UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:

IE TMI INVESTIGATION INTERVIEW

of Walter J. Marshall
Operation's Engineer

Trailer #203
NRC Investigation Site
TMI Nuclear Power Plant
Middletown, Pennsylvania

May 17, 1979
(Date of Interview)

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(Tape Number(s))

NRC PERSONNEL:
Doren R. Hunter
Tim Martin
William Foster

FOSTER: The following interview is being conducted of Mr. Walter J. Marshall. Mr. Marshall is a Operation's Engineer at the Three Mile Island Nuclear Power Facility. The present time is 3:47 p.m. Today's date is May 17, 1979. The place of the interview is Trailer 203 located immediately outside the south gate to the TMI site. Individuals present for the interview are: Doren R. Hunter, Inspection Specialist, Performance Appraisal Branch; Tim Martin, Inspection Specialist, Performance Appraisal Branch; and my name is William Foster. I'm the Senior Inspector Auditor of OIA from the NRC, and I will be doing the monitoring of the interview. Prior to the interview being recorded, Mr. Marshall was provided a document explaining his rights concerning information to be obtained regarding the incident at Three Mile Island. In addition, Mr. Marshall was apprised of the purpose of the investigation, its scope, and the authority by which the Congress authorizes the NRC to conduct the investigation. On the second page of the advisement document, Mr Marshall has answered three questions. The questions and Mr. Marshall's answers will now be recorded as part of the interview. Mr. Marshall, do you understand the document?

MARSHALL: Yes.

FOSTER: Do we have your permission to tape the interview?

MARSHALL: Yes.

FOSTER: Do you want a copy of tape or the transcript?

MARSHALL: Yes.

FOSTER: Mr. Marshall, at this time will you please provide a brief summary of your academic background, employment history, as they relate to the nuclear field.

MARSHALL: I graduated in May of 1971 from Christian Brothers College in Memphis, Tenn., with a Bachelor's of Science Degree in Mechanical Engineering. I started employment June 1, 1971 in Newport News Ship Building and worked there for 5 1/2 years, at which time I was a mechanical test engineer and later a ship test engineer on a cruiser project. In February of 1977, I came to Three Mile Island as an Aux Engineer.

FOSTER: Thank you. At this point, I'll turn the interview over to Mr. Martin.

MARTIN: Mr. Marshall, we would like to start this interview with a determination of when you arrived onsite, when you became involved in the event, and where you were in the plant.

MARSHALL: Okay. I received a phone call approximately at 5:00 on the morning of the 28th, telling me that the reactor in the turbine had tripped and that my presence was requested. I got to the control room, I guess it

was 5:35, twenty minutes to six, at which time I came in the control room and I asked one of the aux operators what had happened, and he said that the polishers had tripped us. I immediately went downstairs to the condensate polishing system and started looking around to figure out why the polishers had tripped us. At that time when I got there, the polisher outlet valves were shut and the polisher system had been bypassed. I started blowing down the instrument, air regulators and found them to be full of water; and I blew down some of the service air lines. They also had water in them, and I proceeded over to the service air compressor/receivers and the instrument air compressor/receivers and started blowing them down. I went back up to the control room about 6:15, no 15 to six, I guess. No, fifteen to seven. It took me about an hour down there and at that time we were just getting ready to go into a site emergency. When the site emergency was declared, I proceeded to get the tables and the isoplats out, and then I manned the status board. Shortly after the site emergency was declared, the radiation alarms started or went off in rapid sequence and a general emergency was declared. I would think that that was some time around fifteen after seven. I continued to man the status board, keeping up with information as it came in, what time phone calls were made, and I guess it was around 9 o'clock, Jim Sumes sent me to Unit 1 to escort NRC inspectors that had arrived onsite over to Unit 2. I came back to the Unit 2 control room with the NRC inspectors and let's see. I don't remember exactly what time that was, but it was probably somewhere around 10 o'clock. I'm trying to think what was going on then. I think it was from around that time until later in the afternoon, I was involved with the various

phases of the accident as I was instructed by the shift supervisor for the most part. About 4:30 that afternoon, myself and Fred Shimond and a health physics technician entered the auxiliary building to reclose the breakers on the building's spray pumps, not the building spray pumps, the reactor building sump pumps. We could not get to the breakers because of the high radiation area, so we came out of the auxiliary building shortly after we entered it. Sometime during the day, I was requested by Joe Logan to interview the operators that were involved, who were on duty at the time of the incident; and some time that evening I started doing it. I left the Island, I don't remember what time it was, but I went over to the Observation Center to start talking to some of the aux operators, and I guess the rest or the major part of the evening, I guess from about 9 o'clock that night till 2 or 3 in the morning, I spent talking to Craig Falks and Ed Fredericks and Hugh McGovern and taking a written interview with them. Sometime around 3 o'clock, I called back to the Island to see if Jim Floyd had arrived yet. I was told that he had arrived, and at that time, I came back to the Island to try and locate Jim, at which I didn't have any luck in doing. I finally got a message from him that he had gone home and for me to call him at home. So I called him at home and talked to him and he said that after he got a couple hours, a few hours sleep, he was going to come back in and for me to go on home and get some rest and come back in that night. This was probably 7:30 or 7:00 o'clock Thursday morning. I lost track of time there after awhile.

MARTIN: Mr. Marshall, Tim Martin speaking. I would like to tie down a little better the exact time of arrival by using some events that I know occurred. I would also like to focus in on some of the points that you've raised. The first question I have is, when you arrived in the Unit 2 control room, what was the status of the rector coolant pumps?

MARSHALL: I don't know, Tim. The first thing I did when I came in the control room, Mike Ross, George Kunder, Bill Zewe, Tim Bryan were all in the control room, and the first thing I did was ask the aux operator what tripped us. He said the condensate polishers, and I went down to the condensate polishing system.

MARTIN: Martin, speaking again. When you arrived at the condensate polishers, is this in the vicinity of condensate pumps and booster pumps?

MARSHALL: Yes, it is.

MARTIN: Were the condensate pumps running?

MARSHALL: I didn't notice that the condensate pumps were running at that time.

MARTIN: Were the booster pumps running?

MARSHALL: I didn't notice that the booster pumps were running at that time.

MARTIN: You did indicate that the polishers had been bypassed or something.

MARSHALL: Yes, and I believe that the condensate pumps were running, but I didn't physically go over and verify that the condensate pumps were running.

MARTIN: Martin, again. Were there any other auxiliary operator's in the area?

MARSHALL: There was one auxiliary operator with me, he came down with me, and I believe it was Donny Miller. I'm not sure if it was Donny or not. We proceeded to blow down the regulators in the lines and then went over to the receiver area.

MARTIN: Martin, again. Were there any other auxiliary operators in the area?

MARSHALL: I don't remember.

MARTIN: What was the condition of the hot well at this time?

MARSHALL: I didn't check on the hot well level.

MARTIN: Martin, again. How long did it take you to blow down the instrument air receiver?

MARSHALL: From the time that I started blowing down the individual regulator stations and the instrument air receivers and service air receivers, I would say it was forty-five minutes to an hour.

MARTIN: Martin, again. In your own opinion, could what you had found in the instrument air system have caused the isolation valves on the polishers to go shut?

MARSHALL: Yes.

MARTIN: Can you describe to us how this might have occurred?

MARSHALL: It seems in the past that we, at least once, we got water in the instrument air system and the polisher outlet valve shut. It didn't happen on the shift that I was on, but I came in and relieved the polisher watch that night and I seem to think that the plant tripped because of that, one time. I'm trying to think what month that was. It must have been November, some time in November at which time we determined that the fluffing air valves were leaking by, and over the next week we replaced all the fluffing air valves.

MARTIN: Martin, again. If the fluffing valves were leaking, does this allow water to get back into the instrument air system?

MARSHALL: It can't. A check valve also has to leak by and another manual valve has to be opened.

MARTIN: Given that that night they found a resin plug in the transfer line from one of the polishers and were, in fact, attempting to transfer resins, wouldn't the normal lineup have had only the fluffing valve closed and cycling the fluffing valve, and then the demineral water, and that, in fact, the fluffing valve would have been the only barrier between the instrument air system and the water which existed in the tank.

MARSHALL: True. That and the check valve.

MARTIN: Martin, again. There is some confusion on the fail--what position the outlet valves will fail in, given a loss of air or loss of electrical power. Do you know the position they will fail in?

MARSHALL: They will fail in the closed position and the loss of electrical power. That happened once when the technician mistakenly opened the control power breaker fluid of the polishers. On loss of air, they will also fail. Loss of controlled air they will also fail closed.

MARTIN: Is the air that is utilized to operate the valve, the same air that is utilized for fluffing operations?

MARSHALL: No, I don't. I believe the instrument air is used for operating the valves and the service air is used for fluffing.

MARTIN: Martin, again. How do you then mix the water entering into the ... the potential water leaking into the stationary system, how does it get over into the instrument air system and cause the valves to go shut?

MARSHALL: The service air and instrument air systems cross connect.

MARTIN: Is that cross connect close to the polishers or should we expect to find other failures in the system?

MARSHALL: It's not. Physically, it's on the same level as the polishers, its not in the same immediate vicinity, and I don't, I'd have to look a little harder to tell whether you'd have to expect some more failures.

MARTIN: Martin, again. Is it true that we did find water in the receiver for the instrument air system?

MARSHALL: I believe so.

HUNTER: This is Hunter speaking. The AL in the control room who told you the plant had tripped, what was his name? Was that Donnachie?

MARSHALL: I'm not sure.

HUNTER: Okay. When you went downstairs, you knew when you went down towards the demineralizers and found the outlet valves closed, you indicate you started blowing the air lines to control stations down and the service air and instrument air. Based on your previous experience making sure that there was water--it didn't surprise you when you found water in it?

MARSHALL: Well, it surprised me, because I hadn't seen, I hadn't any reason to expect water to be in there other then the polisher valves being shut and maybe Donny might have been down there then and suggested that we had water in the instrument air system.

HUNTER: If our information is right (Hunter speaking again), they've been working on that problem of the resin feed, of the resin plug for 11 hours.

MARSHALL: I was not aware of that at that time. I later heard that they had been working on it since second shift, not the shift before.

HUNTER: Looking at the, you indicated that the outlet valves and the inlet valves were closed.

MARSHALL: I didn't notice that the inlets were closed. I did notice that the outlets were shut.

HUNTER: Alright. The condition of the polisher when you left and you had just blown all the valves down and then left it to the auxiliary operator, or did you place, did you leave it operating.

MARSHALL: Let's see, let me think a minute. I blew all the regulators down, and at that time, I believe I went back out front and the outlet valves were open at that time. They had come back open.

HUNTER: As soon as you had blown the water out of the lines apparently the outlet valves came back open.

MARSHALL: I believe I remember that.

HUNTER: Okay. In the morning, things you discussed during some previous interviews, that George Kunder had indicated that they had requested Dick Dubiel to make the standard preparations apparently to enter the containment.

MARSHALL: Yes, I believe

HUNTER: And, were you involved in that particular request to go into the containment?

MARSHALL: I vaguely remember somebody saying get RWP ready; Marshall and I will go in or something like that. Nobody approached me and said get ready to go in, but I think I remember hearing somebody say....

HUNTER: Do you know why anyone would have wanted to go in at that time?

MARSHALL: No.

HUNTER: Not specific. Nobody specifically mentioned to you...

MARSHALL: No.

HUNTER: Okay.

MARSHALL: I don't believe. I don't recall.

HUNTER: Okay. And that time then working on the isoplats, the status board, Unit 1 as an escort to bring NRC fellows over back to Unit 2, did various jobs.... What do you like to be called? I hate to use your last name, Mr. Marshall.

MARSHALL: Bubba.

HUNTER: What's your various jobs that you were involved in in the control room area? Do you recall being involved in any of the specific plant

activities, such as the sites, like the reactor building sump pump breakers, you attempted to reach them and close them...that particular activity, do you recall why you were asked to close the reactor sump pump breakers? Who asked, who set that up, who did you go with and why were you going to close them?

MARSHALL: I think the breakers had opened earlier or the bus had been cleared earlier. And there was some suspicion as to whether it was the sump pump breakers that cleared the bus. Joe Chiwastik wanted us to go up and close the sump pump breakers.

HUNTER: Okay. To close the sump pump breakers to, what to, I'm not following the sequence.

MARSHALL: To see if that's what had cleared the bus.

HUNTER: And you never got...

MARSHALL: We never got there, and we subsequently started reloading the bus and the other complements that were energized would stay on the bus, so later came to the conclusion that the sump pumps were the reason that the buss had cleared.

HUNTER: Okay. How far did you make it on the way to the, I guess this is on the radwaste panel there ...

MARSHALL: Yeah. We made it to the 328 elevation of the auxiliary building.

HUNTER: [illegible] did you encounter?

MARSHALL: At that time, the health physics guy. Let's see, I can't even remember his name, but he had the teletector and he was in front of us, and we came in the door by the elevator and started over to the other side of the building and we got about 10 or 15 feet in and he said, it's too hot in here and let's go back. So we turned around and came back. I don't remember, right off the top, what the level was then.

HUNTER: Did you have a self-reading pocket dosimeter?

MARSHALL: Yes, I did.

HUNTER: And so, did you read it at that time?

MARSHALL: No, it was inside the wetsuit.

HUNTER: Did you read it later on?

MARSHALL: Yeah.

HUNTER: Had you received any exposure?

MARSHALL: Yes, I had.

HUNTER: How much?

MARSHALL: I think it was about 60 millirems.

HUNTER: Sixty millirems?

MARSHALL: If I remember correctly.

HUNTER: Any specific jobs that you were involved in, in the plant itself, other than the polishers, auxiliary feedwater system, reactor coolant pump operation, makeup system operation?

MARSHALL: No sir.

HUNTER: Or for the shift supervisor. You indicated you were doing jobs for the shift supervisor.

MARSHALL: No sir.

HUNTER: Okay. Okay, Tim.

MARTIN: This is Tim Martin. To our records, the NRC inspectors were escorted to Unit 2 approximately 10:30 in the morning. At approximately

10:30, the primary plant was between 2000-2200 lbs., was being controlled through some mechanism. Would you happen to know what that mechanism was?

MARSHALL: Well, it would be speculation on my part.

MARTIN: Okay. Sometime after that, approximately 11:30, a decision was made to depressurize the plant. Do you know the technique used to utilize, to depressurize the plant at that time?

MARSHALL: I believe the this was just the effort to insure the core was covered by dumping the core floods.

MARTIN: That's affirmative.

MARSHALL: I believe the pressurizer vent was open, to depressurize itself.

MARTIN: The vent or the EMOV.

MARSHALL: The electromatic relief.

MARTIN: Okay. Tim Martin speaking again. Were you in the Unit 2 control room for most of rest of the afternoon?

MARSHALL: Yes.

MARTIN: Were you in the control room at the time that the reactor building's spray pumps started?

MARSHALL: Yes sir.

MARTIN: Did you hear anything during that period of time?

MARSHALL: I remember I was standing right near the makeup panel at that time, and I remember Gary Miller asking me what was that. I didn't notice anything, and I started looking around at various instruments, primary plant pressure, the pressurizer level and I didn't see anything unusual. I told Gary that and about right after I got that out of my mouth, I looked up and saw that we had the building spray actuation and I did say, "We got building spray." What was it, a 4 lb. signal. Shortly after that, two or three minutes after that, the building spray pumps, in fact, had started and I don't know if I secured them and then, I believe Glen Wright actually secured them. We were both standing there next to each other. This was sometime around 2:00, I guess.

MARTIN: How do you spell Mr. Wright's name?

MARSHALL: W-R-I-G-H-T.

HUNTER: This is Hunter speaking. Let me ask you at that time, I've asked you about some of your background, Walter. You've been as an operating engineer since February 1977.

MARSHALL: Yes.

HUNTER: Did you work Unit 1 and Unit 2?

MARSHALL: No sir. I came to Med Ed in 1977, strictly for Unit 2.

HUNTER: Do you have any operator or license training?

MARSHALL: Yes sir.

HUNTER: Are you a senior license operator?

MARSHALL: Yes sir.

HUNTER: Okay. How long have you been senior licensed?

MARSHALL: Since June-July 1978.

FOSTER: Foster. We are now going to take a short break to change the tape. The time is 4:15 p.m.

FOSTER: We are now going to continue with the interview with Mr. Marshall. The time is 4:18 p.m.

MARTIN: Bubba, Tim Martin, again. Since you indicate that you were by the makeup panel at the approximate time that we had this pressure spike, you probably also had looked at the makeup flows and letdown flows and what pumps were operational. Do you happen to remember any of that?

MARSHALL: I believe the A makeup pump was running, but I'm not positive, and I don't remember what the CL injection flows were or the letdown flow at that time.

MARTIN: As a result of the pressure spike, did we get a ES actuation?

MARSHALL: I don't know. I don't really remember if we got an ES actuation. We did get the 4 lb and the 30 lb signal in the building isolation coolant and the spray pump started, but I don't know if we got the ES actuation at that time.

MARTIN: Martin speaking again. If you have a 4 lb signal, doesn't that normally...

MARSHALL: Yes, it does normally, it does start. I don't remember it happening.

MARTIN: Following the pressure spike, examining the wide range pressure indication, we see a long period, some five to six hours, of slow pressure increase. It gradually works its way up and I have very little information

about what was going on during this period of time. What decisions were being made; what actions were taking place in this period of time. Do you have any ...

MARSHALL: This was prior to the spike.

MARTIN: No, right after the spike, and up to the point where the decision was made let's repressurize the plant. We have five to six hours there that just, very little information and obviously not many radical decisions were being made because of the pressure just hanging up.

MARSHALL: Building pressure?

MARTIN: No, this is reactor quadrant pressure.

MARSHALL: It seems like after we depressurized and dumped the core flood banks, shortly after that, we attempted to increase primary plant pressure and collapse the bubbles in the hot legs. We did it on the A side. We had indication that we collapsed the bubble on the A side. We went to the B side and attempted to do the same thing on the B side, and the bubble reformed in the A side, and we went back and recollapsed the one on the A side and then went to the B side again and collapsed the one on the B side. That took a considerable length of time if I'm not mistaken.

MARTIN: Martin speaking again. Could you describe for us the maneuver that was utilized to collapse these bubbles?

MARSHALL: Essentially blocked the electromatic relief and pressurized it with HP injection.

HUNTER: Hunter speaking. Bubba, were you working with Mike Ross at that time?

MARSHALL: No, I wasn't.

HUNTER: Were you working or who were you working with at that time?

MARSHALL: I don't really remember who I was working with at that time.

HUNTER: Were you moving around with your station at that time. Were you moving around the panel, in other words, with like Bill Zewe or the shift supervisor.

MARSHALL: No. I think, maybe by that time, I was keeping a log. Sometime during the event, I started keeping a log of what was going on, and maybe by then I had gotten into that, but I don't really remember.

HUNTER: Did you start keeping a log about 1300 or 1 o'clock?

MARSHALL: I don't really remember what time it was.

HUNTER: Okay. Looking at the containment spray pumps operating, they were turned off 5-6 minutes after they started. Were you involved in the discussion as far as turning the pumps off, the containment spray pumps off?

MARSHALL: No. There wasn't...If I remember correctly, there wasn't a discussion as to turning them off or not. Joe Chiwasek was there, and after we realized that they were running, we left the building pressure and it was down. It was just a tremendous spike and then came right back down to where it was, and Joe said secure the pumps, and like I say I can't remember if I secured them or if Len Wright secured them.

HUNTER: Hunter speaking. When you saw the spike, Joe saw it, Len probably saw it ...

MARSHALL: This was after it had occurred.

HUNTER: Right. Okay, and it was time to shut the pumps off. The pressure was probably still decaying or it may be

MARSHALL: It spiked, came down almost...

HUNTER: It had already decayed back to normal?

MARSHALL: Yes, it didn't even ink coming back down.

HUNTER: Okay. The question, then, is what was the discussion you fellows had at that time, not today but at that time, as far as what caused that particular spike.

MARSHALL: We couldn't come up with any reason at that time that would have given us a building pressure spike, other than maybe an electrical system or an instrument fault.

HUNTER: Did you call somebody to look at that into that aspect of it or are you aware that they called anybody?

MARSHALL: To be honest, I don't remember.

HUNTER: Joe, the shift supervisor, knew that it had occurred and that he had the pumps turned off. Did you or he tell anybody else about this particular event, that you are aware of?

MARSHALL: I discussed it with Jim Floyd the following night.

HUNTER: Now, you indicated that Gary Miller was there and said, "what's that," and you said then you told him the building spray pumps started.

MARSHALL: Well initially, I looked at the primary indications, thinking that something had happened to the primary, and I want went over and looked at the condenser hot well and secondary side. I didn't see anything. I came back to Gary and he said I don't think it was anything, and then that's when I noticed that we had the ES actuation.

HUNTER: And your comment to him then was that the sprays are on?

MARSHALL: No, I had already told him I don't think anything had happened, and I think Joe said well we got building spray.

HUNTER: Okay. In your discussion around that event, was there an activity that was being performed, that you are aware of, right at the time that spike occurred?

MARSHALL: I think we were cycling the block valve at that time.

HUNTER: Okay. The power operator relief EMOB block valve?

MARSHALL: Yes.

HUNTER: Okay. Did you, at any time, look at the nuclear instrumentation.

MARSHALL: At that particular time?

HUNTER: During the day, really.

MARSHALL: During the day, yes. I did look at the source and intermediate range indication. I'm trying to think when it was.

HUNTER: If you tell us what you saw, I suspect that we could put a time on it.

MARSHALL: It was a spike from source and intermediate range indication.

HUNTER: They both went up?

MARSHALL: They both spiked up.

HUNTER: Okay.

MARSHALL: Slightly. I'm trying to think what we were doing at that time. I think it was earlier in the morning, sometime during the morning, probably around 7 o'clock.

HUNTER: That's when the reactor coolant pumps were off and you were sitting, and

MARSHALL: Yes, I believe it was.

HUNTER: And you saw the the range vent off the intermediate range went up with it, emergency borate. Were you involved in the emergency question or any of those to enter that decision, or a discussion as to why the source intermediate range came off; why the source increase?

MARSHALL: I don't believe. No I wasn't involved in that.

HUNTER: Were you aware during the day that the auxiliary feed pump, the emergency feed pump, discharge valves, the EF B-12 and A and B were closed?

MARSHALL: I was not aware of that until after midnight that night when I was conducting interviews with the operators.

HUNTER: Who indicated to you that they were closed?

MARSHALL: Craig Faust.

HUNTER: Did during the interview, no, okay, that's fine. That's the point where you found out.

MARSHALL: Yes, that's the point.

HUNTER: Did you notify anybody at that time?

MARSHALL: Let's see. I think it was around that time when I talked to Floyd, I think, that I told Jim then.

HUNTER: Okay. Bubba, have you been in Unit 2 during previous unit trips, actually in the control room?

MARSHALL: Yes sir.

HUNTER: As the shift supervisor?

MARSHALL: Not as the shift supervisor.

HUNTER: During the trip and then during the recovery?

MARSHALL: And subsequent recoveries. Yes sir.

HUNTER: Okay. Have you seen the power pressure relief valve open before on a turbine trip with the reactor?

MARSHALL: Yes, sir.

HUNTER: I may assume then that you've also, it closed normally in the past?

MARSHALL: Yes sir.

HUNTER: Okay. And what about the operation of the pressurizer, heaters and the spray in manuals do to the leak on the, apparent leak, on this relief valve and the safety valves. Were you aware of that and had that happened before?

MARSHALL: At the time of the accident, I was under the impression that the pressurizer heaters and spray wern't manual because they were trying to equalize the boron.

HUNTER: Right, and has that happened before that you are aware of?

MARSHALL: That we periodically have to equalize the boron?

HUNTER: Yes, that you have to equalize the boron.

MARSHALL: Yes.

HUNTER: The immediate operator actions then become spray and the heater slats were on during that time.

MARSHALL: Right.

HUNTER: Okay. During a unit trip, in the past apparently you had the engineer in Safeguards following the trip. Is that fairly normal in Unit 1?

MARSHALL: I don't have the background on Unit 1.

HUNTER: I'm sorry, on Unit 2.

MARSHALL: On Unit 2, we've had it at least twice, and without going back and looking, maybe three times.

HUNTER: The operators, when they start the second makeup pump, according to the procedures, or a third makeup pump and you get down to 20 inches of pressurizer, normally go around the panel then and open up one of the suction valves on the ESP, one of the five valves, during your experience on the trips in Unit 2 is that normal to see the guy start the pump, check everything, go around, open the five valves, come back and then effect on the makeup panel? Is that generally the way it occurs?

MARSHALL: Yes sir.

HUNTER: Okay.

MARSHALL: Generally, the first thing that happens is letdown gets secured and a second makeup pump gets started, very shortly into the incident, into the trip.

HUNTER: They had some problems with the 1A makeup pump during the day. Craig Faust, the operators had problems, he tried to start it, he didn't hold the switchover, the oil pressure didn't build up and he let the switch go trip back off. We understand that. I think that was fairly clear. One thing that happened was that the pump had been running for 29 seconds or so and then it tripped for no reason at all, that we can see. The operators didn't trip it. The fact is, in 2 seconds they put it back on. They would have restarted very quickly, because they wanted it on, so it might have been the guy, that the operator might have tripped it, but the interview's don't show that; it doesn't show that the operator tripped it and put it back on. He noticed it was off and then he restarted it. Do you have any experience from an operations standpoint that the A or the makeup pumps, any of them, had tripped before and is there a reason that those things would trip that you are aware of.

MARSHALL: No sir. I don't think we have a history of tripping makeup pumps.

HUNTER: Okay. We've checked into the maintenance aspects of it, and when you look at the maintenance, we're still reviewing it to see if they have a reason that the pumps would actually trip. Okay. Did you get involved with, one thing that occurred during the trip, was that one of the main turbine stop valves failed to close. Did you get involved in that activity at all?

MARSHALL: No sir, didn't. That was another thing that I didn't know until I had looked at the sequence of events.

HUNTER: Okay.

MARSHALL: That was something I did during the day.

HUNTER: Oh, okay...

MARSHALL: During a period of that lost time there, I spent a portion of the time looking for sequence of events.

HUNTER: What--did you see anything that was significant to you during the review of the sequence of events? What was most significant?

MARSHALL: COP 1A was the first thing on there that tripped.

HUNTER: Is there any reason for COP 1A to be the first thing to trip that you're aware of?

MARSHALL: No sir. There isn't. That being the first thing that tripped made me wonder whether the polisher outlet valves went shut after that pump tripped or before it tripped.

HUNTER: Hunter speaking. That's the A condensate pump was the first item to trip on the computer at minus 1 second, I believe.

MARSHALL: Right. And in fact, the condensate booster pumps on the sequence of events didn't trip until 5 minutes after.

HUNTER: Can you explain that, as far as why they ran out in five minutes?

MARSHALL: I can't explain that. It's been my experience with the polishers that when, and if, the outlet valves goes shut that the condensate booster pump is the first thing that trips and that it in turn trips the feed pump. I've never seen a condensate pump trip because of a polisher.

HUNTER: And looking at the sequence of events then, could the condensate polisher valve have gone shut later into the event and at that time would have tripped the condensate booster pumps?

MARSHALL: That's a possibility. I haven't had an opportunity to look at the individual polisher flow charts, but I would think that that might be an indication of the valves going shut rather than flow.

HUNTER: Let me ask you a question. Looking at the flow path out of the condensers, what's the pumps next to the condenser?

MARSHALL: The condensate pumps.

HUNTER: Alright, then they, in fact, discharge through the polishers?

MARSHALL: Through the condensate polishers.

HUNTER: Right and then you have...

MARSHALL: And they provide the suction to the booster pumps.

HUNTER: Was one condensate pump on at all times following the trip.

MARSHALL: Yes sir.

HUNTER: So that would tell us that if one condensate pump was on, and you had no feedwater requirements, no heavy feedwater flow, one condensate pump, since you had the system in manual flowing through the polishers, would have kept three booster pumps suction pressure high enough to keep the three booster pumps on reset.

MARSHALL: Very possible.

HUNTER: Okay. And then the feed pumps. What would have tripped... What trips the feed pumps. Low suction pressure?

MARSHALL: Low suction. Yes sir.

HUNTER: With one condensate pump and three boosters.

MARSHALL: I'm sure that they would have tripped on low suction one condensate pump.

HUNTER: Okay. It would have dropped right back down. So now we're back down to the point, it appears where maybe one condensate pump tripping would just drop your pressures down to the point where the feed pumps couldn't continue.

MARSHALL: That's possible. Yes sir.

HUNTER: Okay. We have not, in fact, picked up a reason for a condensate pump to trip. It wasn't in automatic; it wasn't paired off. Apparently, I thought about a low suction pressure trip, but it doesn't have, a water handle wouldn't even have tripped up on the low suction pressure.

MARSHALL: If I'm not mistaken, the only thing that trips those is under current loads, under voitage reflectable trips.

HUNTER: To reset the, are you, let me ask you a question for my own edification. You are, you have a 4160 volt breakers in Unit 2 for this type of equipment?

MARSHALL: Yes sir.

HUNTER: What is it required to reset that 4160 volt breaker? Just turn the handle?

MARSHALL: Yes. Turn it to go back.

HUNTER: What if an operator physically took the condensate pump and tripped it. Now you saw that it was flagged and he went down and he, in fact, reset it. He would have cleared the trip on it?

MARSHALL: I'm not sure.

HUNTER: Is that when you get an over-current trip or a trip--can you clear it with the switch handle, or do you have to go down locally.

MARSHALL: I'm not sure if you... I believe you have to go down locally and reset the flags. I'm not sure. He can remotely reset the breaker but I'm not sure that you have to physically, I believe, go down and reset the flags. I'm not positive on that.

HUNTER: Okay. Well we'll look at that... Okay, Tim. Any further questions? Okay, we're through right now. We would like to indicate as we go through the sequence and if we pick up any other particular points, specifically being the operations engineer, we may, in fact, want to talk with you again. If we do, we'll contact you; try to set up another interview.

MARSHALL: Yes sir. Okay fine. Thank you.

FOSTER: Thank you, Mr. Marshall. This concludes the interview at 4:40 p.m.