind of information that we apparently need is something that ought to be explored in subcommittee, it seems to me.

MR. EBERSOLE: This is extrapolated from the subcommittee information here. We didn't get this information.

DR. KERR: I mean, if we need further information of this kind, it seems to me --

MR. EBERSOLE: I think they would say this could be resolved by some sort of a letter or some statement from the staff to us at a later date.

DR. KERR: It would be nice, though, if the staff knew exactly what it is that we wanted them to document.

MR. EBERSOLE: I think the staff knows precisely want.

DR. KERR: Maybe the staff does. I don't.

MR. ROSSI: Let me ask you a question. I think if we are going to be asked to come back and answer, it

might be good if we had a letter from the committee with specific questions that were being asked because a lot of times when we come to these meetings we get a lot of questions, and we aren't really sure how much staff effort to put in to coming back and trying to answer each one.

So I would much prefer -- and I think Ron Hernon would, too, if we could have the questions that you really feel you need answers to in writing. Then we could devote the staff resources to it and come back.

MR. EBERSOLE: Only since it is a very reaching, widespread problem, I think it would be easier to put a letter out on this matter.

MR. REED: Are you going to tell us who was responsible for the modification installation of these Rosemonts?

MR. SEARS: There was no modification. These were installed.

I don't understand the modification part.

MR. REED: Is this an aspect from Three Mile Island? Did they change?

MR. SEARS: I believe so.

MR. MACHINTONI: It was kind of an equipment qualification upgrade and Three Mile Island.

MR. REED: So some installer, either the contractor or the utility did the work. Who did the work?

MR. SEARS: The utility, I believe. It was done in 1982, before the EQ test was performed.

MR. REED: As at Three Mile Island. I was wondering why the circuits didn't get complete.

Is that a contractor fault or a utility weakness?

MR. SEARS: It is a utility weakness. It is a QA fault. It is clear to me, anyway.

MR. REED: I guess I should put that differently. The licensee is always responsible. I was wondering whether he had it done by contractor. Was there a contractor gap there?

MR. SEARS: I don't see that there could have been a contractor gap. The equipment was installed, but the tests were run, the test reports were given to Maine Yankee. Maine Yankee did not go back and see that this equipment was in enhanced testing condition, a clear QA fault.

On the follow-up Maine Yankee checked for other like problems and found none, except as noted up there.

On September 10th, J. T. Beard briefed this subcommittee on the steam generator, pressure instrumentation that was compromised. Now, taken together, these events are being considered an abnormal occurrence. The safety significance, of course, is the steam line break could have compromised the systems that were served by the

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Rosemonts.

MR. EBERSOLE: Would it be more accurate to say that any kind of a steam or water vapor leak of substantial amounts in the containment rather than the steam line break itself, any kind of a leak, a high pressure line leak would have done that? Wouldn't it?

MR. SEARS: It could have, yes. My problem here is that I don't know how tight these connections were.

What Maine Yankee did, as soon as they found a loose one, a QA man was called in. He couldn't answer how tight they should be.

MR. EBERSOLE: Isn't the so-called tight test established by how tight you do it in foot-pounds, inch-pounds, or however you do?

MR. SEARS: In this case it was clearly specified. All of the connections had inch-pound.

MR. EBERSOLE: So this is an intrinsic weakness we already knew about in a tight test concept?

MR. ROSSI: I think there is a misunderstanding. My understanding of what happened was that they installed the equipment prior to completing the equipment qualification test in anticipation that the equipment would pass the test. Then they ran the tests under certain conditions, and they didn't feed back the certain conditions to bring the plant equipment into conformance with the

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conditions under which the tests were run.

So I am not sure it means that there was a problem with the tight test. There was a problem in making sure that the installed equipment was inscalled the way it ultimately was tested when it passed.

MR. EBERSOLE: Only what I am saying is that is what is wrong with all type tests, whether the field installation matches the test?

MR. ROSSI: That is true, but you wouldn't run the equipment qualification tests necessarily on the installed one.

MR. EBERSOLE: No, but you must follow rigidly procedural details.

MR. REED: This is not a unique thing that is occurring out there with Three Mile Island backfits as far as the sequence of events. A lot of Rosemonts are here that haven't been equipment qualification tested, and they are waiting for this significance and waiting in the great rush to get these things turned out.

Have you gotten out a bulletin to other people who are involved in this Rosemont backfit?

There might be the possibility that it exists for others.

MR. ROSSI: I don't believe we have gone out with either a bulletin or an information notice. I believe that

we are still considering an information on the problem.

MR. SEARS: I know we are.

MR. ROSSI: So you know it is a breakdown in the QA that ought to be out there, and we are looking at whether a notice may help. I think it is unlikely that we would go with a bulletin.

MR. SEARS: I talked to the region yesterday. They are going to run a special QA audit in this area to see that the as-billed condition matches testing conditions. This is Maine Yankee now.

DR. OKRENT: So far we have been talking about the Rosemont connections. What is not clear to me is whether there may be other connectors made by a different manufacturer which have been one way or another left in a nonhermetic condition and how the staff would know if this were the case.

MR. SEARS: They did find one.

DR. OKRENT: You are talking about this particular plant, and I am talking about 100 plants.

MR. SEARS: You mean the generic issues?

MR. ROSSI: I don't think there is any question that every so often we find problems where the equipment is installed in a way that is inconsistent with the way that it was tested or analyzed.

That is true of seismic devices, also. It is a

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QA problem, and I don't know that notices and bulletins and that kind of thing will totally solve the problem.

It doesn't seem feasible to go out with a bulletin that says check every piece of equipment in every plant. It doesn't seem too useful to go out with a bulletin that says check particular pieces of equipment in every plant.

What we would normally do is look and see if there were something unusual in the instructions or something else about one piece of equipment that other licensees might not have the right information to use in their QA program, and then we would go out with a notice or a bulletin.

It is difficult to know exactly how to handle it, but we run into these problems, I guess I would say, now and then.

MR. SEARS: Maine Yankee, by the way, does have a good QA program in place.

DR. OKRENT: I heard the answer but I'm not sure why you think it's adequate.

MR. SEARS: The QA program?

MR. ROSSI: No, why my answer is adequate. I'm not sure how to reply to that question. Clearly, what we're doing, well, not 100 percent ensure that every problem is found on every plant. You know, the responsibility for the QA lies upon the licensee. What the NRC does is try to audit what they're doing, make sure they're doing it right and make sure people have the right information to use in their QA programs.

And where we find they aren't doing these things in our inspection programs, we take appropriate enforcement. It's a matter of practicality and how far we can go in doing the job for the utilities.

Clearly, if we think they're missing information they need to do their job correctly, then we issue an information notice or a bulletin or a generic letter, depending on the severity of the problem and how important we think it is to get feedback on what we did.

MR. REED: Let me try to help you a little bit with this because I feel that you don't have to go out and generate research on ground zero to this. There's a

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different pattern in this Rosemont installation -- that's what I was trying to make a point -- from the normal pattern of received equipment qualified goods, putting them in place.

These Rosemonts, I think many licensees put them in place, waiting for later equipment qualification information.

MR. ROSSI: You're absolutely right because they may have put it in. They didn't have all the original information when they originally installed it and now they have to come back and perhaps modify the installation. You're right, that is different and that is a smaller problem. This may be the kind of thing that the notice is quite appropriate on.

If we do go with the notice, it would seem that it ought to be worded more broadly than just "Rosemont transmitters". It ought to cover everything that's been put in prior to doing the EQ testing. You want to make sure that the loop was closed, to make sure that it's installed the way it was ultimately tested and that the testing was done after the installation.

I think that's your point.

MR. EBERSOLE: May I ask a question, Ernie?

In the broader context, can you provide us with any kind of statement going back to day one as to what's

been required of the utilities, beginning at the highest voltage we have inside these containments in these hostile environments, and what they do with the variety of terminal types that they have in regard to either hermetically sealing them or permitting them to be open and not subject to leakage currents.

As a case in point, I must think the 4160 leached, the main coolant pumps, are hermetically sealed; correct?

MR. ROSSI: I'm reluctant to try to answer.

MR. EBERSOLE: I'm just starting with that, okay? Now, I'm going to come down the line to 440, 250 DC, et cetera, et cetera. Are there any general requirements that say that you must hermetically seal these as a guaranteed concept of adeqacy? Or if you're going to run the risk of leakage currents so qualified by whatever method you prescribe?

MR. ROSSI: I suspect that I'm not absolutely sure of this, that we do not tell them prescriptively when and when you don't hermetically seal things, that our requirements are more generally worded, that they have to be qualified to do the job that they're intended to do. And we don't tell them how you go about doing that.

That's the general approach that we take.

MR. EBERSOLE: So we have no knowedge at this

time what they do.

MR. ROSSI: I do not have any. There are probably general things which are done, but I suspect that we don't prescribe it, that our regulations are more general when you say it's got to do the job under the conditions that exist when it has to do the job.

And we tell them that they've got to test or whatever. Leave it at that, and then audit, testing, and so forth.

MR. EBERSOLE: Ever since I heard that Sandia report in which the testing laboratories, it's so biased it makes things worse, that's been bothersome.

MR. ROSSI: That seems to me a case in which the way they tested was probably the problem. I guess we have somebody here from the Equipment Qualification Branch.

Do you have anything to add or to correct to what I said?

MR. MACHINTONI: Yes, the requirement on utilities is that the equipment must be installed in a manner which does not violate the test which was performed on it during the qualification test. If the terminal block or the equipment was tested and exposed to the environment that it sees during an accident, then it can be installed the way it was tested.

Our requirement on all qualified equipment is

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that it has to be installed the way it was tested.

MR. ROSSI: And we don't prescribe whether it has to be hermetically sealed or whatever, as long as it passes the test.

MR. MACHINTONI: That's correct.

MR. EBERSOLE: On the other hand, you didn't define the testing conditions to preclude their preheating the system and they escape through that narrow crack.

MR. MACHINTONI: I would say, if they preheated the equipment, it's a violation of the testing requirement. They should not preheat it. They should test the equipment. It should be when it sees the accident environment. If preheating it is done, then it's an invalid test and we wouln't accept that.

MR. EBERSOLE: Okay. Good.

DR. SIESS: Preheating to what temperature?

MR. EBERSOLE: Whatever temperature would prevent condensation when it's impacted by steam.

DR. SIESS: That would be higher than the normal containment temperature, which is what? A hundred and twenty?

MR. EBERSOLE: I think it would be, yes, probably higher.

MR. ROSSI: I'm not familiar with the details of that report but what you're describing to me sounds like a

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clear-cut case of where they simply went out of their way to do the test in a way that wasn't valid, so they'd pass it.

That's assuming that it was the way you described it.

MR. WYLIE: This could occur. Maybe the Equipment Qualification Branch might want to speak to it, but it has occurred in the past where equipment was not deliberately done that way, but it was done because they had limited test facilities. And in order to get the temperatures up, they'd first run steam through the chambers and then hit it with the pressure later, in which case they dried it out when they were running the steam through it.

That is an erroneous way to do the test, but that was because they didn't have an adequate steam source to do the test.

That has occurred in some of the verification tests. At the National Labs also, where they had an inadequate steam source.

MR. ROSSI: I think that's a general problem, too, that when you run the test, you have to run it in some way that it approaches as nearly as you can practically do the conditions you're going to see during the accident. There may be cases where people have just technically not done it correctly because of a lack of knowledge or whatever, which is a different situation than I understood

you to be describing.

One is a deliberate way to circumvent the test requirements. The other is something that they didn't know at the time that made the test not valid. They're very different situations and, you know, we obviously look for both in what we do.

MR. WYLIE: But the events that I would cite here is the breakdown on the QA program, where the QC inspector didn't sign off on the way something was installed. The recommendations by the manufacturer that it be installed in a certain way, even though in this case the testing was after the fact, we should have come back and done something about it.

MR. EBERSOLE: By the way, did the papers show that everything was in order?

MR. WYLIE: That's the question, whether the QC inspector signed off on the installation or not.

MR. ROSSI: I don't know, but I thought we had somebody here from the utility.

MR. SEARS: Stan, do you know if there was any documentation on the original installation?

MR. HERBANOWSKI: I've not seen the package.

MR. WARD: Would you identify yourself, please?

MR. HERBANOWSKI: Stan Herbanowski from Yankee Atomic, representing Maine Yankee. I have not seen the

design package that the transmitters were installed under, so I can't verify what's in the package, the signoffs.

MR. WYLIE: I would assume that the quality assurance program requires that they have a complete design package or installation spec before they install it.

MR. HERBANOWSKI: That's true.

MR. WYLIE: In general though, you have to have qualification testing before you install them.

MR. HERBANOWSKI: True.

MR. WYLIE: Isn't that correct? You quarantine equipment until you get that kind of information. Then, once it's installed, then the QC inspector signs off that he saw it installed and verifies that it was installed the way it was supposed to.

MR. HERBANOWSKI: This is the case where the transmitters were installed with conditional approval on EQ.

MR. WYLIE: What do you do where you don't have the conditional approval?

MR. HERBANOWSKI: The normal case is that the equipment is qualified first and we're aware of the qualification test report and have it in our possession.

In this particular case, it was part of a massive industry program to qualify the Rosemont series transmitters. And all the transmitters that were installed

during this time were conditionally approved for EQ based on successful completion of the EQ test.

MR. WYLIE: What ensures then that you are going to install the correct one?

MR. SEARS: The QA system broke down there.

MR. EBERSOLE: I think we can close out on this. I think we can write the letter you want, Ernie.

MR. WARD: All right. We've used about half the time.

MR. EBERSOLE: We'd better accelerate the rest.

MR. WARD: Ten minutes a piece for the next items.

MR. ROSSI: The next presentation is on an event that involved reactor coolant system leakage to the reactor building through a leaking scram solenoid, and then through the scram discharge volume vent and drain valves.

This presentation will be given by Eric Weiss of the Office of Inspection and Enforcement.

MR. EBERSOLE: While he's getting ready, let me remind you of the Hatch events and the Oyster Creek events. Again, this is a recurring problem with the standard solenoid valve and the dump volume of the boiler.

MR. WEISS: On September 19th, Dresden had a leak of reactor water in the reactor building caused by what we now understand to be the configuration of the pilot scram

solenoid valve and the characteristics of those valves.

The reactor was operating at 80 percent power when they had a spurious turbine control valve closure. They got a pressure spike on APRM high. The operators attempted to reset the scram but due to a problem with the mode switch, they could only reset channel A.

This turns out to be one of the necessary conditions for the sequence to occur. You have to have the A channel preset and the B channel still tripped following a reactor scram. And then we will get this leak. And we would expect it to occur in other boiling water reactors except those with fast scram drives.

The operators noticed steam in the reactor building. They got radiation alarms. There was contamination on the first three levels of the reactor building. They got some false indications which misled them as to where the leak was coming from. And, ultimately, they terminated the event by closing the vent and drain valves, which I'll show you later.

Three individuals were contaminated during the event, and I understand a fourth was contaminated during the cleanup.

There are tests which were rather extensive both on the reactor and in place. These indicated that 51 scram solenoids were leaking and there was a reconstruction that

indicated that the mode switch was left inbetween positions because it was part of the normal scram recovery procedure that they move the mode switch to the refuel position to get the white light on rod position. It verifies that all rods are in and they inadvertently left it between positions.

(Slide.)

The leakage path, which I'll show you later, was from the vessel through the scram discharge valves and into the reactor building via the reactor building equipment drain tank and the instrument volume. The leak lasted for about 23 minutes.

(Slide.)

We did an investigation of this event. We went out and examined the licensee's extensive testing efforts with the help of the resident inspector. We concluded the following things, that most BWR's will have this leak if they have A channel reset, B channel tripped following a full scram.

We think the operator should be able to recognize this event because they have adequate instrumentation in the control room to recognize. They have a blue light on the full card display that indicates the scram outlet valve is open. They also have red and green lights indicating the position of the scram discharge volume vent drain valves.

The research that was done by the licensee

suggests that the exhaust diaphram on one of the two valves in the culprit and that it tends to leak due to bad pressure. There may be a contribution due to maintenance.

I bought the valve with me. It is a three-way air solenoid valve with a pilot solenoid. It has two rubber diaphrams in it that have to pop as the result of solenoid action.

I've also brought pictures of the work in place and some of the bench testing that's done.

(Slide.)

I'd now like to briefly illustrate how this event could occur. This shows the reactor protection system in the reset condition prior to a scram, with the air pressure holding the scram inlet and outlet valves closed and holding the vent drain valves open.

So these are air to close, these are air to open.

(Slide.)

During a scram, the scram solenoids which I've indicated here, the 117 and 118 valves, will change positions and they'll cause the scram inlet and outlet valves to come open. And these valves over here, the 20 valves, will cause the vent and drain valves to go closed.

This gives it a solid reactor water underneath the drive piston; the control rod drive removes it from the

DAV/bc

top of the piston and deposits it into the reactor building equipment drain tank where it stays bottled up.

There is a condition called a half scram, which occurs quite frequently. It doesn't look a lot different than the reset condition. We have one channel tripped. We have one of these solenoids tripped, but the net effect is we're still sitting there very much like we were in the reset condition, even though we've got one of these solenoids tripped. And one of 20 valves tripped. That's the one out of two taking place.

The logic is that we must have both solenoid pairs go in order to get the valves to change position.

(Slide.)

The problem occurs if you have a leak in the exhaust diaphram of the 117 valve. We get a degraded air pressure here; following a scram, we actually have zero pressure here due to the backup scram solenoid. But when the backup scram solenoids close, we don't build up air pressure to the full 75 psi if this is leaking out through the vent. We'll have a degraded air pressure here, say, of 38 psi, which is sufficient to hold these valves open, and insufficient to close these over here.

So now we have a leakage path out the vent and out the drain into the reactor building.

(Slide.)

This diagram shows the scram solenoid pairs, the 117 and 118 valve, solenoids in both exhaust and pressure diaphrams in both, and in a nutshell, what happens or what we believe happens is that there's a pressure built up on this side of this particular exhaust diaphram which keeps it from completely seating due to the pressure drop across this open diaphram.

This incidentally shows you in a half scram condition, or half reset condition if you want to be more precise -- by half reset, I mean a half scram following a full scram, where we have the A channel reset and the B channel tripped.

DAVbur

(Slide.)

The solenoids I passed around the room appear here under each hydraulic control unit. They are indicated by the number 7. So they are addressed, and there are 177 pairs of these solenoids.

And in response to this event, we are issuing an information notice.

I have also included in your package a more detailed drawing showing some of the intricacies of the system.

Are there any questions?

MR. EBERSOLE: Are there any questions on this?

DR. KERR: What do you think will be the effect of your investigation on future incidents?

MR. WEISS: I expect that plants will modify their procedures and training and that if it should occur again -- which we think is a fairly low probability event -- but if it should occur again, I would expect that operators will recognize it more quickly and have a procedure in place to deal with it.

DR. KERR: Thank you.

MR. EBERSOLE: Any other questions?

(No response.)

MR. EBERSOLE: Let's move along to the next one, then.

DAVbur

MR. ROSSI: Next is going to be a discussion on problems with the auxiliary feedwater system at Turkey Point Unit 3, which occurred on July 22nd.

We are going to have two people giving us presentations. First, Bob Baer, from the Office of Inspection and Enforcement, is going to review the specific event and causes for it.

Then we have Dan McDnald, the Project Manager, from the Office of Nuclear Reactor Regulation, who is going to give a more general discussion of the auxiliary feedwater system design at Turkey Point Unit 3 and some of the changes that have been made to it over the years.

Bob Baer will start with the discussion of the specific event.

(Slide.)

MR. BAER: With the shortage of time, I will try and run through this fairly quickly. This was an event the committee heard about at its September meeting. This is just to try to refresh your memory.

The event occurred just before midnight on July 21st, 1985 and carried on into the next morning. The Unit 3 tripped from full power, as I said, just before midnight.

The level in the steam generators were maintained with the main feedwater pumps. They were run back to the control level, but the high level occurred in the steam

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generators, and this caused the main feedwater pump to trip.

Turkey Point has three safety grade steam turbine driven aux feedwater pumps. These started automatically, and all of them started and ran. One pump, however, had problems with an air-operated aux feedwater control valve on the discharge side of the pump, not directly related to the steam admission to the turbine.

Sometime later the main feedwater pump was restarted, and the aux feedwater pumps were shut off. The aux feedwater pump turbine governors were reset locally.

This involves among other the steps draining oil from the governors. I will get back to that point in a moment.

The pump then had problems with the air flow water control valve. The steam supplied to the turbine that runs that pump was put in an off-normal configuration so that they could do troubleshooting of the flow control valve. And what this amounts to is there is an interlock on one of the steam admission valves whose position is interlocked with the air supply to the flow control valve so that normally closed -- those two valves are in series. The normally closed valve was open, and the normally open valve was closed so they would have air in this feedwater control valve.

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Sometime after that, while operating on the main feedwater pump, again there was a high level of steam generated. This time when the aux feedwater pumps were restarted two of them tripped on aux feed. Those were the two in the normal configuration.

The third pump, which was in this abnormal configuration as far as the steam supply valves, operated, but the fuel oscillated. The pump went from on to off.

The basic cause of the problem was the governor oil was not drained properly when the aux feedwater turbines were reset locally.

What this amounts to is there was oil in the governor when the pumps were called upon to restart and the control system was biased to a higher speed. It starts up faster, and it is more likely to have a mechanical overspeed trip.

The procedure was not sufficiently explicit. The generic actions that were taken with I&E is we have obtained about a week and a half ago a great deal more information from Terry Turbine on the various governors and auxiliaries that are offered for Terry turbines, and we plan to prepare an information notice that will describe the event and make the information available to the industry.

MR. REED: I am a little surprised to see here again -- this, I believe, is a Westinghouse unit -- that

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all the auxiliary feed pumps are steam driven, the same as Davis-Besse, only there is a better steam supply.

MR. BAER: Dan McDonald is going to talk about the actions taken at the plant.

MR. EBERSOLE: There is a part two to this, Glenn, there under licensing. Part two is coming. Part two is critical to this presentation.

MR. BAER: You are on, Dan.

MR. ROSSI: We have Dan McDonald now, and he will progress the design of the auxiliary feedwater system.

MR. EBERSOLE: There is kind of a correlation to the Davis-Besse problem here, and some actions are contemplated to bring it up to a high level of reliability.

By the way, these three pumps are shared with two units, right? So there is not really three turbine pumps per unit but three turbine pumps per two units.

(Slide.)

MR. MC DONALD: Attached to the briefing package is the memorandum to the Commission, in which they asked the staff how were we responding to the letter you sent to the Commission expressing your concern about this event, and attached to that memorandum is a response to the ACRS letter.

I believe your concern is broader than the event itself, but more concerned about the regulatory process and

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how we are attempting to identify a combination of things that individually may not lead to an event but collectively contribute to it.

In order to do this, I want to very quickly go over the original design of the Turkey Point auxiliary feedwater. Then I will go over the current design that has resulted in the changes in the post-TMI. I have highlighted the key changes that have been implemented subsequent to that.

FP&L has installed two motor driven pumps, nonsafety, 850 gallons, and an additional 500,000 gallon demineralized water storage tank.

After that, I will go through the follow-up of the event by the staff and also actions taken by the licensee, and very briefly I will discuss a special I&E team inspection, which was not the result of the event itself but concerns the staff has had that was highlighted by the Davis-Besse event in that maybe we were not going into enough depth and looking collectively over all the things that could contribute to it.

(Slide.)

In order to get a feel for the original design, I have a one-line.

As indicated, there are three turbine driven pumps. There is a three-loop Westinghouse plant, Unit 3

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and Unit 4, with a steam supply from each of the steam lines just outboard of the con ainment on each of the units.

They go through a pressure reduction stage. These were low pressure turbines, two condensate storage tanks, 250,000 gallons, 185,000 gallons, dedicated to the aux feedwater system. Then the outboard flow control valves to the steam generators of each of the units.

I would like you to note the piping and the number of valves, both at the inlet and the outlet.

The next one-line in the package --

MR. REED: Why did you make that point of the number of valves. I was sitting here pleased that they were in the open position versus other manufacturers and reports we have heard.

MR. MC DONALD: As a result of the TMI modifications, this was just simply three pumps shared between the two units as a result of the modifications. Let me just highlight them again.

(Slide.)

The system was manually initiated. It became automatically initiated. There is redundant flow indication. There is redundant level alarms on the condensate storage tanks. Two separate full flow capacity AFW trains.

When you look at the other one-line attached to

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the package -- I will put it on the projector in a minute -- you will note there is more redundancy in the inlet valves, plus some of the passive piping was even added to ensure that even passive failure would not result in failure of the system.

There are some air-operated flow control valves which had a nitrogen flow station for each of the units. That was divided and redundant for the two trains. There was no diversity on the inlet valves. They were all AC. Two of them are on each of the units. Two are DC and one is AC.

The pressure reduction station was taken out, and the high pressure turbines and a trip and throttle valve were installed in each unit within each train.

MR. EBERSOLE: Pardon me. You are telling me that they are normally open?

MR. MC DONALD: Yes.

MR. EBERSOLE: How does one maintain aux feedwater flow when you have a total AC power failure?

MR. MC DONALD: This was post-TMI modification.

(Slide.)

These are the normally closed. These are steam inlet valves. DC, AC, and DC. So we have DC now, post-TMI. Prior to that it was only AC operated, like a lot of the older auxiliary feedwaters.

MR. EBERSOLE: Are there any environmental or other problems with these auxiliary turbine driven pumps which require AC cooling or any other supportive function?

MR. MC DONALD: There are support cooling systems which I didn't include as one of the things. But this cooling system form has also been upgraded.

MR. EBERSOLE: Can these pumps run for an acceptable period of time without any AC?

MR. MC DONALD: Yes, sir.

MR. EBERSOLE: Thank you.

MR. MC DONALD: As I mentioned, the only thing I wanted to indicate, you can see the train, and now this is very busy and very difficult to follow. But you have Train 1 and Train 2. You can see the valving arrangement and the piping arrangement has been modified, both on the inlet and on the outlet sides.

So given a failure in any one train, in any components within that train now, you do have a two-train concept versus three shared, which is still a very complicated system. The pumps, as I indicated, are now high pressure. They have taken out the pressure reduction, which has improved the reliability of the pumps themselves. They have installed a trip and throttle valve, which is normally open. It is actually used in the electronic overspeed for the turbines.

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Again, this is not part of TMI, but there were installed the motor driven pumps with another source of water, 500,000-gallon demineralized water storage tank.

(Slide.)

The reason I bring up the question about the lack of diversity in the motive sources -- I have indicated there is diversity in the steam inlet now, but with the installation of the nonsafety grade steam generator feed pumps we have a letter with a commitment from the licensees to tech spec these pumps, provide surveillance to assure that if the safety grade system fails that one of these two pumps will be adequate and available to provide a water source for the steam generators.

I might mention they are nonsafety, but this size is somewhat in need. There are five what we term Black Star diesel generators.

These Black Star generators are used with two fossil units that are onsite. These Black Star generators are adequate to power these two pumps for exactly the same manufacturing size as the safety-related diesel generator onsite.

They have hardwired these in. They have taken the breakers out. There are interlocks. They have a procedure, and in about 15 minutes they can provide loss of all offsite power and could provide a backup power to these

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pumps and provide another method of getting water to the auxiliary.

MR. EBERSOLE: I believe you said they were radiator cooled, weren't they?

MR. MC DONALD: I believe they are. I am not sure, Mr. Ebersole.

And I will get back on some of the actions that we are taking in the proposed generic letter to address the concern. There are some plants out there that lack diversity.

MR. REED: You certainly overwhelm me with the redundancy in the equipment for auxiliary boiler feed as a technique to remove decay heat.

Just another question: do they have diversity in principle perhaps; what are the sizes of their PORVs; do they have PORVs?

MR. MC DONALD: They have PORVs. I don't know what the size are.

MR. REED: You don't know what their bleed and feed capacity is?

MR. MC DONALD: They do have a procedure they have already developed. It will be in process or in place by the end of the month.

The staff has tried to separate on the secondary side feed and bleed, being our defense in depth concept. We

still want to decide that the auxiliary feedwater systems and the diversity in it and use the feed and bleed as the defense in depth.

In fact, I will go to the generic letter. There are at least eight or nine plants that have been identified that do not have the reliability that we defined, high reliability, 10 to the minus 4 to 10 to the minus 5, that we feel should go back and look at their systems and may require some equipment modifications.

In addition, that generic letter, which is getting put together for a CRGR package, will include the concern about diversity, and I believe there are only four plants out there that do not have motor driven diversity in the motive source for aux feedwater.

With a commitment from Turkey Point, all four of these plants, similar to Turkey Point, have tech spec procedures in place as a backup for their steam driven systems.

I have kind of jumped ahead a little. I won't go into the immediate action, but Bob mentioned there was a procedural problem with oil gunk, also. We had to confirm that all the components within the system were operable.

There were some problems with the air system. We immediately had to verify on Unit 3 and also the operating reactor that all inherent components were operating.

DAVbur

An information notice.

There was a problem with dumping the oil, and that is being developed by I&E.

As I mentioned, we have a commitment for the nonsafety pumps tech spec'ing, and we have addressed the general concerns expressed in your letter to the Commission.

I believe the sensitivity that staff has now is tne regulatory process breaking down. We have, as you are aware, a Maintenance and Surveillance Branch now. And it appears that improper maintenance, not in itself but collectively, with testing, training and all these things together, seem to contribute to these events.

We have a team going out to survey several plants in the area of maintenance and surveillance. And they happen to be going to the Turkey Point site on December 5th and 6th. This will be factored in to either requirements or the way that we expect to look at these aspects.

In addition, they're going to have another outlook at the unit and have a look at what is being done to upgrade the units.

As far as Florida Power and Light, they took care of the immediate problem but in the long-term, they have a program in place which we call the PET Program, the performance enhancement program. To get a feel for that, it's a $100 million effort. They hired 140 additional group that will be on the Turkey Point site. They have made management changes, including a site vice president at the Turkey Point site.

In this program, because of the time, I'll just go through. It addresses design, operation, testing, training, all these programmatic things, coupled back

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together and along with QA and QC, as we discussed earlier, before the committee on the Rosemont. It's not just that the QA program is there, but the people that are looking at it are taking what we term a vertical look, looking indepth. For example, if it's a qualification question, as, in fact, has been installed as the qualification requires.

If it's a test, is it tested to what it should be for performance. FP&L is attempting to get people that are licensed operators for the Turkey Point facility integrated in all these areas. So they will get the operations feedback through the checks and balance system.

Part of this PET program includes a plant specific simulator, new health physics, and some other aspects. I'll touch on this team concept again.

As part of the staff's sensitivity to the regulatory process, we'll be looking at the right things. As I indicated, I&E even prior to Davis-Besse, and subsequent to that, determined that possibly the inspection modules were not adequate for picking out the interaction of all these different items.

The special team included what we term PAT and IDI performance appraisal teams, an integrated design inspection concepts where they looked at both programmatic and at the design from the initial design basis through all the changes. And is it still within its original design

basis given the modification changes, and also some investigative techniques that were used in Davis-Besse.

In summary, in the long-term, we are looking more at maintenance surveillance. They are looking at different inspection methodologies to ensure that this is an interactive thing.

The licensee program, which I haven't given as much attention as I should, on the PAT program and the maintenance, for example, they're looking for predictive analysis, not just some sort of calendar schedule of maintenance. They've got what they term MOVAT, motor-operated valve analytical testing machines, which will automate testing of MOV's.

So it's very comprehensive. It will be some time before all the benefits are seen, but it is in progress.

MR. MCDONALD: Are there any questions?

Yes, sir?

DR. KEPR: I don't mean this to sound like a critical question. It's not meant to be.

Have you looked to see if there are any tech specs or regulations that are likely to interfere with achieving a more reliable system?

MR. MCDONALD: Any tech specs or regulations? I'm sure not aware of any. I can't think.

DR. KERR: Has there been a systematic look to

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see if something about the way the regulations are written would inhibit the program, which would otherwise improve reliability of the system?

MR. MCDONALD: Related to reliability, I don't know if there's been a systematic look at it. But we do have a group that is looking at -- I don't know the proper term -- tech spec betterment, or whatever. They are looking at the tech specs per se.

DR. KERR: I applaud what you're doing. It seems to me what you're doing makes sense, but we both know that there is an extensive literature of tech specs associated with the operation of any of these plants. And it's clear to me that one might want to look and just make certain that somehow this one is not overloaded.

MR. MCDONALD: I appreciate that. One thing I did mention about Turkey Point specifically. It is an old vintage plant, licensed in 1971 and '72, with plant specific tech specs, which they're in the process of converting to the standard tech specs.

But, in response to your question, we are looking at the standard tech spec and I assume we're looking at any effect it could have on reliability, or these other things. But I can't specifically say.

MR. ROSSI: One of the things that's being looked at in tech specs is trying to optimize things like

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surveillance. And that sort of thing, to get good reliability and make sure we're not degrading reliability by doing more testing of systems than is necessary.

I would assume you're generally aware of the fairly extensive tech spec work that's been underway for some time.

MR. EBERSOLE: Mr. McDonald, I detect here that now we at long last are in the process of doing field in situ examination of design adequacy.

MR. MCDONALD: We are in the licensee also.

MR. EBERSOLE: It's been long in coming. You know, the old inspection routine never did that.

MR. MCDONALD: I think that's true. My experience has been, and I hate to use a cliche, but the horizontal look is just like when we were talking earlier, in Rosemont, if you've got a QA program, you should catch these things; but sometimes they don't.

When you start doing the indepth, you find more things; even though, as I mentioned, this PET program has been in place for some time, I believe that what was found in this inspection by the staff has sensitized them more for the utility itself to look in more depth.

And they surely are. They've made several commitments to us.

MR. EBERSOLE: This may be beyond existing

regulations and criteria.

MR. MCDONALD: I think the findings of the team and the event at Turkey Point provided support for the things the staff is looking at and doing in terms of these.

As a result of this event and the inspection on Turkey Point, Florida Power and Light is going to be a little ahead of the pack and have these all ready.

MR. EBERSOLE: Mr. McDonald, your point was intended to give you all a warm feeling, and I hope you have it. If you don't, speak up.

(No response.)

MR. WARD: Thank you.

Do you think we could skip the next item?

MR. ROSSI: This is fairly short and I'm not going to get up there to give it. It's recent reactor trip breaker failure on the Westinghouse Plant on October 29th. The D.C. Cook Unit 2 reactor tripped on a spurious, low flow signal from the reactor component pump breaker contacts. And there wasn't an actual loss of power to the pumps or a loss of flow.

During the trip, reactor trip breaker A failed to open, and reactor trip breaker B accomplished the trip function. As I'm sure you're aware, the Westinghouse plants have two breakers, either one of which will accomplish the reactor trip. These breakers are Westinghouse DP-50 type.

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Neither of the breakers on Cook Unit two had the automatic shut trip installed as yet. Shunt trips, automatic shunt trips, however, have already been installed on Unit one. In evaluation of the event at Cook, we feel that the A breaker had marginal, well, the undervoltage trip attachment has marginal capability to trip the breaker.

On November 3rd, a few days after the event on October 29th, they did a bench test of the remaining seven operating and spare breakers of Cook units one and two. And during that, the breaker which had been successful in getting the reactor trip on unit two on October 29th failed the undervoltage trip attachment force margin test.

Now we have gone out on the 5th of this month with an I&E bulletin. And that bulletin is addressed for action to the licensees of operating Westinghouse reactors that have not yet installed the automatic shunt trip feature on the reactor trip breakers. And that bulletin will require forced margin testing of the undervoltage trip attachment within seven days of receipt of the bulletin.

And then, thereafter, it requires monthly forced testing until the shunt trip has been installed into the automatic protection system and our preliminary survey indicates that there are now three operating plants that have not yet installed the shunt trip into the automatic protection system.

There are six other plants that have not yet installed the shunt trip in the automatic system. But they are currently shut down and we expect that they're going to complete the installation of the shunt trip into the automatic system before resuming operation.

That's all I have to say on that.

MR. EBERSOLE: Mr. Chairman, that's it.

DR. KERR: The three does not include two?

MR. ROSSI: That's correct. There are three other than Cook II, but Cook II is now shut down and they're going to install a shunt trip before they go back up. And I believe Cook II, I think they're included in the remaining ones.

Oh, one further thing. We just received a call today from Kewanee. They had started their testing as a result of the bulletin and the B bypass breaker failed the undervoltage trip attachment margin test.

The A bypass breaker there had been tested and passed the test. The B bypass breaker failed the test. And they had not yet tested the breakers that are actually being used in operation.

MR. EBERSOLE: I want to thank you and your team for making the presentation.

MR. WARD: Thank you. Let's take a break and return at quarter to 5.

(Whereupon, at 4:35, the committee recessed to go into an unrecorded session.)

CERTIFICATE OF OFFICIAL REPORTER

This is to certify that the attached proceedings before the UNITED STATES NUCLEAR REGULATORY COMMISSION in the matter of:

NAME OF PROCEEDING: ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

307TH GENERAL MEETING

DOCKET NO.:

PLACE: WASHINGTON, D. C.

DATE: THURSDAY, NOVEMBER, 7, 1985

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission.

(sigt) David L. Hoffman

(TYPED)

DAVID L. HOFFMAN

Official Reporter

Ace-Federal Reporters, Inc.

Reporter's Affiliation

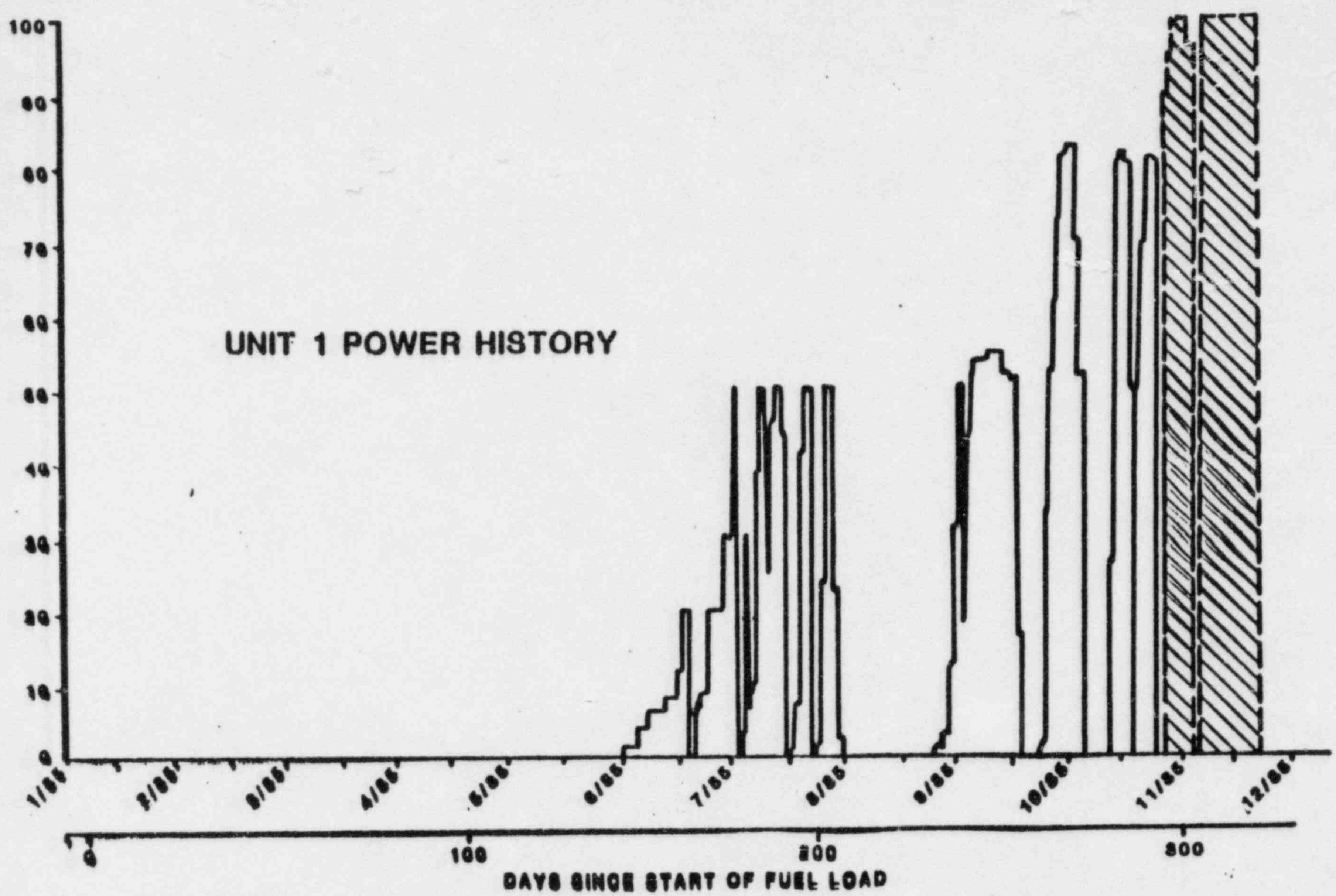
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

FULL COMMITTEE MEETING

NOVEMBER 7, 1985

ARIZONA NUCLEAR POWER PROJECT

PRESENTATION


UNIT 1 POWER HISTORY
100
80
60
70
50
40
30
20
10
0
1/85
2/85
3/85
4/85
5/85
6/85
7/85
8/85
9/85
10/85
11/85
12/85
0
100
200
300
DAYS SINCE START OF FUEL LOAD

- DEVELOPMENT OF PAT PROGRAM SCHEDULE
  - ACTUAL TEST PROGRAM DURATION AT OTHER CE PLANTS
  - SCOPE OF TESTING FOR PVNGS vs. OTHER CE PLANTS
  - ACTUAL TEST TIME
- TEST PREDICTIONS vs. TEST RESULTS
  - VERY GOOD AGREEMENT BETWEEN PREDICTION/RESULTS
  - NO UNEXPLAINED TEST RESULTS OR PLANT TRANSIENT RESPONSE
- PLANT TRIPS: 7 TRIPS (TWO WHILE TESTING)
  - TWO MAIN FEED PUMP TRIPS
  - ONE CEAC CIRCUIT BOARD FAILURE
  - THREE LOSS OF POWER TRIPS (ONE WHILE TESTING)
  - ONE S/G LOW LEVELS TRIP (WHILE TESTING)

MODIFICATION SUMMARY

- ADD SECOND, DIVERSE REFERENCE LEG TO VCT LEVEL TRANSMITTERS
  - ADDRESSES ROOT CAUSE OF LOSS OF CHARGING EVENT
  - REPLACES NEED FOR DAILY REFERENCE LEG CHECK

- PROVIDE POWER TO VCT OUTLET AND RWT GRAVITY FEED LINE VALVE FROM 1E MCC
  - ELIMINATES NEED TO MANUALLY RESTORE POWER TO THE VALVES FROM OUTSIDE THE CONTROL ROOM FOLLOWING AN SIAS

- ADD AUTOMATIC ACTUATION TO GRAVITY FEED LINE VALVE
  - ELIMINATES THE NEED TO MANUALLY OPERATE THE GRAVITY FEED LINE VALVE FROM THE CONTROL ROOM DURING LOSS OF OFFSITE POWER CONDITIONS

- LOCK OPEN TWO NORMALLY OPEN VALVES IN AUXILIARY SPRAY FLOW PATH
  - ELIMINATES POTENTIAL FOR ISOLATION OF GRAVITY FEED OR CHARGING LINE DUE TO SPURIOUS ACTUATION OR OPERATOR ERROR

MULTIPLEXER SYSTEM

- o REMOTE OPERATION AND INDICATION OF NON-SAFETY EQUIPMENT, INCLUDING THE NON-SAFETY 13.8 KV SWITCHYARD BREAKERS
- o COMPUTER-BASED SYSTEM UTILIZING FIBER OPTICS

OCTOBER 3 AND 7, 1985 EVENTS

- o SPURIOUS SIGNAL FROM THE PLANT MULTIPLEXER CAUSED AN INADVERTENT OPENING OF THE MAIN FEEDER BREAKERS SUPPLYING OFFSITE POWER

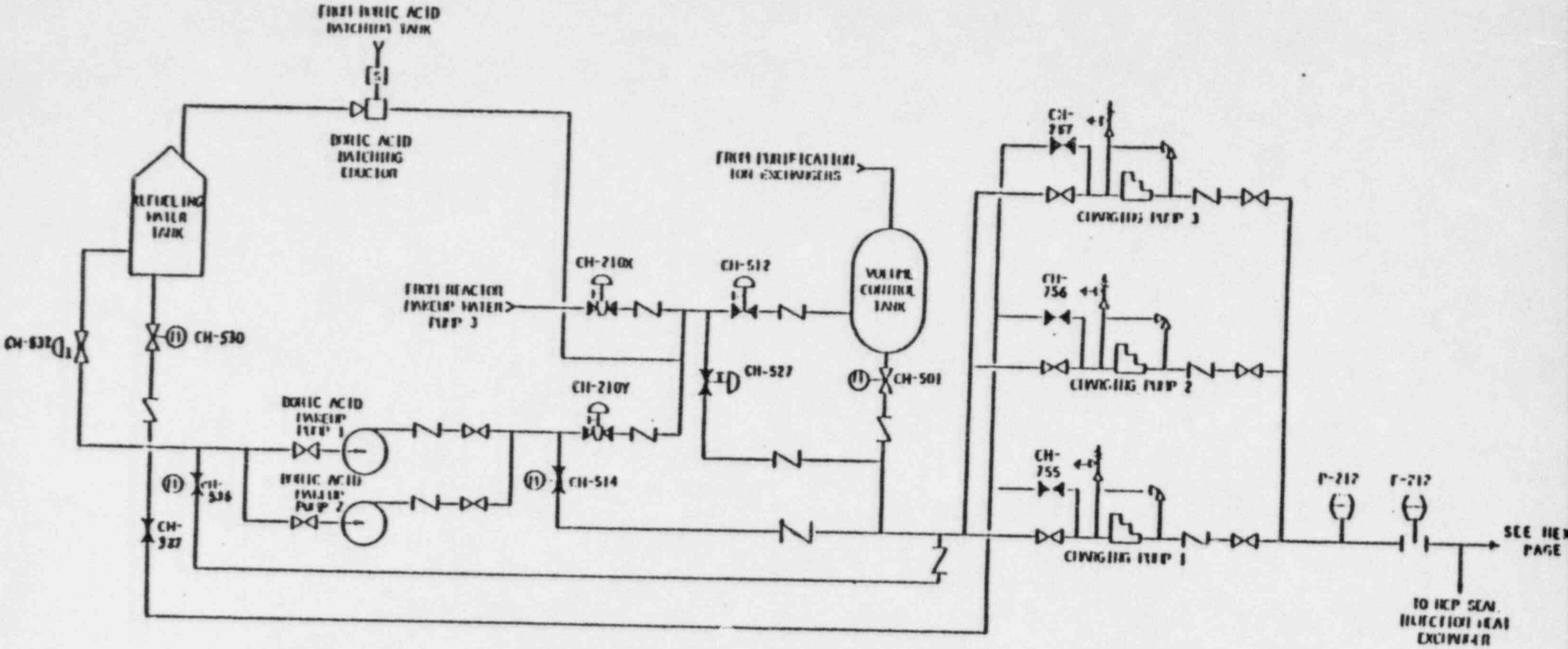
CORRECTIVE MEASURES

- o COMPLETE HARDWIRE MODIFICATION FOR CONTROL OF 13.8 KV SWITCHYARD BREAKERS
- o PERFORM SURVEILLANCE TEST TO ENSURE PROPER BREAKER CONTROL

LICENSING BASIS FOR PALO VERDE UNIT 2

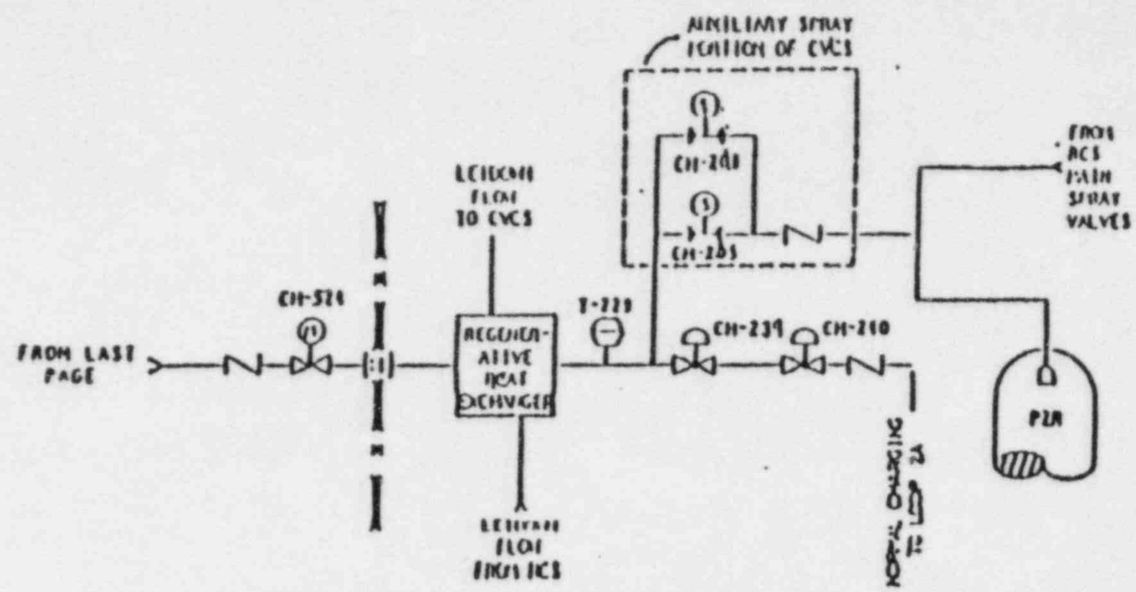
- RESOLUTION OF THREE REMAINING ISSUES
  - POST ACCIDENT SAMPLING SYSTEM
  - ECCS REANALYSIS
  - PRESSURIZER AUXILIARY SPRAY SYSTEM
- CERTIFICATION BY APPLICANT THAT DESIGN, CONSTRUCTION AND TESTING OF UNIT 2 HAVE BEEN COMPLETED IN CONFORMANCE WITH FSAR AND OTHER DOCKETED COMMITMENTS.
- COMPLETION OF POWER ASCENSION TEST PROGRAM FOR UNIT 1 PRIOR TO INITIAL CRITICALITY OF UNIT 2.

SIMPLIFIED SCHEMATIC OF PALO VERDE CVCS SHOWING SOURCES OF BORATED WATER FOR AUXILIARY SPRAY



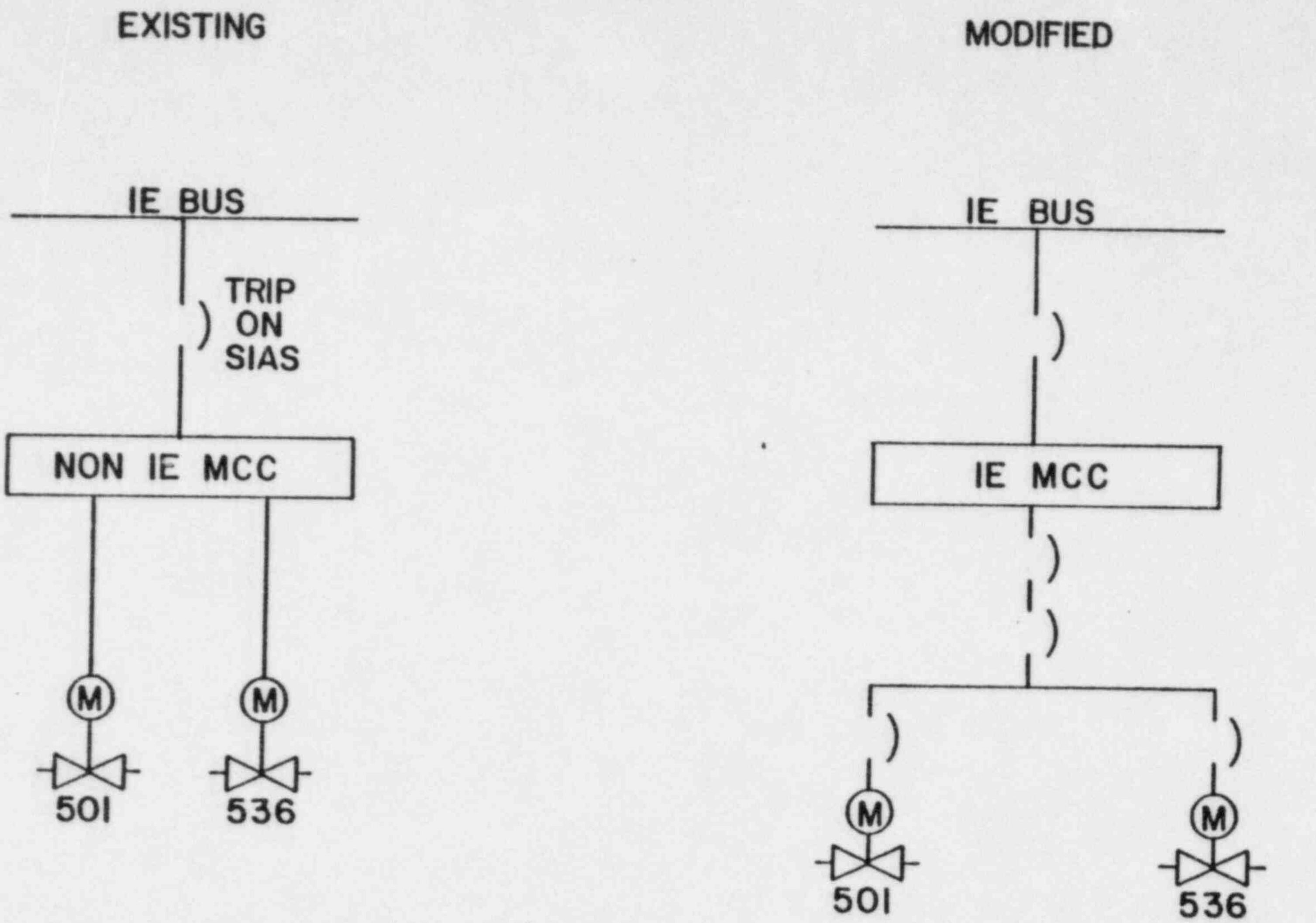
CLASSIFICATION OF MAJOR COMPONENTS				
COMPONENTS	ASME CODE	SEISMIC CATEGORY	IE POWER	ENVIRONMENTAL QUALIFICATION
CHARGING PUMPS (3)	III, CLASS 2	I	A/B	YES
CH-501	III, CLASS 2	I	A	BTP 5-1
CH-536	III, CLASS 3	I	A	BTP 5-1

SIMPLIFIED SCHEMATIC OF PALO VERDE CVCS SHOWING AUXILIARY SPRAY PORTION



COMPONENTS	ASME CODE	SEISMIC CATEGORY	IE POWER	ENVIRONMENTAL QUALIFICATION
CLASSIFICATION OF MAJOR COMPONENTS				
CH-524	III, CLASS 2	I	A	YES
CH-239	III, CLASS 2	I	NON-IE	YES
CH-240	III, CLASS 1	I	NON -IE	YES
CH-203	III, CLASS 1	I	B	YES
CH-205	III, CLASS 1	I	A	YES

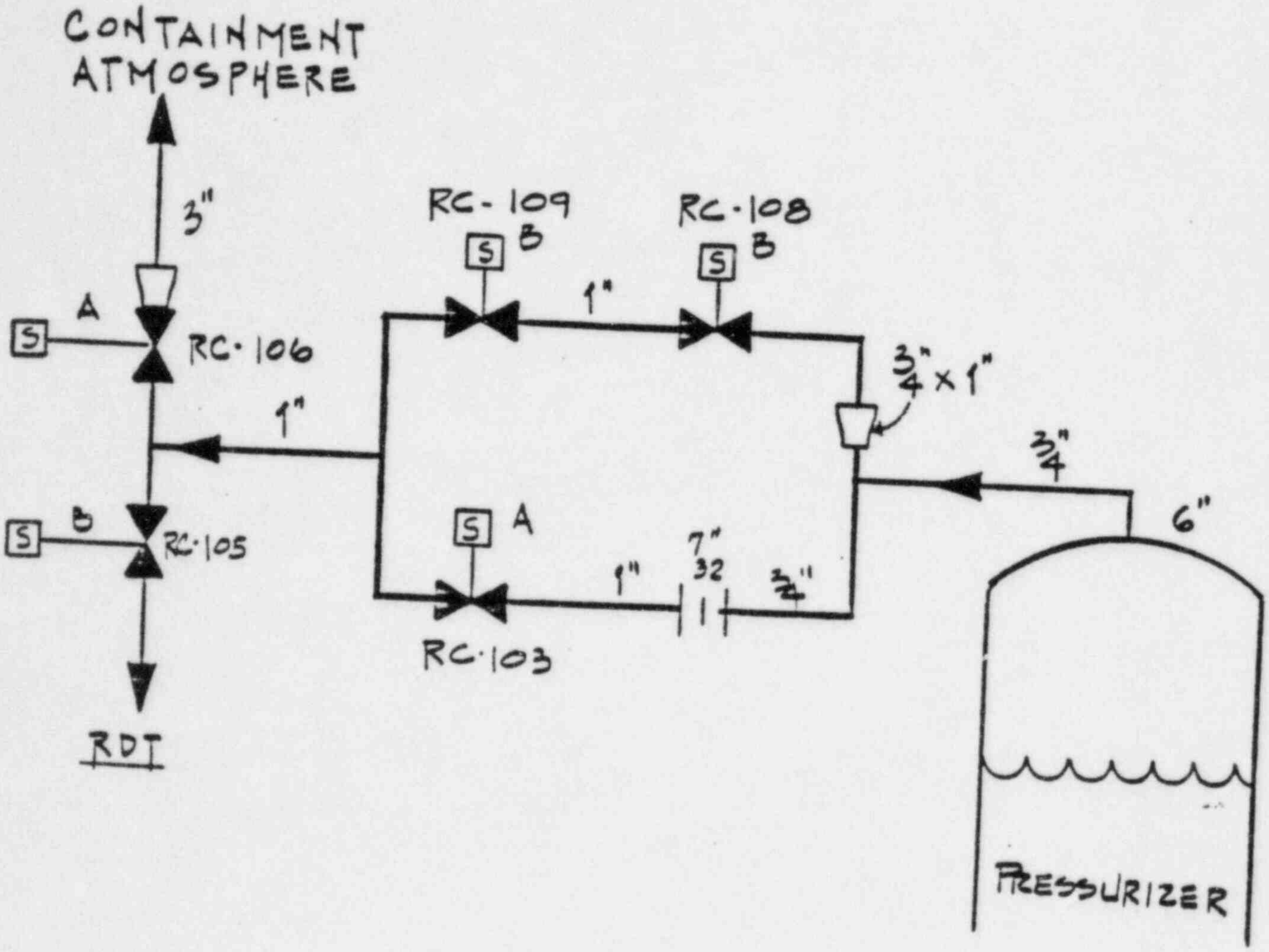
VALVE POWER SUPPLY CHANGE



CHANGE ENSURES OPERABILTY FROM CONTROL ROOM AFTER SIAS AND LOP SUCH THAT SUCTION COULD BE ALIGNED TO RWT FROM VCT.

FIGURE 3

PRESSURIZER VENT PATHS



CLASSIFICATION OF MAJOR COMPONENTS				
COMPONENTS	ASME CODE	SEISMIC CATEGORY	IE POWER	ENVIRONMENTAL QUALIFICATION
RC-103	III. CLASS 2	I	A	YES
RC-105	III. CLASS 2	I	B	YES
RC-106	III. CLASS 2	I	A	YES
RC-108	III. CLASS 1	I	B	YES
RC-109	III. CLASS 1	I	B	YES

GWS
11/05/85

PRE-ACCIDENT IODINE SPIKE

THYROID DOSE-REM

	2 HOUR DOSES EXCLUSION AREA BOUNDARY (REM)	8 HOUR DOSE LOW POPULATION ZONE (REM)
PVNGS FSAR APPENDIX 15A AUX-SPRAY AT 1015 SECONDS	200	41
AUX-SPRAY AT TWO HOURS	208	44
PRESSURIZER VENT AT TWO HOURS	208	44

10CFR100 DOSE LIMIT IS 300 REM

GWS
11/05/85

RADIOLOGICAL CONSEQUENCES OF THE STEAM GENERATOR TUBE RUPTURE WITH A LOSS OF OFFSITE POWER AND FULLY STUCK OPEN ADV APSS OPERATION AT 1015 SECONDS

(PVNGS FSAR APPENDIX 15A)

Location	Offsite Doses, Rems GIS	PIS
1. Exclusion Area Boundary 0-2 hr. Thyroid	40	200
2. Low Population Zone Outer Boundary 0-8 hr. Thyroid	20	41

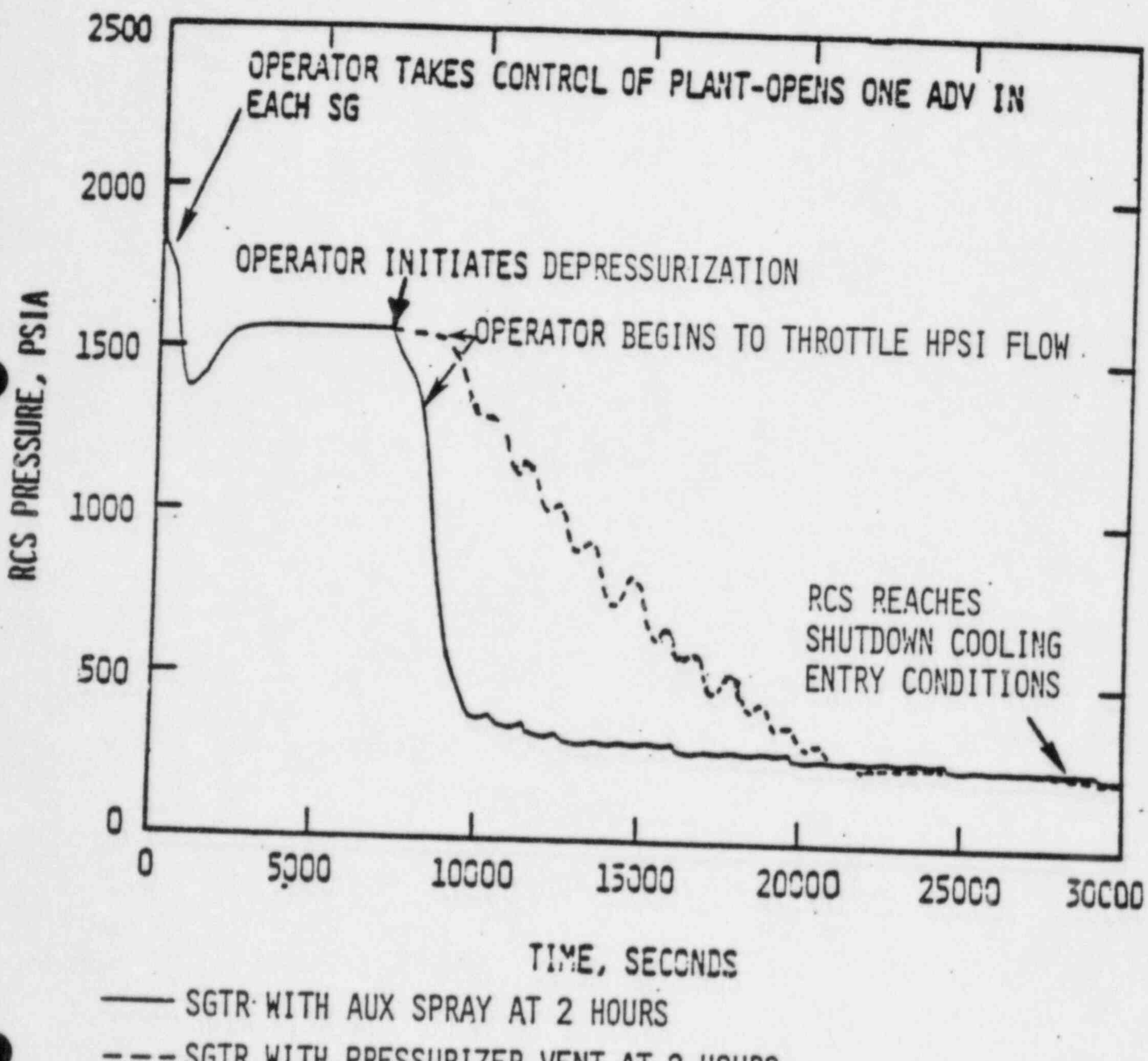
RADIOLOGICAL CONSEQUENCES OF THE STEAM GENERATOR TUBE RUPTURE WITH A LOSS OF OFFSITE POWER AND FULLY STUCK OPEN ADV APSS OPERATION DELAYED TWO HOURS*

Location	Offsite Doses, Rems GIS	PIS
1. Exclusion Area Boundary 0-2 hr. Thyroid	42	208
2. Low Population Zone Outer Boundary 0-8 hr. Thyroid	22	44

* Results for SGTR with a fully stuck open ADV and using the pressurizer vent system are the same.

GWS
11/05/85

COMPARISON OF THE RCS PRESSURE RESPONSE FOLLOWING A SGTR WITH AUX SPRAY INITIATED AT 2 HOURS vs PRESSURE VENT OPENING AT 2 HOURS



STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ATMOSPHERIC DUMP VALVE

Agenda for ACRS
Meeting on November 7, 1985
3:00 p.m.
Room 1046, H Street

RECENT SIGNIFICANT EVENTS

Date	Plant	Event	Presenter/Office telephone	Page
10/10/85	Maine Yankee	Rosemont Transmitter Improper Installation	P. Sears, NRR (492-7458)	2
09/19/85	Dresden 3	Scram Solenoid Problem Induced RCS Leakage	E. Weiss, IE (492-9005)	6
7/22/85	Turkey Pt. 3	Problems with Auxiliary Feedwater Following Reactor Trip (Followup)	R. Baer, IE (492-4780) D. McDonald, NRR (492-7363)	15 16
10/29/85	D.C. Cook 2	Reactor Trip Breaker Failure	C. E. Rossi, IE (492-4193)	No Slides

MAINE YANKEE - ROSEMONT TRANSMITTER
IMPROPER INSTALLATION
OCTOBER 10, 1985 (P. M. SEARS, NRR)

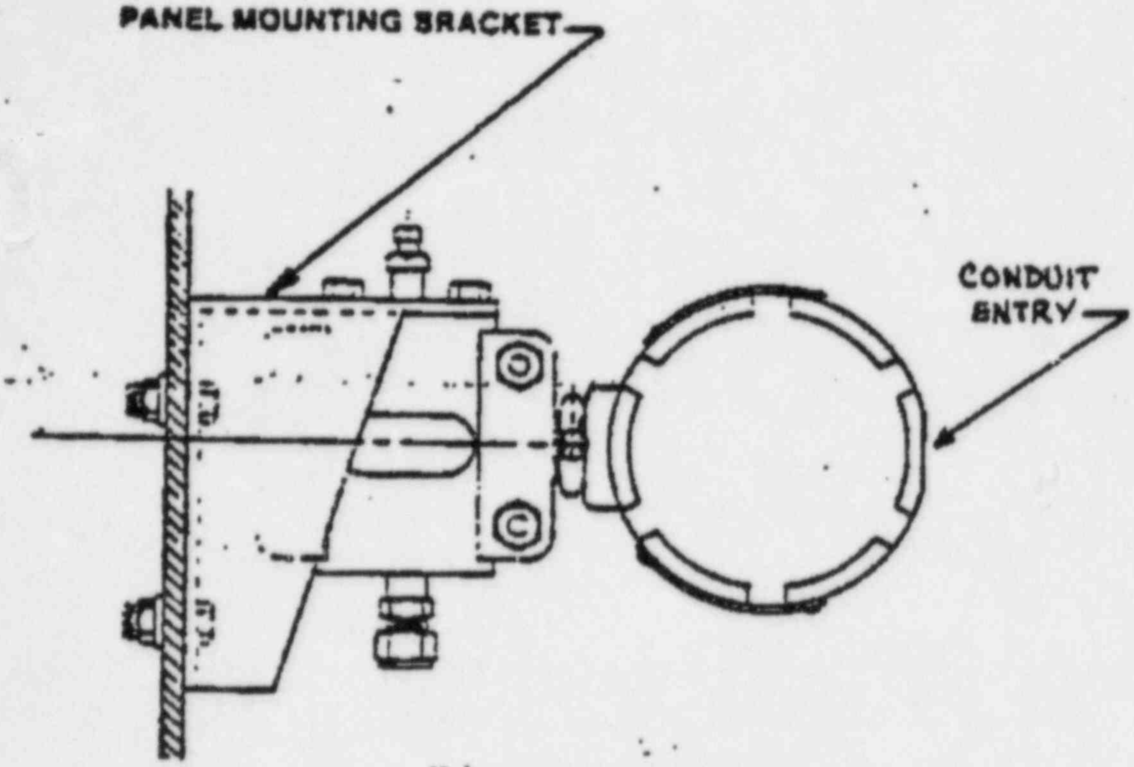
- PLANT DOWN FOR REFUELING

- PROBLEM: MAINE YANKEE DISCOVERED THAT PRESSURIZER PRESSURE (4), PRESSURIZER LEVEL (2), AND STEAM GENERATOR LEVEL (12) TRANSMITTERS HAD NOT BEEN INSTALLED IN COMPLETE AGREEMENT WITH THE EQ TEST CONFIGURATION. THE INSTALLATION WAS COMPLETED IN 1982 AND THE TESTS WERE COMPLETED LATER.

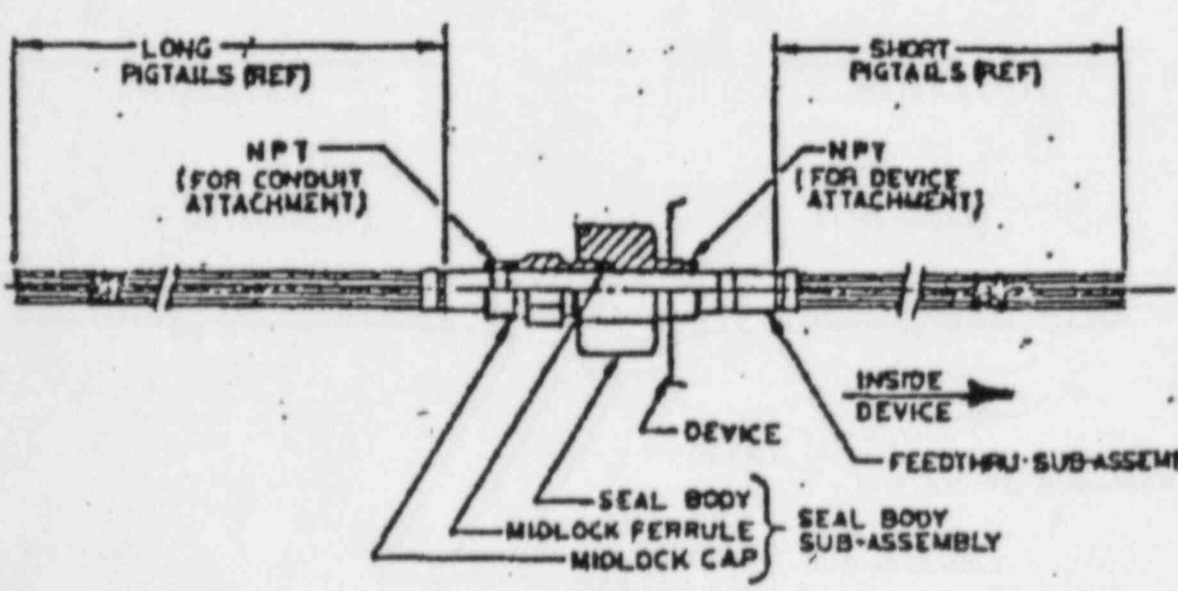
- SAFETY SIGNIFICANCE: A STEAM LINE BREAK COULD HAVE COMPROMISED THE ABOVE SYSTEMS.

- DISCUSSION: UPON CHECKING THE EQ TEST REPORT, MAINE YANKEE FOUND THE FOLLOWING:
  - SOME CONAX SEAL ASSEMBLIES (WHERE LEADS ENTER) WERE NOT TORQUED UP AS TIGHTLY AS IN THE TEST CONFIGURATION.
  - SOME ROSEMONT/CONAX SEAL CONNECTIONS NOT TORQUED AS TIGHTLY AS IN THE TEST CONFIGURATION.
  - SOME VENTING ENCLOSURES ON LIMIT SWITCHES NOT SCREWED DOWN AS TIGHTLY AS IN THE TEST CONFIGURATION.
  - NO DRAIN HOLES IN THE BOTTOM OF JUNCTION BOXES.
  - ROSEMONT COVERS NOT TORQUED DOWN AS TIGHTLY AS IN THE TEST CONFIGURATION.
  - THE COVERS ON ALL CONAX RTDs AND TCs (WHICH WERE ON THE EQUIPMENT QUALIFICATION LIST) WERE NOT TIGHTENED AS TIGHTLY AS IN THE TEST CONFIGURATION.

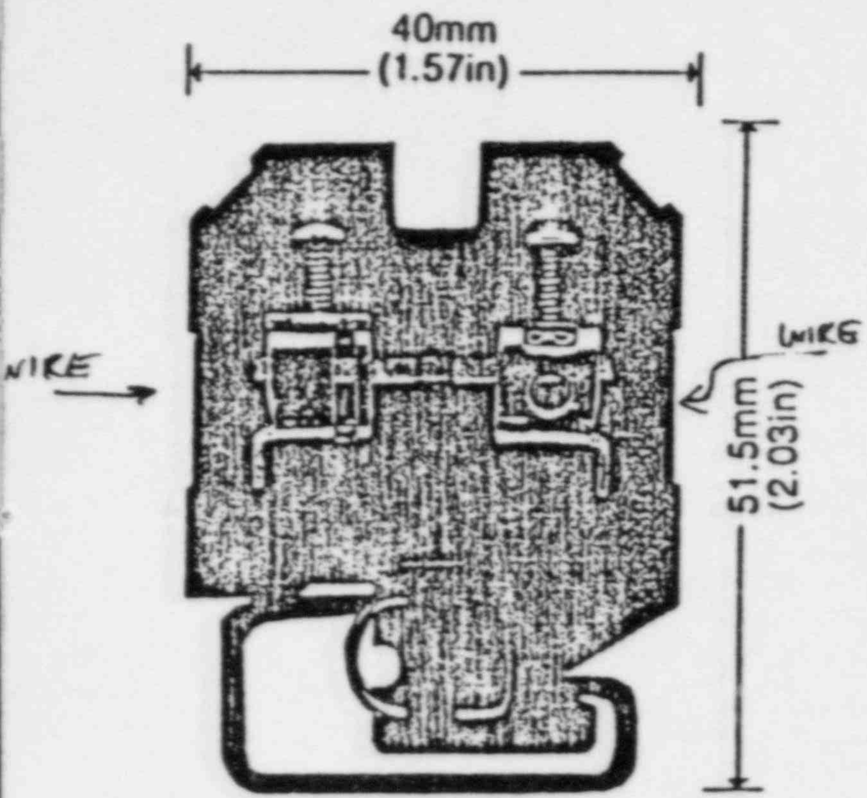
- FOLLOWUP:
  MAINE YANKEE HAS CHECKED FOR LIKE PROBLEMS WITH OTHER QUALIFIED EQUIPMENT AND HAS FOUND NONE. ON SEPTEMBER 10, 1985 J. T. BEARD BRIEFED THIS SUBCOMMITTEE ON THE S/G PRESSURE INSTRUMENTATION THAT WAS COMPROMISED. TAKEN TOGETHER THESE EVENTS ARE BEING CONSIDERED BY NRR AS A CANDIDATE FOR AN ABNORMAL OCCURRENCE.

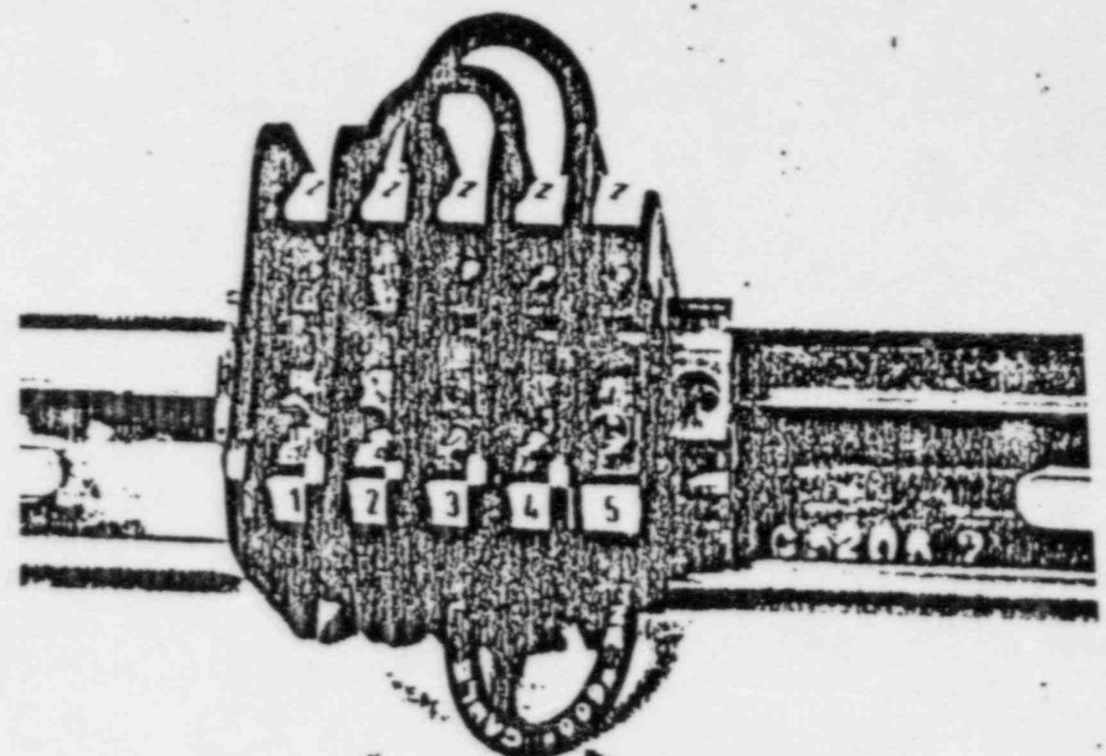


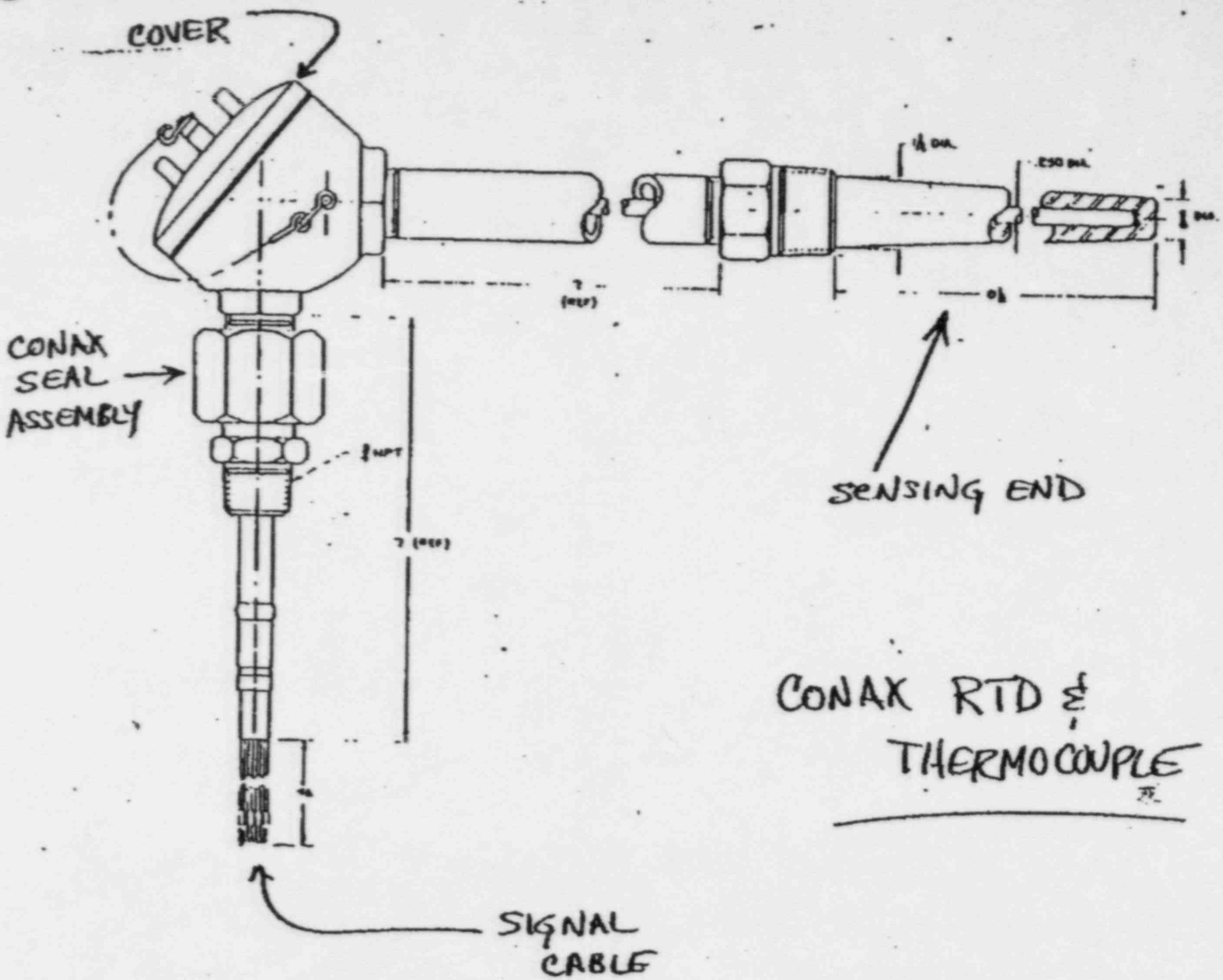
ROSEMOUNT 1153D



CONAX


40mm
(1.57in)
51.5mm
(2.03in)
WIRE
WIRE
SECTIONAL
VIEW


1
2
3
4
5
JUMPER
FOR EQ
TEST
ISOMETRIC
VIEW



CONAX RTD & THERMOCOUPLE

DRESDEN 3 - SCRAM SOLENOID PROBLEM INDUCED RCS LEAKAGE
SEPTEMBER 19, 1985 (ERIC WEISS, IE)

- PROBLEM - RCS LEAKAGE TO REACTOR BUILDING VIA LEAKING SCRAM SOLENOIDS AND SCRAM DISCHARGE VOLUME VENT AND DRAIN AND INTO VENT SYSTEM.

- SAFETY SIGNIFICANCE - INTERMEDIATE AIR PRESSURE CAUSES PROBLEMS WITH SCRAM SYSTEM VALVES. POTENTIAL DEFICIENCY IN MODE SWITCH.

- SEQUENCE OF EVENTS

  - REACTOR OPERATING AT 80% POWER
  - TURBINE CONTROL VALVE FAST CLOSURE CAUSED BY INSTRUMENT TECH
  - PRESSURE SPIKE CAUSES SCRAM ON APRM HI
  - OPERATORS ATTEMPT TO RESET SCRAM BUT ONLY CHANNEL A RESETS (RESETTING CHANNEL A CAUSES SCRAM DISCHARGE VOLUME (SDV) VENT AND DRAIN VALVES TO OPEN)
  - LEAKING SOLENOID VALVES CAUSE LOW AIR RESULTING IN PARTIALLY OPEN SCRAM OUTLET VALVE AND SDV VENT AND DRAIN VALVES
  - STEAM IN REACTOR BUILDING AND RAD ALARMS ACTIVATE
  - OPERATORS MANUALLY CLOSED SDV VENT AND DRAIN VALVES
  - 3 INDIVIDUALS CONTAMINATED DURING EVENT

- CAUSES

  - MODE SWITCH NOT MOVED ALL THE WAY TO "REFUEL" (THIS PREVENTED RESETTING CHANNEL B)
  - 51 SCRAM SOLENOIDS LEAKED (LEAKAGE PATH WOULD HAVE BEEN BLOCKED IF CHANNEL B HAD RESET)

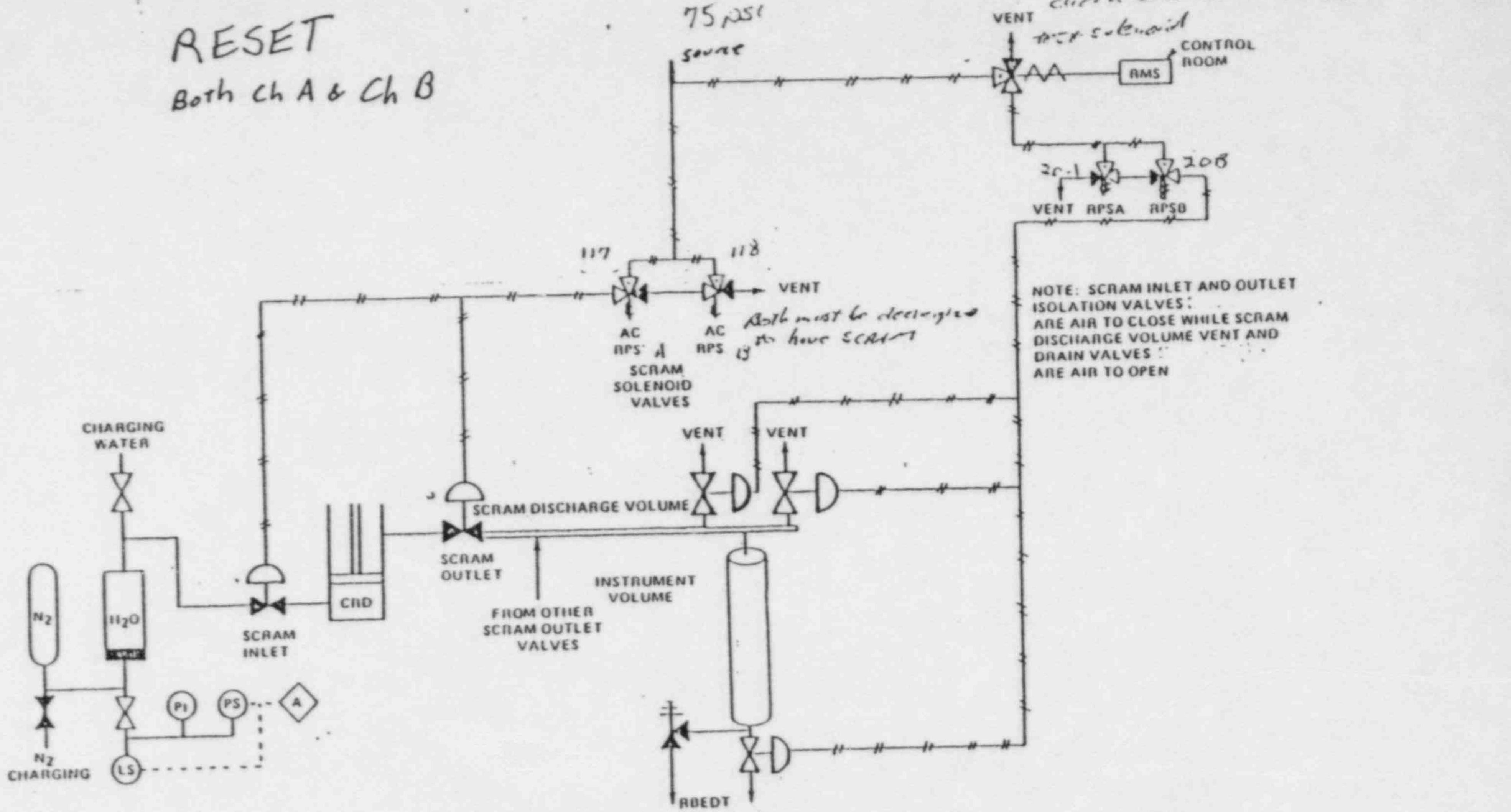
- LEAKAGE PATH
  - FROM VESSEL THRU LEAKING SCRAM SOLENOID VALVES TO SCRAM DISCHARGE INSTRUMENT VOLUME
  - LEAK LASTED FOR 23 MINUTES
- FOLLOWUP ACTION
  - PLANT SHUTDOWN
  - LICENSEE EVALUATING PROBLEM AND REPLACING SELECTED VALVES
  - REGION FOLLOWING

DRESDEN 3 - SCRAM SOLENOID PROBLEM INDUCED LEAKAGE - FOLLOWUP

SEPTEMBER 19, 1985 (ERIC WEISS)

- PROBLEM
  - RCS LEAKAGE TO REACTOR BUILDING DUE TO LEAKING SCRAM SOLENOIDS.
- LEAKAGE PATH
  - FROM SCRAM OUTLET VALVES TO SCRAM DISCHARGE VOLUME VENT AND DRAIN VALVES.
- SAFETY SIGNIFICANCE
  - DRESDEN PROBLEM MAY BE GENERIC TO BWR'S
- PRELIMINARY CONCLUSIONS
  - MOST BWR'S WILL HAVE A LEAK OF REACTOR WATER OUTSIDE DRYWELL IF:
    1. THEY HAVE A HALF SCRAM CONDITION (A CH RESET & B CH TRIPPED)
       AND
    2. THE HALF SCRAM FOLLOWS A FULL SCRAM
  - THE SOURCE OF THE LEAK IS NOT OBVIOUS TO OPERATORS UNLESS TRAINED TO RECOGNIZE THE PROBLEM
  - THE LEAK IS EASILY TERMINATED AT DRESDEN WITH MANUAL CONTROL OF VENT AND DRAIN VALVES
  - THE EXHAUST DIAPHRAM IN THE 117 VALVE IS NOT HOLDING PRESSURE WHEN AIR HEADER PRESSURE IS SLOWLY INCREASED
  - THE LEAK WILL OCCUR WITH NEWLY REBUILT VALVES.
  - ALTHOUGH TESTS IN SITU SUGGEST THAT SYSTEM DESIGN IS RESPONSIBLE FOR THE LEAK OF REACTOR WATER, INDIVIDUAL BENCH TEST SUGGEST VALVE CONDITION LEAK MORE LIKELY.
  - MAINTENANCE RECORDS SHOW THAT SOME OF THE WORST LEAKING VALVES WERE REBUILT RELATIVELY RECENTLY
- FOLLOWUP
  - IE IS PURSUING MATTER WITH GENERAL ELECTRIC
  - AN INFORMATION NOTICE IS IN PREPARATION

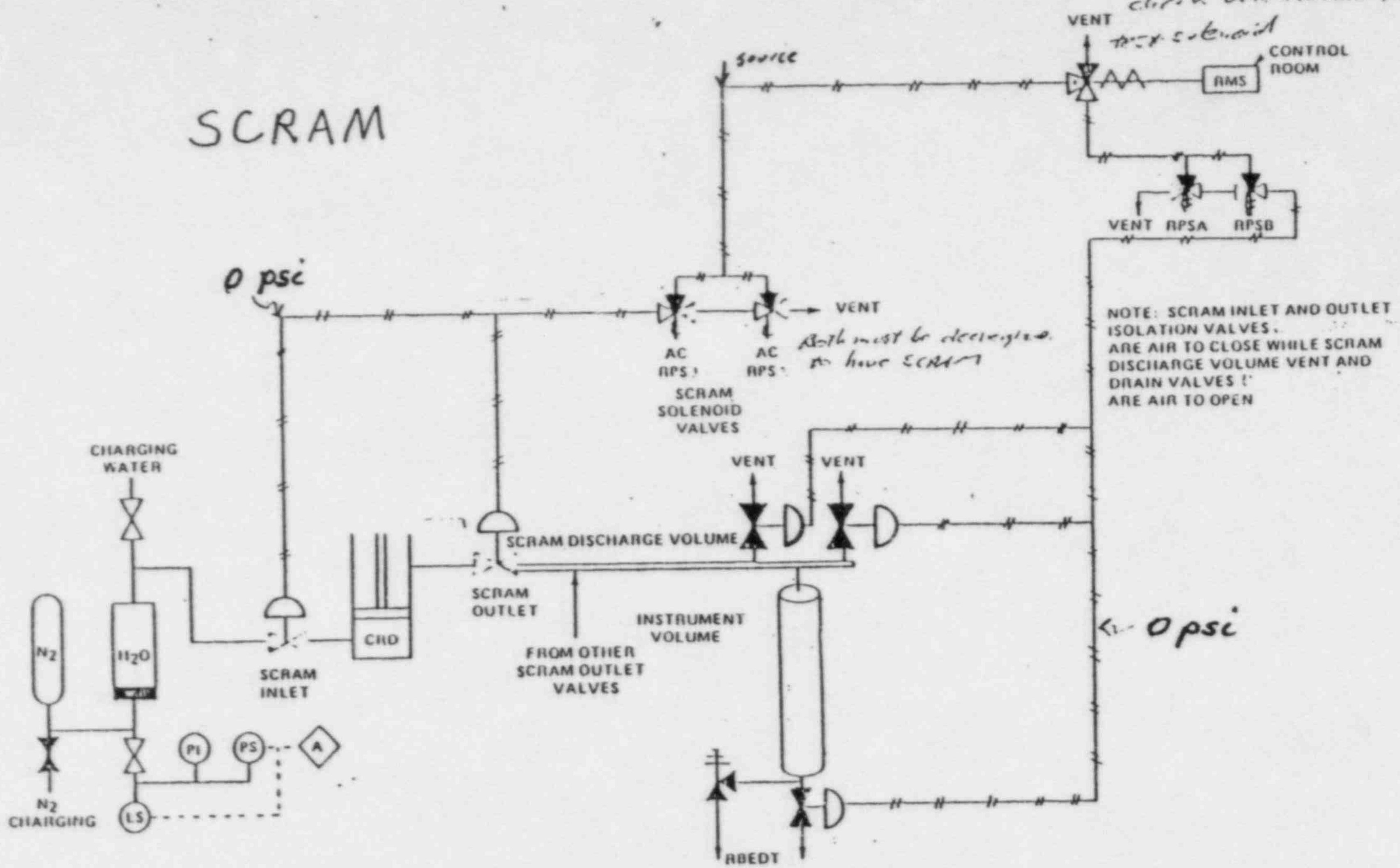
RESET
Both Ch A & Ch B



SIMPLIFIED
SCRAM VALVE ARRANGEMENT

*WHEN SOLENOID IS ACTUATED THE DOTTED PORT AND THE CLOSED PORT WILL SWITCH POSITIONS

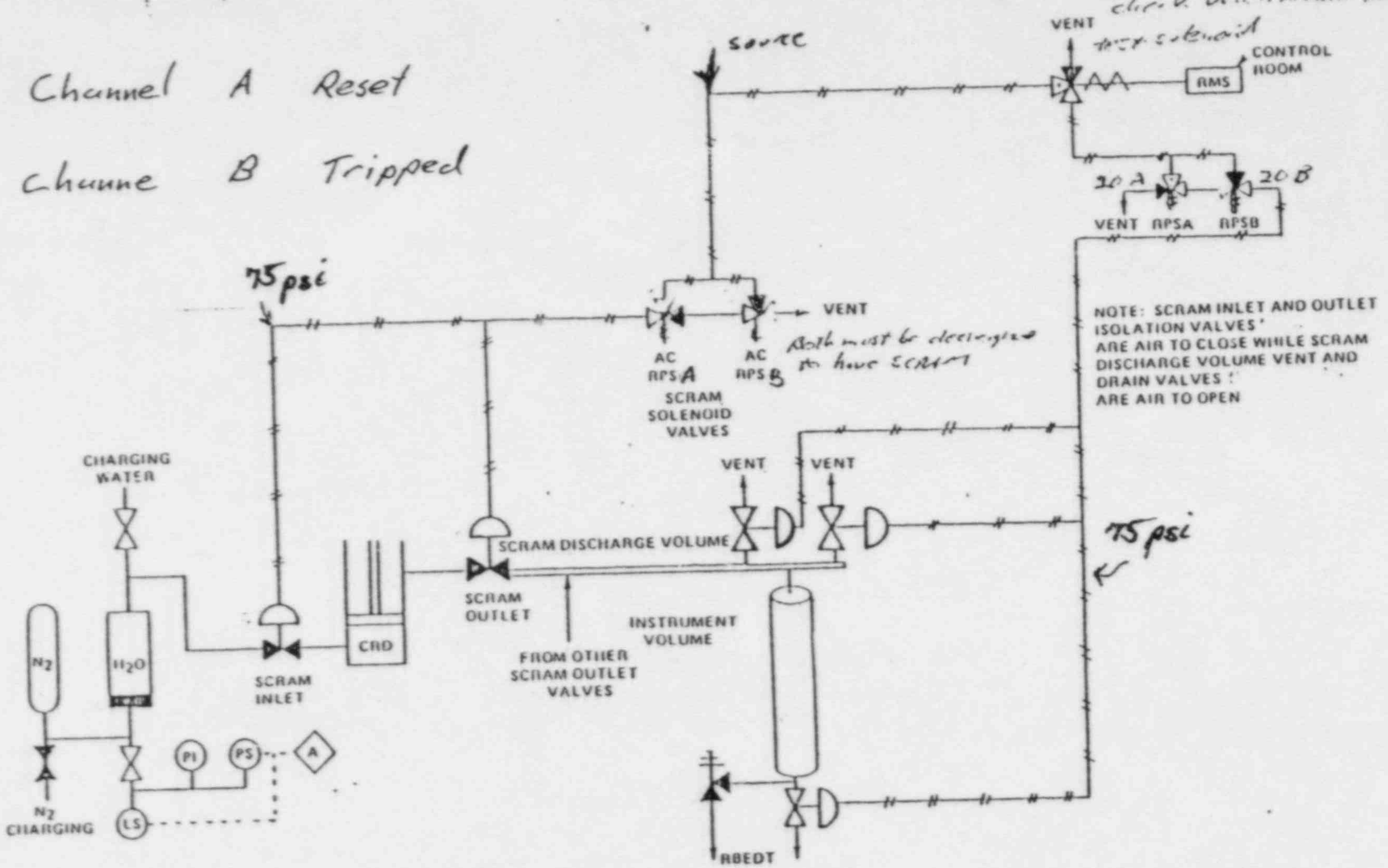
SCRAM



SIMPLIFIED
SCRAM VALVE ARRANGEMENT

Channel A Reset

Chunne B Tripped

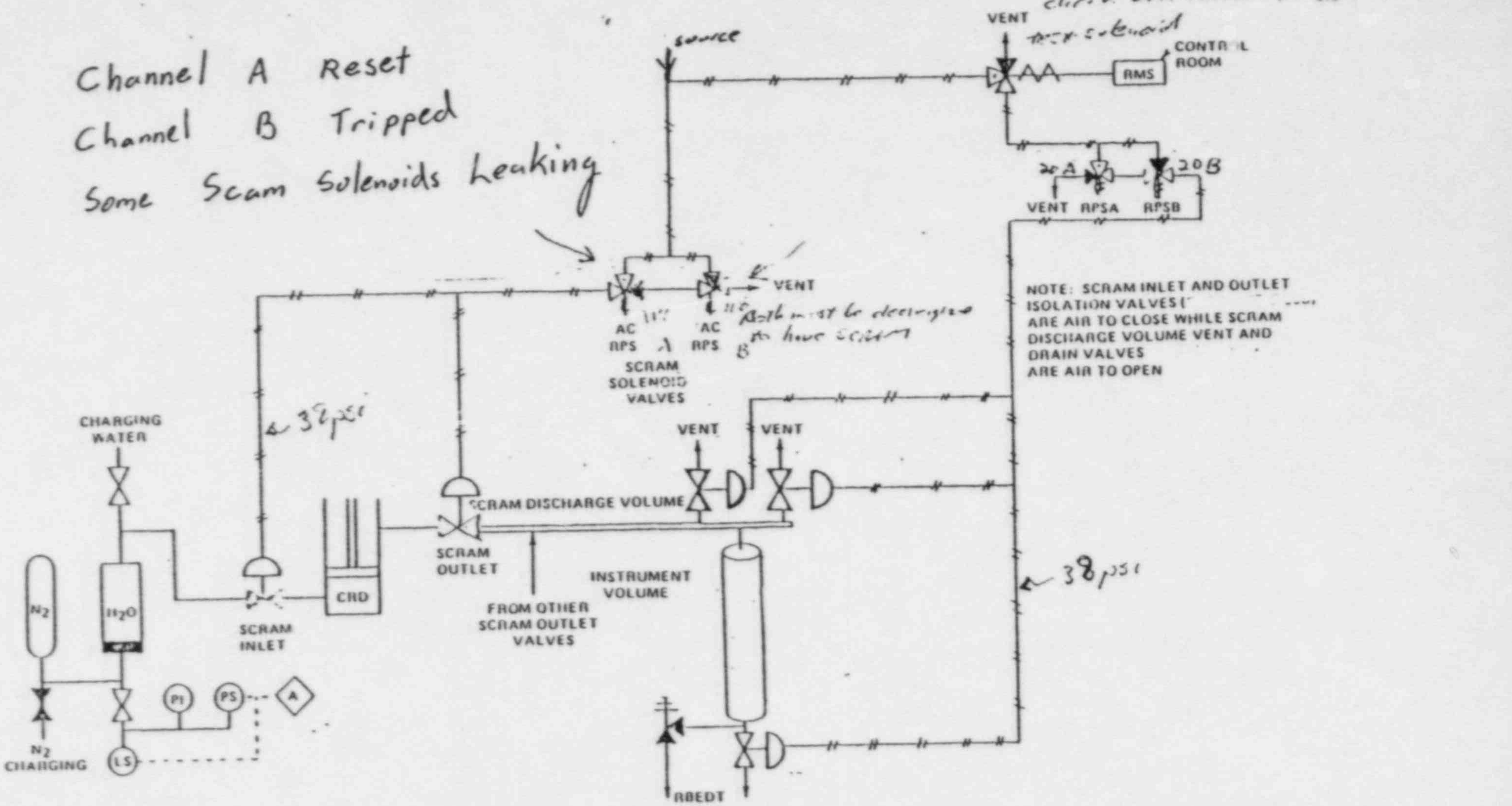


NOTE: SCRAM INLET AND OUTLET ISOLATION VALVES' ARE AIR TO CLOSE WHILE SCRAM DISCHARGE VOLUME VENT AND DRAIN VALVES ' ARE AIR TO OPEN

SIMPLIFIED
SCRAM VALVE ARRANGEMENT

*WHEN SOLENOID IS ACTUATED THE DOTTED PORT AND THE CLOSED PORT WILL SWITCH POSITIONS

Channel A Reset
Channel B Tripped
Some Scam Solenoids Leaking



SIMPLIFIED
SCRAM VALVE ARRANGEMENT

*WHEN SOLENOID IS ACTUATED THE DOTTED PORT AND THE CLOSED PORT WILL SWITCH POSITIONS

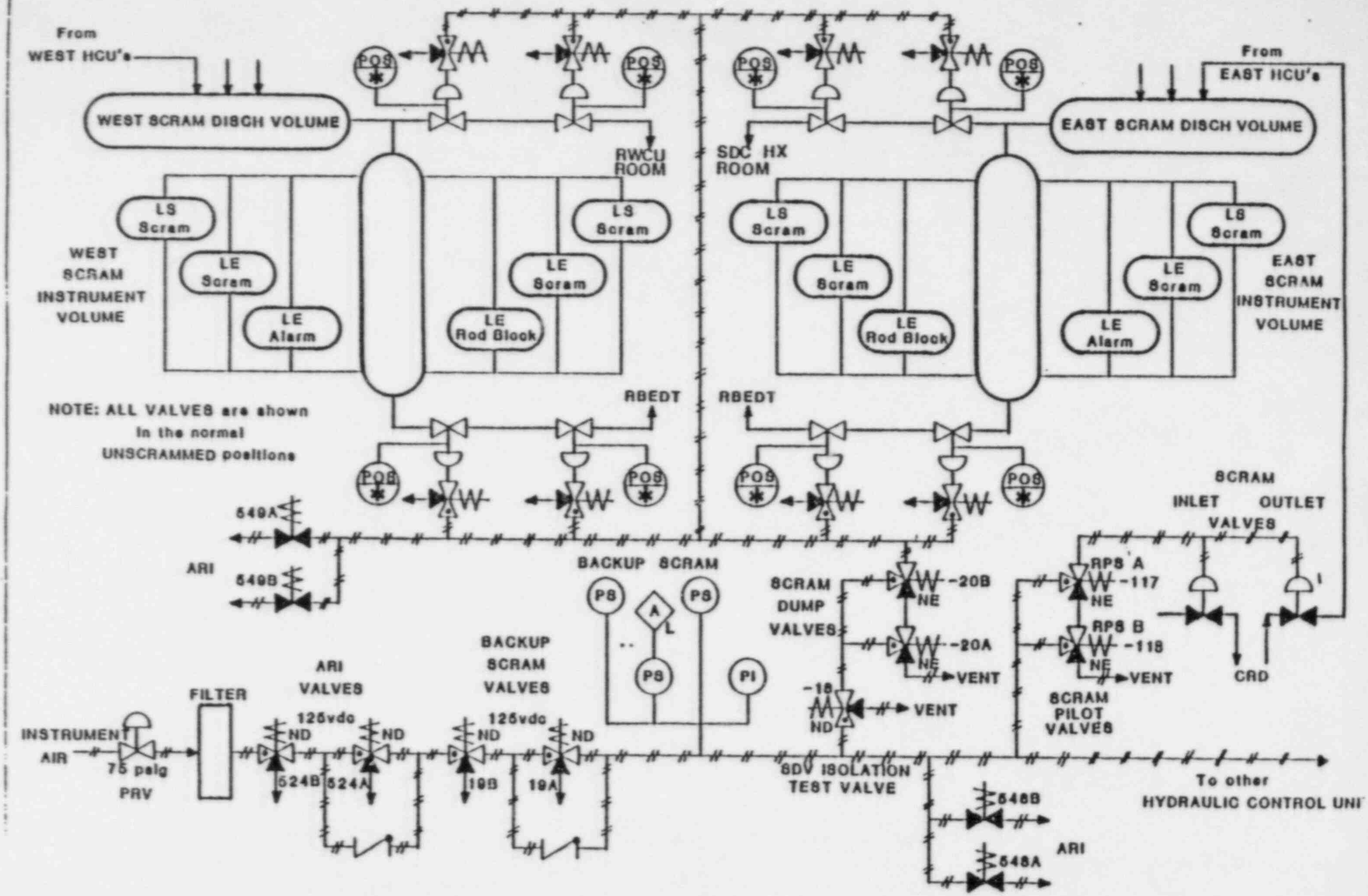


Figure 1. Scram Discharge Volume (SDV)

13

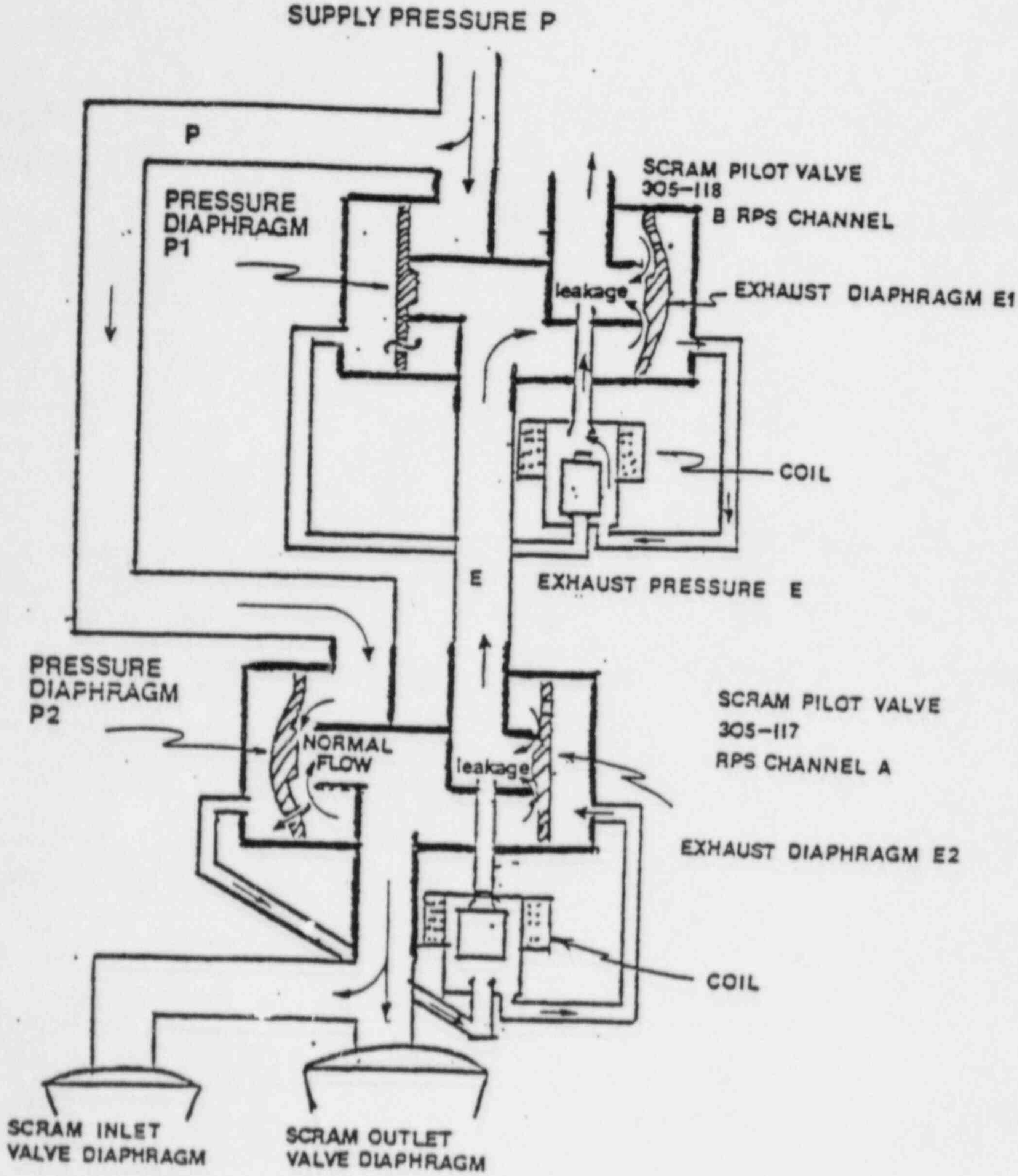


Figure 2. Scram Pilot Valve Configuration with A RPS Channel Reset and B RPS Channel Tripped

Robert Baer

TURKEY POINT AFW SYSTEM PROBLEM

SUMMARY OF EVENT

- Unit 3 Tripped from Full Power on July 21, 1985
- High level in SG caused MFW pumps to trip
- All 3 steam driven AFW pumps started and ran. One pump had problems with air operated AFW control valve
- MFW Pump restarted. AFW pumps shutoff
- AFW pump turbine governors reset locally. Steam supply valves to one turbine placed in off-normal configuration to facilitate trouble shooting of flow control valve.
- High SG level occurred again with MFW flow
- AFW pumps restarted. Two tripped on overspeed. The AFW pump with the off-normal steam valve configuration ran, but flow oscilated

Basic Cause

- Governor oil not drained properly when AFW turbines reset locally.
- Procedure not sufficiently explicit

Generic Actions

- Have obtained more detailed information from Terry Turbine
- Plan to prepare Information Notice

DANIEL McDONALD
NRR-PM
AFW EVENT 7/22/85

TURKEY POINT PLANT
AUXILIARY FEEDWATER SYSTEM

- Original System and Design Basis

- Current Design Basis
  - Supply 373 GPM to single unit with AC power available
  - Supply 286 GPM to each unit with loss of AC power

- System Modifications - Post TMI
  - Automatic system initiation
  - Redundant flow indication
  - Redundant level alarms on the CSTs
  - Two separate full flow capacity AFW trains
  - Redundant N_2 supplies to flow control valves
  - Diverse power supplies to flow inlet MOVs (AC & DC)
  - High pressure turbines and trip/throttle valves

- Non-Safety SG Feed Pumps
  - Two 850 GPM pumps
  - 500,000 gallon DWST

- AFW Event Follow-up Actions - NRC Staff
  - Immediate corrective actions
  - Developing IE Information Notice
  - FPL commitment to Tech. Spec. the non-safety SG feedpumps.
  - Survey of FPL Maintenance Program by NRR team
  - Proposed Generic Letter requiring upgrade at some plants.
  - Letters to the Commission and ACRS

- AFW Event Follow-up Actions - Licensee
  - Immediate procedure changes
  - Interim and long term corrective actions

- Special IE Team Inspection of AFW System

AUXILIARY FEEDWATER SYSTEM

PRESENT DESIGN

- Two seperate full flow capacity AFW trains.

- Capable of supplying 373 GPM to one unit for loss of normal feedwater.

- Capable of supplying 286 GPM to each of two units for loss of offsite power (RCP's stopped).

- Each unit maintains a supply of 185,000 gallons of demineralized water in its condensate storage tank.

- System automatically initiates on the following signals:

  1. Safety injection
  2. Low-low level in any of the three steam generators
  3. Bus stripping
  4. Loss of both feedwater pumps under normal operating conditions.

- System is designed to remain functional following a safe shutdown earthquake and meet missile protection criteria.

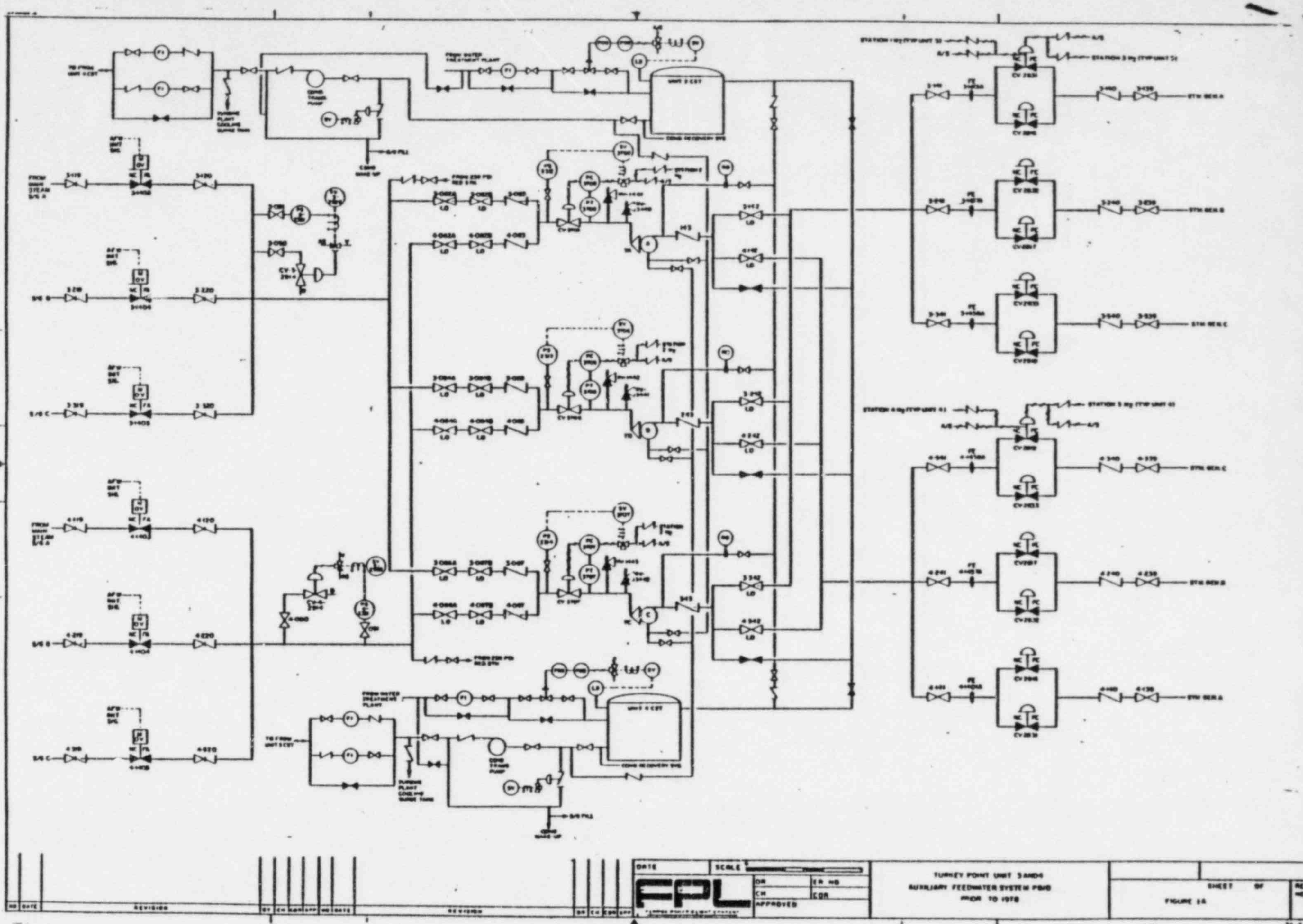
AUXILIARY FEEDWATER SYSTEM

CURRENT ENGINEERING PROJECTS

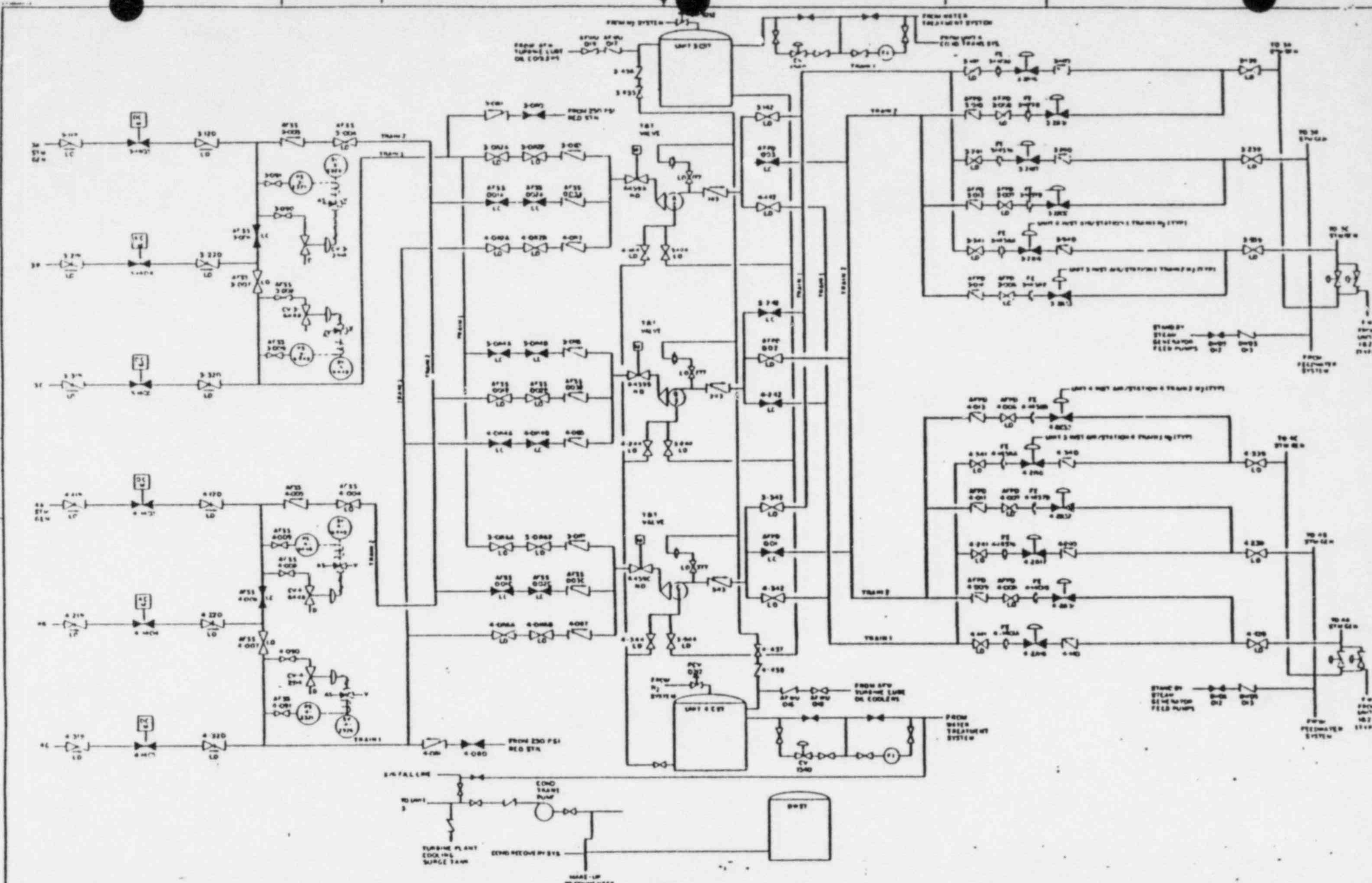
REA-TPN 85-30 AUXILIARY FEEDWATER SYSTEM DESIGN REVIEW AND OPTIMIZATION

1. MINIMIZE AFW FLOW CONTROL OSCILLATION
2. AFW TECHNICAL SPECIFICATION REVISION
3. AFW GOVERNOR PERFORMANCE
4. UPGRADE OF AFW FLOW CONTROL VALVE NITROGEN SUPPLY LINES
5. AFW T&T VALVE SWITCHES AND LOCAL INDICATING LIGHTS
6. DESIGN BASIS DOCUMENT
7. AFW-NITROGEN BACKUP SYSTEM
8. AFW SYSTEM ACCESSIBILITY
9. AFW SYSTEM STEAM LEAKOFFS
10. AFW-AFP RPM MONITORING
11. AFW-ELECTRICAL CONDUIT REROUTE
12. AFW-REMOVAL OF OBSOLETE EQUIPMENT
13. SINGLE FAILURE ANALYSIS
14. MISALIGNMENT OF AFW
15. AFW-AUXILIARY OIL PUMP
16. AUXILIARY FEEDWATER SUPPLY FROM THE DWST

19



FPL
TURKEY POINT UNIT 3 AND 4
AUXILIARY FEEDWATER SYSTEM P&ID
PRIOR TO 1978
FIGURE 3A



DATE	SCALE		TURKEY POINT UNIT 3 AND 4 AUXILIARY FEEDWATER SYSTEM PIPING AND INSTRUMENTATION DRAWING AS OF 8-85	SHEET OF	REV NO
FPL	DR	EN NO		FIGURE 1	
	CH	COR			
	APPROVED				

20

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCT 29 1985

MEMORANDUM FOR: Chairman Palladino

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: SEPTEMBER 20, 1985 LETTER FROM ACRS ON TURKEY POINT

This is in response to the questions in your October 16, 1985 letter.

(a) What actions the staff has underway with respect to the ACRS letter?

Response: A reply has been sent to the ACRS, copy enclosed.

(b) What priority and staff resources have been assigned to explore the deeper implications of the event?

Response: Immediate staff resources were assigned to explore the deeper implications of the July 22 Turkey Point event within a matter of days following the event. ACRS was informed of the special inspection discussed in our enclosed responses on September 13, the day that the exit interview was held. I note that the ACRS letter is dated one week after that. The actions taken are described in the enclosed letter to the ACRS. High priority and staff resources continued to be assigned in our evaluation of generic implications of the Davis-Besse AFW event as they may apply not only to Turkey Point but also to all pressurized water reactors.

(c) When a report to the Commission and a response to the ACRS will be available?

Response: The enclosed response outlines the actions already taken and those still underway. I have requested a meeting with the President and Chief Executive Officer of Florida Power and Light to examine whether sufficient management attention has been given to improve overall nuclear performance at Turkey Point.

CONTACT:
J. D. Neighbors, NRR
492-4837

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Our recomme.idation of the short term actions to be implemented regarding 'FW systems as a result of the Davis-Besse event will be availat.le by the end of this year; recommendations for the longer t.rm actions by mid-1986.

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

Enclosure:
As stated

cc: Commissioner Roberts
Commissioner Asselstine
Commissioner Bernthal
Commissioner Zech
OGC
OPE
SECY

ENCLOSURE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 28, 1985

Mr. David A. Ward
Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Ward:

I have been requested to respond to your letter to Chairman Palladino dated September 20, 1985, in which you expressed the ACRS concerns relating to the recent post-trip failures in the auxiliary feedwater system (AFWS) at the Turkey Point Plant, Unit 3. The Commission and staff share your concerns and have placed a high priority on determining the implications of the Turkey Point event.

The auxiliary feedwater pump failures on July 22, 1985 were reviewed by the staff immediately following the event. The significance of the failures was recognized by the staff in reviewing the licensee's restart plans and in terms of the generic implications of the event. Follow-up discussions were held between the staff and the licensee to determine the cause of the failures and the need for corrective actions. These failures were brought to the attention of NRC senior management at the Operating Reactors Events Briefing of August 13, 1985. In order to assure that other licensees are aware of this common cause failure potential, an IE Information Notice, is being developed.

Other staff actions related to the Turkey Point AFW system specifically and to AFW systems generally are:

- A special first-of-a-kind inspection was organized by the Office of Inspection and Enforcement during the weeks of August 26-30 and September 9-13, 1985 addressing the operational readiness of the Turkey Point AFW system. This special inspection was an NRC inspection initiative resulting from the June 9, 1985 event at the Davis-Besse plant. Turkey Point was selected as the initial plant for this special inspection because of its recent AFW events. We are pursuing with Turkey Point the resolution of our specific concerns as outlined in our inspection report; however, the findings resulting from this special inspection will be included in the areas the staff has identified as necessary to pursue in evaluating potential generic short term and long term actions as a result of the June Davis Besse event.

- In addition to the evaluation of generic short term and long term actions as a result of the June Davis-Besse event, the staff is reviewing past and present requirements for AFW systems and evaluating the need for further action for those plants where the reliability of the AFW system should be improved. The staff expects to submit a proposed generic letter to CRGR for review in early November which would require AFW modifications at some plants.

The team which performed the special inspection utilized techniques employed during Performance Appraisal Team (PAT) inspections and Integrated Design Inspection (IDI) efforts to assess both the design changes and the other functional areas which could affect the operational readiness of the AFWS. The Inspection Report (50-250/85-32; 50-251/85-32, "Safety System Functional Inspection Report") was issued on October 7, 1985, in which the staff addressed deficiencies in maintenance, surveillance testing, and design changes and modifications. Copies of the report have been sent to the ACRS.

The licensee has already responded to our concerns relating to procedures and training and has committed to provide Technical Specification requirements to assure operability of the two 100% capacity motor driven non-safety grade AFW pumps. These pumps are routinely used for start-up and shut-down and, if off-site power is lost, can be powered by any of the five non-safety diesel generators on site. The licensee has been requested to respond to all the items in the report and to provide details of additional actions to be taken to resolve our concerns. This matter has been referred to the Chief Executive Officer of Florida Power and Light for his personal participation in resolving our concerns at Turkey Point.

In addition, a survey of the maintenance program at Turkey Point will be carried out within the framework of the Maintenance and Surveillance Program in NRR. The survey is scheduled the week of December 2, 1985. The objective of the survey is to review the overall practices and organization of the maintenance programs. The survey will examine the organization and administration of the maintenance department, facilities and equipment, technical procedures, personnel, and work control policies. Four such surveys have already been completed at other plants. An identical protocol, developed in the Maintenance and Surveillance Program, is being used for all site surveys. A copy of the Turkey Point site survey report will be available in mid-January 1986.

We will continue to keep the committee informed of our efforts relating to enhancement and improvement of AFW systems to provide increased assurance that they will be available and capable of performing their critical safety function when needed.

Sincerely,

Harold R. Denton, Director
Office of Nuclear Reactor Regulation