BEFORE THE FACT FINDING TASK FORCE

OF THE NUCLEAR REGULATORY COMMISSION

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Re: :

Davis-Besse event :

of June 9, 1985 :

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P R O C E E D I N G S

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Proceedings before the Nuclear Regulatory Commission Fact Finding Task Force in regard to the aforementioned event, held at Conference Room 209, Davis-Besse Nuclear Plant, Oak Harbor, Ohio, commencing on Friday, June 21, 1985, at 10:30 o'clock a.m.

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PRESENT:

J. T. Beard	Dennis Mominee
E. Rossi	Jim Helle
Walt Rogers	Masound Bajestani
Bob Peters	Art Charbonneau
Nick Jackiw	Phil Hildebrandt
John Wood	Larry Bell
Steve Wideman	Wayne Laning
Bernie Beyer	Wayne Shafer
Erdal Caba	Bill Rawles
Jim Long	Mr. Miller
Larry Grime	Sushil Jain
Stan Batch	Walt Rogers

Terry Murray

Friday Morning Session

June 21 1985

10:30 o'clock a.m.

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P R O C E E D I N G S

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MR. ROSSI: If everybody is ready, why don't we begin the meeting, and I guess this meeting was asked for by Toledo Edison, and maybe I'll let you tell us what the meeting is about rather than me try to tell you what I think it is about.

MR. WOOD: This meeting was requested in response to our previous discussions on the guidelines whereby when we have information relating to a root cause identification, it was agreed we would come together and discuss the results of the troubleshooting and the identification of the root cause with the fact finding team as soon as practical. This is the time that was chosen to meet that criteria.

So at this time we wanted to bring the lead people who have reviewed the situation with the auxiliary feedwater valves AF 599 and AF 608 and have them present their results to the fact finding

team for their review.

MR. BEARD: We had a meeting to discuss that action plan. We offered our comments, I think, then you went back and revised your action plan, and so are we here now to talk about the results of that revised action plan?

MR. WOOD: Not to talk about the action plans, but the results of performing against the action plans, of the revised plans.

MR. BEARD: Do we have copies of the revised action plan?

MR. LANING: I don't know.

MR. ROSSI: I think we have asked for that a number of times. I don't know whether we have gotten them. We do want the revised action plans for our records. If we don't have them, we ought to get them fairly promptly after they develop, but I do not want to delay this meeting while we go find out whether everybody has got the revised action plan. Why don't you proceed to tell us what you found out about the problem with 599 and 608.

MR. WOOD: Jim Long, the lead person on this action plan, will be presenting the results.

MR. HELLE: Recognizing that they may not

have the action plan, it might be helpful to review the step of the action plan as you define the results.

MR. LONG: In accordance with Rev 1 of my action plan that was prepared in accordance with our guidelines to follow in troubleshooting, we went down -- the first day we went down and troubleshot AF 608, and that troubleshooting effort was observed by both myself and Masoud Bajestani, and we had two members from the NRC region staff, we had two QC inspectors, and we had both representatives from the electrical and pipe shop maintenance and, in accordance with our action plan, the first item was, it said, "Before beginning troubleshooting work document the as-found condition of the valves. Limit those conditions which can be recorded without changing conditions, that is such things as valve position, general condition, and environmental conditions."

The results of our inspection indicated that we could find no abnormal conditions. The valves appeared in good shape. The valves were well lubricated. We didn't find any missing or broken parts, and this condition was both documented on the

MWO, maintenance work order, and we also took photographs of the valves themselves.

The second step of the action plan said that the torque switch settings were changed for AF 599 and 608 under FCR 8439, and these settings were supposed to be a 1.5 open, 1.0 closed, and these settings should be verified.

At this time we opened the cover of the motor-operated valve. Again we took a photograph of the inside of the operator. We verified that these settings were in fact 1.5 open and 1.0 closed. We proceeded to make a detailed visual inspection of the internals, and again we found nothing abnormal, no wires broke, nothing disconnected, no broken or missing parts.

The third step was to -- it said that the stem thrust load should be measured to verify the thrust calculation. MOVATS, motor-operated valve analysis and test system, should be used to measure the valve stem thrust, time of control switch actuation and dynamic motor current.

At that time we did, in fact, connect the MOVATS equipment to -- we started with AF 608. We proceeded to cycle valve from an open to a closed

position to develop a signature, and we found out on the first run that we still had the SFRCS open signal applied to the valve. So when the valve went shut the first time, it immediately reopened. We determined from that we were not getting a good signature, so we opened a slide link in the connection box to deactivate the open circuit so that we could, in fact, shut the valve to get a good seating torque.

MR. BEARD: Excuse me, Jim. Just a point of clarification. You said you found that you still had the SFRCS closed or open signal?

MR. LONG: SFRCS open signal.

MR. BEARD: Open signal. You were attempting to close the valve?

MR. LONG: Yes, so that when we closed the valve from the local switch, as soon as the valve reached its closed position the SFRCS told it to open, so it immediately turned around and came open. We determined from that that we were not getting a good seating thrust into the seat, so we opened a slide link to deactivate that open circuit.

We then cycled the valve several times while we took and recorded the stem thrust

measurements, the actual switch position, and then after we concluded, took those signatures, then the next step was to verify the magnetic brake.

Step four says that AF 599 and 608 are fast feed operators. A magnetic brake is provided to oppose the motor inertia after the power is removed from the motor. The brake and motors were replaced during the last refueling outage. These brakes should be checked for proper operation.

Okay, again we did a visual inspection of the brake, and we could find nothing abnormal with the brake, and then during the operation of the signatures we verified that the brakes were, in fact, picking up and dropping out as required.

MR. ROSSI: I assume you have records of all that you are telling us?

MR. LONG: Yes, all this information is recorded on the maintenance work orders.

The next step then was to actually verify by our procedure the number of handwheel turns that the bypass contact for the torque switch was set at, since this was one of our hypotheses that we thought that we might have had a misadjusted switch. The next step was to verify the number of turns on the

handwheel of the valve from the fully closed position to limit switch contact 33/AC bypass for the torque switch contact 33/to, which is the torque open switch.

At that time we did, in fact, with the valve in the fully closed position, we recorded the number of handwheel turns that it took for this contact to actually open. That information was again recorded on the maintenance work order.

And then the next step says --

MR. BEARD: Excuse me, Jim, I fail to perceive whether or not that was a normal number or an unusual number.

MR. LONG: The results that we found from that was that it was not correct.

MR. BEARD: It was a correct number?

MR. LONG: Not a correct number.

MR. BEARD: Could you give us some feel for maybe what it should have been and what you found so we have a feel for how-- was it slightly off or way out or what?

MR. LONG: If it is okay, what I would like to do is go through what we did first, then I will give you our conclusions.

MR. LANING: I would like to understand which limit switch. This is the limit switch setting, what I would call the hammer blow motion of the motor operator?

MR. LONG: Yes, in the open direction you have a torque switch contact that would open to deenergize the motor while the valve was in the open position. This torque switch contact is bypassed for a certain amount of valve travel to allow the valve to unseat. What we were verifying is where that contact actually opened in relation to the number of turns on the valve handwheel.

The other thing we were concerned about was that the torque switch might have had a preload on it when it was installed.

So one of the steps was to, with the valve in the mid-position, which means the spring pack in the valve is relaxed, we verify that the torque switch was not preloaded, and again doing a visual inspection we verified that the spring pack was not preloaded, torque switch was not preloaded.

Now, the next step was to have been a visual -- verify by visual inspection that the spring pack model number was correct, and this step

was to remove the spring pack cartridge, disassemble it, and verify that it had the correct number of washers and that they were the right thickness and that the preload on the spring pack was in fact correct.

At this time we stopped our investigation at the request of Ned Shoals, Region III. His concern was that we did not want to change any of the as-found conditions until a determination was made as to whether we wanted to do any further hot testing of the valve, so we did not do step seven of our action plan at this time.

Now, the results of our inspection indicated from the MOVATS signatures was that in both valves the bypass contact opened too early in the stroke to allow the valve to unseat before the torque switch took it out. Based on a review of our procedures and past work orders, the root cause that we have determined is to be improper maintenance personnel actions and basically the complexity of the limit switch setting procedure. We determined that the procedure itself is hard to read and that it would have been very easy for a maintenance man to misinterpret the procedure thereby setting the

switch wrong.

MR. BEARD: Are you saying it is a difficult procedure?

MR. LONG: Yes, it is. The procedure itself is not difficult. It is difficult to interpret if you don't read every step of the procedure.

MR. BEARD: Difficult in an editorial sense.

MR. LONG: In an editorial sense.

MR. BEARD: Did you make your determination or look at the adequacy of it, assuming you get over the hurdle of understanding it, was it accurate or correct?

MR. LONG: One of the corrective actions that we are going to take is looking into whether or not we feel that the present 2.5 percent and five percent opening for our gate valves is adequate.

MR. ROSSI: Did you in the process of the work that you have done determine whether you had ever tested the ability to open this valve after it had been totally closed for a period of time? By totally closed, I mean the SFRCS system is designed to close the valve for some events, and then the

valve would have to reopen. Has that ever been tested or had it been tested after the last time that this bypass switch was adjusted?

MR. LONG: The last previous testing that was performed on both of these valves was December 31, 1984, which was the postmaintenance testing that was done after the refueling outage. At that time both valves successfully passed a surveillance test. It should be noted that that surveillance test is done in mode five, which means that the plant is basically cold and depressurized.

MR. ROSSI: What does the surveillance test consist of? Does it consist of actually closing the valve, seating it, and then reopening it, or a quick cycle where it doesn't fully seat?

MR. LONG: The surveillance test tells us to initiate an SFRCS trip to shut certain valves in the system, and in conjunction with that it also says stroke and time AF 608 and then in another section AF 599.

MR. BEARD: The stroke time you measure, is it on the closed cycle or both?

MR. LONG: They stroke time both cycles and they are recorded and listed in the valve logs.

MR. BEARD: Closed and open?

MR. LONG: Closed and open.

MR. ROSSI: Do they seat on the closed cycle, fully seat?

MR. LONG: That is still a question I have to look into. From reading the ST, it appears that they do in fact seat. If it is tested with the SFRCS initiation. Now, if it is manual initiation with a push button, there is a question of whether or not the valve fully seats before it turns around and starts its open stroke.

MR. ROSSI: You did cycle the valve all the way closed, fully seated it, and then reopened it before you started to look at the settings on these switches; is that correct?

MR. LONG: Yes.

MR. ROSSI: And it worked?

MR. LONG: Yes.

MR. WOHLD: The key thing on this is really -- appears to be the differential pressure across the valve. Surveillance testing is normally done with no differential pressure. It might seat for a long time, but without the differential pressure, you are not going to get a realistic test.

It might be a good time at this point to relate some weaknesses in the normally required testing in these types of valves. We envoke Section 11 of the ASME code, American Society of Mechanical Engineers code, Section 11, that is the normally envoked surveillance test requirement, and Toledo Edison would be fully in compliance with all surveillance test requirements if they meet that code test, code testing requirements.

The weaknesses, I have got three weaknesses where the problems with this valve could be overlooked in the code requirements. First of all, the code considers the safety-related function of the valve first. In this case the safety-related function is to close.

MR. ROSSI: Well, why isn't there a safety-related function for it to open, because my understanding is that the SFRCS system for a steam line break or a feed line break would normally close the valves all the way, and then when pressure in the steam generator recovers, one of the valves would reopen, one to the good steam generator. How was the conclusion arrived at that the safety-related function is only to close the valve?

MR. WOHLD: Okay. You get into complicated evaluations. This is one of the problems with applying Section 11 of the code. In order to arrive at a maintenance requirement in the valve, the fellow at the utility has to decide what the safety function is, and a lot of times there is the weakness right there.

MR. ROSSI: But the utility decides that and in this case they decided the safety function was only to close it?

MR. WOHLD: It is normally opened, so it is passive according to the code in the open direction, so no open stroke is required to be tested, according to the code.

MR. ROSSI: Does the code take into account the fact that there is this one mode where it closes and then has to reopen, or is that, I mean, is that specifically addressed by the code or is that a judgment made by whoever determines what the safety-related function of the valve is?

MR. WOHLD: If Toledo Edison decides that it is not required to stroke open, then there is no code requirement to test that condition.

MR. ROSSI: But a utility could decide, I

assume, under the code that there is a safety-related function for the valve to close and another safety-related function for it to open? .

MR. WOHLD: They could make that determination.

MR. ROSSI: For many valves, I assume that would be the correct interpretation.

MR. WOHLD: Yes.

MR. SHAIFER: Didn't you say in December of 1984 that you tested the stroke time for both open and closed on those valves?

MR. LONG: Yes, they did.

MR. SHAIFER: Has that always been a practice?

MR. LONG: Yes.

MR. WOHLD: They are taking the stroke times, but the code does not require that. I am pointing out some weaknesses in the code test requirements in what they were required to do in terms of a surveillance test and they are doing more than is required in some senses and less than required in another sense.

MR. ROSSI: The code requires them to test it for the safety-related function, and my point is

that there was a safety-related function that the valve open after it has been closed, as well as with it closed, and they may have missed that safety-related function. Somebody may have mininterpreted what the safety-related function is, but that is indeed a safety-related function of this valve, I believe.

MR. WOHLD: I don't think so in terms of the way it would have been evaluated before this event. I don't think there is any doubt that you want it to be open now but inadvertent operator error in miss positions the valve is not considered in determining whether there is a safety requirement to move it back.

MR. ROSSI: Let me go back to that point again because it was my understanding that for a steam line feedline break, that what would happen is that both valves would go closed during the depressurization phase for a steam line feedline break, that they both being closed and then the valve for the good steam generator would then reopen when the pressure recovered.

MR. BEARD: Mr. O'Connor explained to us what he thought the performance of the system is

supposed to be.

MR. WOHLD: Is that right?

MR. ROSSI: Someone told us that in a meeting this week. Do people disagree that is the way if works or not?

MR. WOHLD: It was my impression only the valve to the faulted steam generator would close, that is my impression.

MR. BEARD: May I make a suggestion to either Ernie or Mr. Murray if he is still available we ask Mr. O'Connor to come back to possibly clarify this, or some other technical expert, get an understanding of the ways these valves are supposed to work or the way you want them to work?

MR. BELL: I thought the steam line break, and that is the easiest one to talk about, would reduce reactor coolant system temperature and both steam generator pressures would drop below your load pressure set point.

MR. ROSSI: Because of drop in the temperature or because of some other reason?

MR. BELL: Because of the drop of the temperature in the reactor coolant system. The faulted steam generator pressure drops because of

the break. But that is a cool down again on the reactor coolant system, so that the impact steam generator pressure will also drop, and I thought both steam generators would drop down below your low pressure set point and we would get closure of 608 and 599.

When the main steam isolation valves close, then the faulted steam generator is isolated or boils dry, and the intact steam generator pressurizes above 612, I think as your set point, and is allowed feed; is that a correct assumption on my part?

MR. MURRAY: Let's get the expert.

MR. ROSSI: There is a question of whether in my mind whether the safety-related function in my mind was properly determined or whether there was, there is a problem with the code in that it doesn't take into account inadvertent closure.

We can sort that out whether your expert gets here or not, we can sort that out whether your expert gets here or not. So I don't know that we need to discuss it here. Why don't you go ahead with other weaknesses.

MR. WOHLD: Two others, second one, the

code does not require closure stroke and opening during the surveillance testing against a Delta P.

MR. BEARD: Are you saying the code will be satisfied if it was done with the line voided or cold or any other way?

MR. WOHLD: Cold, not, basically they look for standard conditions if possible. There is no requirement to have a Delta P across the valve. Okay.

MR. LANING: Is this your interpretation of the code, or are there specific statements in the code to this effect?

MR. WOHLD: The code simply says if it required a stroke, you stroke it, time the stroke, compare that stroke to a previous stroke, and if there is a stroke time increase, then it is degrading you know that. If it is degrading, it should degrade under passive conditions as well as Delta P conditions, and you would detect there is a problem occurring and go in and fix it.

MR. ROSSI: The code is really directed, I gather, at checking the valve motor rather than the torque switches and the bypass switch settings and that kind of thing; is that a fair statement? Is it

really directed at testing the combination?

MR. WOHLD: I would like to quote the code, but I don't have it with me. It is basically to look at the valve itself with the operator and to be able to assure that it is ready to perform its function when it is asked, and you do this by looking for degradation in the stroke time.

That gets to the third weakness, however. This valve is, being a motor operated valve, essentially works a constant speed. When the load changes, the motor current changes, and the speed changes almost imperceptably.

You have, what, three percent, five percent slip before it is going to reach its maximum torque. So the basic premise of the code in detecting stroke time changes is not valid in determining degradation of the valve or the ability to perform its function.

MR. BEARD: Are you saying, Pete, that the code specifies some acceptance criteria related to speed versus should have been related to current; is that what you are saying?

MR. WOHLD: Doesn't mention current, basically talks about the speed of the valve stroke.

MR. BEARD: You are suggesting better criteria would be current?

MR. WOHLD: Current, whatever, that is not something I can say what it should be. What it is is inadequate to determine the degradation that will simply result in increased motor currents.

I have dore in-service test program evaluations at a number of utilities, and I have asked this question of every utility I have gone to. They basically say that they really never have identified degradation based on stroke time increases.

The thing either strokes in its designed time or it doesn't stroke at all.

MR. BEARD: So the requirement in the ASME code is stroke time, which relates to speed?

MR. WOHLD: It is looking for stroke time changes. So if you add these factors together, the stroke timing, the surveillance requirements under the ASME code for these two valves were not adequate to detect the degradations in the valve setup that were existing for some time.

MR. ROSSI: You have concluded that the bypass switch setting was incorrect?

MR. WOHLD: Yes.

MR. ROSSI: Based on measurements of the number of turns and so forth. But prior to determining that, you cycled the valve and it worked properly?

MR. LONG: Yes.

MR. ROSSI: How do you know that the bypass setting is the correct setting? Is there some calculation that tells you that that is the correct setting when you take into account the fact that the valve will have differential pressure across it when it has to open or may have differential pressure?

MR. LONG: The torque switch setting we establish for each valve is based on the calculated thrust required to move that valve against its designed Delta P.

MR. ROSSI: The designed Delta P that this valve -- that was used for this valve would include or bracket at least the Delta P that existed during this event, has somebody checked that?

MR. LONG: Yes. The valve was designed to operate against a full 1050 psid.

MR. ROSSI: In the direction that it

existed during this event, or I mean in that direction, because it may be that the differential pressure being in one direction has a different effect than it being the other direction, so my question is does the designed Delta P that the valve was designed for both in direction and magnitude bracket what existed for this event?

MR. WOHLD: It is not a directional valve, to my knowledge, simple gate valve.

MR. ROSSI: It doesn't matter which direction?

MR. WOHLD: Not to my knowledge.

MR. LONG: I don't know if that calculation takes that into account.

MR. GRIME: Has the vendor qualified his statement of that DP that would indicate its directional?

MR. WOHLD: That usually wouldn't be specified.

MR. GRIME: Implying, as you said, that it is a nondirectional?

MR. BAJESTANI: We are not.

MR. ROSSI: For this gate valve then the DP really should apply, regardless of which way it

is, and you believe the torque calculation was done with that kind of DP across it and so forth.

Then why does the bypass setting, why is it adequate, I guess, when there is no DP across the valve and inadequate when there is the DP? That is the bypass setting, not the torque.

MR. LONG: The torque switch, the bypass setting tripped at the same place regardless of whether DP or no DP.

Now the point comes that the existing setting on the torque switch in the nontransient condition still supplied enough thrust to operate the valve against a zero or a small DP condition, even with the improperly adjusted limit switch setting.

The 1 1/2 open setting on a torque switch was supplied enough thrust to the valve to unseat it without turning it off, without the DP condition during the transient, it is apparent we had a DP across the value, that when the torque switch was placed in the circuit, at this time we needed more thrust than was available at that time to unseat the valve.

MR. ROSSI: I understand.

MR. BEARD: I am not sure I understand the answer to your question. Wasn't your question --

MR. ROSSI: The answer to the question was there is a certain torque. Let me give it back to you, see if you agree.

There is a certain torque when you open the valve with no DP across it, and the torque required to open it with no DP is less than the torque required when there is a DP.

So even though the bypass switch works improperly and operates too quickly when you are trying to open the valve, when you are opening it with no DP across it, after the bypass switch operates, there is still the torque required to open the valve is below the torque switch setting. That is what you are saying?

MR. LONG: That is correct. That is why we didn't pick it up on the surveillance testing.

MR. ROSSI: It was done with no DP.

MR. BEARD: The torque switch setting, had it been proper, would have been inadequate for the application like this event?

MR. LONG: The torque switch setting was adequate. Where we placed the torque switch into

the circuit was inadequate. The setting on the bypass was inadequate.

MR. ROSSI: I don't know where you were in your presentation, but why don't you continue.

MR. LONG: From our traces on the MOVATS signature, we determined that on AF 608 the torque switch was placed in a circuit before the valve had cleared its seat by some amount.

This was without a DP. So if you use the hypothesis that there was a DP across this valve, then it would have made the situation even worse. It would have probably never cleared the seat.

On AF 599 we found a gross misadjustment. The bypass on that opened before the valve even had a chance to start to leave its seat.

MR. ROSSI: The valve would still open with no DP across it?

MR. LONG: It did in fact open every time with no DP.

MR. LANING: The torque switch setting does not encompass what I call a hammer blow portion of the valve movement, is that correct?

MR. LONG: That is correct.

MR. LANING: [illegible] my limit switch setting,

the bypass setting, is incorrect such that it puts my torque switch into the circuit before the valve is unseated, that is an excessive torque and the limit switch would engage and stop the valve movement?

MR. ROSSI: The torque switch would engage and stop the valve movement.

MR. MILLER: The limit switch is supposed to bypass the torque switch until it is off the seat. The torque switch is never intended to be able to lift the valve off the seat, because you close the valve and stop the closed motion with the torque switch in closing it.

So you close it tightly, and but when you get the valve closed, now we closed it with no Delta P. To open it with a Delta P you have to bypass the torque switch setting. It won't open unless you bypass the torque switch setting when you are opening it.

MR. BAJESTANI: Torque switch setting calculations, again we assumed we are going to bypass the torque switch setting for that period of that many turns.

MR. BEARD: Jim, can I go back and make

sure I understand what you said? I think I heard you say that the torque switch bypass setting on 599 was grossly misadjusted?

MR. LONG: Yes.

MR. BEARD: What had you said 608?

MR. LONG: It was misadjusted. It is kind of hard to describe. On 608 the valve had cleared the seat or was in the process of clearing the seat, and it was still, the thrust was still on the down slope heading toward running load when the switch actuated. On AF 599 the switch actuated before the valve even hit its peak to unseat the valve.

MR. ROSSI: Walt, do you have comments or questions what they are saying, or anybody else from Region III? We have asked a lot of questions.

MR. ROGERS: The licensee is eventually going to explain this thing. The bottom line is both valves are going to go closed, one on the good generator is going to go open on a large steam line break.

MR. ROSSI: You believe that is the way, for a large steam line break, both valves would close?

MR. ROGERS: Yes.

MR. LONG: There is a point that requires those valves to go closed and one of them to go open, and regardless, the safety function of the valves is to go closed and at some point go open.

MR. ROSSI: It only takes one break location, then it is a required safety function.

MR. ROGERS: I don't think it matters where it is.

MR. BEARD: Does the licensee concur with the statement?

MR. ROGERS: 599 608 will go closed given the scenario in the break at one point in time one of those valves would come open.

MR. MILLER: It depends where the break is. If the break is down near the main turbine on a large break, they probably both will close, but if the break is inside the containment on one steam generator, you will probably only close one of them.

MR. ROSSI: But in determining required safety functions for the valve, it only takes one break location where that is what happens, and then it is a required function of the valve?

MR. MILLER: One break location could close both of them if the break were down near the

main turbine in the turbine building.

MR. MURRAY: The critical point is is there a case then after either one of them closes that that same valve could be called upon to open again?

MR. MILLER: Yes.

MR. MURRAY: That is the critical thing, could be called upon to open after it closed.

MR. ROSSI: The significance of that answer really is that the safety function of the valve includes both its ability to close and its ability to reopen?

MR. MILLER: Exactly right.

MR. WOHLD: I should make a point, regardless of what all the outcome of this is, the testing under the ASME code is not in compliance with the code for several reasons. This is all going to have to be re-evaluated by the licensee in the testing of these two valves brought into compliance with the code.

MR. ROSSI: There are other problems that the way they have been testing them in the past has not complied with the code?

MR. WOHLD: They are on a refueling cycle

frequency for testing per their program right now. The code requires quarterly testing, and based on what we have said here, additionally, an open safety requirement and a closed safety requirement exists, and they had only identified on direction as a safety requirement.

MR. HILDEBRANDT: Testing both directions, it is important that that is on the record.

MR. WOHLD: If they are in full compliance with the code, they would not have detected this problem anyway.

MR. ROSSI: That is an important point, because of the lack of the requirement to test with a DP across the valve.

MR. ROSSI: But had the bypass switch been set correctly, I mean, as far as we know now, and that can be verified later, I guess, by some sort of a test, calculations and all that should have been enough to have resulted in the bypass switch being correctly set, as far as we know?

MR. LONG: Yes.

MR. BELL: Is there not a section of the code that allows the valves to be tested in a cold shutdown period if testing during the operation

would result in a cyclic or unnecessary thermal stresses on the plant, and I would assume you would have submitted a request to defer these valves until cold should down testing because you didn't want to feed into the aux feed nozzles that power?

MR. CABA: On the forward flow direction there was a relief request, so we did not have to do a forward flow test check on the check valves in that line to defer testing of that line to cold shutdown for that reason.

MR. BELL: Was there a similar request made for 608 and 599, not refueling periods, but to cold shutdown periods?

MR. CABA: That was not made. On that question of refueling, we have currently been under a process of totally reviewing our valve program, ASME valve program, with our engineering department and our consultants to just review the status, because currently our valve program, per our valve program we had just been testing and refueling.

We were reviewing all of the valves in the safety systems for, just to double check to see how we were testing and the adequacy of the tests, and we had picked up that for those valves that they

should be, possibly they should be tested quarterly.

There were other questions as far as tech specs isolating the valves, if we could do that quarterly, but that was picked up in that the valve should be tested in both directions was also picked up.

We have not at this point completed our review. We were in the process of modifying our ASME valve program, submitted revision and the change procedures. This was something just going on at that time.

MR. BELL: Since you have found a defective procedure, if I may use that term, that affects all other safety related valves in the unit?

MR. LONG: Yes, it does.

MR. BELL: I guess that is a Region III response.

MR. SHAFER: Part of their corrective action proposal.

MR. BELL: Your corrective action proposals will include not only actions on 608 and 599, but all the other safety motor operated valves in unit to ensure that those bypass switches are now set correctly?

MR. LONG: Yes.

MR. WOOD: In all of our corrective action we are be looking at generic implication, whether that is all nuclear or some other set motor operated valves or some other set.

MR. BEARD: John, maybe I am the only one in the room this way, but I am a bit confused with regard to what the conclusions of Toledo Edison are as a result of this action plan and what the conclusions are that the NRC may have.

MR. ROSSI: I think that is probably premature. I think we are still in the process of discussing it. Why don't we explore the questions on what they have done so far.

MR. BEARD: Before we conclude this meeting, I ask that we summarize, I would like to see someone from the utility summarize what the utilities' conclusions are, and then if we desire, we can address the NRC's conclusions.

MR. ROSSI: I think we are a ways from that yet. You sent somebody down to set this bypass switch, and he does that, I assume, by himself, according to a procedure, and then he closes up whatever and it is supposedly set.

Is there some way after it is set for verifying that it has been set correctly, either in the circuitries or any other reasonable test that could be done?

MR. LONG: There is now. Now that we have seen the capability of the MOVATS, we do now have a capability of checking where that switch really is.

Up until now we depended on our post maintenance testing to tell us whether we had the right or wrong, or basically a go, no go.

MR. ROSSI: What did -- the post maintenance testing would only include the cycling of the valve?

MR. LONG: Correct.

MR. ROSSI: What does the new method consist of?

MR. LONG: Something we haven't developed yet. We are aware that after we set the switch, we can take a signature and verify that the switch is in fact set where it should be, that it is in fact set far enough during the valve stroke that it would allow the torque switch to be bypassed and prevent the valve from torquing out.

MR. ROSSI: That is a test that could be

performed independent of the guy that goes down and sets it? You could send a guy down every -- I am not suggesting that you do this this way, you could send another guy down every month to check it, and he could tell whether it was set properly or not?

MR. LONG: Once those switches are set, unless you have a failure in the valve, they are not going to change position.

The only time that switch position would be changed is in a case where when we relube the operator, we disassemble it, the switches come out. When they are put back in, we may have to reset the position of the switch because of taking the gears out and putting everything back together.

At that time the switch is reset and now under our, what we think we may be doing is we would probably now take every time that we reset that switch, we would take a new signature to verify that the switch is in fact set correctly, but it is not something that you would have to do as a normal, go down every month and check. It it is not expected it would ever change.

MR. ROSSI: What is involved in doing the signature check? Do you have to take covers off the

switch or what exactly do you have to do to do that signature check, to check that the bypass switch is set correctly?

MR. LONG: If I could, I would like Mr. Charbonneau to explain his process.

MR. CHARBONNEAU: For your check, you could do it at the motor control setup by just taking motor current on the MOVATS system and switch actuation. That would be the simple way to do it.

MR. ROSSI: How do you check the proper setting of the bypass?

MR. CHARBONNEAU: Can I put something on the board, I think it will explain all this unseating and the bypass switches and everything else.

MR. ROSSI: You can. The only problem with the board is if you can explain it clearly so we can get it on the transcript. You are from MOVATS?

MR. CHARBONNEAU: Yes. I want to show you a typical thrust signature that we get. This is a gate valve. Now, the thrust is in this direction. An increase in our signature in that direction is an increase in load from this particular point.

Okay. What this is telling us is that the operator turned the switch to open the valve here. The spring pack, what we are measuring, its motion, was compressed in the other direction.

So the first thing that happens when the motor turns on, the spring pack relaxes. It is now relaxed. From here to here the dogs on the worm gear and the standup, it has to rotate 180 degrees, re-engage part of the stem nut to drive the stem in the other direction.

So right here the dogs engage and you get the so called hammer blow, just like trying to open up a stuck door. The stem starts to move. Typically in a valve such as 599 and 608, there is a clevace (phonetic) in here.

The stem will come down into here. You see there is a gap in here. So what happens is the stem, once we have got the stem moving, the load comes down, and it is moving along very nicely until this engages.

This is where the problem was with 599 and 608. We started to pull the disk out of the seat. Once it cleared the seat, the load goes down to so-called running load.

Superimposed on this is switches.

MR. ROSSI: This is current that you are plotting up?

MR. CHARBONNEAU: Thrust, we are actually measuring the motion of the spring pack.

MR. ROSSI: There is an instrument down at the valve?

MR. CHARBONNEAU: This is mounted right on the valve. It is a temporary installation, okay.

Now, let's take a look at switches. Take four alligator clips, hook them to the terminals, I guess you have an example, of the limit switches.

MR. ROSSI: Let me go back to the thrust curve again. I had thought somebody had said that this whole thing would be done at the motor control center.

MR. CHARBONNEAU: I just said that. I was going to get from here to the motor control center. This is -- the base line signatures are done, what we call base line signatures are done at the operator itself, at the valve. This is what we did for this investigation. The switches now, higher is what we saw.

This is the switch actuation signal, this

drop right here tells us that the closed to open torque switch bypass switch is just open.

This one tells us that the open limit switch has just opened. Now, these are taken simultaneously on the screen, and we can line this up to tell us that that bypass switch opened before the valve unseated, and the load under this condition, which was shutdown cold condition, was not high enough to trip the torque switch. With the Delta P you will probably get something that looks like this.

And this magnitude now in the scenario that we are postulating with the high Delta P tripped the torque switch.

Now, we also take motor current, and then we will show you the motor current looks like this. It is an increase in rush running, and this motor current is slower than the MOVATS thrust that hits you at the value.

It is not as sensitive, but you will see this, so what we are saying when we say periodically you could go to the motor control center whatever frequency you have, these terminal connections are in the motor control center normally.

This power lead is in the motor control center, so you could check to make sure your switch is set properly. That switch is supposed to be out here. It cannot open before the valve is fully unseated.

MR. ROSSI: I have a general understanding of the technique now in what you are saying.

MR. BEARD: Let me clarify. When you drew this up on the board, were you drawing it in a way you found it for these particular valves and then pointing out for proper adjustment the position that the limit switch should operate and the load current should have this little peak in really should be further out?

MR. CHARBONNEAU: Absolutely.

MR. LONG: In relation to that top curve we found that AF 608, the switch opened close to the bottom of that down slope, on this side of the peak.

On AF 599 the switch opened on the left side of the peak before the valve even had a chance to reach its peak.

MR. ROSSI: I understand the general technique. Now, what else did you have you wanted to say?

MR. LONG: In addition, on AF 599, when we were installing the MOVATS equipment, we recognized that the shoulder nut that holds the spring pack in place had been installed backwards.

This had no effect on whether or not the valve would have opened or closed, it was just an observation that we noted it was something different that is not supposed to be there. The shoulder nut was installed in a backwards position.

Again, based on the results of the MOVATS data and based on our manually verifying the position of the switch, the actual results of the valve not opening was due to the closed to open torque switch bypass contact opening prior to the valve unseating, and the root of cause of that would have been the operators improperly setting the switch, combined with the problem that we have that our procedure is bulky, and it would be quite possible for a man to misinterpret it.

MR. SHAIFER: Did you say that shoulder nut was installed backwards, both valves?

MR. LONG: Just 599.

MR. ROSSI: Where do you stand at this point? You have not corrected any of the problems.

It is sitting there this way at this point, or have you readjusted the bypass or --

MR. LONG: As I said before, Mr. Sholl said he did not want us to go any farther until it was determined whether or not either the fact finding team or Region III or somebody made a decision whether they wanted us to test the valves in the as found condition with the plant hot or some other testing requirements without changing the as found condition.

MR. ROSSI: Without input from either Region III or our team, what would you propose to do?

MR. LONG: On these two valves our proposed corrective action was to, one, pull the spring packs out, make sure that they are assembled correctly. Two, to set the bypasses accordingly.

One of the proposals we are go to make, we are going to change our procedure, draw up to 2.5 and five percent of hand wheeled turns and change that to ten percent for all valves.

We feel this is in line with, from what I have talked to other utilities, this is in line with other industry practices with other utilities of setting those a standard ten percent on all valves.

This would give us additional margin to make sure the valve is clear of its seat.

MR. ROSSI: You are proposing to do this before you would run any kind of test to verify that you could make the valve do what it did in the event, make it not open again under similar circumstances?

MR. LONG: Again, from our calculations, we are certain that is what the problem is. Now, if it is determined by either Toledo Edison or the NRC that they would like to see us try to establish as close as we can possibly what the conditions were at the time and leave the valve in the as found condition and take another trace, and then to prove that, set the valve correctly, establish the same test condition and take another trace, that is something that I guess is going to have to be decided.

MR. BEARD: Can I ask you what your technical expert here, the consultant, has advised you with regard to the desirability of that kind of thing?

MR. LONG: Our conclusions are if we set the switches correctly, balance the torque switch, make sure the spring pack is installed correctly, we

are certain that the valves will operate as designed without any additional testing.

MR. ROSSI: Assuming you reset it all and then now without trying to reproduce the conditions at cost without the work, would you propose to test it after you go hot under similar conditions or not?

MR. WOOD: I think that gets into the corrective action that we are not really prepared at this time to elaborate to what extent we are going to apply these causes into a corrective action program, that is something that we need to yet talk about within Toledo Edison and propose what that corrective action will be for this circumstance.

MR. ROSSI: At some point we are going to want to break and caucus among the NRC people.

Do you have anything else that you want to state before we take a break and discuss what you told us, or do any of the NRC people have any more questions?

MR. SHAIFER: The last time those switches were set, did you determine if the same individual set both of them, or was it two different individuals?

MR. LONG: Two different individuals.

MR. LANING: Does the torque switch setting include the torque required to change the valve direction in mid stroke?

MR. BAJESTANI: What was the question again?

MR. LANING: It is my understanding that this valve can change direction during mid stroke.

MR. BAJESTANI: It can't.

MR. LANING: Neither of these valves can?

MR. BAJESTANI: If you look at the control circuit, it cannot change its position.

MR. WOHLD: I would like to suggest another idea that has not been brought up on the root cause, and that is standard limit switch setting recommendation by a contractor hired by Toledo Edison, Torrey Pines, recommended a five percent bypass for this particular valve. I think this valve is four inches and above.

MR. LONG: Four inches and above is five percent, less than four inches, 2.5 percent.

MR. WOHLD: For this valve it was five percent of stem travel, which calculated out to be approximately nine turns. The actual number of turns, correct me if I am wrong, was approximately

eight. So they were one turn off out of nine turns in terms of setting this torque switch.

MR. ROSSI: You mean setting the bypass switch? One turn out of nine turns in error in setting the bypass switch, on --

MR. WOHLD: On AF 608. That is too close. There is a certain amount of judgment in determining whether stem travel has begun or not. There is variation in this clevace pin travel and so forth, and not enough margin in that five percent setting to assure that this bypass switch was going to work properly.

MR. MURRAY: Jim said we want to use ten percent rather than five percent.

MR. WOHLD: I believe you have learned five percent is really not adequate. What I am saying as part of the root cause here is that Torrey Pines number.

When you get ten percent off on a hand wheel adjustment, that is too close to call, and I think that is part of the root cause.

MR. BAJESTANI: That is not a calculated value. This is just general practice. All the other utilities, they use anywhere between three to

eight percent.

MR. ROSSI: Where would the calculated number have been?

MR. BAJESTANI: For the torque switch. For the limit switch there is no calculated.

MR. WOHLD: It is pretty much standard industry practice to select something reasonable that other people seem to be using, and in this case they selected five percent, and it just doesn't really guarantee that you are going to have an acceptable valve.

MR. ROSSI: On these valves using the signature technique, what would the number of turns have been for the setting of the bypass?

MR. LONG: Based on the MOVATS recommendation, their recommendation was to add an additional eight turns to our existing procedure, which would have in fact placed it at ten percent.

MR. BEARD: They recommended you go from nine to 17?

MR. BAJESTANI: To 17 turns.

MR. BEARD: That would give you ten percent.

MR. LONG: In addition, part of our action

plan was also to do, reverify our engineering calculations, verify that we did in fact have the right operator, right size motor, that it was developing the correct thrust, and the MOVATS signature indicated those calculations were correct, we do have the right size operator, right size motor, and it is delivering the required thrust for those valves.

MR. BEARD: Could someone show me where is ten percent and where five percent would have fallen?

MR. BAJESTANI: Five percent that we have right now without the Delta P on 599, no, 608, five percent is right here. (Indicating).

MR. BEARD: Five percent is right there, just at the recovery point of the thrust with no DP?

MR. BAJESTANI: Right.

MR. BEARD: Where would ten percent then be?

MR. BAJESTANI: Normal running, right here.

MR. BEARD: The reason I asked the question was, I was trying to understand the question whether or not the thrust with significant DP across it is within the ten percent.

In other words, have you looked at that

part of it? In other words, there is a dotted line the gentleman drew to show what he believed the thrust would go to with the DP, and it shows that the thrust is significantly higher and significantly longer.

And I am trying to ask the question, have we done, have you folks done the calculations or whatever is involved to make sure that the, that signature is well within the ten percent number?

MR. BAJESTANI: There is no calculation to come up with that ten percent. The only way we can do it again if we actually have the Delta P across the valve, operate the valve, and take the signature switch.

MR. BEARD: Why would you believe ten percent is a proper setting if you haven't done that?

MR. CHARBONNEAU: Based on our experience. Your question is well taken. No one, as far as I am aware of, has ever done any test to show how wide does that peak get. It is going to depend on how much Delta P you have, how hard you seated it the last time.

That is why everybody has an MOV, so many variables as to where does that thing drop down.

MR. ROSSI: I can understand why the peak gets higher. Tell me why the peak gets wider? Is that because when you have the DP across it, you actually change some of the dimensions as to when the thing unseats?

MR. CHARBONNEAU: No, I think what it is, as Pete pointed out, this is essentially a constant speed AC motor. It is running at a constant speed. In reality, what is happening during the loading condition on the valve, the stem speed changes and it slows down. The higher the load, the slower the stem.

The portion of the motor, now, the motor was trying to give all of its motion to the stem. Why did the stem change speed?

The reason is because part of the rotational input from the motor is going to the stem, but now a portion of it is being taken up in motion of the spring pack. Once you get to the loaded condition and a stabilized loaded condition, now all the rotational force goes back.

That is why the unseating takes longer, depending on the load. Because you are going to have to compress the spring pack more, which means

you are going to take more time to unseat, move that same distance out of the seat.

MR. BEARD: Going back to your experience on the ten percent setting number, has it been your experience with this particular valve with DPs of the magnitudes we have been talking about here this morning, that the torque is going to be well within the ten percent or right near it, or what has been the experience?

MR. CHARBONNEAU: We have tested something like 1,200 valves, and I will bet that maybe 20 of them have been under flow and pressure conditions.

Most of our testing is to obtain a mechanical and electrical EKG of the valve and what have you, but under those limited numbers of tests, we feel fairly confident that the lo is correct. However, we have taken the position that that is based on our experience.

MR. BEARD: You feel confident that what?

MR. CHARBONNEAU: That is sufficient bypass.

MR. BEARD: Ten percent value?

MR. BEARD: If you use a hard number like ten percent, every valve is different, every gap is

going to be different.

It would be my opinion that 99 times out of 100 the ten percent is going to cover it.

MR. BEARD: I recognize you people make valves and have done this testing on valves for not only the nuclear industry but other industries?

MR. CHARBONNEAU: We are not that old yet. We are just getting into it.

MR. BEARD: In view of the significance of this thing being misset, as apparently was found here, would it be desirable to throw in some margin to provide assurance that you are not going to find out two years down the road as a result of some other event it ought to be 20 turns instead of 17 turns?

MR. CHARBONNEAU: Absolutely, I agree.

MR. ROSSI: Another approach would be if you had the test, you could then determine whether you did or didn't have margin and where you were if you ran the test with DP.

I mean, if you tested it with DP, then you could set it with margin and you know exactly what you had.

MR. SHAFER: Sounds to me like you are

saying essentially that we have a generic problem here and that there may be other plans for those switches set nonconservatively.

MR. BEARD: I think that is beyond the scope of this particular meeting.

Maybe we could handle that in ten minutes or so.

MR. ROSSI: Let's keep -- I want all the people -- I want you to finish what you have got to say, and I want the NRC people to ask whatever questions they have, and then we will take a break and caucus.

MR. LONG: Ideally, probably the best thing to do would be to set this valve up, do a signature on it with its design condition and whatever Delta P that it could be called to act upon.

However, I think we will find that in most, in a lot of cases that is just going to be physically impossible to do, that we are not going to be able to establish the plant condition to subject that valve to the designed DP and cycle it.

MR. BEARD: Are you suggesting the need for lab testing versus using the plant as your laboratory?

MR. LONG: I think we have to depend on similar engineering calculations to say, yes, this operator is sized correctly, and then establishing some reasonable number that we think will be sufficient on the bypass, you know.

MR. ROSSI: Can you run the test for these particular valves? Is that a feasible test to do and a safe way on the plant?

MR. MURRAY: I am not sure we can answer that right now.

MR. LONG: I am trying to develop something to see if we could. So far I haven't.

MR. BEARD: What I have heard in here this morning, it applies not only to this valve, but other valves in your plant and beyond.

The biggest thing I am hearing is there is not a pat answer, so to speak, for each valve, that you have to investigate and do the engineering analysis and engineering tests, something like that, to get the right values.

Am I misunderstanding that or understanding that properly?

MR. LONG: I think we have the engineering values. I think the question now is picking a point

to set our bypass that we feel will cover basically everything.

In other words, right now Torrey Pines has given us a procedure that says for gate valves less than four inches you set this bypass at 2.5 percent of the full hand wheel turns. For torque valves greater than four inches, set that value at five percent.

MR. BEARD: Today you are saying ten percent.

MR. LONG: From our experience we are now thinking that may not be adequate, and we are going to change that, double that requirement on the bigger ones, and it is a factor of four on the smaller ones.

MR. ROSSI: Walt, you said you had a large number of questions. Why don't you ask some questions.

MR. ROGERS: I will try to do this rather quickly. I think I know the answer to the first one. I want to verify.

When you started testing, the valve went closed then came back open. Why?

MR. LONG: The SFRCS still was setup

normal. It was telling the valve, it should be in the open position. That is the normal position of these valves.

MR. ROGERS: What activated the SFRCS?

MR. LONG: That is its normal position. Without an SFRCS actuation, the valves were in normal condition, and the normal condition for those valves, they are normally closed contacts in the open circuit telling those valves they are supposed to be open.

MR. ROGERS: The shoulder nut you found put in backwards in this case didn't affect the operability of the valve. The shoulder nut, could it affect the operablility of the valve if you put these shoulder nuts in improperly?

MR. LONG: Yes. In this case, the way the shoulder nut was put in, it was physically impossible to set the set screw that holds the collar in place.

The result of that could be through use and vibration, this shoulder nut could have backed itself out to where now the spring pack could move in its housing.

Results of that would mean that in the

closed direction the valve could torque out before it ever reached its designed torque set point.

MR. ROGERS: Do your maintenance people know that, that were doing the work on the valve? Is what you all talked about today, the torque switch settings and all this about the bypass, have your people been trained on this and understand the significance associated with these settings?

MR. LONG: I would say yes, the operators have gone or maintenance people have gone through the basic Limi Torque training classes we have had up here.

This procedure that we are using now, the 2.5 and five percent is a recent procedure that we have put in after we had the Torrey Pines study done, and like I said, we have recognized that it is a bulky procedure, and it would be very easy for a man to miss a step if he didn't read it carefully.

MR. ROGERS: The one valve that had some gross misadjustment, I believe is what you all said, I thought you showed a double hammer blow up here, double thrust. I think when you are supposed to be doing this, you are supposed to take the gear train teeth up.

MR. LONG: Yes.

MR. ROGERS: Is it possible they didn't take the gear train teeth up when they set it?

MR. LONG: That is what I think happened. Like I said, the way the procedure is written, tells you to take the backlash up, drop down two or three paragraphs, then it says continue an additional five percent.

It would be very easy for the man to jump down, see five percent, and in fact open the valve a total of nine and a half turns in full shut rather than the nine and a half turns after he had taken the back lash up, and that is what we found.

MR. ROGERS: What you found correlates the backlash was not taken up?

MR. LONG: Yes.

MR. ROGERS: Are you all satisfied that the valve, it is the DP that is causing this problem could cause it to bypass setup; it has nothing to do with the hot condition of the valve or the cold condition of the valve?

MR. LONG: Assuming that there was no leakage, the valves where they are located in a mechanical penetration room and with a static no

flow condition through the normal aux feed system, I would assume that those valves would normally be at the ambient temperature of the mechanical penetration room. So they would normally not be very hot.

If we are postulating we did have some back leaking, then it is conceivable those valves were closer to steam generator temperature at the time of the transient, and then when the auxiliary feed system went off, we could have gotten cold water through from the opposite direction.

MR. ROGERS: Talking about back leakage on check valve?

MR. LONG: Or possibly backup through the steam generator recirc system.

MR. ROGERS: Do you all have any interpretation or anything like that that let you know about that back leakage?

MR. LONG: No.

MR. ROGERS: ASME code testing, is what you all were doing for testing, from what you are saying, do you all agree ASME code and the tech spec operability testing, I mean surveillance requirement, was not sufficient to assure operablility of AF 608

and AF 599?

MR. LONG: Even had we been doing that testing quarterly, it probably would not have indicated this problem. Even if we had done the test every quarter rather than refueling, it probably would not have shown that we had this problem.

MR. ROGERS: Doing the surveillance requirements, tech specs, and ASME code was still not sufficient to assure operability?

MR. LONG: I would say that is true.

MR. BEYER: By definition, operability is determined by the testing, to say it is inadequate for inoperability.

MR. ROSSI: That is a legal problem. Operability to me means the valve will do everything it has to do under the conditions it has to operate. That is the technical definition of operability.

The legal definition may be something else. The technical definition can only be that the valve will perform all the functions it is expected to perform under the conditions it is expected to do that.

MR. BEYER: With that definition I agree

with Jim's response.

MR. BEARD: We have been through that with different people. The standard answer is that the successful completion of all the required surveillance tests is a necessary part of operability, but it is not sufficient.

If your vendor sends you a letter and informs you of some reason that says these valves may not work properly, those valves could be considered to be inoperable even though they considered to pass the test, because of new information or information similar to what we may have heard this morning, could cause you to have to to declare them inoperable.

MR. LONG: In addition to your answer there, we did test these valves at 15:15 the afternoon of the transient with the plant hot. They did stroke. They passed their cycle times correctly.

So whether the plant is hot or cold, the testing the valve under a static condition didn't, still didn't show it up.

MR. ROGERS: That is important to understand your reasoning why you think it is DP. My last question is are you all under an approved

IST test program, correct?

MR. LONG: Yes.

MR. ROGERS: And AF 599 and 608, you did not have relief from that testing requirement at the time of this transient, is that correct?

MR. LONG: Our approved valve program, our in-service testing program --

MR. CHARBONNEAU: The approved in-service testing for the valve program on those two valves did not require a quarterly test.

MR. ROGERS: That was approved, relief request, right, as you all read the code right now, you believe you need a relief request to test those valves in the methodology in which you were testing; is that a safe assumption?

MR. CABA: To go, yes, if it is not practical, to do it alternative to what the code says, you need a relief request.

MR. ROGERS: I think I got all my questions.

MR. BEARD: I don't want anybody to take this the wrong way. I think we are talking here about a root cause determination that has significant implications for other valves at your

plant and maybe beyond, and I am saying that a lot of these results are based on advice from a consultant, MOVATS, and I am wondering in view of the significance of the conclusions you have told us about today, part of your program, Mr. Wood, would include discussing this finding or this test method, significant, or whatever with the people who designed it, which I guess would be Limi Torque, to see if they would concur in either the testing methods or results or things of this nature before people end up with temptation to go out and march into war.

I am asking some sort of confirmation from the people who designed it.

MR. WOOD: Certainly we recognize the overall implications. That is part of the reason we can't sit at this time and tell you what our corrective action will be. We would need first to verify as you are indicating how confident we are of this information before we go and do something of such a large scale nature.

MR. BEARD: I take it you will be discussing this with Limi Torque to confirm these things.

MR. BAJESTANI: We have talked to Limi Torque about one of the problems MOVATS brought up, which was limit torque switch, and Limi Torque claims that when they sent us the Limi Torque actuator, that the torque switch is balanced when it comes, and there is a discrepancy between MOVATS saying it is not necessarily that is true. Limi Torque is saying when they ship their equipment, the torque switch is balanced.

MR. BEARD: That was some years ago.

MR. BAJESTANI: Recently.

MR. BEARD: It was shipped some years ago?

MR. BAJESTANI: Yes.

MR. ROGERS: Limit torque says when they leave the factory, the thing is balanced.

MR. BAJESTANI: Yes, sir.

MR. ROGERS: MOVATS has found in cases it is not balanced or has found occasions it is not balanced.

When you took it apart, was it balanced or not balanced?

MR. BAJESTANI: According to MOVATS, it wasn't balanced.

MR. ROGERS: When you took it apart, was

it balanced or unbalanced?

MR. LONG: When we did the visual inspection, AF 608 visual inspection, it was difficult, we could not notice any preload on the torque switch.

On AF 599, the face plate of the torque switch did have a slight canter to it, indicating that it was imbalanced.

MR. ROGERS: MOVATS was right.

MR. LONG: Yes.

MR. CHARBONNEAU: Since this is going into a public record, I would like to clarify one thing. MOVATS never stated that the torque switches are typically shipped from Limi Torque unbalanced.

Our position is we don't know whether they are balanced or not. Did you get all of that?

MR. ROSSI: Now, I would like to ask the last question before we caucus, and the last question before we caucus is directed to Toledo Edison, and that is what do you expect from this meeting?

MR. PETERS: Can we discuss that after the caucus?

MR. ROSSI: We were going to discuss your

expectations during our caucus. Maybe if you want to.

MR. MURRAY: One thing, we were with this meeting trying to accomplish bringing to you the information we had found regarding cause of problem, as we have talked here.

We started to get off onto what corrective action was going to be. We are not yet ready to talk about corrective action.

We need to take the data and develop the corrective action. I am not sure we were trying to do anything in this meeting other than bring to you the information that we committed to bring to you.

MR. ROSSI: Why don't we caucus then.

(Shortbreak)

MR. ROSSI: Why don't we begin. We had some discussions amongst ourselves in Region III and we are uncomfortable about several things, and the first one is kind of an easy one. We think you ought to go and discuss what you think the root cause is with LimiTorque and see do they agree with that or do they have a problem that they think you haven't found it, you know, that kind of thing? I would assume that isn't very hard to do? Have you done that yet?

MR. LONG: No, we haven't.

MR. ROSSI: We would like to know the results of that when you do it.

The other problem is in looking at some sketches we drew on the board in the other room, we are a little concerned about how much you know about exactly how you got the DP across the valve during the time that you were trying to open it, because it appears that there is a check valve in the line on one side and that the auxiliary feedpump came up to the high speed and tripped and you had the steam generator pressure on the other side. Have you looked at that as to exactly how you got the DP, what caused it, and what effect that the pump coming

up to speed was and that kind of thing? Have you done that kind of analysis of the piping layout, or have you jumped to the conclusion that there must have been a DP?

MR. LONG: I tried to go through the scenario trying to decide what was happening with the feedpump. From what I saw, I couldn't come up with a conclusion exactly what caused the DP.

MR. ROSSI: If you get a DP, you have to have a leak at least in one of the check valves; is that true?

MR. LONG: Yes, either in the check valve or in the steam generator recirc line.

MR. ROSSI: I guess the bottom line of that is you haven't been able to reproduce the failure at all in either valve?

MR. LONG: Correct.

MR. ROSSI: It would appear to us you ought to look at doing a test where you can reproduce the failure and in some informal discussions that we had, that looked like there ought to be ways to do a test that don't involve taking the plant apart or anything. There ought to be ways of pressurizing the lines between two valves

and between the check valve and a valve and actually having a DP there and doing a before and after test to show that both valves fail with DP and when you change the setting on the bypass switches that they don't fail. I mean, that is the way it looks to us.

Now, did anybody else have any comments?

MR. BEARD: Do you have any response?

MR. MURRAY: I would like to think about what you said before we respond.

MR. ROSSI: You haven't been able to reproduce the failure and whether you had a DP or not depends on a lot of assumptions and there is just an uneasy feeling that maybe that isn't the problem. Let me put it a different way, we would have a lot easier feeling in our minds if you could put a DP across the valve and you got the failure again and without the DP you don't get a failure and then with the DP and bypass switch adjusted, you don't get a failure. We would leave, I guess, those details up to you as to what you can and can't do and whether that is not possible to do. I assume you understand our uneasiness of not being able to reproduce the failure.

MR. BEARD: I think that to understand

where we are coming from maybe it is important to recognize that in this event it appeared that there were either two independent failures or common mode failure of these two valves which would have had the result of loss of safety-function auxiliary feedwater system and, therefore, it is, I think, important both from your viewpoint and ours to have as good a possible understanding and confirmation that we know the root cause and you know the root cause because loss of safety function is an important item.

MR. LONG: I made the statement earlier that these valves had a normally open signal from SFRCS and Mr. Miller clarified that for me saying that they had an open signal but it wasn't a normal signal. It was a signal because we had a loss of all four reactor coolant pumps.

MR. BEARD: That is because that was the plant condition at the time you did the tests?

MR. LONG: Yes.

MR. ROSSI: We would like to hear what you decide on this, because I think we have given you our concerns and we would like to hear back from you after you have thought about it.

MR. BEARD: I assume on this and other items, this is the first meeting we have had where you folks have come and told us the results of your troubleshooting effort and you have identified the root cause. I assume at some point you will come out with a report that we will receive with all that information in it.

MR. MURRAY: That is true. Do you want to take five minutes and talk amongst ourselves and then get back?

MR. ROSSI: You may want to spend more than five minutes taking a look at what is involved in this because, you know -- that is up to you, if you want to take five minutes and come back, that is fine, or we can break up for this meeting and meet later in the afternoon.

MR. WOOD: I think we should break up and meet later.

MR. RAWLES: We do have another action plan, the one handed out on the trip throttle valve.

MR. BEYER: We said today would be acceptable for comments if you have comments.

MR. ROSSI: We had two more things, I think, that Bill and I talked about scheduled for

today. Now, we may have this one scheduled also. We were going to talk about the trip throttle valve at some point this afternoon.

The other thing we wanted to do is at 4:00 this afternoon we wanted to have another meeting on the sequence of events to get an update on anything that has been learned on the sequence of events during the time that we have been here that might affect the accuracy of the sequence of events that we gave you a couple days ago, our first produced sequence of events. We also had a few questions which I am going to try to get to Bill an hour or so before that meeting, but we wanted to get a good last dump of what has been learned before we leave.

MR. BEARD: Make sure when we leave tonight that the quarantine list that we all are working from is the same document and is up to date.

MR. GRIME: What about the SFRCS plan?

MR. ROSSI: You had better give us the SFRCS plan to take back to Washington with us. I don't think that one will be quick.

MR. BEARD: You mean in terms of a meeting to discuss it?

MR. ROSSI: That one I think it is not

feasible to do this afternoon. That is not going to be a one-hour review.

MR. BEARD: If it is available it would be certainly to your advantage and ours to give it to us as early as you can.

MR. GRIME: Would that be applicable to any of the action plans?

MR. BEARD: I think so, but if it is finished and ready to be presented this afternoon, then maybe we can get copies rather than wait and get them three days from now or something like that.

MR. ROSSI: Now, the other thing, obviously, we are going back to Washington tomorrow, so on Monday we will reconvene with people in Washington to see where we stand and let them know what we are doing and where we go from here. We have had a number of conference calls with it, but I am sure on Monday people will get a better understanding of what we have been doing and action plans and how we have been handling them and all of that. We are going to have to decide. I think the question is when we come back about whether --

MR. MURRAY: Until you come back can we send to you actions plans and get back from you

comments on them so that we can continue making progress toward our troubleshooting effort?

MR. ROSSI: Certainly, I think you definitely want to send them to us and we will definitely try to figure out some arrangements so that we can respond in some reasonably prompt way.

MR. BEARD: Details of logistics of whether it is sent by phone or some other mechanism may be yet to be discussed or whatever, but we certainly intend to give you a prompt response.

MR. ROSSI: It may be we fly back on Tuesday, that is one possibility. Maybe your people are asked to fly there, that is another possibility.

MR. MURRAY: Talking about the schedule for the rest of the afternoon, let me propose one. I am trying to get the nuclear mission staff together for a staff meeting at 2:00, and I need to have some time with Region III and would like to schedule that for 3:00 and then back with you for sequence of events and wrap up on this AFW 608, 599 thing at the same time.

MR. ROSSI: That sounds good. The only other thing, if we could fit it in there, might be the action plan on the auxiliary feedwater -- well,

the overspeed I don't think they have given us one, the overspeed trip. If we could work that in and we could work the sequence of events in this afternoon, that would be good. Whatever you want to talk about on this 608, 599.

MR. MURRAY: Three items on the agenda for a 4:00 meeting.

MR. ROSSI: We will be here again like we were last time.

MR. BEARD: The reason we would like to get that in is just so we are assured we are not in your critical path and we are not holding you up. If we are not holding you up, that is a different matter.

MR. MURRAY: The completion of these action plans is the critical path for us. We have got to get them produced and get them in to you and get your comments. That is very definitely a part of our path. Anybody having problems with that proposed schedule?

MR. ROSSI: Sequence of events, you want to meet at 4:00 to try to do all this after 4:00? I mean, we have got the overspeed trip throttle valve action plan, we might be able to talk about earlier

sometime.

MR. MURRAY: Are you going to be in a position to talk on that one? It is 3:15 to 3:30. I need you in the 3:00 meeting. We can split up. We can have a Region III meeting going on.

MR. SHAIFER: I don't see us taking an hour for our briefing. Okay.

MR. MURRAY: Maybe we can get what has to be done today between now and 2:00 to allow us to get started as early as 3:00 on these other things.

MR. ROSSI: Why don't we try to get back together at 3:00?

MR. MURRAY: Or a little thereafter.

MR. ROSSI: Scheduling since we have been here has been flexible. We will talk about the overspeed trip that we didn't talk about yesterday and then at 4:00 we will talk about the sequence of events and you can give us some quick feedback on what we just told you on 608. Then between now and 3:00 or earlier, we ought to try to get whatever guidance we can to you for the 4:00 meeting, questions that we would like your best answers on on the sequence of events. The thing on sequence of events is just going to have to be what you know at

this point and not anything that ought to take a long time.

Just make sure that whoever knows the latest on the sequence of events is there and tells us where they have found new information that might reflect on the accuracy of our sequence of events, and I will try to get Bill some specific questions that we have got, and if you have got answers to them, fine. If you don't have answers to them, that is fine too, because, you know, we are just trying to get as much information as we can.

MR. BEARD: The items that I have noted, the majority of the questions are what is the best available information at this point in time on a given matter.

MR. ROSSI: On the sequence of events?

MR. BEARD: On the sequence of events. Just to make sure when we leave here, we have as much up to date as we can get.

MR. ROSSI: Some indication what you are basing that on, certain computer printout you might have so we can verify that. That is a best effort thing. This is going to go on for a while. I am sure things will be found on a new sequence of

events.

MR. RAWLES: It is a matter of getting questions sent back to them so they can answer them.

MR. ROSSI: Can we adjourn this one and meet at 3:00 or soon thereafter?

(Short break.)

MR. ROSSI: This meeting is on the action plan for the auxiliary feedwater pump turbine overspeed trip throttle valve problem. Let me start.

Well, I have got just one question, really, and that is the question on the very last page where you talk about tests to open the valve against full steam generator pressure and making an adjustment for manufacturer's instructions to make sure that that can be opened with a normal force applied. My question is has that kind of test and adjustment ever been made before on the auxiliary feedwater pump turbines?

MR. HOLDEBRANDT: We are unaware if the test has been made before. No records show that it has been made.

MR. ROSSI: No records show it has been made. I just wanted to get a feel for the kind of things that were routinely done with this. It appears this is not something routinely done.

J.T., I think, has some comments and questions.

MR. BEARD: I would like to ask a general question at the front and that is I would be interested to know to what extent or what type of

vendor notices have you received from the Terry turbine folks or other related vendors related to the trip throttle valve and to what extent do they relate to this issue?

MR. HILDEBRANDT: I am unaware that any have come to this company. It is not addressed in the report and we should perhaps ask that question. It was not addressed here. If it had been looked into in the preparation report, I think it would have been addressed here.

MR. BEARD: I guess the reason for bringing up the question is the obvious lesson that we have learned that there may be vendor notices that you may not have received, but that is the only reason.

MR. ROSSI: Terry turbine is going to be involved in this plan and also in the work that goes with this plan, right, you are helping?

MR. HILDEBRANDT: Yes, sir, that is correct.

MR. BEARD: I had a second comment that I will get to. In the back of the action plan when you get to the specific table listing the details of the action plan, on the second page, step No. 3 says

that you plan on performing an exercise of the overspeed trip linkage for aux feedpump turbine No. 1 and No. 2. My question is do we run a risk here of this exercise impacting potential causes or making things go away as we have with other equipment in reactor plants around the country?

MR. HILDEBRANDT: Your question is -- let me rephrase it to make sure I understand your question -- that in doing so would remove any evidence of what might have been the problem; is that what you are asking?

MR. BEARD: I don't think it is in the context of removing or destroying evidence. Let me give you an example. The particular piece of equipment I have in mind is the reactor trip breakers. We know from experience that after the device has been exercised once or twice, possibly just in removal from its cubicle, that its performance thereafter is substantially affected.

I am trying to understand here, since you say "exercise," I guess I should say to what extent has that been considered in light of upsetting what you may want to be trying to find?

MR. HILDEBRANDT: The intent here is to go

through and see what is the condition of the overspeed trip linkage, in the process of doing so, we may make it more easily movable, in fact. The ST that is called out here does that periodically, as you infer from the paragraph. On a judgment we would like to understand how it is working before using it for subsequent operation of the turbine to make sure that the overspeed trip is working correctly and in the process of getting to that point, understand what appears to have been any problem with that overspeed trip linkage by the investigation.

MR. BEARD: I guess it may be that the nature of the beast here is such that hopefully it may be sufficiently different from previous experience with other pieces of equipment that this may not be a problem, but I did have a question in this area.

MR. HILDEBRANDT: It is an exposed mechanical piece of equipment, fairly straight forward, intends to go in and look, examine, determine whether there appears to be parts incorrectly dimensioned, bowed, whatever the problem may be, but then to restore it, ensure it is good

before we go on to running of the turbine, as was discussed in the other action plan, to make sure this is indeed operable.

MR. BEARD: It just occurs to me that, I don't mean at this moment it occurs to me, but I had considered that the overspeed trip mechanism is one of those that you hope won't be needed, won't be used, so it would sit hopefully in a stagnant condition most of the time and then be called upon to operate, so that initial thrust part of it may be of concern, but I guess that is more of a concern with regard to the overspeed trip itself of these two pieces of equipment rather than what you have identified as you broke this program up. Really in this action plan I guess you are trying to address the area, the problems in relatching it, and the difficulty of turning the trip throttle valve afterwards or in the process to relatch it.

Maybe my comment would be better considered in the context of the overspeed trip than in this particular area, but I throw it out so if it is worth anything you can consider it. If it is not worth anything, then you can dispose of it.

MR. HILDEBRANDT: Make sure we don't lose

that information.

MR. BEARD: Look into the matter.

MR. ROSSI: Do you have anything more?

MR. BEARD: Those are the only two comments that I think ought to be presented at this time.

MR. ROSSI: Wayne, do you have anything?

MR. SHAIFER: Yes, I have a couple of comments. On page 5 where you are talking about the maintenance and surveillance/testing history, I note on the surveillance conducted on 5, 21, 23, and 6, I guess I have the same basic question. You say very specifically that no problems were reported with either the linkage or valve opening.

Similarily, on 5, 23 you say no problem with linkage relatch or valve opening. Were there any problems reported at all?

MR. HILDEBRANDT: No, sir. What you see here is basically a reiteration of what the maintenance work order states, and we can only state what the maintenance work order states. There is no other information available. In some cases it doesn't address both questions.

MR. SHAIFER: If you go to the next one on

page 6, you state categorically no problems were reported, but I saw that and I went back to see the same surveillance effort, you were very specific as to what kind of problems were not reported. That is why I asked the question.

MR. HILDEBRANDT: No problems were reported at all. Yes, sir, I understand your question.

MR. ROSSI: I think I heard you say the words you have down here are essentially the same words that were written on the maintenance work order.

MR. HILDEBRANDT: It is only repeating what is there. Nothing else is really available.

MR. ROSSI: Whoever wrote the words there may have seen the same thing each time and just worded it different each time?

MR. HILDEBRANDT: Yes.

MR. ROSSI: So there is nothing more implied in the difference of wording than that is all that was there and that is the way it was worded on the maintenance work order?

MR. HILDEBRANDT: Yes.

MR. BEARD: Did you attempt to try to talk

to the people who did this maintenance?

MR. HILDEBRANDT: I believe Mr. Gradomski did.

MR. BEARD: Your research did include more than just reading the work orders?

MR. HILDEBRANDT: Yes, sir.

MR. SHAIFER: If we can go on to page 7 under the hypotneses, although there have been no reported problems associated with relatching of the overspeed trip device during regularly scheduled testing, personnel involved in the evolutions had noticed some difficulty. Could you explain a little better what that difficulty is?

MR. HILDEBRANDT: A discussion appears to be one of more along the lines of what was run into during the transient, that it is difficult occasionally to reseat the latch. You need to put some English behind it, if you will, to get the latch to take. It is a large mechanical device that is spring loaded. No problems in the sense that it does not work, but difficult in the sense that ocassionally it is difficult to relatch it, that is, it is difficult to overcome the spring force to relatch it. It is a very general statement. That

is all we know at this point.

MR. ROSSI: That was based primarily on discussions with people rather than written?

MR. HILDEBRANDT: That was my understanding. That was passed on to me by Mr. Gradomski.

MR. BEARD: Do we want to go off the record? I wanted to raise the question if you wanted to go off the record. I guess we don't, so Wayne, you are going on?

MR. SHAIFER: Yes, I am going on. I don't have any more questions. Pete, do you have any?

MR. WOHLD: If I read it right, they are apparently going to do a test with the full pressure?

MR. ROSSI: Test and an adjustment, as I understand it. More than just a test if you are going to adjust it so that it relatively takes normal types of valve forces to open it up and you don't need a valve wrench.

MR. HILDEBRANDT: Yes, sir. The adjustment apparently is of limited capability. You can adjust it to provide less opening force required on the throttle trip valve.

MR. WOHLD: Is this another potential generic item? You said very few incidences have occurred where they have tried to reset the trip and throttle valve with the full steam pressure?

MR. HILDEBRANDT: At this plant the surveillance requirements, that is the testing that is done on these are done at low pressure, 200-plus pounds, I don't remember the exact pressure, between 200 and 300 pounds, and they have not done it against a thousand or 900-pound type number. I don't know how that applies to other plants.

MR. ROSSI: Well, this one appears to have low generic applications because it does indicate that they are adjusting things in accordance with the manufacturer's instructions, so what is going on at other plants to a large extent would depend on the preventive maintenance programs and so forth. Preventive maintenance in general may be a generic problem, but aside from that I don't see it as one.

Anything else? Okay I guess we don't have any more comments on this one.

MR. BEARD: Can I ask you a question? Is this an appropriate time to bring up the question about the quarantine list, or should we do that

separately?

MR. ROSSI: Bring it up. What is the question?

MR. BEARD: We have received in the last hour, I guess it is Rev 4 of your quarantine list or you call it the equipment freeze list, and on the first page of that right below item No. 11 there is a change bar in the left margin marked change three. It appears there is nothing in that space and it leads me to believe something was deleted, and I would like to understand what was deleted.

MR. ROSSI: I know what it was. That had been discussed with me.

MR. WIDEMAN: What happened was it was partly my fault for not reviewing it a little more closely, was we had initially put the steam traps in the drains for the turbine bypass valve header as a separate item, then we moved it under, I believe it is item 7, and it didn't get deleted off, so Rev 3 deleted those off of there and we left the blank there.

MR. BEARD: I see. I just wanted to make sure I understood.

MR. ROSSI: I assume that these revisions,

you have records of them all? If somebody had a question of what did you do between Rev 2 and Rev 3 six months from now, you could go back to your files and find that; is that correct?

MR. WIDEMAN: That is correct.

MR. BEARD: It was an administrative correction?

MR. WIDEMAN: Yes.

MR. ROSSI: Okay, then this meeting is finished for right now.

(Short break.)

MR. ROSSI: What we are going to do now is just find out whether there is any new information from any analyses or evaluations or anything else that anybody has found out during the two weeks that we have been up here on the sequence of events with respect to anything that might affect the accuracy of the NRC sequence of events that was sent out on June 19th, I guess.

MR. BEARD: What we called our Rev 1, that is the date of the event. The date of the document is Rev 1, 8:30 a.m., June 19th, 1985 as written in the handwriting there.

MR. ROSSI: Maybe the best thing to do is can you just tell us for starters whether you know of anything new that has developed that affects the sequence of events?

MR. SHAIFER: Would you tell me what date of your sequence of events is, what rev?

MR. ROSSI: The licensee sequence of events?

MR. SHAIFER: Yes.

MR. ROSSI: What is the latest one you have written?

MR. BATCH: We have not updated our

sequence of events from the time of Rev 0, June 14, 1985.

MR. BEARD: They had a sequence of events I think on the same day, did you not, or maybe it was the day before? The day before. They had one dated June 18.

MR. SHAIFER: I don't have it. That is why I asked the question.

MR. BEARD: My memory is they had one dated June 18th at 12:00 or something thereabouts. That was one that we were handed just prior to going into the meeting wherein we discussed our sequence of events. We walked into the meeting with Rev 0 and basically came out of the meeting and deliberated the comments and we created Rev 1 of ours.

MR. BATCH: I did have several comments on the Rev 1 NRC sequence of events that we have here. I guess it is page 4, at the top of the page, where the time is 1:53;22. We had made the comment the last time, I think most of it got incorporated there. There is just a little confusion where the last added sentence should be added to, the pump would not control from the control room. That really

should stay at the 1:53;22 time frame and should not be moved to the 2:01 time frame. I don't know if it is clear where that is supposed to go.

MR. ROSSI: No, it is not clear as a matter of fact the way it is written here, would have moved that to 2:01. You are saying the pump would not control from the control room on a stay with the 1:53;22 time?

MR. BATCH: That is correct.

MR. ROSSI: We will probably reword that to say something like the pump could not be controlled from the control room, so that is really correct; right?

MR. BATCH: Right.

Page 5, we made this comment the last time. I am not sure if we didn't make our point clear or if you decided not to incorporate it, but in the middle of the page under the additional complications, the third item where it talks about the desuperheating spray, that is only one possible explanation there. I don't think that has been confirmed at all. This comes out a little too positively.

MR. BEARD: Now, recognize that when we

wrote this this was the only explanation that your company had come forward with, not anything else. In a meeting the morning of the 19th, I believe it was on the subject of the action plan related to the turbine bypass valve failure, that we got into a discussion and at that time it came to light essentially on the heals of the issuance of this document that the more plausible or more likely thing was something else and we have not revised our document since then.

MR. BATCH: When we reviewed the Rev 0 of this, we just suggested you add the words "it is possible."

MR. ROSSI: Is it still even possible that it is the desuperheating spray?

MR. WOOD: The first sentence is still correct. It is the conclusion then that is drawn by the second sentence that can't be supported.

MR. ROSSI: Aren't we pretty sure now that the desuperheating spray was not the cause of the water hammer?

MR. WOOD: We are reasonably sure --

MR. BEARD: That that is not the cause?

MR. WOOD: -- but since we have not

pinpointed what the cause is, it is difficult for us to say absolutely it would not be this.

MR. BEARD: I think we are trying to put down what is the best shot at this time, and I remember at the meeting that you were referring to earlier it was suggested that we add after the second sentence, "it is believed." We took that comment under advisement. We decided the preliminary nature of this thing said that by definition that this is our best shot at this time, so it can be changed without notice, immediate change. We did not find it necessary to add the words "it is believed" in the second sentence. We did consider the comment.

MR. ROSSI: Probably what we ought to do at this point in time would be to just delete the part about the desuperheating spray, or we can say the desuperheating spray allowed water into the main steam piping also when vacuum was restored and the MSIV opened, there was water hammer damage to the turbine bypass valve. We understand now more about the fact that the desuperheating spray is not nearly as likely now to have caused that damage as we originally thought. Okay. Anything more?

MR. BATCH: Not on the sequence of events Rev 1. We did get a copy of your questions just prior to this meeting. I can go through and try to summarize what our responses are on that. The first one --

MR. BEARD: Hold on just a second. Let me catch up. I have got to get my piece of paper arranged here.

MR. ROSSI: Why don't you go ahead. The first one was the general question, have you learned anything new that affects our sequence of events.

MR. BATCH: In general we found no new significant items in the transient analysis that have not been put forward. Each of these individual items have found out some significant things, what they believe the root causes may be in some of these analyses, but as far as the plant transient and its analysis, we have found no new significant items.

I would like to go through these other items, and I think part of the problem is on some of these additional items is that you have not yet received the plans for things like the startup feedwater valve. You have not seen what Toledo Edison's plan is for that yet. That is where some

of your questions are.

You have questions on what is the latest information on the operation of the startup feedpump control valve SP7A. We know that both startup feedwater valves SP7A and SP7B did operate correctly during the transient. Both position indication we have and aux feedwater flow indication is available showing both those valves did operate. The confusion that was with the operators was the result of a burned out light bulb that was in the reset light on the reset for SP7A. Not knowing if the reset was granted to him, he did not know right away he had control of that valve.

MR. BEARD: If the light were functioning properly, but did not come on, would that be indicative that he had not regained control?

MR. BATCH: Right.

MR. BEARD: So the indication, albeit burned out bulb, was he had not regained control and therefore the valve would be presumed to be staying in the closed position?

MR. BATCH: He did not believe he had control of the valve. Right, that is not really a position indication. The reset is only whether or

not the SFRCS signal was reset.

MR. BEARD: But the SFRCS signal would have closed it.

MR. BATCH: Would have left it closed, that is correct.

MR. BEARD: Therefore, if he hadn't regained it, he would be very reasonable in assuming that it had remained in a closed position?

MR. BATCH: That is correct.

MR. ROSSI: I am not sure I understand now. He had a burned out light bulb on the reset valve SP7A. Did that mean he did not try to open SP7A as a result of that, or are you saying he opened SP7A but didn't think he had opened it?

MR. BATCH: I am not sure if it was the same operator that pushed the reset button, the light that didn't come on that opened the valve in the front, but the valve was opened in the front using the chrome switches.

MR. ROSSI: Okay, so SP7A was opened and you verified that from the sequence of events printout or the alarm printout, one of those?

MR. BATCH: The DADS data does show both flow and valve position showing both startup

feedwater valves did respond.

MR. ROSSI: And you had flow to both steam generators from the startup feedwater pump.

MR. BATCH: That is correct.

MR. ROSSI: Did the flow going to steam generator No. 2 occur prior to or after the auxiliary feed flow occurred to steam generator 2?

MR. BATCH: We had startup flow indicating at approximately 1:51;30 to the steam generators.

MR. ROSSI: 51;30?

MR. BATCH: Yes, approximately that. At about 1:51;24, I believe, was the exact time.

MR. ROSSI: Say it again.

MR. BATCH: 1:51;24, and at 1:53;19 we had our auxiliary feedwater flow start to show, so it was definitely before the auxiliary feedwater flow.

MR. BEARD: Is this time that you just gave us -- is it Stan?

MR. BATCH: Yes.

MR. BEARD: -- the 1:51;24, is that the time the startup feedwater flow went to the first of the two steam generators or went to both or what is that?

MR. BATCH: They both went right within a

few seconds there. 1:51;30, in that neighborhood they did both have flow. It is on your DADS printout that you do have showing that both. It is computer points F878 and F879.

MR. ROSSI: So the times that you are giving us are the times corresponding to the alarm printout?

MR. BATCH: No, I am giving you off the DADS printout now.

MR. ROSSI: This is DADS printout time?

MR. BATCH: Right.

MR. BEARD: Is there a clear and obvious indication on the DADS numerical printout that flow was achieved in the No. 2 steam generator as it was in No. 1?

MR. BATCH: There was a slight amount of flow shown. I don't believe that to be instrument error. I believe that is actually showing a flow.

MR. BEARD: I was thinking more in line of for a period of time there was some value maybe approximating zero and it went to some value rather than it was just bobbling along at relatively the same value throughout.

MR. BATCH: That is correct. It did

definitely indicate above what was the zero indication.

MR. BEARD: For both of them?

MR. BATCH: Right, and we did get flow and valve positions and we even show steam generators repressurizing at this time. There definitely was water going in.

MR. ROSSI: Now, let me just be sure I understand. The startup flow then was the first flow to both of the steam generators.

MR. BATCH: That is correct.

MR. ROSSI: Not auxiliary flow?

MR. BATCH: That is correct.

I think we jumped ahead, did the extra ones on that page, items three and four with your questions.

MR. ROSSI: You didn't address No. 2. I don't know whether you know anything about No. 2 or not.

MR. BATCH: No. 2, it is a little bit, you know the sequence of events when the MSIV went closed. I guess what you really are asking here is any hypotheses we have for why they went closed; is that correct?

MR. ROSSI: Yes, and if it is a very soft hypotheses we can save it for troubleshooting.

MR. JAIN: We have a preliminary action plan prepared for it. We have the soft hypotheses right now. I would suggest, though, that we defer the detailed discussion on it until the final action plan is submitted.

MR. ROSSI: Let's just skip 2 then. I don't think we even need to talk about 2.

MR. JAIN: We could give you the hypotheses that we have now.

MR. ROSSI: I guess some of us would like to hear.

MR. BEARD: We would be receptive to hearing your soft hypothesis.

MR. JAIN: As Stan said, we have the SFRCS trip at 1:35:31 and the alarm typer shows that full trip stayed for about three seconds. There is a two-second time delay, off delay, if you will, so that the alarm then comes on. It stays at least for two seconds, so the typer, when it said it stayed for three seconds, it could really have in actuality stayed for one second. With that premise there, you could say that the alarm was there only for a second

or less.

MR. ROSSI: You mean the real full trip signal was there for one second or less?

MR. JAIN: Correct. The other hypothesis there is that there were half-channel trips occurring within the SFRCS fluctuation channels, and if you postulate a strategical timing of those half trips coming along, you could potentially say that you did have a full SFRCS trip.

The full SFRCS trip is further supported by reseat of the turbine trip alarm which came in from the SFRCS, although the turbine was tripped before, but we got an SFRCS turbine trip alarm which only comes when you have a full trip, and the contact says that the alarm comes on only when you have a full trip of the SFRCS.

The other indication, of course, was coming out of the SFRCS full trip alarm and also the level trip alarm that came on.

MR. BEARD: You said there was a level trip alarm?

MR. JAIN: Let me check that to be sure. Excuse me, it was not a level trip. I was thinking about the ARTS trip, Q777 is the computer point

which comes on. This is the ARTS trip.

MR. BEARD: You are saying the ARTS trip came in which is suggestive of what?

MR. JAIN: The SFRCS also trips the ARTS, but there are three parameters of the SFRCS that trip the ARTS and a full trip of ARTS coming in suggested that we had a full trip of the SFRCS.

MR. BEARD: Are you saying that based on these indications of what had occurred, what is your conclusion with regard to the trip or partial trip or no trip of the SFRCS?

MR. JAIN: Let me get into that. So we are talking about a momentary SFRCS full trip. The postulation we have for the cause of it is the spikes or the output of the level strength, steam generator level strength, that feed the SFRCS. We have seen spurious half trips in the past when we have had turbine trips. We also have had data that B and W sent us from TMI1 from turbine trips which suggested that the level transmitter or the level strength outputs could swing as much as about 70 to 80 inches on a turbine trip, so given a startup level that we had of about 60 or 70 inches, before the initiation of the transient, one or more of the

level transmitters could have seen such a spike resulting in a momentary trip signal to the SFRCS. There have been several things that have happened to support that. I would not like to go into those just to save time, but that is the postulation on spurious full trip, if you will, of the SFRCS.

The question then comes, why did the MSIVs only remain closed? Why didn't all of the SFRCS actual equipment actuate? The hypothesis there is the MSIVs contain selenoid valves and have a typical logic. They also have air-operated pilot valves or air operated relays, if you want to call them. The postulation there is that the trip was so fast and very, very momentary that the seal-in circuit did seal in for the MSIVs to go closed, but a similar situation for the startup control valves which are of the same logic, selenoid valve operated, but don't have the air-operated pilot valves or air-operated relays, did not seal in there.

MR. BEARD: Could you repeat that last sentence about the seal-ins where the MSIVs apparently did, but the seal-ins for what did not?.

MR. JAIN: For the startup control valves which have a similar selenoid-operated logic did not

seal in. That is why we did not see the startup control valves going closed.

MR. BEARD: They have a similar selenoid tning?

MR. JAIN: Right, it was a five selenoid valve and similar actuation channel arrangement.

MR. BEARD: But they did not?

MR. JAIN: Correct.

MR. ROSSI: These level transmitter spikes, are those what you call noise spikes that occurred on the turbine trip, or are they actual fluctuations in the level caused by the tripping of the turbine?

MR. JAIN: I would say it could be a noise spike. The level doesn't actually move down.

MR. BATCH: Caution on the word "noise." Noise is -- an electronic signal type noise like a bad filter. It is not noise that is a problem with the vibration of the electronic signal coming out of that. It appears it may be due to -- this is hypothesis -- an actual shock wave that passes through the steam generator that throws the differential pressure transmitter into an oscillatory condition.

MR. BEARD: It may actually be responding

to some real phenomena in the steam generator in terms of DP?

MR. JAIN: Responding to a phenonena within the steam generator in relation to the level transmitter has sensed that the DP being sensed by it.

MR. BEARD: So it is something in the DP taps as compared to, say, electronic in the transmitter from there on out?

MR. JAIN: Correct.

MR. BEARD: So it is in the phenomenon.

Well, I guess we were really trying to get to your item No. 2. Are you leading us up to that, you think that the rupture control system actuated at least sufficient to cause the MSIVs; is that the bottom line?

MR. JAIN: That is our postulation at the present time.

MR. BEARD: So that is your, quote, soft hypothesis?

MR. JAIN: Yes.

MR. BEARD: Thank you. I think we will be getting into that much more detailed in another meeting, but I am glad to hear your soft hypothesis.

MR. ROSSI: Why don't we just go on to the questions here and tell us what you can. I guess the next one I think you have already answered; right? Actual conditions regarding feed flow to steam generator No. 2 via the startup feedpump?

MR. BATCH: Is there anything different than the question on the first page?

MR. ROSSI: No. I think the operators' indications regarding SP7A, I think you answered that. So the first two were already answered.

MR. BATCH: And I think to a certain extent No. 4 has at least been addressed. Maybe we could elaborate a little bit more about how long you think the actuation signal was present. You mentioned something about there is a two-second time delay.

MR. JAIN: Yes.

MR. BEARD: And why some seal-in circuits apparently functioned and others did not. Maybe we can leave it as what you have said. It is up to you folks.

MR. JAIN: I think it would be wise to defer the detailed discussion as to what sealed in and what may have been the sequence of which half

channel tripping and what channels overlapping each other to a later date.

MR. BEARD: Okay, so we will defer that right now.

No. 7 on this particular list is -- I am curious about what is the best available information at this point in time with regard to the performance of the PORV on its third lift, and in conjunction with that, did anything else take place at precisely this time?

MR. BATCH: I hadn't read your question the way you had just placed it. I didn't know you wanted an update on what we have found on the PORV.

MR. BEARD: That was the whole purpose of the meeting.

MR. ROSSI: The purpose of the meeting really was not to get into the troubleshooting and results of the troubleshooting on the PORV or on any other equipment, but just the sequence of events. The question as I interpreted it was was there anything else in the sequence of events happening at precisely the same time as the third lift of the PORV?

MR. BEARD: We are looking at it from the

context of we are looking at the traces, in this case, of reactor coolant system pressure and trying to understand why the traces went in certain directions or had certain shapes, and we are just saying that the last time we heard from you you said that the PORV apparently did not perform as you would like for it to, and what we are saying is that still the best information or is there some update you can give us or is there some other factor that came into play that caused the trace to do what it did, or where are we?

MR. BATCH: I think the best information is what you already have on here on your sequence of events for PORV actuations and resetting and what the operator did are absolutely correct. There is no new information there.

MR. BEARD: Was there anything else taking place at that time that could have contributed to the pressure decrease that the trace shows?

MR. BATCH: No, when the steam generators are dry, they are essentially dry at this point in time, so that if you are not talking about the secondary conditions affecting the plant, T ave was still heating up and that RCS pressure dropped and,

your question 8 there was strictly due to the PORV operation.

MR. BEARD: I was trying to write down the second part of No. 7 and now you are going on to No. 8. No. 8 is what?

MR. BATCH: No. 8 asked for the cause of the RCS pressure fall between 1:51;18 to 1:51;42 which is the third lift of the PORV. It is tied directly into your No. 7 question.

MR. LANNING: Would you confirm my analysis of the quench tank data. It is my belief the PORV was open until the block valve was closed.

MR. BATCH: As far as we know that is true also. We have flow indication detectors on there that didn't show the flow stopping until the block valve was closed.

Are we done with 7 and 8 then to your satisfaction?

MR. BEARD: I think so. Now we are on No. 9, the steam generator No. 1 trace.

MR. BATCH: The steam generator No. 1 pressure between 1:47;30 and 1:50, this is a point in time where we are running with essentially a steam generator with no established water level.

The atmospheric vent valve had closed at 1:48:01 and we had no feedwater into the steam generator for it to restore any pressure.

MR. BEARD: At 1:48:01? So it closed 30 seconds after the point of interest in this question.

MR. BEARD: Right. So that atmospheric vent valve was at least due to the first 29 seconds of the pressure drop that you are asking there. Is there some particular interest in that point there?

MR. BEARD: No, I am saying that the curve in this region that we described with the time marks has a shape to it, and I am trying to ask questions as to what is the best available information as to what caused that shape, that's all. Very simple.

MR. BATCH: The closure of the atmospheric vent valve is what caused it to restore slightly. The dry steam generator caused it not to restore completely into pressure.

MR. BEARD: Okay.

MR. ROSSI: Can you help me with the inflexion point?

MR. BATCH: The inflexion point is when the atmospheric vent valve closed.

MR. LANNING: How about 1:49, right on the

line?

MR. BATCH: Pressure is just dropping off slightly after it has been restored. We are not talking about a big change in pressure. We are trying to understand why each little line changes inflexions. I am not sure that we can attach a significant implication to that.

MR. BEARD: Just a slope change instead of rate changes at that point.

MR. BATCH: Possibly.

MR. BEARD: The next question is the same type of question. What happened at the sharp change in the shape of the curve between approximately 1:50 and 1:51:17. I guess there is a sharp fall in the curve.

MR. BATCH: The operator manually opened the atmospheric vent valve and we have an indication open at 1:50:13 and he had opened it from our discussions with him in anticipation of the startup feedpump coming on and not wanting to repressurize -- the main steam safety valves again. So the operator manually opened that and that is what lowered the pressure at that time. The other thing that was operating at that time was that we had the auxiliary

feedpump on. It should have been drawing steam out of there also.

We have a steam generator which is not producing any steam and a slight opening on the atmospheric vent valve would cause the pressure to drop in the auxiliary feedpump. Without generating steam we are not cooling off the primary system here substantially.

MR. BEARD: I guess at this point I was under the impression that the two aux feedwater pumps were tripped and therefore I presumed that they would not be drawing steam.

MR. BATCH: One auxiliary feedpump was running at something like 2,000 RPMs here at -- I don't have the exact time. It is right around 1:50, I am sure it was running.

MR. BEARD: Yes. I believe that is No. 1.

MR. ROSSI: So No. 1 would be coming from steam generator No. 1, I guess, at this point, or is it coming from both?

MR. MURRAY: -- reset the low pressure logic it should be lined up, No. 1 pump being fed from No. 1 generator.

MR. ROSSI: I thought we were told by one

of the operators or somebody at some point in time that towards the end of this event it was my understanding all four of those steam valves were open.

MR. MURRAY: Sughil was just trained.

MR. BATCH: The atmospheric vent valve that the operator had open was the main contributor to the drop in pressure at this time, to answer your question.

MR. BEARD: I guess maybe it would be inappropriate to ask whether or not that is what you wanted him to do or not, so I will defer that.

I guess No. 11 then maybe has already been covered, but I was hoping when I wrote No. 11 to say what is the best available sequence with regard to the operation of the atmospheric dumps or atmospheric values both in automatic and manual throughout the whole thing. Maybe we have already covered that sufficiently.

MR. BATCH: If you have some more questions, I can show you what we have on that informationwise. If you take a look at the plots and when the alarm typer shows the atmospheric valve as being closed or not closed, it pretty much

matches up with the inflexion points that are shown for the steam generator pressure traces.

MR. BEARD: Maybe you could help me just one tidbit. You mentioned a sharp fall in steam generator No. 1's pressure following about the time of 1:50 was due to the atmospheric dumps being opened or one dump being opened. If you have it right there in front of you, can you tell me when that dump was closed?

MR. BATCH: It was closed at 1:51:23 -- that is not right. That is not the time, that is when the feedpump was turned on. We didn't get a full close indication on that valve until 1:58:28. We don't really have when you go to throttle it, but it wasn't returned to fully closed to 1:58:28.

MR. BEARD: That is quite long into the event. In fact, I guess you are into the overcooling phase. Okay.

I guess that is the end of the questions I have.

MR. ROSSI: Does anybody else -- Walt, do you have any questions on sequences of events, or do you have anything to add that you have learned recently on the sequence of events?

MR. ROGERS: No, I don't think so.

MR. ROSSI: Wayne?

MR. SHAIFER: I have nothing.

MR. LANNING: I would like for us to discuss the steam generator pressure for steam generator No. 2 at approximately time 1:46.

MR. BATCH: It appears that is right on the line there. That that is the main steam safety valve reseating and pressure is turning around after the main steam safety valve reseated. You can't be positive for sure on these traces what every inflexion point is. I think we can get carried away trying to give you an absolute story for every time the line turns around. That trace is typical of a main steam safety valve reseating and the pressure going back up.

MR. LANNING: At 1:46?

MR. BATCH: That is right where that line is, 1:46.

MR. LANNING: I understand that. I am really fascinated with the curve after that.

MR. BATCH: Pressure is restoring up to what looks like 1:47:32 area, coming back after the safety is reset.

MR. BEARD: Wayne, is your question why is the shape of that curvature different from the two previous lifts?

MR. LANNING: Yes.

MR. BATCH: The other thing that is a little tricky now, is we are talking about steam generators getting very low in level. They are essentially not steaming at all. Any leaking or valves that are not sealed tight can take that steam generator down and it won't repressurize the way you would expect it to do when it still had water level. The repressurization should be getting slower and harder to do each time as the level goes down. A dry steam generator and safety that is just weakening can draw your pressure down or keep it from going back up.

MR. LANNING: Can you continue along that curve a little bit?

MR. BATCH: The atmospheric vent value wasn't opened until about 1:53:58 which is quite a bit beyond that.

MR. LANNING: Let's back up prior to 1:49 or right at 1:49.

MR. BATCH: I don't have anything marked

on this trace for that point in time as the explanation. The steam generator is dry. It can't maintain its pressure and there is no way to keep the pressure restored in that steam generator. This didn't go very low in pressure. It was pretty well bottled up. This is just the bottled up indication of that steam generator.

MR. ROGERS: Just listening to this, I do have one question. When the secondary safety is lifted and through the process did lift, did you see a phenomena where the set points for the safety appeared to trend downward in pressure when they open up?

MR. BATCH: Actually they all seemed to reseat fairly close.

MR. MURRAY: Did the open pressure, pop pressure, change with subsequent pumps?

MR. BATCH: The peaks are all very close. If you assume that is a safety valve lifting, they are all very close. I would not be surprised that a safety valve on subsequent lifts lifted at a lower pressure.

MR. ROGERS: That is a possible phenomena that you would expect to see, that the set point

would decrease in pressure in subsequent pop.

MR. BATCH: I would not be surprised if that occurred. Looking at No. 1 it looks like the third pop is slightly lower, maybe 30 pounds or so. On the No. 2 side they are almost perfectly consistent.

MR. ROGERS: Thank you.

MR. LANNING: What time on the alarm printout do you have the switchover from the condensate storage tank to the service water system?

MR. BATCH: That was at the 1:58 area?

MR. LANNING: Yes.

MR. BATCH: I have to look on the alarm typer. It will take me a few minutes if you want me to look it up now.

MR. LANNING: I cannot tell from the alarm printout whether that is the time the valve started to close or started to transfer or the transfer had taken place.

MR. BATCH: The only alarm we have tells that one of two pressure switches has made. It is not a positive indication that the transfer has occurred.

MR. ROSSI: Do you know that the valves --

the valves did move?

MR. BATCH: The valves did move. The operator said that they did move back. I can tell you when that alarm came in, but I guess I can't actually read you out on the alarm typer that that verifies by itself that the valves did swap. The operators did say that they had to swap them back, so it did definitely move.

MR. LANNING: I think that answers my question.

MR. BATCH: Okay.

MR. WOHLD: Is it appropriate to ask about the steam generator chemistry, if that was looked at?

MR. BEARD: Try and focus on the sequence of events right now.

MR. LANNING: I would like to go back to the alarm printout. In the very beginning around 0:25, 0:39, the first entry is Z840, data point, where it talks to the RPS, SFAS, or SFRCS cabinet door.

MR. BATCH: Okay.

MR. LANNING: Those entries on the alarm printout, are they indicating that the door is being opened and closed?

MR. BATCH: There is an open and a normal. An open indicates a door was open and a normal indicates they all are closed.

MR. LANNING: Is Z8340 for one particular cabinet?

MR. BATCH: No, for all the RPS, SFAS, or SFRCS cabinets.

MR. JAIN: Any one of those.

MR. LANING: All right. So I really can't tell from this printout which cabinet door or doors are being opened?

MR. BATCH: I can speculate for you that the operator is doing his surveillance test at this point in time. He will go into the four RPS cabinets one channel at a time, and into each SFRCS cabinet one channel at a time and that is what is making these come in and out, in and out.

MR. ROSSI: During the event?

MR. BATCH: No, it was before the event.

MR. MURRAY: The first hour of the shift, shift surveillance test.

MR. BEARD: What time are we talking about?

MR. LANNING: This is right at shift

change at 0:39.

MR. BEARD: Is 39 the minutes, 39 minutes after midnight?

MR. BATCH: Yes.

MR. BEARD: This is like an hour before the trip?

MR. BATCH: Yes.

MR. LANNING: When he is doing these surveillance testing, is it unusual to open and close the doors as frequently as the alarm printout shows at 0:45?

MR. BATCH: Each cabinet door has two sets of doors and he has got to go through each RPS caoinet and through the SFRCS cabinets. He will get a minimum of -- I look at these times here, normal, open. I don't think there is anything terribly abnormal about that, no. I would have to review it in detail to see how fast they came in and out there. There are quite a few on there. He has to go through quite a few cabinet doors.

MR. ROSSI: He is taking readings in this? He is opening them up and reading meters or instruments; is that what he is doing?

MR. BATCH: A combination of just

verifying the bistable lights are lit and some of these zones are a very quick observation that the two lights are lit and this side and half of that door, and then you open up the other door which tells him if it is. Yes, they are getting two readings on that and make a couple checkmarks verifying that some of the lights on there, that the bistables are not tripped on the RPS cabinets though. These guys do this every shift and they are very quick at it.

MR. ROSSI: Do they log that on a sheet?

MR. BATCH: ST 5099 -- surveillance test he is completing at that time.

MR. ROSSI: Do they give a time with that log? What I am asking is is there another log sheet that shows that they did this kind of stuff to match up with the alarm printer?

MR. BATCH: Not every time he opens the door. There would be a time when he completed the test he entered in the log and signed it off in front of the data sheet.

MR. ROSSI: At least there would be some comparison one could make if they wanted?

MR. BATCH: Right.

MR. LANNING: My last question is, would you try to explain the time differences between the alarm printout times and the DADS time and tell me what the time difference is between the two sets of data?

MR. BATCH: There are two sets of computers here. There is the station computer which is the mod comp computer and has its own internal clock. There is the computer downstairs that is part of the DADS, and try as they may it seems like they just can't keep them clocks aligned perfectly. When the system would go down or whatever and the clock comes back up, there are slightly different times. They keep them very closely lined up and there was approximately a six-second difference between the time you will see like on the alarm typer, which is from the station computer, and the DADS system, which would be the plots and the detailed printouts, of six seconds. So, I am trying to think which way that was right now. I will have to go back and look again.

MR. ROSSI: But that is going to be a six-second shift that is constant all the way through the sequence?

MR. BATCH: Yes, the one computer clock has a six-second difference from the other computer clock, so even though the data is coming across, it will put a six-second difference in the time.

When you are looking at the plots and the DADS data, those are consistent. It is just when you go to the alarm typer you want to be aware that there is a six-second difference between when the alarm came in and the plots and the DADS information.

MR. BEARD: Sometimes six seconds may be significant if we are trying to figure out from the shape of these curves what has happened.

MR. BATCH: That is correct.

MR. ROSSI: You need to remember that the six seconds is there and part of your data reduction.

MR. BATCH: That's right.

MR. BEARD: Not only that, but in which direction. Like if we are looking at a particular thing like, say the lift of a safety or atmospheric vent or something, to try to explain a particular change of curvature on here, six seconds is big time.

MR. LANING: I think the DADS data are six seconds behind the alarm printout data.

MR. BATCH: Okay. I just didn't remember

at that moment.

MR. ROSSI: Did you verify it?

MR. JAIN: Yes.

MR. ROSSI: You remember it so it is a verification that he has it right.

MR. BATCH: You can look at the DADS data and see exactly when the information starts changing on there, compare that to the alarm typer time and that will -- for the reactor trip.

MR. BEARD: You recognize just for the record when we made up the sequence of events, we were told that that was probably most accurate?

MR. BATCH: The sequence of events printout goes to the nearest ten milliseconds or so in accuracy, so within the station computer it is the most accurate indication of the order that the events occurred.

MR. ROSSI: The sequence of events in the DADS, they don't have the six-second delay or shift between them; they are lined up?

MR. BATCH: No, that is not correct. The sequence of event is a product of the station computer so it has the station computer clock time on it.

MR. BEARD: So that is the same computer that drives the alarm printer?

MR. BATCH: That is correct.

MR. ROSSI: It is shifted also by the six seconds from DADS?

MR. BEARD: In other words, it is a fair statement to say the DADS printout of the data follows everything else by six seconds?

MR. BATCH: Right.

MR. BEARD: But of the two that it follows, the more accurate is the sequence of events printer.

MR. BATCH: The alarm typer can be off by as much as a second or so, but the sequence of events points are separate points that come into the computer that are accurate to about the nearest ten milliseconds. Those give you a very exact sequence that the items occurred in.

They are both timed from the time clock in the station computer so those times will match and will match the alarms.

MR. BEARD: As I started to say when the tape ran out over here, when we made up our sequence of events, we used the sequence of events recorder as the most precise time we believed to be available

to us. Is that still correct?

MR. BATCH: That is correct.

MR. BEARD: And then when we entered things in our sequence of events we went to the alarm print as the second most accurate. Is that still correct?

MR. BATCH: Most accurate meaning most accurate to the actual 24-hour clock? I don't know, but the sequence of events is good to the nearest ten milliseconds. The alarm typer may be off by a second. The Valadine printout is one second data, so actually the alarms and the DADS or Valadine, whichever you would like to call it, are essentially equal in accuracy as far as plus or minus a second, but their clocks in the computers were set for six seconds offset. Now accuracy is talking about something different.

MR. BEARD: I understand. Do you know of any reason why we should revise the sequence of events we got to account for this offset?

MR. BATCH: Most of your times that you have provided on your sequence of events first from the alarm typer and the sequence of events, you didn't give us times based on how you read the

Valadine, I don't think, so I don't think you have problems on that. I will look at that again just to make sure. I will give you comments if I see a problem. I think you are accurate in your description of sequence of events.

MR. BEARD: My general understanding is we are now in agreement that the information in this meeting is the best available at this time as far as you folks go and we go, and that is it.

MR. MURRAY: Yes.

MR. LANNING: The comparison of the primary system pressure and pressurizer level at time 1:47:32 on the DADS.

MR. BATCH: 1:47:32?

MR. LANNING: Yes. The level is going down, the pressure is going up, and the average temperature is continuing to increase.

MR. BATCH: The general trend of the level is for that whole time frame is up. We are getting up to where very high in pressure in level and the PORV is -- well, there is one other thing. It is a temperature compensated level that you have there. We are putting in the cold water from the hot lake into the level sensing temperature detector and it

is sensing the water as if it was all now the colder water, and that could be an effect that is that very slight bump down that you are seeing at that point in time, and it may be due to the temperature compensation effect. The pressurized level is increasing at this point in time, from increasing T ave, though. That may be a slight bump that you are seeing and it may be due to the temperature compensation.

MR. LANNING: The bump being the decrease in level?

MR. BATCH: Right.

MR. BEARD: So it is a phenomena of the instrumentation, and this particular reason doesn't represent what the level is actually doing?

MR. BATCH: The PORV actually does lift there also toward the end of that down cycle, which could throw your level indication off also. That level indication may not be completely accurate once you start depressurizing the top of the steam bubble. We are getting up to where this temperature indication isn't a perfect indication of what actual pressurizer level is.

MR. ROSSI: Anybody have anything more?

MR. RAWLES: On Page 4, in the NRC sequence of events, the team sequence of events, time 01:51:42, pressurizer PORV block valve was started closed by the operator. I guess that is a limit switch indication?

MR. ROSSI: That was information, as I recall, that was given to us in the previous meeting.

MR. BATCH: That is all you know, is that it started to close.

MR. BEARD: We had it previously that it was closed, and in the last meeting when we went into the meeting with Rev 0, I believe it was Stan that pointed out the actual data point of the other computer is when it starts closed, not that it was closed completely.

MR. RAWLES: It is the not open limit switch?

MR. BEARD: Right, that is my interpretation of what Stan said.

MR. RAWLES: When I look at the acoustic monitor, it indicates no flow at 1:51:49 which is seven seconds later.

MR. BEARD: That is correct.

MR. BATCH: That is your best indication

that the valve is now closed.

MR. BEARD: One of the valves is closed.

MR. RAWLES: Something is closed.

MR. BATCH: Something is closed.

MR. RAWLES: How long does it take the block valve to stroke closed?

MR. BATCH: I don't know that I have that number here.

MR. RAWLES: Is it greater that seven seconds?

MR. BATCH: I don't nave that number here.

MR. ROSSI: That is an important point, I think. That is a value that somebody ought to know, because that is important in telling whether the PORV closed before or after or, you know, the block valve closed. I mean if you find out it takes 20 seconds to close the block valve, very clearly the PORV may have closed slowly, but it would have closed.

MR. BEARD: I assume when we made this thing up that the block valve stroke time was approximately that shown between the difference between the PORV block valve starting closed and the acoustic monitor flow --

I was saying as the tape ran out again, the assumption that I made here is that regardless of what happens -- of course the flow appears to have stopped, but we talked about some other valves that had stroke times of like nine seconds and with that in mind it seemed like the seven-second number was not unreasonable and that is not in the sequence of events, but my personal assumption was that wouldn't be an unreasonable number. I wouldn't be surprised by it.

MR. RAWLES: I don't know what the stroke time is.

MR. MURRAY: We can find out.

MR. ROSSI: Anybody have anything else? Let's go off the record then.

CERTIFICATE

I, Celeste C. Dawley, a Registered Professional Reporter and Notary Public in and for the State of Ohio, do hereby certify that I took the proceedings and that the foregoing transcript of such proceedings is a full, true and correct transcript of my stenotypy notes as so taken.

I do further certify that I was called there in the capacity of a Court Reporter, and am not otherwise interested in this proceeding.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Columbus, Ohio, on this 24th day of June, 1985.

Celeste C. Dawley

CELESTE C. DAWLEY, RPR and
Notary Public in and for the
State of Ohio.

My Commission expires August 25, 1987.

DIRECTIONS FOR MAKING CORRECTIONS

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> Indicate the page of the correction, the line number, and then the change to be made and the reason for making the change. Date and sign all correction pages that correspond with your transcript.

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