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TITLE BRIEFING ON SALEM

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BRIEFING ON SALEM

PUBLIC MEETING

Nuclear Regulatory Commission
Room 1130
1717 H Street, N. W.
Washington, D. C.

Wednesday, March 2, 1983

The Commission convened, pursuant to notice, at 9:30 a.m.

COMMISSIONERS PRESENT:

NUNZIO PALLADINO, Chairman of the Commission
VICTOR GILINSKY, Commissioner
JOHN AHEARNE, Commissioner
THOMAS ROBERTS, Commissioner
JAMES ASSELSTINE, Commissioner

STAFF AND PRESENTERS SEATED AT COMMISSION TABLE:

S. CHILK
H. PLAINE
S. TRUBATCH
G. LAINAS
D. EISENHUT
D. ROSS
R. STAROSTECKI
E. CASE
E. JORDAN
J. ZERBE
R. ECKERT

AUDIENCE SPEAKERS:

R. MATTSON
T. IPPOLITO
J. SNIEZEK

* * *

DISCLAIMER

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P R O C E E D I N G S

CHAIRMAN PALLADINO: Good morning, ladies and gentlemen.

Before we begin we need to vote on having a meeting with less than one week's notice.

Will those in favor on the Commission signify by saying Aye.

COMMISSIONER GILINSKY: Aye.

COMMISSIONER AHEARNE: Aye.

COMMISSIONER ROBERTS: Aye.

COMMISSIONER ASSELSTINE: Aye.

CHAIRMAN PALLADINO: Aye.

The purpose of our meeting this morning is to allow the staff to brief the Commissioners on the event that occurred at Salem Unit 1 last Friday. The event involved a failure of the reactor to trip after receiving an automatic trip signal which required operator action to manually trip the unit.

Each of the Commissioner offices received preliminary information regarding the event on Friday and our meeting this morning should allow a discussion of more of the details surrounding the event.

I understand that the staff met with the licensee for the facility on Monday and I would request that the staff's presentation include a discussion of

the results of that meeting.

Do any of my fellow Commissioners have additional remarks before we begin?

(No response.)

CHAIRMAN PALLADINO: If not, then I will turn the meeting over to Mr. Darrell Eisenhut.

MR. EISENHUT: Thank you.

(Slide presentation.)

MR. EISENHUT: If I could have the outline slide.

We broke the presentation today into two parts. The first part will address the Salem event, or more accurately the Salem events. There were two different occurrences of the reactor having a failure to automatically scram, one which occurred on February 22nd and one which occurred on February 25th. We will be addressing both of those today.

We will break it into two parts. The first part, we will try to go through the event description, what actually happened during these events, which will be covered by Region I today. Rich Starostecki at the Division Director from the Region to cover that. He will be followed by NRR with Gus Lainas making a presentation on the issues relating to restart and the different pieces that flow out of the events.

Following that we are going to try to address and summarize the generic implications with I&E addressing the results or preliminary results I guess of a bulletin that was issued last Friday, followed by some more broader generic implications by a couple of different aspects.

In addition to the meeting that the Chairman mentioned, there was also a site visit last Saturday where both representatives from Region I and from headquarters went to the site and they effectively met most of the day in discussing the events.

So with that, I will turn it over to Rich Sterostecki who will outline the event factually as it occurred.

MR. STAROSTECKI: If I could have the next slide, please.

I will and present an event description and include a brief description of the trip breaker, the solid state protection system, the trip breaker history and a review of the two events.

We are prepared to go into more detail with Gus Lainas' presentation, if you wish, on the background information I will be presenting.

The next slide, please.

The reactor trip breakers in question, as

indicated on the slide, allow power to be provided from a power source, in this case the motor generator sets to the control rod drive mechanisms. That is the system that is normally used to move the rods up and down. Interrupting that power supply train causes a scram.

The trip breaker can be mechanically itself opened by a manual button at the breaker, a latch on the cabinet which automatically would trip the breaker when one tries to open the breaker.

COMMISSIONER GILINSKY: Where are the breakers?

MR. STAROSTECKI: The breakers are in the lower levels of the plant, quite a walking distance away from the control room.

MR. CASE: In a cabinet.

MR. STAROSTECKI: In a cabinet.

CHAIRMAN PALLADINO: Outside containment?

MR. STAROSTECKI: They are outside containment. They are not in the vicinity of the control room.

CHAIRMAN PALLADINO: Are they mechanical latches or are you still using electrical signals?

MR. STAROSTECKI: Well, that is what this is indicating, is that there is one trip bar on the breaker and that one trip bar can be tripped with a manual button at the breaker, the latch on the side of the

breaker housing, a shunt coil, an electrical coil and its attachment and an undervoltage coil and its attachment. All these devices work on one common trip bar.

MR. EISENHUT: We will be discussing that in a little more depth in a little bit, and we actually have an undervoltage relay with us and we have some slides which hopefully will explain the mechanism.

CHAIRMAN PALLADINO: But if the problem is friction on the latch, is there a way to overcome that?

MR. EISENHUT: Right.

MR. STAROSTECKI: What I am trying to present here are the mechanisms and how they influenced the sequences of events and then we can go back and talk about the individual pieces as to friction, et cetera.

The next slide, please.

This slide is entitled "Solid State Protection System," and the point to be made here is that this is really the reactor protection system. There is a logic associated with it bistables. It is maintained by instrumentation and control technicians.

I distinguished that intentionally to make the point that the trip breaker is a mechanical device and the reactor protection system is an electrical type of device. It has a logic and status indicator in the

control room at Salem and upon a valid reactor protection system signal, the protection system stops providing the holding of electrical voltage for the undervoltage coil and that deenergizes the coil resulting in a scram.

If the trip breaker physically does not open, the control room operators are required to initiate certain immediate actions. These I reflect on this slide as ATWS instructions and this represents the order of the trips in accordance with the instructions to the operator.

On February 25th, the first step, as you can see, was the manual trip from the control room. There is a switch that deenergizes both the undervoltage coil and energizes the shunt coil. Both of these steps result in a reactor trip, and we will go into more detail if you wish later on.

In addition, in the control room there are separate push buttons for each of the two reactor trip breakers. They both can be used to open and to close those trip breakers.

In the event of an anticipated transient without scram, the operators are directed to inject boron into the system and that is the next step to initiate safety injection.

CHAIRMAN PALLADINO: Is that a rapid boron insertion?

MR. STAROSTECKI: That is the boron injection tank and that gets inserted first, yes, sir.

The next step is obviously if the above steps haven't been successful or even if they have been carried out, they would then go to the local mechanical push button on the individual breakers and physically trip them there.

COMMISSIONER GILINSKY: How long would it take to get there?

MR. STAROSTECKI: I haven't timed it, but I would presume a few minutes. Walking up from that area to the control room took us a few minutes. An experienced operator may know a faster way than the way we went on Saturday.

As a final point, the local breakers providing supply power to the motor generator sets and also the output of the generator motor sets can be locally tripped to also secure power to the control rod drive motors.

COMMISSIONER GILINSKY: And what other consequences does that have?

MR. STAROSTECKI: The consequences of the generator motor sets is to interrupt power to the

control rod drives. They are dedicated for the control rod drives.

CHAIRMAN PALLADINO: This boron injection, is it rapid and how rapid does it shut it down?

MR. STAROSTECKI: I don't have that detailed information right now. The boron injection tank is about 20,000 ppm boron, and I don't recall the exact number for the concentrations required.

CHAIRMAN PALLADINO: Is that an effective scram?

MR. EISENHUT: It is effective. The timing is the question that you asked, and it is something that we will have to get the answer to.

MR. CASE: It is not an effective way of shutting the reactor down rapidly. It doesn't come in that fast. You rely on the control rods for that.

MR. MATTSON: About five to ten minutes to empty the big tank.

COMMISSIONER AHEARNE: Rich, the manual trip No. 1, do they do that even if the system has automatically tripped?

MR. STAROSTECKI: At Salem there has not been a requirement to do that, and we will talk about this in one of the corrective actions.

The next slide, please.

Just very briefly, we wanted to get some information to show you what kind of information is presented to the control room operator upon a reactor trip. The positive indication that I have labeled "Positive" is that there are two indicators, one from the reactor protection system as displayed on that status board and also on the breaker control push button. There are lights that are physically actuated by mechanical devices on breaker position. So that is a positive indication of breaker position.

Rod position indicators indicating various elevations of the rods, these are separate from what we refer to as the rod bottom lights. Nuclear instrumentation obviously would show reduction in power and the plant computer prints the alarm signals.

CHAIRMAN PALLADINO: Is that item No. 1 such that you get a direct signal and not just that the current has been interrupted?

MR. STAROSTECKI: It is a direct signal based on the position of the breaker itself.

The next slide, please.

This slide is intended to represent some of the other alarms that the operators would be made aware of in the event of a trip. The secondary reactor trip alarms, obviously we would be getting the enunciators

for the negative rate trip, low-low levels in all steam generators would occur and there would be an associated turbine trip. The turbine trip itself can be noted with several of its indicators, such as turbine speed decreasing.

These two slides are solely provided to indicate the kind of information associated with legitimate reactor scram.

The next slide, please.

I would like to very briefly go over a trip breaker history at Salem.

The reactor trip breakers at Salem arrived at the site in approximately 1974. They are interchangeable between units, and until 1982 the trip breakers had no apparent problems.

It is not clear to us at this time as to whether the trip breakers were treated as safety grade and whether they had the appropriate preventive maintenance, storage conditions and corrective maintenance.

COMMISSIONER AHEARNE: I guess I am not really clear about what you meant. Did you ask the licensee did they class it as safety grade?

MR. STAROSTECKI: The licensee states that they are classifying them as safety related.

COMMISSIONER AHEARNE: They did classify them as safety related.

MR. CASE: Yet, some of the maintenance instructions that were issued for those pieces of equipment were checked non-safety grade. So there may be discrepancy between intent and practice.

COMMISSIONER GILINSKY: What is the practice throughout in the industry?

MR. CASE: I can speak as to what our position is. I don't know that we have universal practice.

Roger, do you want to talk about safety grade here?

MR. MATTSON: The trip system, and let me state it generally and then try to state some qualifications, is clearly part of the safety related complement of equipment unequivocal in the licensing history of PWRs and BRWs. The trip system is safety related. Now I am talking about the Westinghouse design.

COMMISSIONER GILINSKY: Do you distinguish that from safety grade?

MR. MATTSON: No. They use safety grade and safety related interchangeably. In the Westinghouse design there are a couple of what people will call attachments when you get into this in a little depth. One is the UV coil, the undervoltage coil that causes

the breaker to open. That portion of the Westinghouse design is safety grade, safety related.

There is a shunt coil, which you are going to hear more about as this briefing goes on, that portion is not safety related. You will see that it is associated only with the manual scram in the Westinghouse design.

It gets a little confusing when you broaden your interest in scram systems because in some other PWR designs both the shunt coil and the undervoltage coil are part of the scram system, that is part of the safety related portion of the scram system, but not in the Westinghouse design. It meets the regulations with just the UV portion being safety related, that is IEEE 279 single failure and all the things that go with a safety grade system.

COMMISSIONER AHEARNE: And since there are two of them you have redundancy.

MR. MATTSON: That is right.

COMMISSIONER GILINSKY: Can you activate the UV coil manually?

MR. MATTSON: Yes.

CHAIRMAN PALLADINO: In what way is the shunt not safety related?

MR. MATTSON: Well, it is used only in the

manual scram. Now the manual scram is not a safety related scram. The safety related scram is an automatic scram.

CHAIRMAN PALLADINO: I understand that. In what way is that shunt not safety related?

MR. MATTSON: In the sense that it is not automatic. That is one way it is not safety related. In the sense that it is not required to be seismic. It may be, but it is not required to be. In the sense that its power supply need not be safety related, safety grade.

Does somebody want to add one?

It is not fail safe. You have to energize it to trip and it is not fail-safe.

COMMISSIONER GILINSKY: The manual system is not under our requirements of safety related systems? It does not have to be?

MR. MATTSON: In this design that is true. I guess I shouldn't qualify it to this design. The manual portion in any design is not.

COMMISSIONER GILINSKY: Does not have to be.

MR. MATTSON: That is right.

MR. CASE: Now I hesitate to get into this, but you must understand that there are two groups of equipment that are important to safety, one more

important to safety than the other. Safety related is most important to safety and then there is another group of equipment that is important to safety.

COMMISSIONER GILINSKY: I recognize that.

MR. MATTSON: I should correct something while we are here on the record. IEEE 279 does require a manual scram and that manual scram just be safety related. The UV manual scram on the Westinghouse design satisfies that requirement.

COMMISSIONER GILINSKY: So it is a safety related manual scram, but it is just that they have an additional feature on it which, since they already have a safety related manual scram, they do not have to make the other one safety related.

MR. MATTSON: Yes. I wasn't following your question very well. Others were, and I apologize.

COMMISSIONER AHEARNE: Now getting back to what it was or what it wasn't that they treated as safety related, Rich, could you mention which piece of it now. Is it the breaker itself that they weren't treating as safety related?

MR. STAROSTECKI: We are not clear that the other voltage attachment got the pedigree treatment in terms of storage, corrective maintenance and preventive maintenance.

MR. CASE: And traceability.

MR. STAROSTECKI: And traceability.

COMMISSIONER AHEARNE: But it is clear to the NRC that it should have?

MR. STAROSTECKI: Yes, it is clear to us it should have.

MR. CASE: And the licensee now states that it is and should have been treated as safety related.

COMMISSIONER GILINSKY: Let's see, that is part of the automatic system, too, though. So how could there be any question about it?

MR. CASE: I don't think there is any question. I just think in implementing the requirement the licensee may have been ---

COMMISSIONER GILINSKY: Isn't that a pretty serious lapse because it seems to me that is something which isn't remotely in a gray area.

MR. CASE: It should be safety related.

MR. EISENHUT: Well, in our mind it is a very significant device. So I say, yes, I agree. Secondly, the question we are looking at and, as Rich said, we are not clear to the degree to which from 1974 through last weekend this undervoltage relay, which happens to be this device that is sitting here on the table, had the pedigree, was maintained as a safety related component,

et cetera, and that is something we are still pursuing.

COMMISSIONER GILINSKY: It is not clear at this point whether in fact it did or didn't receive that treatment?

MR. EISENHUT: That is right. There are a number of questions that have been raised and that is why today we are saying it is not clear.

MR. CASE: There is no doubt in my mind that it was not in certain instances.

MR. EISENHUT: In certain instances there is at least some instances where we have this problem. So it is an area that we are still reviewing.

COMMISSIONER AHEARNE: Where does the Region come out on that?

MR. STAROSTECKI: I think when you look at some of the older plants and when you are talking earlier than '74 when some of these things were being bought, I think on the part of the licensee's behalf they may not have been having the stringent requirements in that day to apply the necessary pedigree to these kinds of devices. So I think there is a gray area in that we have gotten smarter about what kind of care we ought to give to safety related equipment, and I think we are looking at a problem that started over ten years.

COMMISSIONER AHEARNE: But the Region at the

moment is not yet certain whether or not they did give the quality care to this equipment?

MR. STAROSTECKI: I have got a team of six people on site now looking at the traceability aspects and the history associated with the breakers and their attachments. Right now I can't answer that, but I hope to have that answered within about a week.

I will try and get through the rest of the trip breaker history. Very quickly, they encountered no real problems until August 20th of '82. During a routine surveillance test they found that one of their breakers, specifically the "B" breaker had a problem and they replaced it with what is referred to as a bypass breaker. During tests the bypass breaker is inserted into the train.

COMMISSIONER GILINSKY: Let's see, did they switch the breakers?

MR. STAROSTECKI: Yes. This means physically they pulled two breakers out and swapped.

CHAIRMAN PALLADINO: What do you mean they swapped?

MR. STAROSTECKI: They had a breaker in a position called "A", reactor trip breaker "A" bypass, and they put that into the reactor trip breaker "A" position. The one they pulled out of the reactor trip

breaker "A" position they put into the bypass position physically.

COMMISSIONER GILINSKY: Did they then test the bypass breaker?

MR. STAROSTECKI: And they also replaced the undervoltage attachment and then replaced the so-called faulty breaker into the bypass position.

CHAIRMAN PALLADINO: I don't understand. If you have a faulty breaker, why wouldn't you just replace it with an unfaulty breaker?

MR. STAROSTECKI: My understanding is that they do not have large spare breakers on site. They determined that it was the undervoltage attachment that was faulty. So they took out the bad breaker and put a good one in.

MR. EISENHUT: There is a breaker and the breaker is actuated by two devices. One is called an undervoltage relay and one is a shunt relay.

The questions all related to the undervoltage relay at this point, correct, Rich?

MR. STAROSTECKI: Yes.

MR. EISENHUT: And not to the breaker itself. On semantics we get hung up here quite a bit. The entire discussion that we are going to be going through is really relating to an undervoltage relay and that is

a unit, not the coil, not the breaker but really the whole piece of the undervoltage relay.

CHAIRMAN PALLADINO: Are you going to give us a line diagram?

MR. EISENHUT: Yes, we are. We have a cartoon even.

MR. STAROSTECKI: In summary then, in August the breaker failed and the breaker failed because the undervoltage coil was binding. The undervoltage coil was replaced and in the process there was an interchange of breakers at Unit 2.

COMMISSIONER GILINSKY: Did they know the other one was good?

MR. STAROSTECKI: Before they returned it to service, yes, they did surveillance testing on it.

COMMISSIONER AHEARNE: So it was an actual new undervoltage coil they put in?

MR. STAROSTECKI: That is my understanding, correct.

COMMISSIONER GILINSKY: How frequent an event is that, for a breaker to fail a surveillance test?

MR. STAROSTECKI: Well, this is the first time it happened at Salem.

MR. CASE: We have some slides later on on voltage relay failures.

MR. STAROSTECKI: For all plants. This is the first time it happened at Salem.

COMMISSIONER GILINSKY: Could you just give me a hint of how frequent an event that is?

MR. MATTSON: There have been 35 since 1973 in all PWRs.

CHAIRMAN PALLADINO: Thirty-five what?

MR. MATTSON: Breaker failures in the scram system.

CHAIRMAN PALLADINO: In how long a period?

MR. MATTSON: 1973 to today.

MR. EISENHUT: How often are these tested, Rich, the device here?

MR. STAROSTECKI: Their practice at Salem was testing the device approximately once every two months.

MR. LAINAS: That is the undervoltage.

MR. STAROSTECKI: This is the undervoltage attachment that trips the breaker. The breaker itself may have been tested through the shunt mechanism for other reasons.

CHAIRMAN PALLADINO: Roger, those 35 failures, were those on surveillance tests?

MR. MATTSON: The 35 come from our LER data. Do we have a feel for how many were on demand where they had the single breaker failure?

(No response.)

MR. MATTSON: We can get that answer, but we are not prepared today.

MR. STAROSTECKI: So the first indication at Salem was in August of 1982 at Unit 2. In January of this year Unit 2 again was at about 46 power and encountered a low-low steam generator level trip. The plant did trip and the "B" trip breaker did in fact open. However, they discovered that the "A" trip breaker failed to open. They decided to leave it in the fail position for subsequent investigation and 25 minutes later the breaker itself opened automatically.

After they replaced the breakers in Unit 2 using the breakers from Unit 1, they did surveillance testing and this is the first time that the licensee in his evaluation had determined that they were not in fact doing preventive maintenance on these breakers.

During this time period in January of 1983 ---

COMMISSIONER GILINSKY: Let's see, is that a requirement or practice?

MR. STAROSTECKI: There should have been a preventive maintenance program for safety related equipment and this is the first time that such a program was not in existence, or was determined not to be at Salem.

MR. EISENHUT: Well, it is not the first time that it was not in existence. It was the first time that it was detected that from the window of time in 1974 through 1983 there had not at any time been a preventive maintenance program which would in fact be required for a safety related component.

Did I say that right?

COMMISSIONER GILINSKY: Let's see, how come that doesn't get picked up our inspection?

MR. STAROSTECKI: We are now talking about a sampling program and a large list of items. A computer printout is about five inches thick as to requiring ---

COMMISSIONER GILINSKY: Well, was it preventive maintenance on just this item?

MR. STAROSTECKI: It is just this particular item. We are talking about the component specific preventive maintenance and that is the safety related aspect of the breaker. It is a very small piece of equipment that we are now focusing in on.

COMMISSIONER GILINSKY: In other words, they had a preventive maintenance program which overlooked this one piece of equipment?

MR. STAROSTECKI: That is what we are saying, yes.

COMMISSIONER GILINSKY: Somebody is shaking

his head back there.

MR. SNIEZEK: I think that is a question that we ought to ask the licensee of what else in the plant isn't being maintained that is safety related. I don' think we can say it is just this breaker.

MR. CASE: As you will see, that is one of the issues we are going to look into, and we are looking into as it is listed later on.

COMMISSIONER AHEARNE: Did you intend in covering that then to address the Westinghouse letter of 1974?

MR. EISENHUT: Yes.

MR. STAROSTECKI: That is later in the presentation. The point to mention is is that it is in the January time frame, as Darrell said, that this information is coming out.

MR. CASE: Let me just answer it. The licensee did not have the letter and therefore it was not followed.

CHAIRMAN PALLADINO: Who didn't have the letter?

MR. CASE: The licensee.

MR. EISENHUT: The licensee has stated that he had no records of receiving or any knowledge of the 1974 Westinghouse guidance letter and accordingly it was not

followed.

COMMISSIONER GILINSKY: We are going to get to that?

MR. EISENHUT: Yes, we are.

COMMISSIONER GILINSKY: Let me just ask you about these failures to trip. Having two of them sounds like a pretty unusual occurrence, and that there were 35 altogether since 1973 or '74 with two of them in one plant fairly close together. Does that get picked up in our system at all by AEOD or anybody?

MR. JORDAN: Yes, it was picked up and we were in the process of reviewing it with Westinghouse. There had been iientified in the I&E reviews of those events the failure and the discussion with Westinghouse over the current instructions for lubrication for maintenance.

CHAIRMAN PALLADINO: Were all 35 Westinghouse designs?

MR. CASE: No.

MR. JORDAN: No. This was based on Salem's current history at that particular point.

MR. EISENHUT: Let's see, as it turns out we had I believe, following on what Mr. Jordan said, we had the February 22nd and these type failure events under review at the very time of the February 25th review.

MR. IPPOLITO: I am Tom Ippolito of the

Operating Assessment Branch. Each morning we review with I&E the events of the day before. When this Salem transient happened on the 22nd, a number of things happened which appear shortly. But one of the things that caught our eye was a parenthetical phrase that said something like however, the automatic scram preceded the manual scram. That raised questions in our mind and we were beginning to proceed to understand what that actually meant.

Unfortunately, sometimes the data that you get in these morning reports is garbled. So many of them require us to follow up on them.

COMMISSIONER GILINSKY: This is something they called in or what?

MR. IPPOLITO: Yes.

MR. STAROSTECKI: Every morning the Region prepares what is called a daily report where we summarize all the technical aspects and it is distributed throughout the agency.

From a site specific basis, the residents were in fact following these events and in fact we found that the initial licensing event report for the first failure was not adequate and therefore the licensee had supplemented it in the January time frame. So there were two things going on, the follow-up on the specific

action being taken at the site, plus there were discussions in headquarters as to what this was meaning.

COMMISSIONER GILINSKY: How long does it take for us to get informed about, well let's say, a surveillance test failure or the more serious event, the first of the events on the 22nd? Do they call that in or is that just sent in?

MR. JORDAN: The reporting requirement is for notification within an hour of a plant trip. So the event of the 22nd was required to have been reported in one hour. A surveillance test in which one breaker would fail would presently be required to be reported under the tech specs, Reg. Guide 116, which requires a 30-day report for that single breaker failure in a surveillance test.

MR. CASE: But the licensee did not understand on the 22nd that he had a failure to automatically scram. That realization did not come to him until sometime on Friday the 25th.

COMMISSIONER GILINSKY: Well, how was it that they informed us, or did they inform us immediately?

MR. STAROSTECKI: Well, I really haven't gotten that far. Let me just continue on the breaker history.

COMMISSIONER GILINSKY: Good idea.

CHAIRMAN PALLADINO: Why don't we let him go for a while.

MR. STAROSTECKI: What I am trying to do is paint the situation as it happened, that is on August 20th was the first indication of a problem and on January 6th the second indication of a problem. In the January time frame I think it is important to recognize that Unit 2 is shutting down for its first refueling outage and in fact did shut down on January 21st. Unit 1 was in a shutdown condition at that time for its fourth outage and they were preparing to bring it back out of the outage.

During the January 13th through the 18th time frame the Unit 1 breakers were being what one might call overhauled for subsequent use as they come out of the outage. This appears to be the first time that the breakers are lubricated. There is some question, since they didn't follow the 1974 Westinghouse guidance, as to whether a solvent or a lubricant was used on the voltage trip attachment.

COMMISSIONER GILINSKY: The first time since when?

MR. STAROSTECKI: Since 1974 as best as we can determine today.

So during the February '83 time frame the

breakers for Unit 1 were tested prior to coming out of the outage.

As a result of problems with the feedwater control system, Unit 1 at Salem has experienced a number of trips due to the low-low steam generator level. The first one of these was on February 20th where the trip breakers functioned properly on two occasions. One time was low-low steam generator level and the other high-high.

CHAIRMAN PALLADINO: Excuse me. Is anybody looking at that control system on the steam generator level? Is that a source of another problem?

MR. STAROSTECKI: That is another problem that the licensee had recognized and, as I indicate on February 22nd, this problem relates somewhat to the sluggishness of the feedwater control bypass valves during manual operation from the control room. It is a tricky operation and the licensee had done more investigation into that. We will look at the role that played next week.

Following the two successful trips on February 20th, there were two trips on February 22nd, with one earlier in the day. The one earlier in the day again involved the trip on low-low steam generator level. They encountered problems upon restart in the fact that

they could not close one of the trip breakers and this was due to the fact that there was a loose dust cover in the breaker. So the "B" reactor trip breaker cover plate problem simply is a reflection in my mind on the fact that there was some loose material in there that shouldn't have been.

CHAIRMAN PALLADINO: Was this dust cover inside?

MR. STAROSTECKI: It s .ts on top of the breaker.

CHAIRMAN PALLADINO: Can it interfere with operation?

MR. STAROSTECKI: It interferes with closing the breaker obviously. We don't know if it interferes with the opening.

At this time they removed the feed bypass valve position indicators. Again, they have recognized that the source of the problem here from an operational standpoint is the feedwater controls.

What I would like to very briefly do is acknowledge that the next two events on February 22nd and February 25th I in fact have summarized on the next viewgraphs and I would like to defer a discussion to the more detailed viewgraphs on those days.

The next slide, please.

The February 22nd event sequence was associated with several problems in the plant. The root cause of the problem was a faulty limit switch on some electrical bus breakers. During the start-up the plant is shifting certain buses from off-site sources of power to the on-site sources of power since the reactor is using about 20 percent.

During this transfer they encounter a number of problems. The net result is they encounter a low-low steam generator level in the auxiliary feedwater pump start. At about the same time the operators had noted that they had a deteriorating situation due to the difficulty in transferring electrical buses and the feedwater problems affecting steam generator level. So they initiated at the direction of the shift supervisor a manual reactor trip. The reactor tripped and the turbine was tripped.

COMMISSIONER GILINSKY: What was this degrading condition they were talking about?

MR. STAROSTECKI: Low steam generator levels dropping with a recognition that if you add more water it would be called and you would cause a further drop in indicated steam generator level. So they were anticipating the situation that they would trip on low-low steam generator level and decided to manually

scram the plant rather than wait for the protection system to do it. That was their logic.

CHAIRMAN PALLADINO: Aren't you supposed to add more water when you get low?

MR. STAROSTECKI: You get an alarm at low level.

CHAIRMAN PALLADINO: And what would you normally do, not add water?

MR. STAROSTECKI: Well, you would add water at that point, but if you are going down and you go through the low-level alarm set point, I think an operator can use his judgment and say I am not going to catch it.

COMMISSIONER GILINSKY: Let's see, why wouldn't he try to ride it out, or was it absolutely clear that they were going to trip?

MR. STAROSTECKI: Based on the discussions with the operators, it was clear to them that they were going to trip. If they didn't do anything they were going to trip.

COMMISSIONER AHEARNE: You say the reactor trip signal, was that the automatic trip signal?

MR. STAROSTECKI: The reactor protection system logic sensed the low-low level and in fact called for a trip signal and did generate a trip signal.

COMMISSIONER AHEARNE: Are you talking about

internal to the logic or something audible or visual?

MR. STAROSTECKI: You get both. You will get the logic and the status board will indicate that the logic is made up and then you will get the alarm and enunciator saying you have a reactor trip.

COMMISSIONER AHEARNE: But the operator four seconds later wasn't in response to that.

MR. STAROSTECKI: These are approximately four seconds now. Let me just clarify that the time difference of three and a half to four seconds we have gotten looking at the computer printout after the fact. On the day of the occurrence the operators believe that they had almost simultaneously tripped the plant manually. We make the distinction of three and a half to four seconds based on an after-the-fact analysis of the computer printout.

COMMISSIONER GILINSKY: Well, presumably they thought they had manually tripped it in advance of the automatic trip.

MR. STAROSTECKI: One of the operators had believed that he had manually tripped the plant and he believed that the automatic trip came in next.

MR. EISENHUT: Let's see, I should make it clear that in fact the finding out that the reactor trip signal got there and did not do the job first was found

last Saturday on the 26th. On February 26th it was found during the discussions where the NRC team was at the site. Up to that time the utility thought the manual scram actually scrammed the plant. It came out of an analysis of a computer printout off the plant computer which tracks things in cycles and not even in seconds, but it is a very accurate printout.

CHAIRMAN PALLADINO: Didn't the manual actually scram?

MR. EISENHUT: The manual scram of the plant after ---

MR. CASE: The automatic came in first.

MR. EISENHUT: The automatic signal should have scrammed it, but in fact this is the first event which was a failure to scram on a valid automatic signal.

COMMISSIONER GILINSKY: Well, let's see, you don't have anything about that up there.

MR. STAROSTECKI: As we were going through here what I wanted to do was indicate that the computer printout had called for a reactor scram at a certain point in time and the operators believed they had manually scrammed the plant. When you look at the plant computer, it records the plant trip signal from the automatic system, then a manual trip initiated by the scram switch and then a reactor trip.

COMMISSIONER GILINSKY: Is it common for operators to scram the plant in advance of an automatic scram?

MR. STAROSTECKI: That really reflects on the training program and attitude of the management and staff. Based on our discussions, this is what Public Service Electric and Gas would expect from their operators.

MR. EISENHUT: Commissioner, the two items up there, the reactor trip signal from low-low, which was enough to get the aux feedwater to start, indicates that you do have a real RPS signal, but then four seconds later the reactor trip breakers physically opened, which is the indicator to us that there was in fact a failure to scram on a valid RPS signal to the undervoltage relays. In fact, that is the significance, the manual scram system actuates both the undervoltage relay and the shunt relay. Either one can do the job, and we will be getting to that in a little diagram in just a couple of moments.

MR. STAROSTECKI: Let me explain what the 54 seconds and the 58 seconds means after 2156. Upon receipt of a reactor trip signal, it is a fraction of a second later that the trip breakers should open. When you see three to four seconds, it means that the first

trip didn't do the job.

Now on the 22nd because of the additional complications, there was a combination of a loss of reactor coolant pumps and feedwater pumps that resulted in one steam generator being at a lower pressure than the others creating a signal which thought there was a main steamline break. This main steamline break indication generates safety injection.

Safety injection was putting more water in the plant and due to the loss of reactor coolant pumps the pressurizer spray valve didn't have a driving head. So the plant increased in pressure and the power operator relief valves lifted at 2206 to relieve the excess volume being given to the system by the safety injection.

When pressurizer level was up to 22 percent, and it had previously dipped to about one percent, the operators satisfied their criteria for terminating safety injection. At that time the power operator relief valves closed and the plant was shut down and in hot standby.

NRC was notified at 2346.

The next slide, please.

MR. CASE: And I believe the block valve was closed.

MR. STAROSTECKI: That is the next slide.

The occurrences, as you can see on February 22nd, were finished in the time frame of about 11 minutes after 10. At about 6:30 the next morning they had excessive temperature indications on their tailpipes and they closed the block valve because of the seat leakage.

The licensee had done his evaluation on February 23rd and had in fact started the plant back up to power at 8:30 p.m. on the evening of February 23rd. The initial licensee evaluation recognized that the automatic trip signal was received first by the protection system and they recognized that the manual trip occurred second. They concluded based on that that the plant had tripped on the automatic signal.

I mention this simply because of the need, as we discuss later on, of the recognition of the time frame that one should expect between receipt of a signal and actual opening of the breaker.

COMMISSIONER GILINSKY: Let's see, they were aware of this several second difference?

MR. STAROSTECKI: They obviously, based on analysis today, did not recognize the fact that the breakers physically had tripped as a result of the manual trip. They saw a sequence which involved protective system trip, manual trip and reactor trip.

This is somewhat speculative, but they looked at and saw a reactor trip and they saw the trip signal first. The presumption is that the protective system had opened the breaker, and it is only upon subsequent evaluation after the 25th where it was clearly a delayed response. It only after you recognize the time frame between the generation of the trip signal and the opening of the breaker to be a fraction of a second that you would look for it. They were not looking for it.

COMMISSIONER GILINSKY: I think it would be useful at the end of this session if the company had a few words just to comment on anything that may have been said during the course of our meeting.

MR. EISENHUT: The company is here and I think they are prepared to do that.

CHAIRMAN PALLADINO: Well, why don't we move along and see where we come out.

MR. STAROSTECKI: The next slide, please.

The sequence of events for February 25th, again this is Unit 1. The reactor is being started up and they were synchronized with the grid. The feedwater system again is in manual control and again the feedwater system was giving them difficulty.

They generated a low-low level, the reactor trip signal ---

COMMISSIONER GILINSKY: Let me just take you back. You said earlier that the fact that there was a several second difference between those two events made it clear that the plant hadn't tripped on the automatic signal. Was that self-evident and, if so, why wasn't it clear to the company?

MR. STAROSTECKI: As you go through the February 25th event, it is very clear that people recognized that the plant didn't automatically trip. Now when you look at the plant computer it records time in cycles, 60 cycles per second. When you look at February 25th you find that it is about three to four cycles between trip signal manually and reactor trip breaker opening. So it is about four cycles.

When you go back and look at the February 22nd event, the same situation exists. There was a trip signal and a certain number of cycles, four cycles later, that the reactor trip breakers opened.

COMMISSIONER GILINSKY: When you say four cycles ---

MR. STAROSTECKI: It is four cycles on the computer that is indicative of a successful trip breaker opening upon receipt of a valid demand signal. So if there is a signal one should expect four cycles later in computer time to see the trip breaker open.

COMMISSIONER GILINSKY: And the cycle you say is a 60th of a second?

MR. STAROSTECKI: Yes. Now on February 22nd it is on the order of 150 cycles and I can't quote the number.

MR. EISENHUT: It is about three and a half seconds.

MR. STAROSTECKI: It is about three and a half seconds, so it is about 190 cycles or thereabouts. But it is the disparity between three and four cycles and several hundred cycles.

MR. EISENHUT: Rich, I think one thing that helps is on Monday when we met with the utility, the utility's explanation of going back actually and walking us through this with his own viewgraphs, and the explanation that Rich is giving, the factual series of numbers, is in fact the utility's understanding, too.

The missing of it is something that is going to have to be continued to be evaluated. However, the fact that, and I don't think there is any debate, that the utility is in fact presenting the informtion that says that upon detailed evaluation of the computer printout in terms of cycles, which he presented Monday, there was a valid signal that would have indicated that the breakers should have opened and they did not open,

and they now believe that the breakers opened as a result of the manual scram when they should have opened as a result of the RPS automatic scram.

COMMISSIONER GILINSKY: But that was not recognized until after ---

MR. CASE: And the fact that it wasn't recognized is one of the issues we are looking at in this evaluation.

MR. EISENHUT: It still needs to be evaluated. At this point it is pretty well zeroed in that in fact that factually happened. We first heard about it on Saturday, as I said, when there was an NRR regional team at the site and the utility presented the data on Monday in support of that.

MR. CASE: But it is also fair to say that when we got the daily report on Wednesday or Thursday, we were suspicious and we are looking into that very matter.

MR. EISENHUT: For the February 22nd event. We in fact already had a meeting on the very issue.

COMMISSIONER GILINSKY: That was the thing Tom was referring to?

MR. CASE: Yes, sir.

MR. EISENHUT: Yes.

MR. LAINAS: I think it is fair to say that as

far as the February 22nd event that what the utility said was it was more or less of an anticipatory type of scram by the operator. He saw his level getting away from him. So he went and hit the scram before he got an automatic scram, and when it occurred it assumed that it was simultaneous or very close together.

On the February 25th event there was a longer time period there where he knew he didn't have a scram automatically.

CHAIRMAN PALLADINO: Why don't we go on.

MR. STAROSTECKI: Let me just very quickly go through the February 25th event. After they determined that they had a problem with the scram system, they satisfied themselves by testing the protection system five times. They installed artificial trip signals into the protection system and satisfied themselves that the logic circuitry was correct. Trip breaker "A" failed three times to open and "B" breaker failed five times.

Upon determining that they had faulty trip breakers, they declared the alert, make the notifications and then terminated the alert at 2 o'clock in the morning.

Subsequent to this, about 3:30 in the morning they replaced the trip breakers in Unit 1 with the trip breakers from Unit 2 and ran three more tests and

satisfied themselves that the logic circuitry was still working properly and the trip breakers from Unit 2 in fact did work satisfactorily three times.

COMMISSIONER ROBERTS: Let me ask a question. The undervoltage trip mechanisms for Unit 1 were given maintenance in January?

MR. STAROSTECKI: Yes, sir.

COMMISSIONER ROBERTS: It is unclear whether they had ever had any previous maintenance.

MR. STAROSTECKI: That is correct. In a nutshell the breakers that failed to trip on February 22nd and 25th had successfully tripped previously within a matter of weeks and these were the breakers that were so-called overhauled, had maintenance performed and were reassembled.

CHAIRMAN PALLADINO: Are you looking into whether or not the maintenance was appropriate?

MR. EISENHUT: Yes.

MR. STAROSTECKI: Yes, we are, and one of the questions there obviously is what kind of lubricant or solvent was in fact used. That is one of the issues outstanding.

MR. EISENHUT: Perhaps we could switch now to Gus Lainas who is going to be addressing some of the design aspects.

CHAIRMAN PALLADINO: You started to tell me about something you were going to tell us about something at 3:30 and I didn't pick that up.

MR. STAROSTECKI: Well, at 3:20 in the morning after 0200, after they terminated the alert, they took the breakers from Unit 2, which is now in a refueling outage, and installed them in Unit 1 to further satisfy themselves that the logic circuitry was correct and in fact the Unit 2 breakers had operated satisfactorily.

CHAIRMAN PALLADINO: Okay, thank you.

MR. EISENHUT: If I could then, we will go to the summary of the event and we will be at least itemizing and discussing some of the areas we are going to continue to evaluate prior to a restart decision on the plant, but we recognize that our review in all those areas is not complete since it is still unfolding. We will try to give you a graphic description here of what the system looks like to explain some of the confusion of questions before.

COMMISSIONER GILINSKY: Let's see, you are going to go into more detail on the February 25th event now?

MR. EISENHUT: Yes. Well, we will start from the system approach ---

MR. CASE: Not into the event itself.

MR. EISENHUT: Not into the event sequence itself, but into the explanation of how the system works and the areas and the issues we are looking at, so to speak, prior to any restart decision.

COMMISSIONER GILINSKY: In that case let me just ask a question. I am not sure I understood what you meant when you said each breaker tested five times.

MR. STAROSTECKI: The individual breakers were tested as a result of the instrumentation control staff performing surveillance tests on the protection system logic. They insert false signals to generate low-low steam generator trip signals that in fact product the loss of voltage for the UV coil to trip. As part of this test they verify that they generate the signal, they get the trip signal from the logic and they verify that the breakers are open.

They did the test for each of the low-low steam generator's protection system logic plus one spare giving them five tests. For those five tests they looked at each individual breaker. I don't want to create the misimpression that each individual breaker was approached and tested separately five times. That is not the case. Each breaker was tested five times as a result of testing the protection system logic five times.

COMMISSIONER GILINSKY: Let's see, why was an alert declared?

MR. STAROSTECKI: An alert was declared because, in accordance with the Salem precedures, when they have a plant trip called for and the rods don't go in they are required to call an alert.

COMMISSIONER GILINSKY: But at this point the rods had gone in.

MR. STAROSTECKI: At this point the rods had gone in but they had satisfied themselves as result of the testing that the rods had not gone in.

MR. EISENHUT: Originally on demand.

MR. STAROSTECKI: As originally required on the demand of the protection system, they satisfied themselves that it was not a protection system logic failure and it was truly reactor trip breaker failure.

MR. JORDAN: The notification was that they had had an alert situation and they were advising us that they had met the threshold from NUREG 0654 classifying it as an alert, but it was an administrative condition and the plant was not in jeopardy at that point.

COMMISSIONER GILINSKY: I wonder if you could just go through the event in a little more detail.

COMMISSIONER AHEARNE: Before they go into

more detail in the event, could we take a minute and have Gus go through the system.

CHAIRMAN PALLADINO: Yes, I am waiting for that. That is one of the problems I am having, I am waiting until I understand the system a little bit.

(Laughter.)

MR. LAINAS: Why don't you put the next slide on.

What I will try to do is go through a series of fuctional diagrams to try to give a better perspective of what is going on.

On the right-hand side of the diagram you can see where the trip breakers are located. I mean there are two breakers in series that separates the power sources from the power to the control rods and the control rods are bound in scram.

The signals to those breakers come from the automatic protection system and they can also be manually actuated. Each of the trip breakers have two tripping devices on them and when you deenergize the control rods drive in. One is an undervoltage relay that we were talking about this morning, and I will start passing this around.

MR. EISENHUT: You might want to go through the explanation first.

MR. LAINAS: So we have two, the undervoltage relay and the shunt trip. The automatic protection system goes to the undervoltage relay as shown over here. What happens is when the automatic protection system is actuated, voltage is removed from this device and the breaker is tripped.

Now when you look at the manual protection system, we have two ways of doing that from the control room. You have the manual scram and you have individual breaker controls. The manual scram, which is a scram switch in this case, goes to both the undervoltage and the shunt trip. The reactor breaker controls located at the control panel go to the shunt.

MR. EISENHUT: They go to the shunt trip on either breaker. The little cartoon here is missing one, but it goes to both of them.

CHAIRMAN PALLADINO: What is missing?

MR. EISENHUT: Each one of the three controls goes to a shunt trip on both of them.

MR. LAINAS: For each breaker the manual scram actuates both devices. The reactor breaker controls actuate just the shunt trip.

On the next diagram which is a little bit busy ---

CHAIRMAN PALLADINO: I am sorry, you said

something at the end that negated what you just said before. You said the breaker only goes to one.

MR. LAINAS: It goes to the shunt trips of each breaker. There is a line missing.

The next diagram is a little bit busy, but if you will again look at the right side of the diagram there are MG sets which convert the power to 280 volt AC. The significant difference that I show on the right-hand side is that there are bypass breakers that are put into service when you are periodically testing the main breakers.

CHAIRMAN PALLADINO: And that is their only purpose?

MR. LAINAS: That is their only purpose, that is correct. And while the testing is going on the bypass breakers can be actuated by the automatic protection system.

As long as we are talking about testing ---

COMMISSIONER ROBERTS: Or by the manual, either.

MR. LAINAS: Oh, yes, they are completely functional. There are separate switches in the control room by which you can manually trip the bypass breakers, and of course the scram switch also actuates it. So you have full protection.

CHAIRMAN PALLADINO: By while the bypass breakers are in service they get the same kind of treatment as the other?

MR. LAINAS: That is right.

Now as long as we are talking a little bit about the difference between the undervoltage and the shunt, maybe we can say a little something about the testing.

Periodically the undervoltage is tested at bi-monthly intervals where they actually go in, an I&C technician goes in and simulates undervoltage from the automatic system and watches that the breaker trips.

The shunt coil is actuated from the control room manually on a seven-day period. That becomes significant later on where the licensee is proposing to increase the frequency of the testing of the undervoltage.

CHAIRMAN PALLADINO: By bi-monthly you mean every other month?

MR. CASE: Every other month.

MR. LAINAS: It was every other month.

CHAIRMAN PALLADINO: You say the shunt is tested every ---

MR. LAINAS: Every seven days.

MR. JORDAN: I guess maybe for clarity there

was a statement that the bypass was as good as the normal breaker. The bypass is actuated by only half of the ---

MR. LAINAS: A single channel.

MR. JORDAN: That is right. So you don't have the full protection since you only have one channel feeding it.

MR. LAINAS: That is right.

CHAIRMAN PALLADINO: But you don't bypass both of those?

MR. LAINAS: You don't do them both at the same time.

COMMISSIONER GILINSKY: Is the bi-monthly test specified in the tech specs?

MR. LAINAS: Yes.

MR. EISENHUT: You really test one monthly and you alternate so that you end up in essence getting each device every 60 days. That is what the tech specs say.

MR. LAINAS: The upper-left-hand corner of the automatic protection system shows from the senors through the actuation logics to the breaker controls themselves.

As you can see, there are computer signals for each of the bistables which would indicate what gave you the trip.

COMMISSIONER GILINSKY: Say that again.

MR. LAINAS: The computer signals that you see there, the "C's", that is what was used in the event recorder which was checked after the event.

COMMISSIONER GILINSKY: Is there an indication on the control board what the cause of the trip was, whether it is automatic or manual?

MR. STAROSTECKI: In the control room there is a status board which shows a mimick of the logic diagram to show you the generation of the input signals.

MR. LAINAS: We can show you a diagram on that.

COMMISSIONER GILINSKY: Well, does it indicate whether it was manual or automatic?

MR. STAROSTECKI: No, it just indicates whether the protection system thought there was a trip signal generated or not. Then there are separate lights for whether the breaker actually is opened or not.

COMMISSIONER GILINSKY: What you are saying is that there is no indication whether the actual trip was caused by the manual trip or by the automatic trip?

MR. STAROSTECKI: There is no enunciator that gives you that information. That requires analysis of the computer printout.

MR. LAINAS: There is an indication of a breaker trip. When the breaker trips there is a limit

switch and on the panel there is an indication of when that tripped.

COMMISSIONER GILINSKY: Just to repeat the question, there is not an indication of whether it was the automatic or manual scram that actuated the trip?

MR. LAINAS: No, but there is an indication on the panel which indicates whether the breaker is open.

MR. STAROSTECKI: The answer is no, there is no device to discriminate between automatic and manual.

MR. LAINAS: The next slide is trying to get into the mechanical aspects of the trip breaker. As you can see, again repeating, there is a shunt trip and an undervoltage trip. Significantly here there is a mechanical linkage as you can see from the device itself.

CHAIRMAN PALLADINO: Where is the device?

MR. LAINAS: Between the undervoltage trip coil and the trip bar.

MR. EISENHUT: We will pass this around. It suffices to say that basically the breaker, which we have a picture of, has a bar in it.

Why don't you go to the next slide.

This device is reset by a bar which in essence cocks the relay and the bar on the breaker sets on the bottom device, this little tab here on the bottom. There is, besides the undervoltage relay, there is also

a shunt relay. So either one of the two devices can flip the bar up.

The device, just to show you, there is a little arm in here, that Gus will be talking about in a minute, which when you pull it back actually cocks the device and this is, incidentally, one of the faulty devices that was taken out of the plant. This particular device we are going to be talking to the utility about and we are trying to get a contractor to examine it. But this is one of the devices that can actually hang up.

CHAIRMAN PALLADINO: Is that what happened?

MR. EISENHUT: Basically, as Gus will explain in a minute, that is what is believed to have happened, but it is the linkage between the cocking arm and when this becomes deenergized it is supposed to flip up and trip the bar.

CHAIRMAN PALLADINO: This happened on both of these breakers?

MR. EISENHUT: Yes.

MR. LAINAS: Yes.

CHAIRMAN PALLADINO: There is something I have not yet understood. It sounds to me like, since the manual works on the same mechanical devices, were we just lucky that when we called for manual scram we got

it?

MR. EISENHUT: The manual works on both the undervoltage and the shunt at the same time. Either one of the two will actuate and lift the bar. So it is believed that the shunt device ---

CHAIRMAN PALLADINO: If it was a mechanical failure, then neither ---

COMMISSIONER GILINSKY: The Chairman is saying if it was stuck.

(Laughter.)

MR. EISENHUT: The way it is designed, if it stuck, it can remain stuck and the shunt coil can operate it because the bar sets on the piece of metal. The bar can be flipped up by the shunt coil and this could be locked or frozen or whatever and would have no effect if the shunt coil actually fulfilled its function.

COMMISSIONER GILINSKY: It depends on what is stuck.

MR. EISENHUT: No, this device could be frozen.

CHAIRMAN PALLADINO: Are there two ways of breaking the current?

MR. LAINAS: Why don't you put the next diagram on.

MR. EISENHUT: We have a cartoon here.

COMMISSIONER GILINSKY: Well, if the

mechanical failure is in this device ---

MR. EISENHUT: If the undervoltage relay is what is frozen or hanging up, then the device will still work. If the failure were in the breaker itself, then you would not have gotten a scram even on the manual button.

COMMISSIONER GILINSKY: And you are saying the difficulty is in here?

MR. EISENHUT: Well, the belief right now from the utility is that they have identified the failure in this device because when they actuated the manual scram button the breaker did function. In fact, as Rich Starostecki pointed out, when they then tried to test these devices they have in fact been found to be hanging up.

MR. CASE: Could we return to Commissioner Gilinsky's questions.

CHAIRMAN PALLADINO: Can you answer my question. Were we lucky that it opened or was it such that the interruption of the current was forced?

MR. EISENHUT: Well, I don't know.

CHAIRMAN PALLADINO: I don't know what this shunt is doing. I pictured the shunt as something that shunts the current away.

MR. STAROSTECKI: Let me just say that the

shunt attachment looks physically similar to what you are holding in your hand with the exception that you don't have an elaborate mechanical linkage. The shunt relay is a coil that energizes to lift that little mechanism on the bottom which is a trip latch.

MR. EISENHUT: But, Rich, not to lift any piece on there.

MR. STAROSTECKI: There are no other mechanisms on the shunt coil. It only has a little trip latch on the bottom with a spring and when you energize the shunt it lifts that latch.

CHAIRMAN PALLADINO: I see.

MR. STAROSTECKI: This device, because it is deenergized to function, has additional features on it to make it fast acting and to perform its function.

MR. EISENHUT: Following on what Rich was saying, the breaker itself has a bar on it, and under that bar there are basically two tabs. One tab comes off the undervoltage relay and one tab comes off the shunt relay. Either one of the two is believed to be able to lift the breaker arm and in fact break the circuit.

This device is believed to have failed and not lifted the bar, but upon pressing the manual scram you give a signal to both and the shunt relay is believed to

have been the one that raises the arm.

COMMISSIONER ROBERTS: To go back to your previous slide, what is the mechanical push bar? Is that physically on the piece of equipment?

MR. LAINAS: Yes, it is on the breaker itself.

MR. EISENHUT: Gas has a cartoon here which may help.

MR. LAINAS: I don't know if it will help or not.

(Laughter.)

COMMISSIONER GILINSKY: Actually if we understand that what you are giving us is the correct explanation, then to follow the Chairman's question, I suppose we are lucky they had a shunt trip coil.

MR. EISENHUT: I think that is correct.

CHAIRMAN PALLADINO: Even though that is not safety grade.

COMMISSIONER GILINSKY: Even though that is not safety grade or required.

MR. CASE: It was put there deliberately to provide a diverse way of scramming the reactor.

COMMISSIONER GILINSKY: That is right.

MR. CASE: I don't quite consider that luck. It was deliberately done.

CHAIRMAN PALLADINO: I agree. That is not

what I was referring to when we taked about it.

Okay, do you want to move on.

MR. LAINAS: This is again I guess repeating some of what was said. The first thing you should look at is the shunt trip coil in the upper-right-hand corner of the slide and the undervoltage trip mechanism on the left. Those again at the two tripping devices for the breaker.

COMMISSIONER AHEARNE: If you could just walk me through your device. The circuit that you are trying to break is the -- (Inaudible).

MR. LAINAS: That is right.

COMMISSIONER AHEARNE: So you are trying to show the trip as you are pulling away ---

MR. LAINAS: Opening the contact, right.

COMMISSIONER AHEARNE: And there is a spring bolted device that is going to ---

MR. LAINAS: --- kick the trip release bar.

COMMISSIONER AHEARNE: Where it says trip release bar, you have got to pull that bar out of the way and that spring activates the device ---

MR. LAINAS: Exactly.

COMMISSIONER AHEARNE: And now you are talking about the various ways to lift that trip release bar?

MR. LAINAS: That is right.

COMMISSIONER AHEARNE: Now the mechanical trip push bar, that is at the cabinet?

MR. LAINAS: That is at the cabinet, yes.

CHAIRMAN PALLADINO: That is what I was worried about when I asked you before. All these other things on the right still have to go the electrical circuits.

MR. LAINAS: That is exactly right.

COMMISSIONER AHEARNE: The straight mechanical trip ---

MR. LAINAS: Is local.

CHAIRMAN PALLADINO: The straight mechanical trip is that bar up at the top?

MR. LAINAS: Yes. What I will do is I will send around pictures of the breaker itself, the entire breaker.

CHAIRMAN PALLADINO: I might get more out of the cartoon.

MR. LAINAS: Okay, sure.

CHAIRMAN PALLADINO: The mechanical trip is that bar up at the top?

MR. LAINAS: Yes.

CHAIRMAN PALLADINO: And that actually pushes down and trips the release button.

MR. LAINAS: Right.

MR. EISENHUT: And the release bar over here on the side, the trip release bar, is the bar that has both the undervoltage and the shunt.

MR. LAINAS: The point that should be made is that for the undervoltage trip mechanism itself, there is a linkage involved that you can see from what we passed around. The shunt trip coil is more positive.

COMMISSIONER AHEARNE: Let's see, the shunt trip coil you have to energize, correct?

MR. LAINAS: That is right. One way of doing it is with the manual scram switch.

COMMISSIONER AHEARNE: Or the breaker manual.

MR. LAINAS: I am sorry, or the breaker manual, right.

CHAIRMAN PALLADINO: Could you use the shunt if you had no power?

MR. LAINAS: No.

MR. CASE: The shunt requires power.

MR. LAINAS: The shunt coil.

COMMISSIONER AHEARNE: What is the automatic scram contact?

MR. LAINAS: That is from the protection system. As you can see, the automatic protection system throws the undervoltage.

COMMISSIONER AHEARNE: The manual scram switch

that you have indicated there ---

MR. LAINAS: That does both.

COMMISSIONER AHEARNE: --- its normal condition is that it has closed the circuit to the undervoltage mechanism and when you push the man scram switch you open the undervoltage or you c't out the undervoltage?

MR. LAINAS: That is right.

MR. CASE: And provide current to the shunt trip.

MR. LAINAS: That is how in fact the reactor was scrammed.

The next one is just a little more detailed than the first one.

COMMISSIONER AHEARNE: But if you have lost all power, the only way to do it is by the mechanical trip?

MR. LAINAS: But you lose power to the drives, in other words, if you lost MG power.

CHAIRMAN PALLADINO: If you lost all power I thought you would deny yourself the shunt, but wouldn't you get it to scram?

MR. LAINAS: Well, it depends on where you are talking about loss of power. Loss of control power?

COMMISSIONER AHEARNE: Yes.

MR. LAINAS: Loss of control power, well again, it depends on where the failure is.

CHAIRMAN PALLADINO: Let's just assume they had no failure, just to understand how it works.

MR. LAINAS: Well, if I had a loss of off-site power, let's say, a loss of all incoming power to the MG's. The MG sets would stop and you drop down. If you had specific loss of power to the shunt coil, you couldn't use that.

CHAIRMAN PALLADINO: Suppose I lost power to the undervoltage trip mechanism.

MR. EISENHUT: That is a design that is in fact supposed to drop the rods.

MR. CASE: Unless there is a hang up in the mechanism.

COMMISSIONER AHEARNE: The 48 volt DC system which you have listed here, if you lost that, then it looks by your diagram that the only thing you would have is the mechanical trip.

CHAIRMAN PALLADINO: That is what I was asking before.

COMMISSIONER ASSELSTINE: If you lost power during this incident.

MR. LAINAS: Yes.

CHAIRMAN PALLADINO: Say that again.

MR. LAINAS: If you loss 48 volt ---

COMMISSIONER AHEARNE: Right, that takes out both your undervoltage ---

MR. STAROSTECKI: I think that needs some clarification. This is a functional diagram. The power source of 48 volt DC going to the undervoltage coil is separate from the power going to the shunt coil.

COMMISSIONER AHEARNE: Okay.

MR. STAROSTECKI: This just represents a power source.

MR. LAINAS: Yes.

COMMISSIONER AHEARNE: Okay.

MR. LAINAS: I didn't plan to go into the next one. It is just a little bit different.

MR. EISENHUT: There is one thing on this on this diagram or cartoon here, the latch paw. The culprit, so to speak, is that this latching mechanism has been believed by the utility as what is hanging up. In fact, the device that we sent around was one that you could almost hang up if you cock it. In fact, it will sometimes almost hang up before it releases, and there is a little latching mechanism when you cock it.

COMMISSIONER AHEARNE: So you think that is what ---

MR. EISENHUT: That is in fact what the

licensee attributes the problem to, and it is fair to say it is something we are still looking at.

Before we go on to the corrective actions, we had one point on what is available in the control room and what kind of indications you get in response to Commissioner Gilinsky's question.

Roger, I wonder if you want to amplify that.

MR. MATTSON: I wonder if we could go back to the slide that is the reactor trip system. I believe it was the second in this series of pictures.

Commissioner Gilinsky was asking what was available in the control room for the operator to know after the February 22nd trip what was the source of the trip. We talked about the computer printout from the event recorder being available but not being studied and analyzed until some time later, and that clearly showed that it was the manual that caused the trip even though the automatic had come in earlier and should have caused the trip.

There is another indication of the fact that this electronics sends a signal wanting a trip, and that is an enunciator that goes in the control room. We could ask the Salem people. Most control rooms have a first in light, and it is after the trip signal has been received a light goes on that tells the operator what

the signal originated from. That probably went on, or something like that, in the Salem control room.

The point that Mr. Starostecki was making is that these breakers over here don't send the signal to anything in the control room other than the computer saying what they opened on. Once they open, then the operator says well, I see this, but I also know I scrammed with the manual button. The only way he is going to be able to tell the difference we think is by either detecting that this went off four seconds before he hit the botton, which is a pretty close call, or by reading the computer.

COMMISSIONER GILINSKY: Well, let's see, four seconds, isn't all that short if there is an enunciator.

CHAIRMAN PALLADINO: It depends on how busy you are.

MR. MATTSON: I didn't want to close the review. I just wanted to straighten out that it appears that we were saying there wasn't any indication that there was an automatic trip signal other than the computer printout, and that is not right. There is another automatic trip signal and that is this enunciator I just pointed to. Whether or not the operator should have know that or not, we need to know more about what was going on and we need to study it a

little further.

MR. STAROSTECKI: The fact that the protection system got a valid trip signal was recorded on the indicating lights. So the information was presented to the operator that the protection system called for a low-low steam generator level trip and that was indicated. Because the operator thought he manually tripped the plant first before that signal got locked in, in response to that question of whether he could discriminate whether he tripped the plant or whether the protection system tripped the plant, there is no automatic device to them him that. That requires evaluation.

CHAIRMAN PALLADINO: Is this an audible indication or a light, the one that indicates that the signal is going on?

MR. STAROSTECKI: The actuation logic that comes out two out of four and logs in the control room, is audible. That is your reactor trip alarm and that is audible.

COMMISSIONER GILINSKY: Were there other alarms on at that time or enunciators? I suppose we can hear from the licensee.

CHAIRMAN PALLADINO: Well, if we are going to hear from the licensee we ought to move on.

MR. EISENHUT: That was meant to help clarify the previous question.

COMMISSIONER AHEARNE: If you are going to get into the corrective actions, I wonder if you could make one comment. In looking ahead and looking at what you have labeled back-up slides and your statistics, it seemed that you have had 21 Westinghouse scram breaker failures since 1973, but I think what you just said is that there are four here. Is that 4 out of 21?

MR. MATTSON: You are looking at this slide way in the back.

COMMISSIONER AHEARNE: Yes.

MR. MATTSON: One of the things we would have said if we had introduced this slide rather than you reading ahead ---

(Laughter.)

MR. MATTSON: --- is the following. This comes from LER data, and LER information, as you know, requires some follow-up. This has not been followed up yet. This is raw analysis of LER. This is something we put together actually in advance of this event last November for the ATWS rulemaking. People wanted to know what does the recent LER data show.

We updated it yesterday and in the 21 Westinghouse events there are six counted for Salem, one

in August, one in January and four from the two doubles in February. Now that may not be a fair count and I recognize that.

COMMISSIONER AHEARNE: So it is six out of 21.

MR. MATTSON: Six of the 21 are Salem, that is right.

COMMISSIONER AHEARNE: So I imagine one of the things you are looking at is why Salem.

MR. MATTSON: I guess I should have said the words I left out. Two times two, the doubling of that count for February is very crucial, this point about should it have been detected on the 22nd, and had it been detected on the 22nd it wouldn't have been two times two.

COMMISSIONER AHEARNE: Then it would only have been what, four out of 19?

MR. MATTSON: Yes.

COMMISSIONER AHEARNE: Four out of 19 is still ---

MR. MATTSON: I don't know, it is kind of interrupting the flow, but of the 35 failures that you are seeing on that page, those 35 failures have occurred at ten plants, not 35 plants, and really at seven sites. I count here one other sites with four failures, Zion. Oconee Unit 1 had four failures and Oconee Unit 3

had three failures. So there are 7 for the Oconee units alone.

COMMISSIONER AHEARNE: I am not sure whether that means we shouldn't therefore look hard at Salem as well as the others.

MR. MATTSON: It tends to point to maintenance which we are attributing here as the cause as something that could be systemic.

COMMISSIONER AHEARNE: Yes, and it might lead one to look more closely at a few of those other plants to understand what they aren't doing.

CHAIRMAN PALLADINO: Also, the nature of the maintenance is very important.

MR. CASE: Indeed.

CHAIRMAN PALLADINO: I know in the Army we never seemed to have trouble with our tank transporters until we did preventive maintenance, and almost every one of them gave us trouble after preventive maintenance because they didn't do it right..

(Laughter.)

CHAIRMAN PALLADINO: Well, why don't you go on.

MR. LAINAS: I am going to go through the corrective actions and I will try to go very quickly.

COMMISSIONER GILINSKY: I wonder if you could go back over the event. I think as a practical matter,

we are not going to be able to have our other meeting this morning.

CHAIRMAN PALLADINO: Well, I was hoping we still could.

COMMISSIONER GILINSKY: Well, I think we have a good bit to cover on this one.

COMMISSIONER AHEARNE: It looks like it.

COMMISSIONER GILINSKY: I just don't think we are going to get to the other one and this seems to me more urgent than the other one.

CHAIRMAN PALLADINO: Well, I think it is important for us to understand it.

What is the Commission pleasure, to keep on going on this?

COMMISSIONER ASSELSTINE: Yes.

COMMISSIONER AHEARNE: (Nodding affirmatively.)

COMMISSIONER ROBERTS: (Nodding affirmatively.)

CHAIRMAN PALLADINO: All right, let's keep on going.

COMMISSIONER GILINSKY: I wonder if you could just run through the events briefly on February 25, Rich.

MR. STAROSTECKI: The February 25th event is a lot easier to explain.

If I could have the slide for the sequence of events for February 25.

On February 25th, again the feedwater control system is in manual control during a power ascension of Unit 1. They encounter problems with the feedwater control. The protection system senses a low-low water level in No. 12 steam generator. The reactor trip signal is generated by the reactor protection system, what we refer to as SSPS, the solid state protection system, and is indicated in the control room. So the control room has gotten an alarm saying reactor trip. An enunciator goes off and the status board indicates a low-low bistable trip and that is all.

Plant parameters are not consistent with the scram. The other enunciators normally associated with a scram do not come in. The rod bottom lights do not come on. The nuclear instrumentation does not decrease. You do not get a negative start-up rate trip alarm. You don't see the indications in the secondary plant as to a reactor scram, specifically the turbine doesn't trip and you are still tied to the grid.

In about 25 to 30 seconds the operators in the control room scan their boards, satisfy themselves that the situation they have involves a reactor scram with no trip and they manually call for a scram with a scram switch.

COMMISSIONER GILINSKY: Now why do you say

approximately. Is there no record of that?

MR. STAROSTECKI: No. It is simply simplifying for the viewgraph it is approximate. When you go to the computer printout we will count the number of cycles, divide by 60 and we will know exactly how much.

COMMISSIONER GILINSKY: Okay.

MR. STAROSTECKI: But it is an approximate time order. It is something less than 30 second.

COMMISSIONER AHEARNE: I realize it is very preliminary and perhaps that is the right answer, but it seems somewhat anomalous that in the first case on the 22nd you have a situation where the operator reactor so quickly that it was hard to tell whether the operator beat the automatic scram or not. In this particular case, the automatic scram goes on and 30 seconds go by before the operator scrams. Would you say that 30 seconds is about the time you would expect the operator to take?

MR. STAROSTECKI: I think that is something we are going to have to study a little bit more, but I would also caution you that the feedwater control system is a complicated operation in manual. The shift supervisors and the individuals involved, I think you have to look at their training and their backgrounds as

to the decisions they made.

On the 22nd I believe that the shift supervisor gave the order to trip the plant manually. On the 25th he apparently did not and they were scanning the boards to satisfy themselves.

I would say in very preliminary sense it is judgment as to the rate at which, or the speed with which the steam generator level drops. If in this case they thought they were going to catch it and were trying to catch it and didn't, then they would have to satisfy themselves of what did we do wrong, what else is going on.

COMMISSIONER AHEARNE: I guess what I am asking is that in the first case you were talking about the operator trying to judge whether or not they were going to catch the steam generator and concluding that they probably couldn't and so they manually tripped it. There it was a judgment not that the plant had automatically called for a scram, but it was a judgment that it probably made sense to scram it.

In this case the automatic system had called for a scram, and you are saying that rather than scramming the plant they were then, it sounds like, trying to consider whether or not it had scrammed or whether or not they should manually scram it.

MR. STAROSTECKI: Well, let me say there are a couple of things to clarify. On the 22nd there were other complications, specifically those associated with the transfer of electrical buses. When you look at other factors like that and looking at the judgment of the operator with respect to the rate at which his level is dropping, I distinguish between that and the 25th. It was not as hectic and they did not have the electrical problems.

CHAIRMAN PALLADINO: On the 25th that is why they did the waiting.

MR. STAROSTECKI: That is a gray area in the fact that it is not a standard practice to manually scram the plant every time the protection system calls for a scram. On the 25th the operators consciously scanned the boards to understand the situation they were deal with and then initiated their procedure and the first thing that was called for was a manual scram. I think we are going to have to get some people get some insight as to is 30 seconds a reasonable time. The licensee has indicated his preliminary findings that he finds that very reasonable.

COMMISSIONER GILINSKY: Let me ask you again about the February 22nd event. Let's accept the operators' thoughts that they may have themselves

scrammed the reactor. Was there any doubt about this? In other words, where there any suspicions that it might have been otherwise, because it would seem to me that even if you thought you had scrammed it but thought perhaps not that is something that you would really want to look at very hard.

MR. CASE: You mean at Salem?

COMMISSIONER GILINSKY: Yes.

MR. EISENHUT: I don't think we know of any suspicions, but I think one of the things we will be addressing, if we get to the second part, generic aspects, one of the things we are doing is, and Bill Dircks signed a memo out yesterday and the Region will be doing an evaluation of the facts surrounding the situation by March the 9th, but one of the things we are certainly asking for is any information and data relating to what the operators were doing, what the operators' evaluations were, operator response times and information that was available to the operator during the event. Those are really inputs. That is factual information of what occurred at the site.

I just think it is premature at this point, but we don't have any, certainly I have never heard of any information. In fact, every indication I had and ever heard is that up until Saturday when people were

actually at the plant looking at the details, everyone believed that the plant had essentially simultaneously and was manually scrammed.

COMMISSIONER GILINSKY: Before you get into corrective actions, you said earlier something about the plant not receiving the Westinghouse bulletin on maintenance and you were going to go into that. I don't see that in any of the following slides.

CHAIRMAN PALLADINO: The fact that Salem didn't get the, what was it, the 1974 memo?

MR. CASE: There has been action taken to make sure that they have it.

COMMISSIONER GILINSKY: Can you just tell us what the problem was before we get into the solution.

MR. CASE: The problem is that they didn't have it.

CHAIRMAN PALLADINO: Are you going to start on the corrective actions?

MR. EISENHUT: Yes.

CHAIRMAN PALLADINO: I wonder if I could just interrupt for housekeeping purposes. I propose we take a break soon, in fact in about one minute.

(Laughter.)

CHAIRMAN PALLADINO: Also, could I get an idea of what more you have for presentation. You are going

to through the corrective actions. Are you going through the backup slides?

MR. EISENHUT: We figure the corrective actions we could probably be through with in 10 minutes. Then we would turn to the generic aspects and we would turn to I&E to summarize what the bulletin is and what are the preliminary results that we have been getting in. Ed Jordan is here.

Ed, how long do you think?

MR. JORDAN: Five minutes.

CHAIRMAN PALLADINO: I want to make sure we have some time for the licensee.

MR. EISENHUT: Then we could summarize the generic direction we are heading and what we have set up and the mechanisms we have got in very sort order. So we could probably be done certainly in a half an hour.

COMMISSIONER GILINSKY: I guess I would also like to hear what sort of restrictions the plant is under right now and will continue to be.

CHAIRMAN PALLADINO: The status of it.

COMMISSIONER GILINSKY: Yes.

CHAIRMAN PALLADINO: Well, I am going to suggest we take a seven or eight minute break and then come back.

(Whereupon, a recess was taken from 11:05

a.m., to 11:20.)

CHAIRMAN PALLADINO: Well, I wonder if we could resume the discussion, and I gather you had raised a question on receipt of the '74 memo.

MR. LAINAS: I will try to. The NSD 74-02 were the directions that went out that were supposed to be applied to the breakers. They recommended some maintenance procedures, lubrication procedures and period preventive maintenance type of procedures. That is the second item, 74-02, NSD 74-02.

I might point out that the slide I have there up on the screen for corrective actions was based on the meeting that we had last Monday with the licensee. This has since been supplemented by a letter dated March 1st, which has been made available to the Commission.

CHAIRMAN PALLADINO: Is it attached hereto?

MR. LAINAS: It was a separate attachment and there are additional copies in the back if they haven't been passed out.

Trying to paraphrase some of the things that the licensee is recommending, the first item of course is to verify that the surveillance testing meets the current tech spec requirements.

The second, that the maintenance procedures ---

COMMISSIONER GILINSKY: Let's see, was that

all you were going to say about that '74 memo?

MR. LAINAS: About the 74-02?

MR. CASE: There is not much more we can say. The fact is the licensee said it was never sent and he does not have the procedures.

COMMISSIONER AHEARNE: You mean the licensee said it was never received. That does not say it was never sent.

MR. LAINAS: Right, it was never received.

COMMISSIONER GILINSKY: Did Westinghouse ever send it, or we don't know?

MR. CASE: We don't know.

MR. LAINAS: As you will see later on, Westinghouse is developing an interagency task force to make sure that all licensees are upiated on the current maintenance procedures.

COMMISSIONER GILINSKY: And there is just nothing that brings something like this to the surface over a period of ten years that a maintenance bulletin on a fairly important piece of equipment just hasn't been received?

MR. EISENHUT: Well, I guess to put it in perspective, there was a 1971 technical manual relating to the equipment, and then there was a January 1974 technical bulletin or a technical letter ---

MR. LAINAS: Technical bulletin.

MR. EISENHUT: --- technical bulletin from Westinghouse. Then there was a February 1974 bulletin which clarified or modified the January '74 bulletin. So there were those three basic documents. It is my understanding that the 1974 02 latest guidance just physically wasn't received and it relates to the maintenance and lubrication of the device.

MR. CASE: I feel part of the underlying problem is likely a lapse of implementation of quality assurance requirements that should be applied to the safety related piece of equipment.

COMMISSIONER AHEARNE: I recognize that it is nine years ago that the bulletin was issued. At that time was there a recognition this was safety related or safety grade, whatever terminology was used at that time?

MR. CASE: My understanding is that the FSAR so states.

COMMISSIONER GILINSKY: How could it not be? It is a good question still.

MR. EISENHUT: You will see when we get to the issues that the first item on our issue list we need to resolve is the safety classification of the breaker on this plant.

COMMISSIONER AHEARNE: I am looking not so much at Salem, but I am looking at Westinghouse. This item that Westinghouse says is a verbatim transcription of the Westinghouse letter talks about saying that a technical bulletin issued in January of '74 described a reactor trip breaker malfunction at the Robinson station and then it goes on to talk about various maintenance procedures.

What I guess I am asking is did Westinghouse

have a system which said here is something that is a safety grade item and so this went out in a distribution with some kind of priority attached to it or at least separate handling or was it just one of many thing sent out by a large commercial division?

MR. EISENHUT: I don't think we know today and that is one of the items that we are exploring generically, too, as a result of the bulletin which we will ge to in a moment.

COMMISSIONER GILINSKY: When did the plant start operating?

MR. EISENHUT: I thought the about the time frame of '74.

MR. STAROSTECKI: Unit 2 was in commercial operation about a year and a half ago. Unit 1 was in '76.

MR. EISENHUT: I was told '76 was the year for Unit 1.

COMMISSIONER AHEARNE: So actually this would have come out before that plant went into operation.

MR. STAROSTECKI: Yes.

CHAIRMAN PALLADINO: I do think it is an issue that ought to be examined and gone into in detail. I gather you are finding that.

MR. LAINAS: It might be worthy to note that

when the breakers or the undervoltage coil was worked on last January that there was a Westinghouse representative on site at that time that supervised that kind of work.

MR. CASE: That was a representative of Westinghouse Commercial as distinguished from Westinghouse Nuclear.

CHAIRMAN PALLADINO: Do I understand that there is a contract for maintenance of this equipment with Westinghouse Commercial?

MR. CASE: I don't know whether there is a contract.

MR. STAROSTECKI: Salem procured the services of Westinghouse to send a representative to give them guidance and direction in the overhaul of the breakers. As a result of the August 20th event, they called in Westinghouse for assistance. The work itself was done by Public Service at the supervision of the Westinghouse representative.

COMMISSIONER GILINSKY: Did Westinghouse not check the procedures?

MR. CASE: Apparently not. This was a Westinghouse Commercial representative and not Westinghouse Nuclear.

COMMISSIONER AHEARNE: Why did Salem contract

not with Westinghouse Nuclear?

MR. CASE: I can only guess. They were implementing a non-safety grade.

COMMISSIONER AHEARNE: That is what it sounded like.

MR. EISENHUT: In fact, on Monday it was stated by Public Service that these devices, the relays here, are commercial off-the-shelf items, that they acquire them as commercial off the shelf and then they look at them and decide what is needed to have to give them the proper pedigree.

Recently, starting with about the January occurrence, they are now getting certificates of conformance, or sometime in the very recent past.

MR. CASE: It was after this incident that they have written procedures.

MR. EISENHUT: But it was clearly stated that it was considered a commercial off-the-shelf component.

COMMISSIONER AHEARNE: From I&E's view is there anything inconsistent with safety grade and commercial off-the-shelf items?

MR. EISENHUT: Yes. Not necessarily if it is commercial off the shelf by itself, but if it comes as commercial pieces of equipment certain features would be required before it could be used in any safety related

application. So then you look and see whether those steps were done and we believe they were not.

COMMISSIONER AHEARNE: Do you know whether the Westinghouse Commercial people were familiar with this Westinghouse Nuclear Service Division report?

MR. EISENHUT: I have no way of knowing that today.

MR. JORDAN: They advised us during the meeting that they did not use the 1974 chart.

CHAIRMAN PALLADINO: They did not?

MR. JORDAN: They did not, yes.

MR. CASE: The person at the site was not necessarily Westinghouse Commercial.

CHAIRMAN PALLADINO: But he did not use the guidance provided in '74?

MR. EISENHUT: That one individual at the site.

CHAIRMAN PALLADINO: He was the one that was sent.

MR. EISENHUT: That is correct.

CHAIRMAN PALLADINO: So presumably he knew what the right thing was that should be done. What did he use if he didn't use this 74 bulletin?

MR. STAROSTECKI: We don't know what they in fact used. We can only go by the evidence. For example, the kind of solvent and lubricant they used is

not the kind called for in the '74 bulletin. Based on that you would have to say he was not knowledgeable of the '74 bulletin.

CHAIRMAN PALLADINO: Is this one of the issues under consideration?

MR. STAROSTECKI: Yes.

COMMISSIONER GILINSKY: Didn't somebody somewhere along the way say that my God this is part of the reactor protection system and this has got to be safety grade? That is what surprises me.

MR. STAROSTECKI: That is one of the issues we have in the utility as to how that information is captured in their system, and I think when we get to the issues page that is where we have some leg work in front of us in terms of finding out how it got to this situation.

CHAIRMAN PALLADINO: Let me suggest that we go through the corrective actions and the issues. If there is more you can pick it up later, because we won't even get through these by noon.

MR. EISENHUT: Well, the important distinction on this that we need to make is these corrective actions are the corrective actions as proposed by the licensee. So we don't leave the wrong impression, the staff has a number of issues and a number of questions before us,

and those are these plus the issues page.

CHAIRMAN PALLADINO: Do you want to go to the issues then?

MR. EISENHUT: I think we can go through these briefly.

MR. LAINAS: I will go through very quickly.

Three is they are going to install new undervoltage attachments and it will be under Westinghouse guidance using the latest procedures and I believe it is the Nuclear Services Division that is doing it.

As far as four is concerned, the question of verification, is what they are putting in now adequate, and that program is being developed by the licensee.

MR. CASE: The testing program.

MR. LAINAS: Whatever it is, including maybe a statistical analysis of some sort.

The fifth item, Westinghouse will make sure that the original safety classification requirements are met for that component.

Six is important in that the licensee has recommended increased surveillance on the testing of the undervoltage relay. As I mentioned earlier, currently it is every two months and how it will be every month.

Seven is a procedural type of change which

will require the operator to actuate the manual trip at any time he gets an indication of an automatic trip, which is exactly the situation that occurred in the past four events.

COMMISSIONER ROBERTS: When is what they did.

MR. CASE: Which is what they did, but this will be an automatic procedure, as I understand and I haven't seen the procedure, rather than using other instrumentation. Once he gets an indication of automatic trip to confirm it by hitting the scram button.

CHAIRMAN PALLADINO: Does that imply immediately?

MR. CASE: Yes.

MR. LAINAS: The eighth item is to develop a formalized post-trip procedure. Considering the length of time it took to identify the February 22nd problem, he is going to institute a procedure.

COMMISSIONER GILINSKY: Is there no procedure now?

MR. STAROSTECKI: It is not a formalized procedure.

COMMISSIONER GILINSKY: The tech specs don't require any specific items to be looked at? Are they required to look at the events sequence?

MR. STAROSTECKI: Right now there is no formal

requirement.

COMMISSIONER GILINSKY: Did they look at the events sequence after the February 22nd event?

MR. STAROSTECKI: Based on the information I have, they looked at the computer printout.

MR. EISENHUT: I think the matter of degree and the depth of the review ---

COMMISSIONER GILINSKY: Well, let's see, if they looked at the events sequence, why did they not pick up the fact that it was the manual scram that scrammed the reactor?

MR. STAROSTECKI: One would have to be aware of the time interval necessary between the initiation of the trip signal and the breaker opening to recognize that.

COMMISSIONER GILINSKY: Wait a minute. They looked at the number of cycles and so on.

MR. STAROSTECKI: Well, we are still looking at that, but it is obvious that they were not aware of the number of cycles that should have tripped it. Their evaluation was based on the fact that it was protection system logic that initiated the trip first and they did not count cycles and they did not make the evaluation as to when the reactor tripped with respect to the receipt of a trip signal.

MR. EISENHUT: That is what we were told. I think in summary that any post-trip review that was done was inadequate because it didn't pick it up. That is where we are.

COMMISSIONER GILINSKY: I guess what I am not clear on is whether they did not want to take the cycles that it took to go from one point to the next in the sequence.

CHAIRMAN PALLADINO: One thing I don't think we should try to do is speculate on what happened. I think the staff is in the process of trying to develop the information and I think we have pressed this point as far as we should.

COMMISSIONER ROBERTS: But I don't think it is a fair characterization to say that it was inadequate as of February 25th.

MR. EISENHUT: As of Monday, the utility stated in a meeting that the review process they had for post-trip review was not adequate to pick up the problem and they were "developing a formalized post-trip review procedure." I am just trying to characterize that this is as they proposed in a meeting.

COMMISSIONER GILINSKY: Let me just understand. When they did their post-trip review, were they aware that there were several seconds between ---

MR. EISENHUT: The detals of that we certainly don't know until we go back and do a detailed evaluation, unless, Rich, you may know now.

MR. STAROSTECKI: We are in the process of interviewing the people who were involved.

CHAIRMAN PALLADINO: All right. Why don't we go on then.

MR. LAINAS: All those items are committed to be done by the licensee prior to start-up.

COMMISSIONER ROBERTS: Are these different in any way from the March 1st letter?

MR. LAINAS: There was one additional item on the March 1st letter which talked about test after maintenance procedures to make sure that when equipment is maintained that it is tested.

There was also in the March 1st letter that a traceability program for the breakers will be done, and they said that would be done by April 1st.

So those were two differences from what we had on Monday.

Nineth is that Public Service will get a compilation of all technical bulletins and manuals pertaining to Westinghouse equipment at Salem.

Tenth is really a Westinghouse item. They are conducting an internal review of their procedures for

dissemination of technical information to utilities.

Eleven is a review is in progress at Salem for past equipment failures as documented in LER's and deficiency reports. Their letter indicated that that would be completed by January 1st, '84.

Going on to the issues, I guess the first ---

COMMISSIONER GILINSKY: These are the issues as you see them?

MR. LAINAS: The issues as we see them, not indicating that they are resolved or anything, but the issues as we see them.

MR. CASE: The licensee's proposals go to some of them to a degree. The question is should it be more or should there be suggested changes and things like that, and that is what they are in the process of doing.

MR. LAINAS: The first is the safety classification of the breakers that we had a number of discussions here on, the pedigree and degree and how the licensee treated the breakers. So that is obviously an issue at this stage of the game.

CHAIRMAN PALLADINO: I want to ask you one question.

MR. LAINAS: Sure.

CHAIRMAN PALLADINO: You are identifying these issues. I presume you will tell us as you go what is

being done about them or are you developing a plan to do something about each one of them?

MR. CASE: These are issues that we are going to look into.

MR. LAINAS: The second one is the identification of the cause of the failure. The licensee attributes the cause of the failure to be a lack of lubrication and maintenance on the breakers at specified intervals and previous Westinghouse experience he quotes as indicating that the reason for the failure was indeed the maintenance procedures that were followed. Of course, this has to be agreed to that indeed this is the cause.

The third item is verification testing. The licensee proposes to come up with a program to say yes, indeed, they fixed the problem, whatever it is. I might add at this time that we also have under consideration to do some independent type of testing of these breakers.

MR. CASE: To determine the cause of failure.

MR. LAINAS: To determine the cause and whether they are fixed or not.

The next item is revised surveillance and maintenance procedures. As far as surveillance is concerned, is indeed the increased frequency of testing the undervoltage adequate, and checking their

maintenance procedures to ensure that they are not falling into the same trap that they fell before of not updating their maintenance.

The next is operating procedures. The first is the adequacy of the automatic/manual scram procedure that the licensee is proposing to do, whether his emergency procedures that he used for following the event indeed were the ones to be followed and that he did do it correctly.

As far as operator response is concerned, it was indicated that it took about 25 seconds for the operator to react to the February 25th event, and was this indeed adequate and is that the kind of thing that should be expected.

MR. CASE: And were the operators' actions on February 22nd adequate or not.

MR. LAINAS: I might also add another thing that we are looking at here is if there were more operators in the control room at that time than there would normally be. So the question is what is the interface between those and did they have better coverage at that time. So that is another one to be looked at.

I listed a bunch of them under management issues, specifically the procedures for the post-trip

reviews ---

COMMISSIONER GILINSKY: Let me ask you, are there not uniform post-trip review procedures throughout the industry? Do we not have uniform requirements?

MR. CASE: I don't know of any requirements that we have. I may be wrong on that.

CHAIRMAN PALLADINO: By post-trip reviews, are you talking about any time you have a trip you are going to have a post-trip review?

COMMISSIONER GILINSKY: Aren't you required to identify the cause of it?

MR. EISENHUT: They are required to first submit the LER with the information. They are also required to have a procedure, a special procedure for feedback of operating experience, I think it is called.

MR. CASE: What we are talking about here is review of what caused the previous scram and make sure you understand that before you go.

COMMISSIONER GILINSKY: Is it different for each reactor?

MR. CASE: I think it is. There is a general requirement to do such a procedure, but the details I am almost positive vary from plant to plant.

MR. EISENHUT: Oh, I am sure the details do.

CHAIRMAN PALLADINO: Are these procedures that

we call for and the licensee develops?

MR. CASE: Yes.

CHAIRMAN PALLADINO: So they would probably be different.

COMMISSIONER GILINSKY: Well, the specific details perhaps, but aren't there basic things that we require just as we do on an LER in general?

CHAIRMAN PALLADINO: There are procedures for getting there, but making the review presumably would be different.

MR. CASE: For instance, do we always require that the computer be looked at, and I don't believe we do. We look at what the licensee's procedures are and determine whether through I&E's and the Region's sample inspection is it adequate, but they don't look at all their procedures.

COMMISSIONER GILINSKY: Do they have any procedures for propsed trip reviews?

MR. STAROSTECKI: I don't know. The information I had is that they have a chain of people to review the decision to start a unit after a trip. I do not know what, if any kind, of procedure they have for making that happen.

CHAIRMAN PALLADINO: On the review of these issues, is there some timetable by which you hope to

look at all of these?

MR. CASE: We would look at all of them and decide if it is an acceptable program before start-up. Now some of the implementation may extend beyond start-up.

CHAIRMAN PALLADINO: No, I meant when might we get some feedback on some of these are what you are planning to do on these?

MR. CASE: We will be reviewing them in the next few days.

COMMISSIONER GILINSKY: I guess I hope you will inform the Commission before letting the plant go back up about how these things have been resolved. I would certainly like to hear about it.

CHAIRMAN PALLADINO: You want information. Are you suggesting that there be Commission approval?

COMMISSIONER GILINSKY: Well, I am not suggesting Commission approval, but I certainly, as in other cases, would like to be informed on a time scale consistent with reacting to what we hear.

CHAIRMAN PALLADINO: Well, that relates to my question of when might we get some feedback on these items.

MR. EISENHUT: I think the best indication is as Mr. Case said, in the next few days.

CHAIRMAN PALLADINO: All right. Why don't you let us know after you have got a better feel for the answer.

COMMISSIONER GILINSKY: Would you not want to hear that, Joe?

CHAIRMAN PALLADINO: No, I do. I would like to hear it. That is why I was asking when we were going to hear about this, but I didn't want to imply ---

MR. CASE: He wants a better schedule of when we would be ready.

CHAIRMAN PALLADINO: I personally did not want to imply that they have to come back to us for approval, but I would like to have information on this before they start up. I don't know how the others feel. I would like to at least get an indication of what is going on on this items because I don't think we will have them all settled.

MR. STAROSTECKI: I would just like to add that on some of these items, like the mangement issues, we need to sit down and tell the licensee what we specifically are going to require. The schedules are somewhat going to be dictated by how soon the licensee can respond.

We obviously have a concern when we look at all these events that there have been a number of

mistakes made by various people at various levels with respect to QA. So there is a concern as to how that organization treated this piece of equipment this way and what needs to be done to prevent that from happening again. That is a broad subject of mangement issue, the timing of it.

CHAIRMAN PALLADINO: I don't expect that you will have told us everything that is going to take place, but at least plan you have on the items where you have not reached a resolution.

COMMISSIONER GILINSKY: I think we ought to get a full briefing before this plant goes back into operation. There are some very serious things that have happened here and I think the Commission ought to be clear on how these problems have been resolved to the satisfaction of the staff before this plant goes back into operation. I can't imagine us not doing that.

CHAIRMAN PALLADINO: I am also concerned about the generic implications of this whole incident.

COMMISSIONER GILINSKY: Well, that is another matter we will want to hearing about.

COMMISSIONER AHEARNE: In your list of issues you have perhaps embedded in here somewhere where I can't quite see it a question of safety classification of equipment.

MR. LAINAS: In general.

COMMISSIONER AHEARNE: Yes, at Salem, in the sense that it appears that if there is a question did they lable this correctly, then doesn't that also then bring into the question have they mislabled other things?

MR. STAROSTECKI: That is the intent for putting quality assurance under mangement issues. That is going to require looking at all equipment.

COMMISSIONER AHEARNE: I would have I guess not necessarily put under quality assurance the question of the classification, but if that is where it is.

MR. STAROSTECKI: Looking at classification is one step, because it is obviously affected by things you have to do in accordance with quality assurance.

COMMISSIONER AHEARNE: Yes, but I would have felt that quality assurance, having classified it correctly now and then putting in the procedures to correctly maintain safety grade equipment, then quality assurance is the program to make sure that you have got maintenance done correctly. As long as somewhere you are going to be looking at whether or not there are other pieces of equipment that they ---

MR. STAROSTECKI: Yes, are going to make sure that the two are married.

COMMISSIONER GILINSKY: Let's see, are we

agreed that we will informed about the resolution of these problems before the plant goes back into operation?

CHAIRMAN PALLADINO: Well, others haven't spoken. My feeling is we ought to have a report or a briefing or perhaps both on where we stand on these before we start up. I don't know how others feel.

COMMISSIONER ASSELSTINE: I would agree with that.

CHAIRMAN PALLADINO: And what we do after that will depend on what we get.

COMMISSIONER ROBERTS: I am not sure that at this point you can say that all these issues are going to be resolved with finality before it might be ---

CHAIRMAN PALLADINO: I said the status and I did indicate earlier that not all of these will be presumably done before restart.

COMMISSIONER GILINSKY: Well, you may not have completed the various actions, but you have to have reasonable confidence that the plant will be operated properly and that is what I think we want to hear about.

COMMISSIONER AHEARNE: That is obvious.

COMMISSIONER ROBERTS: Nobody is going to disagree with that.

CHAIRMAN PALLADINO: I sense we have agreement that we will receive a briefing or a report or perhaps

both from the staff on the status and progress of the items listed as issues prior to restart.

MR. CASE: There may be others added, too, and I am sure you don't preclude those.

COMMISSIONER GILINSKY: Not at all.

CHAIRMAN PALLADINO: Okay, do you want to continue.

MR. EISENHUT: That basically concluded where we were on Salem specifically. We have a summary of two other aspects of where we are generically. I&E, Mr. Ed Jordan is going to be summarizing what we issued in the form of a bulletin last Friday and the preliminary results. Following that we will have some generic implications of where we are going in a broader scheme.

Ed.

MR. JORDAN: Could I have the bulletin slide.

There was a decision on the morning of February 25th by I&E and NRR management that a bulletin was warranted on this issue. We did ascertain there had been an earlier bulletin in 1971 which was I think probably the second bulletin issued on the same issue. We had established that there was a Westinghouse technical bulletin. This is the NSD 74-02 that had been issued on this same matter.

In communicating the generic problem we tried

to communicate it as widely as possible. So we did advise INPO of the problem and INPO put it out on their note pad Friday morning.

We also advised the Regional Administrators ---

COMMISSIONER GILINSKY: Let's see, Friday morning?

COMMISSIONER ROBERTS: Friday morning?

MR. JORDAN: Friday about noon we advised INPO of the event and then they put it out on their note pad. I don't know what time they got it out, but we advised them Friday morning of the event.

COMMISSIONER GILINSKY: But not of the bulletin.

MR. JORDAN: That is corect. So that they were providing a generic notification that there is a problem with this particular relay undervoltage trip system.

We advised then the Regional Administrators and asked them to contact the resident inspectors in each of their regions advising them to further notify the licensees and indicate that a generic action, a bulletin was forthcoming. Subsequently we requested the regions to survey the plants the ascertain which plants had this particular Westinghouse bulletin with the undervoltage trip attachment.

The bulletin was prepared and in the preparation of it there was an attempt to be as sharply focused as practical with the best information we had available at the time so that there are actually three actions.

The first action is to request the utilities to test the undervoltage trip function and the time frame within which the test was requested was 24 hours if a test had not been performed within five days. This is of the undervoltage trip attachment. The normal surveillance we understood at that point was about 30 days for the family plants that we knew had these breakers.

The second item was to review the maintenance program and to assure that that particular plant had conformed to the Westinghouse 1974 NSP or a suitable alternate. It is worth stating that at this point we couldn't establish with finality that the 1974 bulletin from Westinghouse was their most current indication.

MR. CASE: That is as of last Friday.

MR. JORDAN: That is correct, as of ---

COMMISSIONER AHEARNE: How did you determine that it was an appropriate bulletin?

MR. JORDAN: We had contacted Westinghouse in fact the previous day on the same issue based on the

earlier failure at Salem and we had run to the point of knowing that that was apparently the most current. We were trying to verify that it definitely was the most current.

COMMISSIONER AHEARNE: Let's see, you had contacted Westinghouse Nuclear and asked them whether they had maintenance procedures?

MR. JORDAN: We already had in hand the 1974 maintenance procedure and we were trying to establish if that was indeed the most current maintenance procedure and that it had not been superseded by something subsequent.

COMMISSIONER AHEARNE: That was something that you had had in your files in I&E?

MR. JORDAN: Yes.

COMMISSIONER AHEARNE: So your question to Westinghouse Nuclear was whether or not they had superseded that with another ---

MR. JORDAN: That is correct.

COMMISSIONER AHEARNE: And they were unable to tell you?

MR. JORDAN: With finality they were unable to tell us.

MR. CASE: They had to go back to the Westinghouse Switchgear Division because what they do is

to get Switchgear's recommendations and more or less endorse them and sent them out to the nuclear plants.

COMMISSIONER AHEARNE: And they had no filing system of their own to tell what they had sent out on that?

MR. CASE: Well, at least the people we were talking to on Friday afternoon.

MR. JORDAN: So that is the reason for the stated "or alternate maintenance procedure." Perhaps there was a better one based on our knowledge at that time of issuance.

The last one was to notify ---

COMMISSIONER AHEARNE: Let me ask this. What you have told the licensees is to conform to this particular maintenance procedure.

MR. JORDAN: Or an alternate, or an equivalent alternate. So that we left the open door if there was a procedure that the utility felt was better.

I should make it clear that these are requested items. They are not ordered items.

MR. CASE: I should also make it clear that Westinghouse has confirmed that this is the latest bulletin.

MR. JORDAN: Yes, subsequently that has been confirmed.

Then the last action was for the utilities to each notify all of their licensed operators of this particular event and to review with them when they came on ship their own emergency procedures for a failure to trip event.

We do require a report within seven days of receipt of the bulletin. The bulletin was also sent to boiling water reactors and reactors under construction for information purposes and all of the PWRs for action.

Could I have the next slide, please.

CHAIRMAN PALLADINO: What was the rationale on the 24 hours being the time limit for the test?

MR. JORDAN: We felt that there was an immediate health and safety concern and that we wanted verification that there was not in existence across this family of plants an inability to trip in an automatic mode with the undervoltage trip circuit. So that was a time frame within which the utilities should be able to perform their routine surveillance, and if they had not done it within a relatively short time, which we selected as five days ---

CHAIRMAN PALLADINO: That was what was giving me a little problem. You said if you hadn't done it in five days do it in the next 24 hours, the reason being it was a weekend and I don't know how these utilities

work, but if they are somewhat like other organizations they may have key people off and it takes time to plan such an operation. If you are allowing five days since the last test, it would have seemed that you could have allowed between 48 and 72 hours to give them a chance to schedule ---

MR. JORDAN: That was clearly a judgment call, Mr. Chairman, and it was the staff's judgment that the significance of this matter warranted that kind of timely response.

MR. SNIEZEK: I would like to add something. It was our understanding that the normal tech spec surveillance was about 30 days on these breakers. Even if Salem had been doing their surveillance, we found their breakers failed. So we didn't want to allow, you know, within the past 30 days. We we said if you haven't done it within five days, a judgment call, do it promptly within 24 hours. We didn't want to sit around waiting.

These procedures, the normal surveillance procedures, people are already trained in them. So it is not a lack of preparation that you do have to go through. It is a procedure that would be done periodically as part of normal surveillance. We didn't see it as having to develop new procedures, get

approvals or any of those types of processes.

CHAIRMAN PALLADINO: Well, it just seemed that you might have had a little more time than 24 hours on the weekend. Okay, you have given me your rationale.

COMMISSIONER GILINSKY: Well, in any case, their collective view was that the matter was urgent and they had the direct responsibility.

MR. JORDAN: The survey, and this is preliminary ---

MR. CASE: Let me just add to that. It is fair to say that the people who at least work for us questioned the 24 hours. So we collectively reviewed it and decided that we felt that was the correct period of time. It wasn't just something that passed through without consideration.

CHAIRMAN PALLADINO: I was interested in what the thinking was.

MR. JORDAN: These are preliminary results of the regional surveys by the inspectors that all of the Westinghouse operating plants, except Farley, McGuire and Summer do use the DB breaker with the undervoltage trip attachment. Based on that survey, none of the B&W, or EC plants use this type breaker with the undervoltage trip provisions. We had a less formal survey of the GE plants that were not addressed for action and there was

no identification of this type used in their circuit. Their circuit is significantly different and the staff was convinced in the reactor protective system in the scram function that it was not applied.

As a last item on this slide, we are considering other safety related applications of this type breaker with the undervoltage trip attachment, and that would be subject to other action. This would be on, for instance, turbine trip of plants.

CHAIRMAN PALLADINO: Are you sending out another bulletin to get that data?

MR. JORDAN: We have not anticipated which other action we will take, but there certainly will be subsequent actions based on what we have learned.

The next slide, please.

The test results from the bulletin. The utilities have performed the testing as requested in the meeting with the utilities and the Owners Group. On Monday the Owners Group stated agreement with the bulletin actions. They felt that those actions were appropriate for the problem as it was understood.

COMMISSIONER AHEARNE: This Owners Group are ownes of ---

MR. JORDAN: Westinghouse plants.

There were no failures found during the

testing period and there were not reactor trips that occurred as a result of the testing. Those plants that have not tested are shut down and they will do the testing before they resume operations.

COMMISSIONER ROBERTS: And everybody met the 24 hours?

MR. JORDAN: Yes, sir.

That is all I have.

MR. EISENHUT: Going on to the generic implication follow-up slide, there are several things we are going to be addressing and the industry is addressing on a broader perspective.

Gus, why don't you take that one.

MR. LAINAS: At the Monday meeting we had representatives of Westinghouse there plus representatives of the RRG, the Westinghouse Owners RRG.

MR. EISENHUT: Those are regulatory response groups that the industry has set up that we can call if we perceive there is a pending immediate safety concern or a question and they activate their group to address the issue.

MR. LAINAS: They each have since, both Westinghouse and the RRG have sent in a letter confirming what they told us last Monday.

Essentially item one is what Westinghouse

plans to do. Clearly there was a mix-up in the distribution of technical documents and they are establishing an intercompany task force of the various divisions to correct this problem.

Secondly, they are going to develop an evaluation and test program for the model DB-50 undervoltage coil.

Thirdly, they are developing procedures for independent testing of the undervoltage and shunt coil.

CHAIRMAN PALLADINO: I don't know what you mean by evaluation and testing program. Presumably they have got a lot of tests. What are they going to do different?

MR. LAINAS: I don't think we have the details on exactly what they are planning to do.

MR. CASE: Re-evaluate the adequacy of the design and the maintenance procedures.

MR. LAINAS: With respect to the last item as far as independent testing of the undervoltage and shunt coil, this testing capability is available at Salem but not in all plants.

Secondly, with respect to the Owners Group and RRG, they are getting a listing of all current Westinghouse technical data letters and they will distribute them to the various utilities.

They are evaluating the effectiveness of the manual scram following an automatic scram. This is what Salem is proposing to change their procedures to.

Review of the trip and ATWS emergency guidelines procedures. As indicated in their last letter, these guidelines have been reviewed and found to be adequate.

The adequacy of the standard tech spec, surveillance interval, test method and testing of the shunt coil is being looked into. The schedule for that as stated in their letter is June 30th.

And they plan to notify their members to conduct a review for similar type failures in other systems.

MR. EISENHUT: That sort of takes us up to where we are today.

The last three items there are we are presently in the process of setting up meetings with the CE, B&W and GE regulatory response groups. We will probably be having those meetings next week. It is a little more relaxed schedule, but it is the same thing of looking at and addressing the issues and seeing whether they have any of the same problems.

CHAIRMAN PALLADINO: Darrell, with regard to generic follow-up, are there any plans or do you see any

need to accelerate the rulemaking on ATWS?

MR. EISENHUT: Is I can hold that for one more item. That is my last bullet.

The fourth item is Bill Dircks sent out a memo dated February 28th, and a copy of his memo is attached in the back of the package. There will be a detailed event report developed by Region I by next Wednesday, March the 9th, and that report will address not just the system response, but will go into operator response, as we mentioned earlier, and information available to operators. It is a factual summary. It is comparable somewhat to the Ginna evaluation report that was done, albeit, although a shorter time frame.

The second item is NRR has been tasked with setting up a task force to review and evaluate the generic implications and to submit a report to the Commission by April 18th. That task force is presently being formed. It will be chaired by Roger Mattson and it will have representatives of the various other offices as well as the Region, AEOD, I&E, et cetera.

That group then would be the group that will be responsible for recommending any other prompt actions, such as another bulletin, a follow-up to the bulletin or a clarification of the bulletin, whatever. So it will be unfolding and aiming towards a report that

will be done to the Commission by April 18th. It is fair to characterize it that it bridges the gap between the immediate term where we issue the bulletin of last Friday and the longer term which is the ATWS position.

The fifth item here on the page is factoring the experience into our proposed ATWS position and ATWS rule.

Dennie Ross is here and I am sure can answer your questions.

COMMISSIONER GILINSKY: What does this do to all the calcuations?

MR. ROSS: It turns out we were about 95 percent complete with bringing back to the Commission a proposed rule on ATWS. The schedule was mentioned in SECY-82-275 last summer with the Commission. At that time we thought that we could digest the public comments on the three rules, the so-called Hendrie rule, the staff rule and the utility rule.

We decided to contract with Energy, Incorporated, to analyze some technical aspects of the utility rule. We formed two groups that would look much like the group that Darrell mentioned on the April 18th report, a steering group and a task force.

A draft rule was prepared last fall and discussed with CRGR. They had some questions on the

value impact. Written answers were prepared in December. There was CRGR discussion again in January. As of today we have a package which consists of a draft Commission paper, a report by the steering group and a draft proposed rule.

If Salem had not occurred, this would have been, we believe, finalized in CRGR last this month, there would have been ACRS discussions in April and presumably an ACRS letter in May, a package to the Commission in late May, Commission discussion in June and presumably approval in June and then Federal Register notice in July.

We were on that track and, as I said, the document I believe and the supporting justifications are in pretty good shape.

I now speculate that there will be a six-weeks' slip. In the six weeks we will be allowed to take into account the generic implications of this six-weeks study that Roger is working on.

Now we may be able to recoup some of it because the structure that Matton is working on ---

COMMISSIONER AHEARNE: Don't work too hard now.

(Laughter.)

MR. ROSS: Well, I think there is some orthorgonality between what the six weeks' study will do

and the rule. I think they are looking at different things in the microstructure versus the macrostructure of the rule. But, nonetheless, I think we do have to wait until that review is complete.

That is where we are.

COMMISSIONER GILINSKY: What do these two events do to the statistics?

MR. ROSS: We have taken a cursory look in terms of what everyone likes to talk about these days, uncertainties in PRA, and it does not affect it. Obviously numerically it affects it, but we believe it is less than a factor of two, and that is close enough in terms of PRAs.

What has happened is when you revisit the statistics since 1977, you also add in some more reactor years. You also add in Browns Ferry. Then there is controversy as to whether the Kahl failure every should have been included in the first place.

Then you can start doing fine structure, should it only be Westinghouse reactors north of the Mason-Dixon Line.

(Laughter.)

MR. ROSS: Statisticians are not going to agree, but within the uncertainty band no change. So I don't think this places ATWS in a new or different light

in that respect.

COMMISSIONER GILINSKY: Let's see, can we give the company a chance to comment?

MR. EISENHUT: That concluded the staff's presentation, unless there is something else you want to do.

CHAIRMAN PALLADINO: Do we have a representative from the facility? I do think it would be appropriate to give him an opportunity to make any comments.

COMMISSIONER ROBERTS: I am going to have to leave in a few minutes, and my leaving in way reflects a lack of interest.

COMMISSIONER GILINSKY: This is just going to take a few minutes.

MR. ECKERT: Thank you.

I appreciate the opportunity to at least make a few comments on this whole situation.

CHAIRMAN PALLADINO: Do you want to provide your name?

MR. ECKERT: My name is Dick Eckert. I am Senior Vice President of Public Service Electric and Gas Company. We have other members of our staff with us and in case you have specific questions you would like to have replied to, I can refer to them.

Obviously we took this situation we are in very, very seriously and we have been looking at it in great depth. We have submitted to the staff the letter that you have in front of you that outlines the corrective actions as we see them.

They have, as you know, come forth with a list of issues and I would hope that in the immediate future we can get together with the staff and resolve those issues against what we have proposed because I think many of them have been resoved but we need some time to talk those things out.

As I see this problem, there really are three major problems that we have to resolve.

The first is what is really the root cause of what happened here, and the answer to that is the maintenance problem on the UV relays. These were purchased as safety grade equipment. They were delivered with instruction books and the instruction books indicated the maintenance that is required on the equipment.

For reasons that we haven't yet been able to find out, we never got any further information on how to maintain this equipment, which means the 74-02 was never received. We have no record of receiving it and they have no record of sending it. We have got to get that

situation straightened out and in addition make sure there aren't others which have been sent to some people and not to others. You will see in our recommendations that that is part of the program.

CHAIRMAN PALLADINO: You said when you bought it you got it with the appropriate maintenance instructions?

MR. ECKERT: Yes. They ship these things with instruction books and it is safety grade equipment.

CHAIRMAN PALLADINO: Were the instructions in the books followed?

MR. ECKERT: The instructions in the books were followed, but they were very, very little in the way of maintenance. Clean it, look at it, and make sure there is nothing loose. That is all.

CHAIRMAN PALLADINO: No frequency?

MR. ECKERT: I think it was a six-month interval, although I could check that for sure. I am not personally sure of that.

The second problem as we see it is the fact that we did have the failure to trip on the 22nd, and this was not picked up until later. We recognize that is a problem and we are formalizing our procedures to make sure this is not a problem that is repeated.

You should bear in mind that at the time this

happened we had a manual scram within a couple of seconds, we had a safety injection and we had a PORV action. We had a busy place. You get many alarms and you have busy operators.

Yes, we made a mistake. We did not pick it up and we should have. But I can understand under the circumstances why it was not picked up until a later review.

The third item of concern in my mind at least is this question of is the equipment safety grade. It was purchased as safety grade equipment, it was stored as safety grade, it was installed, it was operated and it was maintained all as safety grade equipment.

The place the problem comes up is I believe in January of this year there were two work orders issued for overhaul of the equipment and they were mistakenly identified as not safety grade. As far as we can tell i checking our records, those are the only times that happened. This was a man's mistake. It was wrong. A man made a mistake.

We are putting into effect a check procedure now on all work orders to make sure there is no work order that goes through and is mistakenly identified as non-safety grade when indeed it is safety grade.

To complicate the matter further, in the

meeting we had on Monday our Maintenance Manager talked for quite a while and it became confusing as to whether he considered it safety grade. Now this is a people problem, if you will. We have a problem with that, but it is very clear in everything we have done that this is now and always was safety grade equipment. I just want to make sure you understand that part, but we had a problem with it, no question.

Those to me are the major things that we have got to get straightened out on this.

I can make a couple of other comments, but I think probably that is the thrust of our concerns.

CHAIRMAN PALLADINO: Okay, thank you.

Any questions?

COMMISSIONER GILINSKY: Was there anything we heard today that was just factually wrong that is important enough to correct?

MR. ECKERT: I don't think important enough to correct. I would make a comment on operator action. Twenty-four and a half seconds, as I understand it, is the actual cycle count on that.

We talked to a number of people that were on simulators and people that are familiar with operator reaction time. They told us that they would consider a minute too long but a half a minute very good. So we

don't really think that the operator waited too long to do something. It was a reasonable reaction time on the part of the operators. If that is still under review by the NRC staff, fine, but that is the reaction that we got and where we got it.

Other than that, I don't really know of anything. Details you can get into, but basically the facts were laid out very well I thought by the staff.

CHAIRMAN PALLADINO: Any other questions?

(No response.)

CHAIRMAN PALLADINO: Well, we thank you very much, Mr. Eckert.

MR. ECKERT: Thank you.

CHAIRMAN PALLADINO: Are there any other items that should come before us on this subject at this time?

(No response.)

CHAIRMAN PALLADINO: If not, then thank you all and we will stand adjourned.

(Whereupon, at 12:10 p.m., the meeting adjourned.)

* * *

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

COMMISSION MEETING

in the matter of: PUBLIC MEETING - Briefing on Salem

Date of Proceeding: March 2, 1983

Docket Number:

Place of Proceeding: Washington, D. C.

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

Mary C. Simons

Official Reporter (Typed)

Mary C Simons

Official Reporter (Signature)

D. G. EISENHUT, NRR
X27221

COMMISSION BRIEFING
SALEM EVENT
OF FEBRUARY 25, 1983

MARCH 2, 1983

SALEM EVENT

BRIEFING OUTLINE

SALEM EVENT

- o EVENT DESCRIPTION
- o ISSUES RELATING TO RESTART

GENERIC CONSIDERATIONS

- o NRC BULLETIN OF 02/25/83
- o GENERIC IMPLICATION FOLLOWUP

EVENT DESCRIPTION

EVENT DESCRIPTION

BACKGROUND

- o TRIP BREAKER
- o SOLID STATE PROTECTION SYSTEM (SSPS)
- o TRIP BREAKER HISTORY

EVENT #1 DESCRIPTION
FEBRUARY 22, 1983

EVENT #2 DESCRIPTION
FEBRUARY 25, 1983

TRIP BREAKER

- ALLOWS POWER FROM MG SETS TO BE SUPPLIED TO CONTROL ROD DRIVE MOTORS (CRDM)
- OPENING BREAKER ALLOWS MECHANICAL RELEASE OF ROD FROM CRDM ALLOWING SCRAM
- TRIP BREAKER MECHANICALLY OPENED BY:
  - MANUAL BUTTON AT BREAKER
  - LATCH ON CABINET
  - SHUNT COIL
  - UV COIL

SOLID STATE PROTECTION SYSTEM (SSPS)

- LOGIC AND STATUS INDICATOR IN CONTROL ROOM
- AUTO SSPS TRIP SIGNAL -
  DEENERGIZES (UV) COIL
- ATWS INSTRUCTIONS

  1. MANUAL TRIP FROM CONTROL ROOM - DEENERGIZES UV COIL AND ENERGIZES SHUNT COIL
  2. CONTROL ROOM BREAKER PUSHBUTTON - INDIVIDUAL BREAKER CONTROLS FOR CLOSING AND OPENING (VIA SHUNT COIL)
  3. INITIATE SAFETY INJECTION (INJECT BIT)
  4. LOCAL MECHANICAL PUSHBUTTON ON INDIVIDUAL BREAKERS
  5. LOCAL BREAKER TRIP OF ROD DRIVE MOTOR GENERATOR INPUT OR OUTPUT BREAKERS

CONTROL ROOM INDICATION

- REACTOR TRIP -

POSITIVE

1. REACTOR TRIP BREAKER "OPEN"

    - SSPS DISPLAY
    - BREAKER CONTROL PUSHBUTTON

2. ROD POSITION INDICATORS

3. ROD BOTTOM LIGHTS

4. NUCLEAR INSTRUMENTATION

5. PLANT COMPUTER

CONTROL ROOM INDICATOR

- REACTOR TRIP -

FEEDBACK

1. SSPS LOGIC DISPLAY

2. SECONDARY REACTOR TRIP ALARMS

   - o NEGATIVE RATE TRIP
   - o LOW-LOW LEVELS IN SGs
   - o REACTOR TRIP/TURBINE TRIP

3. TURBINE TRIP

   - o GENERATOR BREAKER OPEN
   - o STOP VALVES AND GOVERNOR VALVES CLOSE
   - o TURBINE SPEED LESS THAN 1800 RPM AND DECREASING

TRIP BREAKER HISTORY

AUGUST 20, 1982	UNIT 2 "B" REACTOR TRIP BREAKER FAILED SSPS SURVEILLANCE TEST DUE TO UV COIL BINDING
JANUARY 6, 1983	UNIT 2 TRIP ON LOW-LOW SG LEVEL. "A" TRIP BREAKER FAILED TO OPEN FOR ABOUT 25 MINUTES.
JANUARY 1983	LER CONCLUDED 01/06 FAILURE DUE TO DIRT, CORROSION AND BINDING
JANUARY 13 - 18, 1983	UNIT 1 UV TRIP MECHANISMS DISASSEMBLED, CLEANED, AND REASSEMBLED
FEBRUARY 1983	FOLLOWING REFUELING OUTAGE, OPERABILITY CONDUCTED BEFORE UNIT 1 RESTART
FEBRUARY 20, 1983	UNIT 1 TRIP BREAKERS FUNCTIONED FOR 2 TRIPS: LOW-LOW SG LEVEL, HIGH-HIGH SG LEVEL
FEBRUARY 22, 1983	o UNIT 1 TRIPS ON LOW-LOW SG LEVEL o "B" REACTOR TRIP BREAKER COVER PLATE PROBLEM o FEED BYPASS VALVE POSITION INDICATORS REMOVED
FEBRUARY 22, 1983 2200 HOURS	SSPS TRIP SIGNALS ON LOW-LOW SG LEVEL "CONCURRENT" WITH MANUAL TRIP. TRIP BREAKER FAILURE ON SSPS SIGNAL NOT RECOGNIZED
FEBRUARY 25, 1983 0021 HOURS	REACTOR TRIP ON LOW-LOW SG LEVEL. NO INDICATION OF REACTOR TRIP. MANUAL SCRAM INITIATED 25 SECONDS LATER.

FEBRUARY 22 EVENT SEQUENCE

TIME	
2155	- REACTOR BUS TRANSFER FROM OFF-SITE TO ON-SITE IN PROGRESS AT 20% POWER. DURING TRANSFER LOSS OF #13 RCP AND #12 MAIN FEED PUMP (MFP) OCCURS DUE TO LOSS OF CONTROL POWER (#12 MFP ONLY OPERATING MFP)
2156 :54	- REACTOR TRIP SIGNAL FROM LOW LOW LEVEL #13 S/G - AUXILIARY FEEDWATER (AFW) PUMPS START
2156 :58	- MANUAL REACTOR TRIP DUE TO DEGRADING CONDITIONS - TURBINE TRIP: REACTOR TRIP BREAKERS OPEN
2204	-*SAFETY INJECTION (SI) DUE TO 100 PSI DP BETWEEN #13 MAIN STEAM LINE AND OTHER STEAM LINES
2206	- OPERATOR NOTED #11 RCP HAD TRIPPED (WITH BOTH #11 AND #13 RCPs LOST, NO PRESSURIZER SPRAY TO CONTROL PRESSURE) - BOTH PORVs LIFT FROM PRESSURE INCREASE DUE TO SI FLOW AND LOSS OF SPRAY FLOW
2211	- SI TERMINATED BY OPERATORS - BOTH PORVs CLOSE - PLANT STABILIZED IN MODE 3
2346	** - NRC NOTIFIED VIA ENS

*100 PSI DEVELOPED BECAUSE #13 SG SUPPLYING TURBINE AFW PUMP AND #13 RCP NOT RUNNING

**NRC WAS INFORMED THAT THE SG LOW LOW LEVEL TRIPPED THE Rx AND THAT THE MANUAL TRIP INITIATED NEARLY SIMULTANEOUSLY

TIME	
FEBRUARY 23	
0628	- BLOCK VALVE FOR PORV PR-2 CLOSED BECAUSE OF PORV SEAT LEAKAGE

SEQUENCE OF EVENT FOR FEBRUARY 25, 1983 EVENT

INITIAL CONDICTIONS - REACTOR POWER 12% TURBINE ON LINE AND GENERATOR SYNCHRONIZED WITH GRID: FEEDWATER SYSTEM IN MANUAL CONTROL

TIME	
0021	- LOW LOW WATER LEVEL #12 STEAM GENERATOR - REACTOR TRIP SIGNAL GENERATOR BY SSPS AND INDICATED IN CONTROL ROOM - PLANT PARAMETERS NOT CONSISTENT WITH SCRAM
0021 :30 (APPROX)	- REACTOR MANUAL SCRAM FROM CONTROL ROOM - PLANT PARAMETERS INDICATE SCRAM
0048 - 0115	- EACH BREAKER TESTED VIA SSPS 5 TIMES - "B" TRIP BREAKER FAILED 5 TIMES, "A" TRIP BREAKER FAILED 3 TIMES
0130	- ALERT DECLARED
0146	- ENS NOTIFICATION MADE
0200	- ALERT TERMINATED

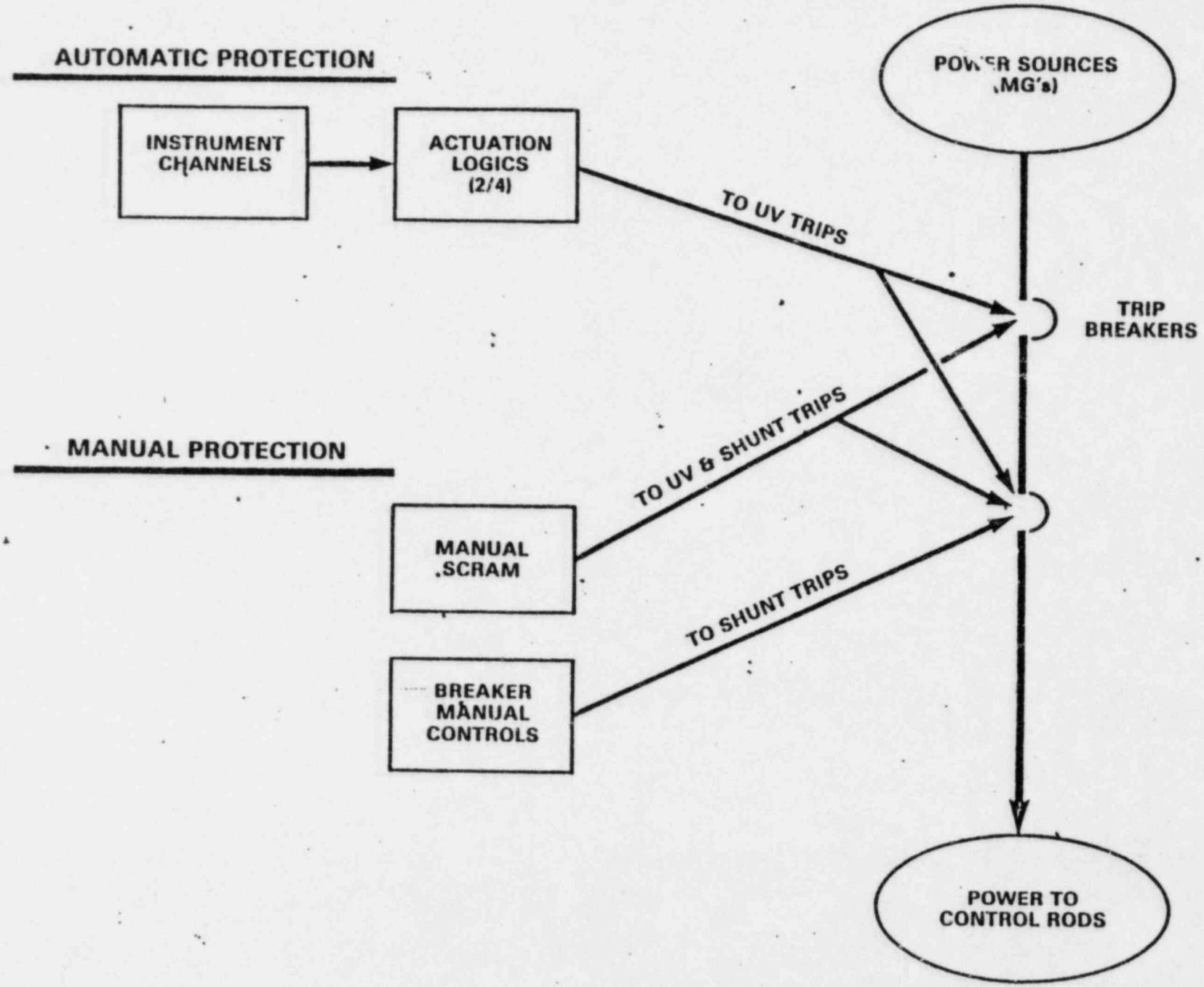
ISSUES RELATED TO SALEM RESTART

AGENDA

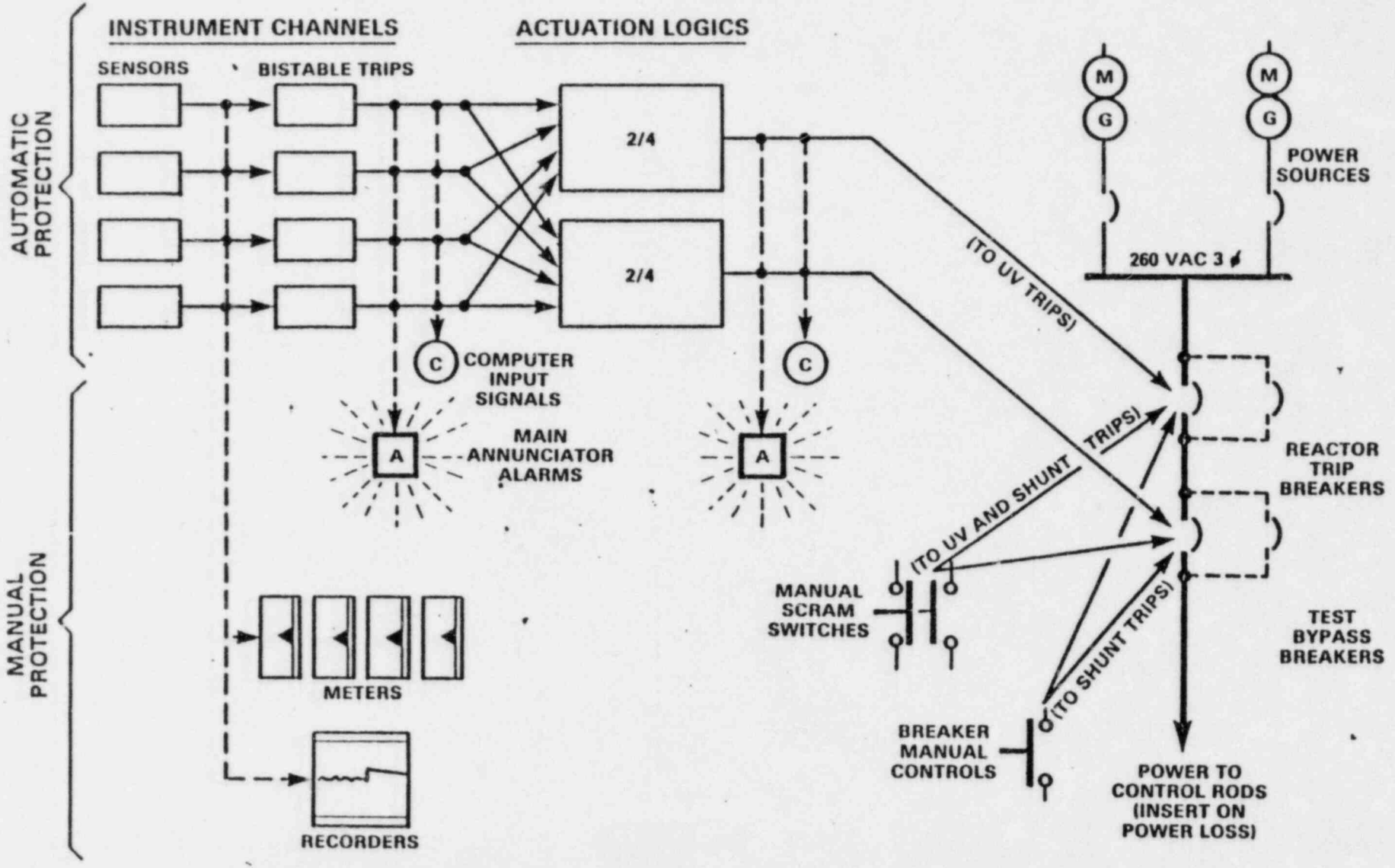
1. DESCRIPTION OF BREAKER

2. LICENSEE CORRECTIVE ACTIONS

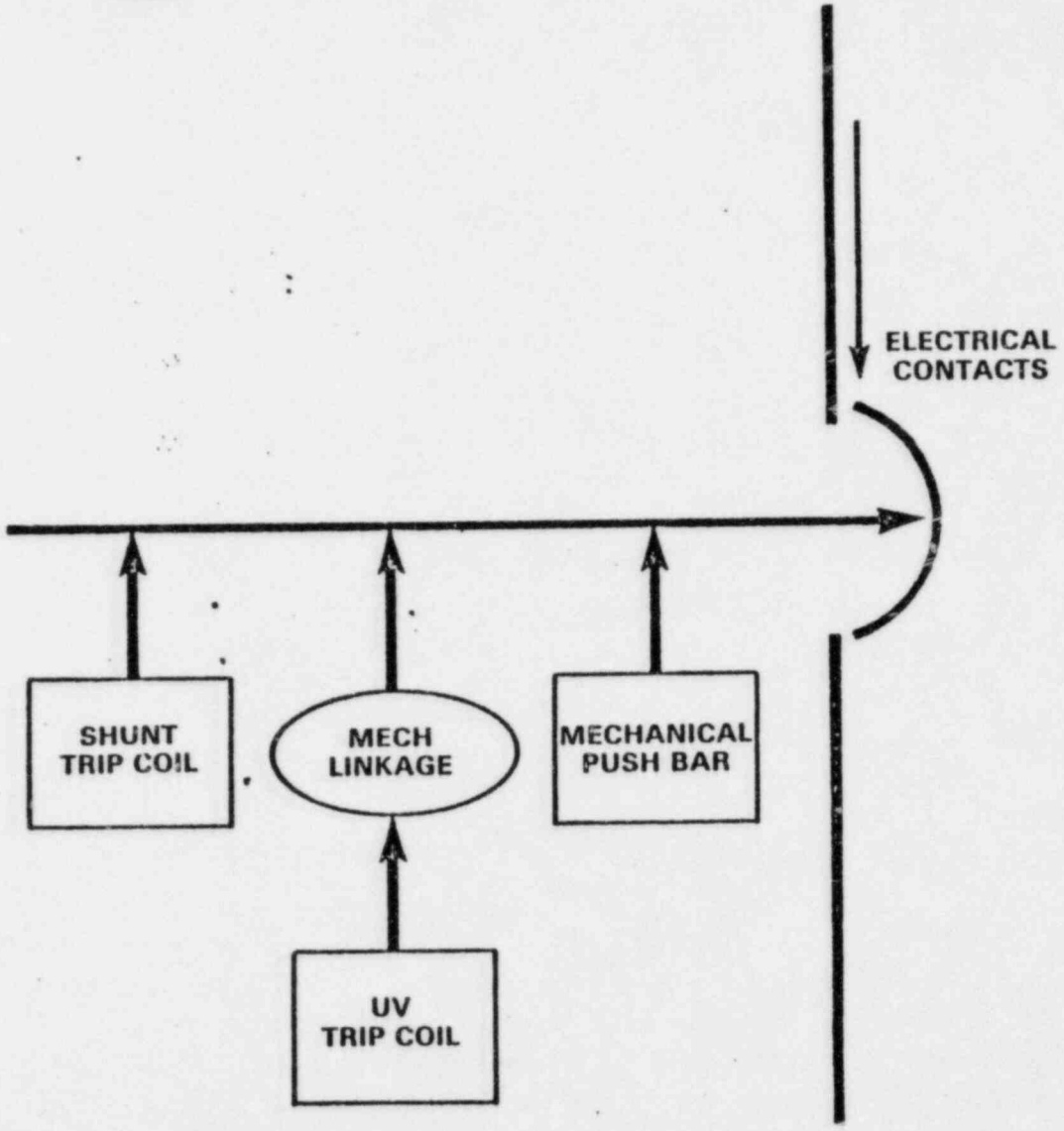
3. ISSUES


AUTOMATIC PROTECTION
INSTRUMENT CHANNELS
ACTUATION LOGICS (2/4)
TO UV TRIPS
POWER SOURCES (MG's)
TRIP BREAKERS
MANUAL PROTECTION
TO UV & SHUNT TRIPS
MANUAL SCRAM
TO SHUNT TRIPS
BREAKER MANUAL CONTROLS
POWER TO CONTROL RODS

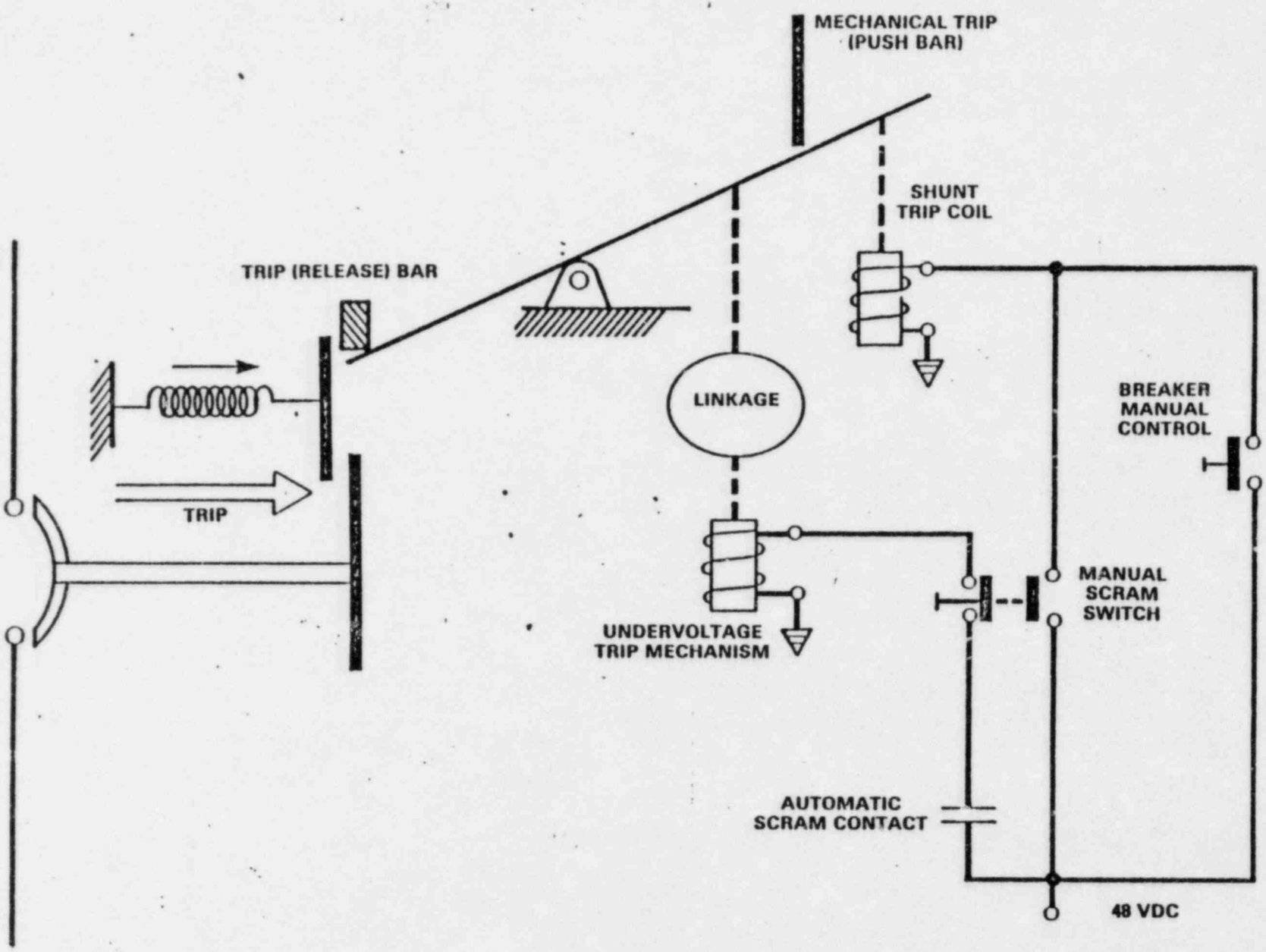
REACTOR TRIP SYSTEM



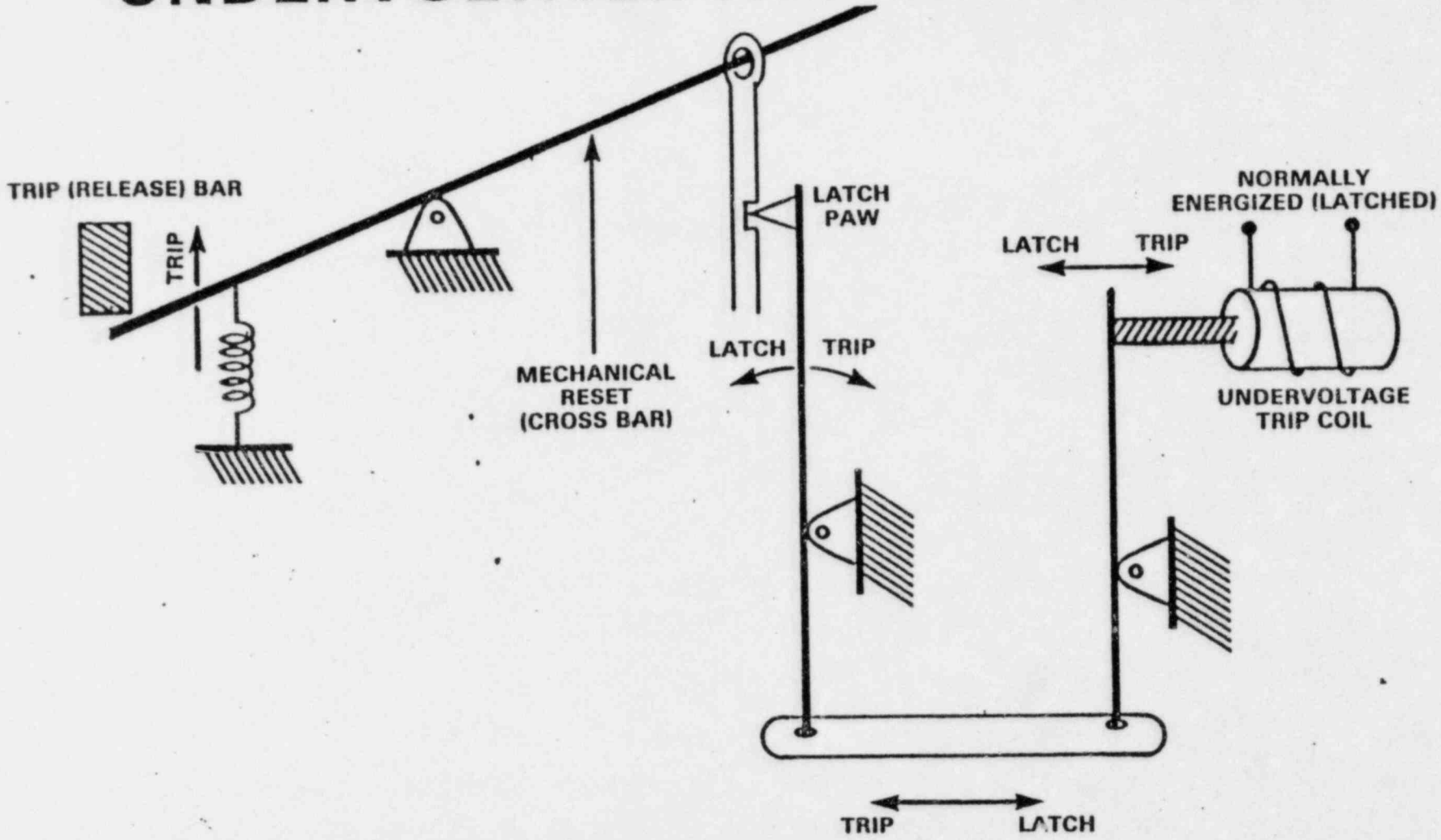
BASIC W DB-TYPE TRIP BREAKER



REACTOR TRIP BREAKER



UNDERVOLTAGE TRIP MECHANISM



CORRECTIVE ACTIONS

(AS PROPOSED BY LICENSEE AT FEBRUARY 28, 1983 MEETING)

1. PSE&G VERIFIED SALEM SURVEILLANCE TESTING MEETS TECH SPEC REQUIREMENTS.

2. MAINTENANCE PROCEDURES FOR THE UV TRIP DEVICES WILL BE DEVELOPED BASED ON NSD 74-02 AND NCD-ELEC-18.

3. W WILL INSTALL NEW UNIT 1 UV ATTACHMENTS.

4. PROPER OPERATION OF THE BREAKERS WILL BE VERIFIED BY PSE&G AND W - PROGRAM BEING DEVELOPED.

5. W WILL VERIFY THAT THE UV ATTACHMENTS MEET SAFETY CLASSIFICATION SPECIFICATIONS FOR THE ORIGINAL RX SWITCHGEAR.

6. SURVEILLANCE OF BREAKER OPERATION WILL BE INCREASED TO MONTHLY INTERVAL.

7. PROCEDURES WILL BE REVISED TO REQUIRE THE OPERATOR TO ACTUATE THE REACTOR MANUAL TRIP SWITCH FOLLOWING AN AUTOMATIC REACTOR TRIP.

8. DEVELOP A FORMALIZED POST TRIP REVIEW PROCEDURE.

9. W WILL SEND COMPILATION OF ALL TECH BULLETINS, MANUALS PERTAINING TO W EQUIPMENT AT SALEM - SALEM WILL REVIEW AND INCORPORATE AS NECESSARY INTO STATION DOCUMENTS.

10. W IS CONDUCTING AN INTERNAL REVIEW OF THEIR PROCEDURES FOR DISSEMINATION OF TECHNICAL INFORMATION TO UTILITIES, PSE&G HAS IDENTIFIED THE DESIRED DISTRIBUTION OF THIS INFORMATION AS PART OF RECENT IMPROVEMENT IN THEIR HANDLING OF TECHNICAL DOCUMENTS.

11. A REVIEW IS IN PROGRESS AT SALEM OF PAST EQUIPMENT FAILURES DOCUMENTED IN LER's, DEFICIENCY REPORT. A PREVENTIVE MAINTENANCE PROGRAM WILL BE IMPLEMENTED BASED UPON RESULTS OF REVIEW.

ISSUES

- SAFETY CLASSIFICATION OF BREAKERS
- IDENTIFICATION OF CAUSE OF FAILURE
- VERIFICATION TESTING
- REVISED SURVEILLANCE & MAINTENANCE PROCEDURES
- OPERATING PROCEDURES
  - AUTOMATIC/MANUAL SCRAM
  - ATWS EMERGENCY PROCEDURES
  - OPERATOR RESPONSE
- MANAGEMENT ISSUES
  - PROCEDURES FOR POST-TRIP REVIEWS
  - QUALITY ASSURANCE
  - ENFORCEMENT
  - LICENSEE UPDATING WESTINGHOUSE MAINTENANCE INFORMATION
  - OTHER EQUIPMENT MAINTENANCE PROCEDURES

NRC BULLETIN OF 02/25/83

IE BULLETIN 83-01: FAILURE OF REACTOR TRIP BREAKERS (WESTINGHOUSE DB-50) TO OPEN ON AUTOMATIC TRIP SIGNAL

REQUESTED ACTION ITEMS - ALL PWRS

- TEST UNDERVOLTAGE TRIP FUNCTION WITHIN 24 HOURS IF NOT TESTED WITHIN 5 DAYS

- REVIEW MAINTENANCE PROGRAM AND CONFORM TO W PROGRAM OR ALTERNATE

- NOTIFY ALL LICENSED OPERATORS OF THE SALEM EVENT, AND REVIEW EMERGENCY PROCEDURES FOR FAILURE-TO-TRIP WITH EACH OPERATOR ON HIS ARRIVAL ON SHIFT

- REPORT TO NRC WITHIN 7 DAYS

PLANTS WITH DB BREAKERS IN RPS

- ALL W OPERATING PLANTS EXCEPT FARLEY, MCGUIRE AND SUMMER

- NO B&W, CE OR GE PLANTS USE DB TYPE BREAKERS WITH UV TRIP PROVISIONS IN RPS

- OTHER SAFETY RELATED APPLICATIONS OF DB BREAKERS ARE BEING REVIEWED

IEB 83-01 TEST RESULTS

- TESTING COMPLETED AS REQUESTED FOR ALL W PLANTS WITH DB TYPE BREAKERS
- NO FAILURES FOUND
- PLANTS SHUTDOWN WILL TEST BEFORE RETURN TO POWER

GENERIC IMPLICATION FOLLOW-UP

GENERIC IMPLICATION FOLLOW-UP

1. WESTINGHOUSE ACTIONS
   - o INTERCOMPANY TASK FORCE - CONDUCTING AN INTERNAL REVIEW OF THEIR PROCEDURES FOR DISSEMINATION OF TECHNICAL INFORMATION TO UTILITIES
   - o EVALUATION AND TESTING PROGRAM FOR MODEL DB-50 BREAKER UV COIL
   - o DEVELOPING PROCEDURES FOR INDEPENDENT TESTING OF UV AND SHUNT COIL TESTING

2. OWNERS GROUP/RRG (WESTINGHOUSE PLANTS)
   - o A LISTING OF CURRENT W TECHNICAL DATA LETTERS TO BE DISTRIBUTED
   - o EVALUATE THE EFFECTIVENESS OF MANUAL SCRAM FOLLOWING AUTOMATIC SCRAM
   - o REVIEW OF TRIP AND ATWS EMERGENCY PROCEDURES
   - o ADEQUACY OF STS, SURVEILLANCE INTERVAL, TEST METHOD, AND TESTING OF SHUNT COIL
   - o NOTIFY MEMBERS TO CONDUCT A REVIEW FOR SIMILAR TYPE FAILURES IN OTHER SYSTEMS

3. MEETINGS WITH CE/B&W/GE RRGs

4. PER EDO MEMO OF 02/28/83
   - o DETAILED EVENT REPORT BY MARCH 9 (REGION I)
   - o EVALUATION OF GENERIC IMPLICATIONS BY APRIL 18 (NRR)

5. FACTOR EXPERIENCE INTO ATWS POSITION

BACKUP SLIDES

- HISTORY OF PWR SCRAM BREAKER FAILURES
- STATUS OF PAST ACTIVITIES

HISTORY OF PWR SCRAM BREAKER FAILURES

- SINCE 1973 THERE HAVE BEEN APPROXIMATELY 340 PWR REACTOR YEARS OF OPERATION:

  220 WESTINGHOUSE
  70 B&W
  50 CE

- DURING THIS PERIOD OF TIME THERE HAVE BEEN 35 KNOWN SCRAM BREAKER FAILURES:

  21 WESTINGHOUSE
  13 B&W
  1 CE

- THE AVERAGE NUMBER OF SCRAM BREAKER FAILURES PER REACTOR YEAR BY VENDOR IS:

  0.095 WESTINGHOUSE
  0.19 B&W
  0.021 CE

- THE CORRESPONDING AVERAGE NUMBER OF REACTOR YEARS BETWEEN BREAKER FAILURES BY VENDOR IS:

  11 WESTINGHOUSE
  5.3 B&W
  48 CE

- THE CORRESPONDING EXPECTED NUMBER OF SCRAM BREAKER FAILURES IN A CALENDAR YEAR BY VENDOR IS:

  2.9 WESTINGHOUSE
  1.3 B&W
  0.15 CE

FAILURE MECHANISMS FOR SCRAM BREAKERS

35 SCRAM BREAKER FAILURES SINCE 1973

- 25 DUE TO UNDERVOLTAGE COIL MECHANISM FAILURE OR BINDING
- 6 DUE TO MECHANICAL PROBLEMS WITHIN THE BREAKER OR BREAKER PARTS BEING OUT OF ADJUSTMENT
- 3 UNKNOWN
- 1 DIRT

STATUS OF PAST ACTIVITIES

NOVEMBER 24, 1981	FRN NOTICE WITH PROPOSED RULES
APRIL 23, 1982	COMMENTS RECEIVED ON FRN. LARGE STUDY BY UTILITY GROUP ON ATWS.
SEPTEMBER - NOVEMBER, 1982	TASK FORCE AND STEERING GROUP MET AND DRAFTED RECOMMENDATIONS
NOVEMBER 3, 1982	CRGR BRIEFED
NOVEMBER 10, 1982	CRGR SUBMITS QUESTIONS TO STAFF
DECEMBER 7, 1982	STAFF SUBMITS ANSWERS TO CRGR QUESTIONS
JANUARY 26, 1982	CRGR BRIEFED ON ANSWERS TO QUESTIONS AND SLIGHTLY REVISED VALUE/IMPACT ANALYSIS

PROPOSED RULE ELEMENTS

GE (BWR)

- o ARI INSTALLED
- o INCREASE SLCS TO 86 GPM
- o AUTOMATICALLY TRIP RECIRCULATING PUMPS
- o PROVIDE RELIABLE SCRAM DISCHARGE VOLUME
- o IMPLEMENT PROCEDURES FOR OPERATOR RESPONSE

PWR (ALL)

- o INSTALL AMSAC-DIVERSE AND INDEPENDENT AFW INITIATION AND TURBINE TRIP

CE/B&W

- o PROVIDE A DIVERSE SCRAM SYSTEM, INDEPENDENT FROM THE REACTOR PROTECTION SYSTEM

CURRENT STATUS

1. DRAFT REPORT OF TASK FORCE AND STEERING GROUP RECOMMENDATIONS ISSUED FOR COMMENT TO MEMBERS

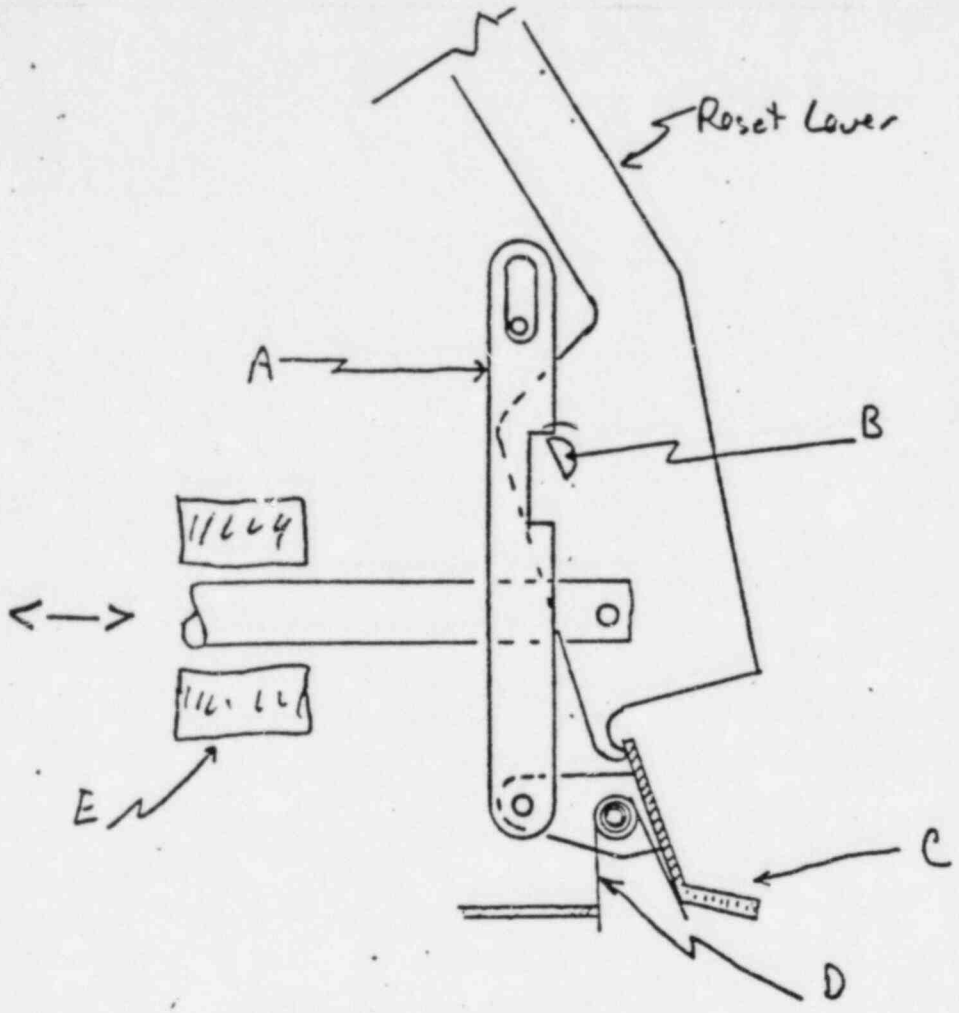
2. DRAFT RULE AND FR NOTICE ISSUED FOR STAFF COMMENT

3. COMMENTS FROM STAFF AND CRGR ON VALUE/IMPACT ANALYSES BEING RESOLVED

4. IMPLICATIONS OF SALEM ATWS UNDER REVIEW

ATWS RULEMAKING SCHEDULE

3/9/83	ATWS TASK FORCE AND STEERING GROUP CONCUR ON REPORT AND PROPOSED RULE
3/23/83	PRESENTATION OF PROPOSED RULE AND COMMISSION PAPER TO CRGR
4/22/83	CRGR CONCURRENCE
5/6/83	ACRS REVIEW
6/6/83	PAPER PRESENTED TO COMMISSION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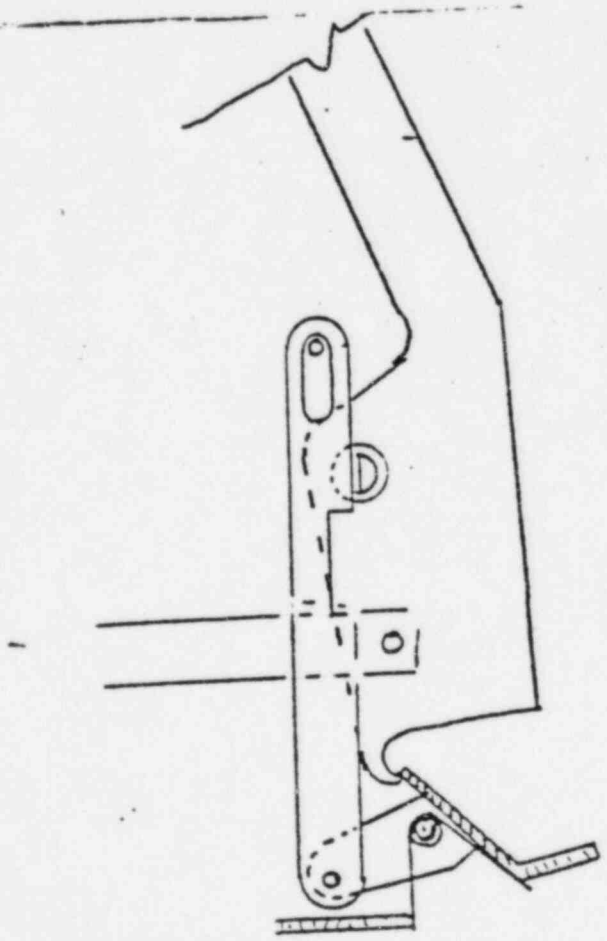

NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 28, 1983

MEMORANDUM FOR: Harold R. Denton, Director, NRR

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: EVALUATION OF THE IMPLICATIONS OF THE SALEM UNIT I EVENT

This memorandum confirms our conversation of February 28, 1983. I am establishing an NRC Task Force to undertake a review and evaluation of the implications of the Salem Unit I event.

You are appointed to organize that task force in order to develop criteria for the review and to prepare a final report. You should designate a senior member of the NRR staff to act as Chairman and a senior representative from appropriate Regional Offices, OIE, NRR and AEOD to be a member of the Task Force. Contact those offices directly to acquire mutually acceptable members. You are authorized to task NRC offices directly to accomplish this work. Offices are expected to give priority to this request unless they obtain relief from me.

Your review and evaluation shall include the extent to which similar equipment is used in other facilities, the extent to which proper surveillance and maintenance of such equipment has been adhered to, and the effect quality classification may have had on the malfunction. At the conclusion of this review and evaluation, I expect that you will identify any changes that are needed in license and/or procedural requirements at any affected facilities.

I request that you keep me advised of progress and difficulties encountered as necessary. A report should be scheduled for transmission to the Commission by April 18, 1983. Publication of the report should be in the form of a NUREG which provides adequate documentation to support any recommendations you may have.

By copy of this memorandum, Region-I is directed to provide you with a report by March 9, 1983 on the circumstances and details of the events that took place on February 22-25, 1983 and any relevant prior experience at the Salem Unit I facility during which the automatic scram system did not function properly.

William J. Dircks
Executive Director
for Operations

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 1, 1983

MEMORANDUM FOR: Chairman Palladino
Commissioner Gilinsky
Commissioner Ahearne
Commissioner Roberts
Commissioner Asselstine

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: SALEM UNIT EVENT

By the attached memorandum, I am asking Harold Denton to prepare a report on the incident at Salem that occurred on February 25, 1983. I have asked that the report be submitted by April 18, 1983.

William J. Dircks
Executive Director
for Operations

Enclosure
Memo to HRDenton/NRR
fm WJDircks/EDO dtd 2/28/83

CC: SECY ✓
OGC
OPE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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William J. Dircks
Executive Director
for Operations

Richard A. Uderitz
Vice President -
Nuclear

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609 935-6010

March 1,1983

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing

Gentlemen:

REACTOR TRIP BREAKER FAILURE
NO. 1 UNIT
SALEM GENERATING STATION
DOCKET NO. 50-272

The purpose of this letter is to document our investigation of two reactor trip breaker failures and provide corrective actions to be taken.

On February 22 and 25, 1983, the Salem Unit 1 reactor trip breakers failed to open upon receipt of a valid trip signal from the reactor protection system. In both instances, the manual trip was used to shut down the unit.

PSE&G has determined that the reactor trip breaker undervoltage trip attachment failures were caused by a lack of proper lubrication on the latch. Westinghouse expert opinion concurs with this based upon:

a. An inspection of the undervoltage trip attachments.

b. A review of PSE&G accounts of the tests performed after the failures.

c. Previous Westinghouse experience which indicates that the lack of lubrication has been the cause of similar previous failures.

As presented in our meeting on February 28, 1983, our investigation of these incidents is summarized herein.

PSE&G has reviewed the plant data from the events of February 22 and 25, 1983 to evaluate any potential safety impact on the primary system. Review of the primary coolant parameters did not reveal any significant perturbations and followed trends that would be expected in a normal plant trip.

The bounding case in the FSAR is the loss of normal feedwater at 102% power with only one auxiliary feedwater pump starting. In that transient, two steam generators boil dry and the other two drop to a level where approximately 50% of the tube bundles are exposed. This provided sufficient heat removal to preclude boiling in the primary system. This is a more limiting case than the two recent incidents at Salem, where on February 22nd as a result of the transient, the water level in three steam generators briefly dropped to a level equivalent to approximately 20% of the tube bundle exposed. On February 25th, the level in one steam generator again briefly dropped to approximately this same level. On both occasions, there was automatic auxiliary feedwater initiation.

The potential for waterhammer in the steam generator feed ring exists when the feedwater flow is interrupted long enough to allow the feed ring to drain. In both recent instances, there was no flow interruption since auxiliary feedwater was initiated automatically. In addition, "J-tubes" have previously been installed in the feed rings.

In conclusion, the events of February 22 and 25, 1983 were within bounds of FSAR analyses and did not have the necessary prerequisites for feedwater line waterhammer.

Our review of the breaker failures has resulted in a program of corrective actions to assure that such failures will not recur. These corrective actions are described below:

1. PSE&G has verified the Salem surveillance testing meets the technical specification requirements.

   Procedure PD18.1.004/5 Solid State Protection System Reactor Trip Breakers and Permissive P-4 Test Train A/B satisfy the requirements for testing the reactor trip breakers.

Procedure PD18.1.008/9 Solid State Protection System Functional Test Train A/B satisfied the requirements for testing the automatic trip logic.

2. A detailed maintenance procedure M3Q-2 entitled Reactor Trip and Bypass ACB Inspection and Test, which includes the undervoltage trip attachment, has been developed and approved. This procedure is based on and references Westinghouse data letter NSD-TB-74-2, Westinghouse Procedure NDC-ELEC-18 and the Westinghouse Instruction Book for DB-50, DBF-16 and DBL-50-ACB's. This includes electrical testing of the breaker, notification of the Technical Department of the need for post maintenance testing and appropriate QA inspection hold points.

3. New undervoltage trip attachments will be supplied by Westinghouse and will be installed on each of the four No. 1 Unit breakers. Westinghouse will provide technical assistance to PSE&G to assure that No. 1 Unit undervoltage trip attachments are installed properly and that the breakers operate properly.

4. Proper operation of the breakers will be verified prior to placing the breakers in service. A program to verify proper operation will be developed and completed prior to returning to service. This program will take into consideration statistical data and recommendations to be provided by Westinghouse.

5. PSE&G will verify that Westinghouse has determined that the UV attachments meet the specification requirements for the original reactor trip switchgear.

6. Surveillance of reactor trip breaker operation will be increased as follows:

   a. Main and bypass breakers will be shunt-tripped weekly.

   b. Main breakers will be UV-tripped monthly.

Proposed technical specification changes will be submitted as appropriate.

7. The following tests will be performed after maintenance on reactor trip breakers to demonstrate operability prior to return of the breaker to service:

   a. Breaker will be shunt-tripped.

   b. Breaker will be UV-tripped.

   c. Breaker will be time-response tested.

8. Emergency Instruction I-4.3, Reactor Trip, for Salem Units 1 and 2 will be revised to include the requirement to manually trip the reactor trip breakers on all reactor trips.

   The revision to this procedure and the basis for this additional action will be disseminated to all licensed operators.

9. A formal reactor trip/safety injection post trip review procedure will be developed and issued as an Operations Department Directive. This procedure will specify the review and documentation necessary to determine the cause of the event and also determine that affected equipment performed in its intended function. The procedure will also include management authorization requirements for startup. All licensed operators will be informed of the requirements of this document.

10. A review of LER's, deficiency reports, maintenance work sheets and work orders is in progress to identify items requiring preventative maintenance. Our preventative maintenance program will incorporate the results of this review to be completed by January 1, 1984.

11. A reactor trip and bypass breaker traceability program will be established to insure that all work performed on the breakers will be traceable to a particular breaker and its location. This will be accomplished by April 1, 1983.

12. Westinghouse has committed to provide PSE&G with a compilation of all technical bulletins, manuals, etc., pertaining to Westinghouse equipment utilized at Salem. These will be reviewed and incorporated into station documents as necessary in a timely manner.

13. Work orders will be reviewed by QA to insure that there is proper designation of safety related items. For safety related work, QA will establish proper inspection and/or surveillance coverage.

    In addition, PSE&G is undertaking a thorough review of its Operational QA Program to identify changes necessary to improve performance.

In our meeting with the staff on February 28, 1983, we were requested to clarify the safety classification of the reactor trip breakers. The reactor trip breakers are part of the Reactor Trip System which is a safety-related system. In the design and construction of Salem Generating Station, PSE&G considered as safety-related, those structures, systems and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public.

Salem UFSAR Section 7.1.1.1 states that the Reactor Trip System consists of equipment which initiates reactor trip or activates engineered safety features. Included is equipment from sensors to actuating devices. The reactor trip breakers and the under-voltage attachment are safety-related. The shunt-trip attachment is not a functional part of the reactor trip system.

Corrective action Items 1 through 9 will be completed prior to startup. Corrective action Items 10 through 13 will be completed as described therein.

We believe that accomplishment of the corrective actions identified above will preclude recurrence of these and similar events and provide adequate confidence that Salem Unit 1 can be safely returned to service.

Sincerely,

R. A. Uderitz

12/82

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Attached are copies of a Commission meeting transcript(s) and related meeting document(s). They are being forwarded for entry on the Daily Accession List and placement in the Public Document Room. No other distribution is requested or required. Existing DCS identification numbers are listed on the individual documents wherever known.

Meeting Title: Briefing on Salem

Meeting Date: 3/2/83 Open X Closed ____

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