

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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INTERVIEW OF TED LEHMAN AND STEVE FEASEL

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Interview of Ted Lehman and Steve Feasel
by the Nuclear Regulatory Commission Fact Finding
Task Force taken before me, Anne I. McBrayer,
Registered Professional Reporter and Notary Public
in and for the State of Ohio, at Conference Room
209, Davis-Besse Nuclear Plant, Oak Harbor, Ohio, on
Wednesday, June 19, 1985, commencing at 1:05 o'clock
p.m.

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8 On behalf of the Commission.

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11 MEMBERS OF THE TEAM:

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13 J. T. Beard

14 Ernie Rossi

15 Larry Bell

16 Wayne Lanning

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Wednesday Afternoon Session

June 19, 1985

1:05 o'clock p.m.

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

We're going to be talking with Ted Lenman, the shift supervisor that was on duty during the event on June 9th, and Steve Feasel, assistant shift supervisor who was on duty the night of the event. And what we'd like to talk to you about now is we want to get a better understanding of how the emergency procedures or any other procedures were used during the event when things were progressing rather rapidly.

The kind of thing we want to know is, you know, whether somebody was reading them up to a point and then that stopped while people went outside of the control room to take actions or what. And maybe you can just, each of you, tell us what you observed or what you personally did. And I don't know which order you want to start.

MR. FEASEL: Can I go first because I started out in the procedure.

MR. ROSSI: Okay. He may have some

1 questions, this is he being Larry Bell.

2 MR. BELL: This is document emergency
3 procedure EP 1202.01, and perhaps it would be easier
4 for you to show us where you were in the procedure.
5 And then we'll make references so that the
6 stenographer gets notes as to which section was
7 being used, if that's okay with you.

8 MR. FEASEL: All right. That's fine.
9 Initially in the event, we started out with the
10 feedwater runback. And at that point, we did not
11 have a procedure out. It was a very short period of
12 time, and we hadn't had a chance to get into any
13 alarm procedures.

14 Shortly thereafter, the reactor tripped.
15 The reactor operators carried out their immediate
16 actions. And I immediately grabbed EP 1202.01, the
17 emergency procedure. I went into section 3, which
18 is the immediate actions section. Went through
19 the -- verified the manual reactor. It had been
20 manually tripped. And that all rods were on the
21 bottom, and we had indication that power had
22 decreased.

23 They manually tripped the turbine using
24 the manual trip button on the EHC control panel.

1 And they isolated letdown using MU2B, which is the
2 motor operated letdown isolation valve. We then
3 immediately went into the supplementary actions.

4 MR. BELL: Which is section 4 of EP 1202.

5 MR. FEASEL: 1202.01.

6 MR. BEARD: Steve, I don't want to
7 interrupt you any more than necessary, but just so I
8 understand, is there only one section of
9 supplementary actions or is this a particular action?

10 MR. FEASEL: There is only one set of
11 supplementary actions. It consists of about 11 or
12 12 steps. The supplementary actions basically are
13 just trying to establish that, I believe, they're
14 just trying to establish that you have electrical
15 power, air, the instrumentation and the control
16 systems that you need for the remainder of the
17 procedure.

18 And so basically what we did was I would
19 read off the heading step, verify electrical power,
20 and the RO that was on the particular side of the
21 control room would respond back to me, that, yes, we
22 do have A and B bus powered.

23 MR. BELL: One interruption, please. When
24 you go to the simulator, do you go as a shift?

1 MR. LEHMAN: Yes.

2 MR. FEASEL: Yes.

3 MR. BELL: So your operators have used
4 this procedure before with you at the simulator?

5 MR. FEASEL: Not with me in particular.
6 I'm rather new to the shift. I came on the shift
7 back in December, I believe, of last year. And they
8 had already made their trip to the simulator. But
9 they had an SRO similar to me that, you know, all
10 the shifts deal with the procedure in the same way.
11 That's the way we've been trained to deal with it.

12 MR. BELL: Please continue.

13 MR. FEASEL: So we went through the
14 supplementary actions. They verified electrical
15 power. Next step is to verify instrument air.

16 MR. ROSSI: Rather, you know, I don't feel
17 you need to tell us each thing, if you can just tell
18 us, you know, that you went through a certain set of
19 things, that's fine, and then go on to whatever
20 happened next in the event where you did something
21 different.

22 MR. FEASEL: Okay. We got as far as the --
23 well, they started a second make-up pump. We got as
24 far as the step referring to feedwater response,

1 condensate feedwater response. And that is when
2 they noticed that the No. 2 main feed pump speed was
3 decreasing. And then is when we looked up and saw
4 that the MSIVs were both shut. At that point, we
5 attempted to manually initiate SFRCS on low water
6 level.

7 MR. ROSSI: Is that a step in the
8 procedure?

9 MR. FEASEL: Well, the next step after
10 feedwater response so to verify a proper -- or
11 verify -- well, there's another additional step.
12 There's an SFAS, verify that you have not had an
13 SFAS, and they had done that. And that is to verify
14 that you have not had an SFRCS trip, steam feed
15 rupture control system trip.

16 We thought that we had had a partial
17 actuation of the steam feed rupture control system,
18 and -- but not all the equipment had responded. And
19 normally if -- it's been our practice in the past
20 that if you get a partial actuation, that you should
21 try to get the full actuation, get on auxiliary
22 feedwater. And that was the attempt that we were
23 making at that point. The procedure does not
24 specifically address manually tripping SFRCS. It --

1 I think the procedure assumes that it would probably
2 trip itself.

3 MR. BEARD: Steve.

4 MR. FEASEL: Yes.

5 MR. BEARD: What led you to believe that
6 you had a partial actuation? Was there some
7 indication or some equipment changes state or what
8 got you to that point?

9 MR. FEASEL: Some of it was knowledge that
10 I had had from seeing the MSIVs shut before in a
11 case like this where the MSIVs had seen the trip,
12 but they have such a quick response time that the
13 other equipment did not see the trip. In that
14 particular instant -- it was a incident that
15 occurred several years ago. I can't even site a
16 date.

17 In that particular instance, they manually
18 initiated SFRCS, and essentially that was the end of
19 the transient. They went on their emergency
20 feedwater systems and were quickly in a hot standby
21 condition. That was the attempt that we were making
22 at that time.

23 We then, after we manually initiated SFRCS,
24 we did -- still did not see a proper response.

1 That's when we noted that SFRCS had been tripped on
2 low steam pressure, one side for each channel,
3 rather than on the low water level that we'd had
4 originally intended. I believe Ted went in and
5 reset the low steam pressure trips, and then
6 reactuated SFRCS on low water level.

7 MR. ROSSI: Now, could you tell me whether
8 that's in a procedure or is that a training step
9 that you relied on? I mean, is there any procedure
10 that would tell you to do that?

11 MR. LEHMAN: Not really. It was just a --
12 just a natural step. We realized, you know, that
13 the wrong action was taken. We corrected it. More
14 basic training than anything else. It's not a
15 specific thing that would be addressed as such.

16 MR. BEARD: Excuse me, Steve. I'm trying
17 to follow along with where you were, and I think you
18 said earlier that you were into the section, and I
19 hope it's section 4.8 because that's where I'm
20 looking, about the feedwater response.

21 And what I would like to ask you is if
22 that's the place you were when you noticed that you
23 lost speed on No. 2 main feed pump and you noticed
24 that the MSIVs were shut, can you give me some rough

1 feel of how far down on what page you'd gotten when
2 that was noticed or -- and specifically with regard
3 to where you stood on low level limit, because the
4 steps go through a, I guess, a couple or so pages,
5 and they all start out with items dealing with are
6 you on low limit, et cetera. So I'm just wondering
7 if you can give us some feel for where you were at
8 that time.

9 MR. FEASEL: I may have been mistaken. We
10 may have already been past that and into verify
11 proper SFRCS.

12 MR. LEHMAN: We had attained low level
13 limits on both steam generators.

14 MR. FEASEL: That's right.

15 MR. LEHMAN: Prior to realizing MSIVs were
16 closed.

17 MR. BEARD: Let me understand, when you
18 say you had attained low level limits, does that
19 mean that the control system has now shifted to the
20 low level limit mode or the water in the generators
21 is at the low level limit value?

22 MR. LEHMAN: Both. We observed they
23 trended down as to the low level limit, and we
24 watched the feedwater valves open and feed the

1 generators to control at that point.

2 MR. BEARD: Okay. So are you saying your
3 best memory right now is you got through this
4 section on feedwater response when you noticed
5 something astray?

6 MR. FEASEL: Yes. Because they had
7 already shut the condensate pumps off. And I
8 remember specifically verifying SFAS had not tripped.
9 And must have been right at the point where we got
10 to the SFRCS of the step 4.10 on SFRCS that Brian
11 said he was losing speed on the No. 2 main feed pump.

12 MR. BELL: Is it about this time that Mr.
13 Lehman has the equipment operators go into the
14 auxiliary feed pumps or have you realized that
15 hadn't tripped yet?

16 MR. FEASEL: No.

17 MR. BELL: So I'm premature.

18 MR. FEASEL: Yeah, it was in section 4.10
19 where we are. About in that time frame is when
20 Brian noted that the feed pump speed was decreasing.
21 The normal sequence post trip, it normally takes
22 about two or three minutes to get through all the
23 supplementary actions if there's nothing improper.
24 So it's a pretty quick evolution the first time

1 through.

2 MR. ROSSI: Now, were you able to get
3 through all of those supplementary actions or did
4 you get to a point where you just couldn't go any
5 further because --

6 MR. FEASEL: We got to the SFRCS section,
7 and that's when he attempted to manually initiate
8 SFRCS and get a proper SFRCS actuation. That's per
9 step 4.10.2.

10 MR. ROSSI: Okay. And then what --

11 MR. BELL: Excuse me, Dr. Rossi. The
12 definition -- what is the definition of "verify"
13 that's used at this station?

14 MR. FEASEL: Verify.

15 MR. BELL: Is that a visual verification
16 or does it mean that if the automatic action hasn't
17 taken place, are you supposed to manually actuate
18 the components?

19 MR. FEASEL: Yes. We would -- if you
20 don't have what you're supposed to have, you attempt
21 to get it.

22 MR. BELL: Okay. Thank you very much.

23 MR. FEASEL: We knew at that point that we
24 did not have a proper SFRCS actuation, and we were

1 attempting to get one. As I said, Ted reset the low
2 pressure trips, and then reactivated SFRCS on low
3 water level. And at that point we still did not
4 have a proper SFRCS actuation.

5 We had the feedwater stop valves --
6 auxiliary feedwater stop valves were still shut.
7 The -- all four steam valves were open. I believe
8 the crosstie valves, the ones that determine which
9 auxiliary feed pump feeds which steam generator,
10 were still in the process of cycling.

11 The next step in this procedure is
12 determine the status -- or verify adequate
13 subcooling margin. We did that. The next step is
14 overheating, verify adequate primary to secondary
15 heat transfer exists. At this point we didn't have
16 that. The procedure tells us to go to section 6.
17 That's what we did.

18 MR. BEARD: You did not have what?

19 MR. FEASEL: We did not have adequate
20 primary to secondary heat transfer.

21 MR. BEARD: So into what action on
22 overheating.

23 MR. FEASEL: We were into overheating.

24 MR. ROSSI: Okay. So that's what you did.

1 You got to that point in section 4, and then you
2 went to section 6.0?

3 MR. FEASEL: Right.

4 MR. ROSSI: Okay. And section 6.0, the
5 title of that is?

6 MR. FEASEL: Lack of heat transfer.

7 MR. ROSSI: Okay.

8 MR. BEARD: Now, when you say you did this,
9 are you talking about -- I assume you had the book
10 like we have here out in front of you and you
11 actually had turned to this section?

12 MR. FEASEL: Yes.

13 MR. ROSSI: Now, how did you use that one
14 when you got there? Did you --

15 MR. FEASEL: The first step in that
16 procedure is determine main auxiliary feedwater
17 availability. And at that time I believe is when
18 Ted directed people to start taking actions to get
19 auxiliary feedwater back and to make start-up feed
20 pump available.

21 MR. ROSSI: Okay. And now, are there
22 procedural steps that tell you what to do there or
23 is this entirely training and understanding of the
24 plan?

1 MR. FEASEL: It's training and
2 understanding.

3 MR. ROSSI: No procedures to tell you to
4 do that, training and understanding to go --

5 MR. FEASEL: There is a procedure. In our
6 procedure there is an action side and a detail side
7 for all the steps in the first seven sections. The
8 detail side gives a little information on, in this
9 particular case, on how long you can attempt to get
10 main and auxiliary feedwater -- or auxiliary
11 feedwater back before you have to go further into
12 the procedure.

13 The guidance here is that as long as you
14 have one -- at least one steam generator with
15 pressure greater than 960 pounds or water level --
16 or I should say and a water level greater than 8
17 inches, that this is where you should place your
18 efforts.

19 MR. BELL: Did you use this, to your
20 memory, did you use this side of the procedure or
21 you just remember that it says this from training
22 or --

23 MR. FEASEL: In my case, I had remembered
24 that step from training.

1 MR. BEARD: Steve, going back, I think you
2 said a minute ago that about the time you got into
3 section 6, this was about the time that Larry was
4 bringing up earlier, that this is when the shift
5 supervisor started dispatching people out in the
6 plant for, I'll call it, recovery actions?

7 MR. FEASEL: Yes.

8 MR. BEARD: Okay. Was a part of that
9 someone dispatching you?

10 MR. FEASEL: Yes.

11 MR. BEARD: Could you talk about that area?
12 In particular, you know, what were you told to do,
13 where were you in the procedure at the time you left,
14 just the general situation surrounding your being
15 instructed to go someplace and do something.

16 MR. LEHMAN: Well, at this time he was
17 reading the procedure in the background. You know,
18 I knew he was going through that because, you know,
19 the operators were responding. When we tripped the
20 SFRCS and observed that it was not functioning
21 properly, he saw that the aux. feedwater block
22 valves were closed.

23 I had observed that the pumps had tripped.
24 That's when we started dispatching people. I sent a

1 man out to unlock and open AF 599 and 608. The
2 primary side reactor operator was the one that
3 dispatched two EOs to the aux. feed pump room in
4 attempt to reset pumps. At the same time Steve was
5 in the same key locker. He said he was going to get
6 the start-up feed pump. It was just all actions,
7 you know, everybody just responded together.

8 MR. BEARD: So what I hear you saying is
9 it's more of a -- the individual knowing what needs
10 to be done and he did it rather than being told to
11 do it?

12 MR. LEHMAN: Um-hmm. It was really a --
13 between the four of us in the control room, it was
14 a -- just like a coordinated response to the
15 situation.

16 MR. BEARD: Okay. Do you have any idea
17 since you're speaking, Ted, about this, where in the
18 procedure Steve was at the point in time when he
19 left -- or I'll say exited the procedures and went
20 outside the control room?

21 MR. LEHMAN: Just about where he said he
22 was at. He was in section 6, lack of heat transfer.
23 While he was out of the control room, there wasn't a
24 lot at that point that we could do. The secondary

1 side operator kept doing what he could with the aux.
2 feed pumps, but, you know, there just wasn't
3 anything there for him. At this time I went to the
4 emergency plan -- or the --

5 MR. ROSSI: Emergency.

6 MR. LEHMAN: Excuse me, the emergency
7 procedure. And instead of trying to catch up to
8 where he left off in there, I pulled out the flow
9 charts that are in the back of each section and used
10 those as a quick review for myself. It was easier
11 for me at that time to use those. And I traced back
12 through the procedure to verify that we had gone to
13 the right place. I first went to the one that's in
14 the back of the supplementary actions.

15 MR. BEARD: This is section 4?

16 MR. LEHMAN: Section 4. I just pulled it
17 just out of the book like this. I traced myself
18 through it until I come to the point where it has
19 you exit to section 6.

20 MR. BEARD: Okay.

21 MR. LEHMAN: Then I went to section 6 and
22 pulled the flow chart out of the back of that and
23 traced myself down through that.

24 MR. BEARD: All right. How far did you

1 get into that? Just for the sake of the record,
2 it's a --

3 MR. LEHMAN: You really just get to the
4 first step, that is a decision box where you -- it
5 says main or auxiliary feedwater available. And
6 it's a yes or no box. And it was at that point that
7 we were waiting to see if we could say yes or no.

8 MR. BEARD: Well, did you -- I need -- I'm
9 trying to understand, was there uncertainty at this
10 point or was it that you didn't have main or aux.
11 feedwater available at the moment but expected to
12 reacquire it momentarily?

13 MR. LEHMAN: Yes, it was that. I knew we
14 had people out there working. I knew that it would
15 take a very short period of time for Steve to make
16 the start-up feedwater pump available.

17 MR. BEARD: And that is the time when he
18 was leaving?

19 MR. LEHMAN: We had had to do that before
20 in certain situations, and it takes a very short
21 period of time. We were aware of the detail section
22 of 6.1, which states, you know, when you get to a
23 certain point, you no longer have feedwater or --
24 what do I want to say. You don't have main or --

1 well, the generators are essentially dry by the
2 definition given. At that point you're required to
3 go to make up HPI/PORV cooling. And it was -- we
4 were just approaching that point in the procedure,
5 and --

6 MR. ROSSI: So you got to the decision box
7 that says main or auxiliary feedwater available, yes
8 or no. And the yes would send you down one track.
9 No at this point puts you into PORV cooling.

10 MR. LEHMAN: Yes.

11 MR. ROSSI: Okay. And that's where you
12 were when the people were dispatched to the plant to
13 get back the auxiliary feed or the start-up feed?

14 MR. LEHMAN: Yes.

15 MR. ROSSI: Okay. Now, did you then --
16 well, go ahead and tell me your characterization of
17 what occurred then while they were out trying to
18 make equipment available.

19 MR. LEHMAN: Well, like I say, I went
20 through these flow charts, verified, you know, that
21 we had not missed anything, that we were to the
22 point in the procedures where we should be. And I
23 was just at that point. It was -- it was a whole
24 point as it was right at that point, just waiting

1 for conditions to develop one way or the other.

2 As it turns out, we got main feedwater in
3 the form of the start-up feedwater pump available to
4 us. At that time we followed the procedure the rest
5 of the way.

6 MR. ROSSI: Down the yes side then.

7 MR. LEHMAN: Down the yes side which tells
8 you to maintain appropriate steam generator levels.

9 MR. ROSSI: Okay. So you got to this one
10 point of the decision about PORV cooling or that you
11 have auxiliary feed or main feed. And at that point
12 there was just a hole while people tried to get the
13 equipment into service to go down the yes side?

14 MR. LEHMAN: Yes.

15 MR. LANNING: This hole is not a physical
16 hole in the procedure.

17 MR. LEHMAN: No, it's not a physical hole
18 in the procedure. It's just a hole that is dictated
19 by the conditions we had at the time.

20 MR. BEARD: As I understand it, I think
21 you said, Ted, that when Steve left the room, you
22 were really in the step 6.1 in the sense that you
23 had not met the criteria for dried out steam
24 generators?

1 MR. LEHMAN: Yes.

2 MR. BEARD: Okay. And then you were
3 waiting to see if feed could be recovered. Do you
4 remember whether or not you met the criteria of
5 either of the steam generators or both at the same
6 time before Steve regained control of feed?

7 MR. LEHMAN: We never saw levels in the
8 control room go below, I'd say, 10 inches. It was a
9 little higher on one side than it was the other.
10 would be like 10 on one side and 2 inches on the
11 other, whichever way it was. And the pressures --

12 MR. FEASEL: You mean 12, not 2.

13 MR. LEHMAN: What did I say, 2? Excuse me,
14 it was 12. It was 10 and 12. And we glanced at the
15 steam pressures on and off. And they were -- the
16 couple times I looked at them they were still high,
17 somewhere in excess of 950, 975 pounds, in that
18 range.

19 I was concerned about those just because
20 it was the pressure we would have to pump against
21 once we did get some form of feedwater back if it
22 came. And -- well, I don't know what else to say.
23 You know, we were at that point. As the people were
24 out of the control room, it to me seemed like a long

1 period of time, but in reality it was a very few
2 minutes.

3 But we did start discussing the
4 possibilities of having to go on PORV cooling
5 between myself and the secondary side RO and myself
6 and Bill O'Connor, who I had on the telephone at the
7 time. And we did know that that was -- point was
8 approaching.

9 MR. LANNING: When you say discussing, can
10 you be more precise? Do you remember more precisely
11 what was discussed?

12 MR. LEHMAN: Well, essentially what we
13 said if we don't get feedwater back here within a
14 matter of moments, we were going to have to go to
15 PORV cooling.

16 MR. BEARD: Why would you decide a matter
17 of moments versus some other criteria?

18 MR. LEHMAN: Well, based on how the plant
19 parameters were trending at the time.

20 MR. BEARD: When you say trending, did you
21 have, for example, steam generator pressure on a
22 strip chart?

23 MR. LEHMAN: No, there was nothing on a
24 strip chart. It was just our observations of the

1 meters in the control room.

2 MR. BEARD: Okay. So it's --

3 MR. LEHMAN: We didn't have anything that
4 was on the chart to look at to watch a definite
5 trend.

6 MR. BEARD: So when you're saying trend,
7 the trending that went on in your mind, every now
8 and then you look at the meter?

9 MR. LEHMAN: Yes, just our personal
10 observations of the plant conditions.

11 MR. BEARD: But as far as you know, that
12 during the time that Steve was out, you never
13 reached the definition of a dried out steam
14 generator on either one?

15 MR. LEHMAN: No, not as such.

16 MR. BEARD: I don't want to be putting
17 words in your mouth. I just want to see if I
18 understand you.

19 MR. LEHMAN: No, we never really did meet
20 those criteria.

21 MR. BEARD: Wayne, did I interrupt your
22 line of questioning? I apologize.

23 MR. LANNING: I don't know.

24 MR. BEARD: I think you were asking about

1 the area of being more precise about the discussion
2 of the need to go into PORV cooling, and he said we
3 knew we might have to go on it in a moment. And I
4 was trying to ask about the criterion.

5 MR. LANNING: Oh, yes. It was my
6 understanding that one of the reactor operators was
7 making recommendation that you go to make up HPI
8 cooling.

9 MR. LEHMAN: That was the secondary side
10 RO that was -- he was the one that was waiting for
11 feedwater to come back. And he did make the
12 statement a couple times that we were close.

13 MR. LANNING: Why didn't you at that time
14 go into this mode of core cooling?

15 MR. LEHMAN: Well, it's a pretty drastic
16 step. And I wanted to wait until I was -- well, I
17 didn't want to do it prematurely. I wanted to wait
18 until I was at the point that was required by the
19 procedures to do that.

20 MR. LANNING: What is drastic about this
21 mode?

22 MR. LEHMAN: Well, up until this time, you
23 know, the unit is still -- the plant is still intact.
24 Once you go to PORV cooling, you're going to blow

1 the rupture disk on the quench tank, you start
2 spilling the RCS out on the basement floor. That --
3 I mean, you know, we have to consider the whole
4 objective here was maintain core safety, core
5 integrity. You know, that was always the first
6 thought.

7 But by what means we did it, you know,
8 that was what was a question at the time, was what
9 means we used to do that. And, you know, if it had
10 come to it, we would have taken, you know, taken
11 that step and there wouldn't have been any doubt
12 about it. But it was just something that, you know,
13 it's not -- you don't want to jump into it
14 prematurely and do it early if there was a chance of
15 getting something else back because then that makes
16 a very large expensive cleanup job.

17 MR. FEASEL: Not to mention it also makes
18 getting into a cold shutdown condition a lot more
19 difficult. There are some things that it -- may
20 become necessary to make a contaminant entry during
21 the phase of cold shutdown. Then you're going to
22 severely limit your access to the containment if you
23 go into that mode of cooling.

24 MR. ROSSI: Okay. Well, let me see. You

1 got -- you went through the procedures following the
2 reactor trip. And you followed the procedures and
3 used the procedures until you got to the point where
4 you had this to make a decision of PORV cooling or,
5 yes, you've got aux. feed or main feed back. And at
6 that point there were a number of actions that were
7 taken to try to get aux. feed or start-up feed back
8 again.

9 The details of what needed to be done
10 there are not spelled out in the procedures.
11 They're purely training, training things to get to
12 that step. And there was essentially a hole at this
13 one point while operators were dispatched to do
14 those things. And then when you got aux. feed or
15 start-up feed back, then you proceeded down the yes
16 side.

17 MR. FEASEL: When I came back into the
18 control room, they had -- were just regaining level
19 in both steam generators. At that point, we were
20 into a overcooling situation as the steam generators
21 repressurized. You get a considerable cooldown rate.
22 At that point, we exited the overheating section of
23 the procedure.

24 Our training has been if conditions change,

1 if you're no longer in that section, then you're
2 supposed to exit that section, go back to your
3 supplementary actions, and go through them again
4 until you find out where you should be. And
5 essentially that's what we did. Went back into the
6 supplementary actions, went through the -- through
7 the steps again. Determined that we were into an
8 overcooling. I went to section 7, which is labeled
9 excessive heat transfer. We insured that we had RCS
10 make-up.

11 MR. ROSSI: Is that the section that would
12 now tell you to use the HPI and piggyback to regain
13 pressurizer level?

14 MR. FEASEL: The actual thing that led me
15 to go into piggyback operation was the fact that I
16 knew that we were going to get an overcooling as the
17 steam generators repressurized. We were still
18 having some control problems with the No. 2
19 auxiliary feedwater pump. They were trying to hold
20 the 46 inch mark, and it was feeding excessively.

21 I believe the operator then had taken
22 manual control back and was trying to reduce the
23 speed on the auxiliary feed pump to re -- to limit
24 the amount of cooldown he was going to get. And,

1 you know, I came back in the control room kind of in
2 the middle of this.

3 I walked over. I saw that we had plenty
4 of subcooling margin. We had insured a
5 considerable volume of water into the pressurizer.
6 I think the level was still upwards of 250 inches or
7 so. I didn't verify it exactly, but it was well up
8 scale. RCS pressure was low. It was around 1750
9 pounds. And I chose, based on a specific rule in
10 the back of the procedure, to piggyback based on the
11 fact that I did not want to lose subcooling margin.

12 MR. ROSSI: There is a specific step in
13 the procedures that tells you to use piggyback or
14 prepare for piggyback when you have either low
15 pressurizer level or you anticipate low pressurizer
16 level?

17 MR. FEASEL: We have a specific rule --

18 MR. BEARD: That's what I was going to say.
19 Could you explain what the specific rules are in the
20 general context the way your emergency procedure is
21 set up?

22 MR. FEASEL: Our emergency procedures are
23 set up in such a manner that there are certain
24 trained operator actions that they -- that we're

1 supposed to commit to memory. And any time you get
2 to one of these points in the procedure, they'll say
3 control steam generator levels per specific rule No.
4 3, or they'll say actuate HPI per specific rule 2.1.
5 These we have committed to memory.

6 These rules are always in effect, whether
7 you're in a step in the procedure that says do them
8 or not. Those specific rules always apply. There's
9 a specific rule for --

10 MR. ROSSI: Yes, when you get the specific
11 rule, why don't you give a page number or step
12 number or something and read it.

13 MR. FEASEL: Section 14. As I said, these
14 are always in effect, whether you're at a procedure
15 step that tells you to perform them or not. It's
16 just part of the operator training. The specific
17 rule that we were into at that time was for specific
18 rule No. 3, which is the guidance that we have for
19 steam generator levels.

20 The exact step would be step 3.1, if SFRCS
21 is actuated and an SPAS level 2 has not actuated,
22 maintain operable steam generators at 46 inches on
23 the start-up range using auxiliary feedwater. The
24 other specific rule that I chose to use at that time

1 was step 2.4.1, which says HPI piggyback operation
2 may be initiated at the operator's discretion as an
3 aid to maintaining pressurizer level at a time not
4 specifically called for by procedure for any plant
5 condition except the following. A large break LOCA
6 has occurred such that LPI flow into the RCS and LPI
7 suction is from the BWST. We did not meet the
8 exception.

9 MR. ROSSI: That's the only exception.

10 MR. FEASEL: That is the only exception.

11 MR. ROSSI: Okay. Would you, Lee, use LPI
12 HPI piggyback for PORV cooling?

13 MR. FEASEL: No.

14 MR. ROSSI: You would not use it for PORV
15 cooling?

16 MR. FEASEL: Not unless RCS pressure was
17 greater than the pressure which the HPI course would
18 pump into the core.

19 MR. ROSSI: There a procedural guidance
20 that says use piggyback operation for that condition?

21 MR. FEASEL: Yes, I'm sure there is in
22 here. And given time, I'm sure I can find it.

23 MR. ROSSI: If you can find it now, it
24 would be nice. I'd like to get the reference.

1 MR. BEARD: Ernie, can I ask you a
2 question while you're looking that up. Did I
3 understand --

4 MR. ROSSI: You have the reference. I
5 think you can look it up later.

6 MR. ROSSI: Why don't we go off the record.

7 (Discussion off the record.)

8 MR. ROSSI: We're going back on the record
9 now. And I guess the question we were discussing is
10 I had asked whether there was anything specific in
11 the procedures that told you to use the piggyback
12 operation of LPI and HPI for PORV cooling. So
13 you've looked through the procedure. Why don't you
14 go ahead and give whatever answer you deem right and,
15 you know, expand on it if you can.

16 MR. LEHMAN: I can remember this fairly
17 clearly. RCS pressure was falling due to the
18 feeding of the steam generators, which we knew would
19 occur. The primary side reactor operator was
20 feeling the effects of this in a falling RCS
21 pressure and a subsequent pressurizer level decrease
22 just due to the shrink on the primary system.

23 As the pressure came down, as it started
24 to get, I don't know, somewhere when he passed 1500

1 pounds, he was afraid that he might go low enough to
2 get a safety features actuation on low pressure,
3 which occurs at 1650 pounds.

4 In an effort to forestall this, he asked
5 permission to put on an HPI system to help boost his
6 RCS inventory. I told him at that time to piggyback
7 HPI with LPI just to increase the discharge pressure
8 that he would get at that time because we were close
9 to the top in pressure of the HPI pump by itself.
10 And it was just for that reason that it was used.
11 There's nothing that's -- other than the one
12 restriction that he mentioned on using piggyback
13 mode, there's nothing wrong with using it at any
14 time for HPI.

15 MR. ROSSI: Okay. But I think in answer
16 to the question on whether there's a specific thing
17 that says use it for PORV cooling.

18 MR. LEHMAN: There's no specific guidance
19 for that.

20 MR. ROSSI: No specific guidance for that.
21 And the exception that tells you that you shouldn't
22 use piggyback, that was only for large LOCA or is it
23 for small too?

24 MR. FEASEL: It's for a large break LOCA

1 where you have low pressure injection flow into the
2 core and with a suction from the BWST.

3 MR. ROSSI: Not for small break LOCA?

4 MR. FEASEL: Not for small break LOCA.

5 MR. BEARD: Steve, is that a situation
6 where you're into that mode and the guidance says if
7 you're there, don't interrupt it and go piggyback,
8 is that what you believe to be the intent?

9 MR. FEASEL: The way we've had it
10 explained to us in our training is that even then,
11 piggyback operation would probably be acceptable.
12 It just was not analyzed for it. It was not done as
13 part of our analysis.

14 MR. BEARD: Do you know, either one of you,
15 if this piggyback mode that we're discussing has
16 been shown on some technical basis to be a
17 sufficient means of cooling the core in a small
18 break LOCA situation such as a stuck open PORV, for
19 example, or do you believe it to be just something
20 you try in hopes it's successful?

21 MR. FEASEL: We did not do this in an
22 attempt to regain --

23 MR. BEARD: This is sort of separate from
24 the event, more as hypothetical.

1 MR. FEASEL: The only small break analysis
2 that we've seen shows that we need approximately 450
3 gallons per minute flow from the BWST into the core
4 in order to prevent the core from heating up.

5 MR. BEARD: 450?

6 MR. FEASEL: 450.

7 MR. BEARD: Is there any time constraint?

8 MR. FEASEL: That's within a half hour.

9 MR. BEARD: Within 30 minutes.

10 MR. FEASEL: Within 30 minutes of the
11 event.

12 MR. BEARD: Okay.

13 MR. FEASEL: Our make-up system will not
14 do that alone. And the HPI pump will not be able to
15 do that alone until pressure gets down to about 1300
16 pounds.

17 MR. BEARD: So the HPI by itself is not
18 sufficient until you're less than 1300 pounds
19 roughly.

20 MR. FEASEL: Yes.

21 MR. BEARD: What about the combination, is
22 there some magic number that you have PORV coolings
23 with both make-up and HPI, is there some pressure
24 thing where that --

1 MR. FEASEL: If RCS pressure is low enough
2 to allow the HPI pumps to put that additional flow
3 in, then there should be no problem. It depends on --
4 a lot on what the initial conditions of the event
5 are, how low the RCS pressure is. Is the PORV open
6 soon enough to allow blowing the pressure down. In
7 other words, is RCS temperature above the saturation
8 for, let's say, 1600 pounds, you know. A lot of
9 that analysis is based on some pretty specific
10 events.

11 MR. BEARD: So in your mind, at least,
12 there's some technical analysis someplace that leads
13 you to believe -- that would give you adequate core
14 cooling. That if you get 450 through these raised
15 pumps within 30 minutes, that that's a sufficient
16 flow to keep the core cooled and you're not going to
17 have problems.

18 MR. FEASEL: Yes.

19 MR. LEHMAN: Yes, we have observed that at
20 our training at B&W on the simulator. We have
21 specifically done that and followed that transient
22 all the way down to cold shutdown.

23 MR. BEARD: Let me ask a different
24 question if I might. Ted, you said earlier in

1 reference to what the pressure was, that from
2 looking at the meters occasionally, the pressure was
3 up around, I think you said 950, 975, someplace in
4 there. Are you aware whether or not between your
5 glances or someone else's glances that the pressure
6 may have fallen substantially. And, if so, for what
7 cause?

8 MR. LEHMAN: No, I don't remember that at
9 the time.

10 MR. BEARD: Are you aware at this point in
11 time, in other words, given this as day 10 of this
12 campaign, so to speak, that the pressure may have
13 fallen in at least one of the steam generators
14 substantially before the start-up feed was acquired?

15 MR. LEHMAN: I've had the charts available,
16 but I haven't sat down and looked at them close. I
17 did note on one printout from the TSC computer, the
18 technical section computers, that pressure did go
19 below the 960 at some point. I haven't specifically
20 looked at just how far it got or what particular
21 time.

22 MR. BEARD: Suppose I told you that I have
23 a copy of one of those prints here that I'd like to
24 describe very briefly, but suppose I told you there

1 was a period of something greater than six minutes
2 where you were well below the 960, would you be
3 surprised in terms of that's new information to you?
4 And my information is that it was a pretty steep
5 fall, and it went down to around 750 as a minimum
6 value. But does this come as new information to you?

7 MR. LEHMAN: It comes as fairly new. I
8 haven't really observed that.

9 MR. BEARD: Okay. So that I guess what --
10 would that be new information, this is before you
11 got into the overcooling part of it, at least as I
12 understand the transient, you were unaware that
13 there had been such a pressure dip as such?

14 MR. LEHMAN: Yes.

15 MR. BEARD: Would you be surprised if a
16 dip like this occurred for six minutes without it
17 being noticed in the control room?

18 MR. LEHMAN: Considering the events going
19 on at the time, I would consider it possible.

20 MR. BEARD: In other words, you hadn't
21 specifically directed someone to keep close track of
22 pressure or you weren't specifically keeping close
23 track of pressure because that was a critical item
24 at this point then? Or I'm asking. I don't want to

1 put words in your mouth.

2 MR. LEHMAN: Not close, no.

3 MR. LANNING: Don't you have a trend
4 recorder chart for steam generator pressure in the
5 control room?

6 MR. FEASEL: Not that was available to us
7 that day. The safety parameter display system does
8 have steam generator pressure on it, and it does --
9 it is a -- it is able to trend that parameter. But
10 it wasn't working that day.

11 MR. LANNING: But there's no strip chart
12 in the control room that records steam generator
13 pressure?

14 MR. FEASEL: That's true.

15 MR. ROSSI: J.T., do you have anything
16 more? Do you have something more?

17 MR. BELL: One final question. Both of
18 you gentlemen told us earlier that you'd been at the
19 station greater than eight years. This procedure is
20 a procedure that was required after Three Mile
21 Island Unit 2.

22 MR. LEHMAN: Yes.

23 MR. BELL: Could you give me your opinion
24 on this procedure as compared to the procedures that

1 were in effect prior to Three Mile Island Unit 2?
2 Is it a better procedure, is it a worse procedure or
3 can you see any difference?

4 MR. FEASEL: I like this procedure real
5 well. I think it's very well written. I think
6 there is sufficient guidance in it that, you know,
7 if you have any equipment left at all, somehow or
8 another you're going to get core cooling. In using --
9 this is the first time that I have had to use this
10 procedure at other than the simulator, in a real
11 situation.

12 I think the procedure helped us identify
13 the majority of the failures that occurred, and I
14 think the procedure was very instrumental in our
15 having recovered this situation in such a short
16 period of time.

17 MR. BELL: Mr. Lehman, could I have your
18 opinion?

19 MR. LEHMAN: Yeah, I like it myself. It's
20 a very concise -- I almost say compact. Before we
21 would have to be in maybe two, three, four
22 procedures. This is the only document that we have
23 to pull out. And it will lead you step by step
24 through the procedure until you do discover your

1 fault.

2 MR. BEARD: Okay. I had one last question.
3 I would like to be hypothetical for a moment and
4 play the devil's advocate and ask you a question in
5 that context. Suppose someone were to ask you in
6 some separate room than this supposed situation that
7 maybe you thought that the operating staff were
8 reluctant to put on PORV cooling as early as it may
9 have been needed or may have been required because
10 of the consequences of the spill in the plant and
11 the other things that we've discussed here today and,
12 therefore, didn't put it on when it should have been
13 on. What kind of response would you think you might
14 give to that kind of a hypothetical question?

15 MR. LEHMAN: I never felt at any time that
16 I was at the point where it was required at that
17 time. There was no reluctance to initiating it
18 because of the reasons you mentioned. There was no
19 real reluctance other than just the fact that the
20 the further the thing went, if we'd have gone that
21 far, it would have just been a much more serious
22 event, just that gut feeling. It was just that we
23 never felt that we were quite to the point where it
24 was required.

1 MR. BEARD: I guess I'm trying to focus,
2 Ted, on the issue of in my mind based on a lot of
3 information I've received from interviews and lots
4 of other things, I get the feeling, gut feeling,
5 that the main criteria was more like a time in the
6 sense that if we don't get it back in one minute,
7 damn it, go do it, versus the criterion is pressure
8 level on the two steam generators, and, okay, watch
9 those, and if we go it, then do it. You see, I've
10 asked a couple of questions in that area. And I'm
11 trying to understand.

12 MR. LEHMAN: It was not so much -- it
13 wasn't a time based -- there was no set time. It
14 was not like we will wait one more minute. It was
15 just a matter of the plant conditions as we observed
16 them at the time.

17 MR. BEARD: Would you concur with that,
18 Steve?

19 MR. FEASEL: I was outside of the control
20 room during that time frame. I did not have the
21 indications available to me. And I feel that what
22 Ted did was --

23 MR. BEARD: What Ted did.

24 MR. FEASEL: Yeah, what Ted did. And

1 without having seen it, this -- the pressures going
2 as low as what you previously stated is all new
3 information to me. I was not aware of that.

4 MR. BEARD: Well, your being outside of
5 the control room that's perfectly understandable,
6 and apparently this is new to Ted too. Okay.

7 MR. POSSI: Wayne, you had one.

8 MR. LANNING: Since steam generator level
9 was one of the criteria for going to PORV cooling,
10 and as I recall it's 8 inches, on the indicator in
11 the control room, this is a narrow range steam
12 generator level, can you differentiate between 8
13 inches and 10 inches on the scale?

14 MR. BEARD: Maybe you could describe the
15 scale. Maybe that would help you.

16 MR. LEHMAN: The scale -- let's see. It's
17 0 to 250 marked off in large divisions of 50, marked
18 off in small divisions of tens. I could -- it would
19 be apparent to me if it was below 10 because that
20 would -- it would be below a division on the scale.
21 We never saw that.

22 MR. LANNING: So there is no numerical
23 value of 8 inches on your scale so to speak?

24 MR. LEHMAN: No.

1 MR. BEARD: Is there any red mark or
2 anything that would flag you?

3 MR. LEHMAN: No.

4 MR. BEARD: There's no special marking at
5 that trigger level?

6 MR. LEHMAN: Nothing.

7 MR. BEARD: Is there any special marking
8 on the instrumentation at the 960 value?

9 MR. LEHMAN: No.

10 MR. LANNING: When touring the control
11 room I saw a microphone from the ceiling of the
12 control room.

13 MR. LEHMAN: Yes, sir.

14 MR. LANNING: Could you tell me the
15 purpose of that microphone.

16 MR. LEHMAN: That is a microphone that is
17 connected to the TSC along with the TV camera that
18 would be plugged in in the event of a action in the
19 emergency plan where the TSC was manned. That
20 camera could be put in service, and the microphone
21 would give them -- well, they could just hear what
22 was going on in the control room. And the camera is
23 there for the purpose of scanning the
24 instrumentation.

1 MR. LANNING: That system was not used
2 during this event?

3 MR. LEHMAN: No.

4 MR. FEASEL: It's also there for a serious
5 control room fire. It's one of the actions that we
6 do prior to evacuating the control room is plug in
7 the microphone and remove the lens cap from the
8 camera.

9 MR. BEARD: That sparks another question
10 if we've got half a second. I noticed that over on
11 the steam feed rupture control panel where you have
12 the various buttons to actuate the various
13 conditions, that one for low level seems to have a
14 special marking on it, looks like two very wide red
15 bands. And the way you've trained your operators,
16 the way you expect them to behave, what's the
17 significance of that red marking?

18 MR. FEASEL: That's only there for the
19 serious control room fire. All the switches,
20 breakers, whatever, throughout the plant right down
21 to the doors that they expect you to use are marked
22 with these red marks to make them easily
23 identifiable in the dark.

24 MR. BEARD: Okay. Is it also or would it

1 be an appropriate thing to have marked for nonfire
2 emergencies? I'm thinking particularly, although I
3 don't want to lead you, of course, but I'm thinking
4 particularly of when you go to actuate the steam
5 feed rupture control system, if at the ivory soap
6 level every time you want to do it manually, it's
7 probably going to be on level, would it serve this
8 purpose.

9 MR. FEASEL: I tend to disagree with the
10 statement. Manually we do it on low steam generator
11 level. We have a guidance in our procedure where
12 they want to us actuate it on low steam pressure
13 particularly if you have a noniceable steam leak.

14 MR. BEARD: I'm not saying they're not
15 guidance, but the majority of the times that it's
16 been done, my understanding is -- and I'm not making
17 statements. I'm really asking you. It may sound
18 like a statement -- that the majority of the time
19 that it's actuated, it's on low level.

20 MR. FEASEL: I agree with you.

21 MR. ROSSI: If you actuated the low
22 pressure, would there be any cases where you do both
23 of them at the same time?

24 MR. FEASEL: No.

1 MR. ROSSI: Are we finished?

2 MR. BEARD: That's all I've got.

3 MR. LANNING: One more.

4 MR. ROSSI: Okay. One more.

5 MR. LANNING: Last one. When you initiate
6 a -- when your reactor operator initiated the HPI
7 pump, does that -- for make-up flow after -- in the
8 piggyback configuration.

9 MR. FEASEL: I performed that step, yes.

10 MR. LANNING: You performed that step.
11 Does that constitute an actuation of the SFAS?

12 MR. FEASEL: We did have flow into the core.
13 It's not a actuation of the SFAS, but it is a
14 actuation of engineered safety features. And we are
15 required to submit a special report in that
16 particular case.

17 MR. LANNING: Was that a full system
18 actuation or just one train.

19 MR. FEASEL: Just one train. And it
20 wasn't even a system actuation -- it wasn't an SFAS
21 system actuation. It was an engineered safety
22 features.

23 MR. BEARD: There's a difference at this
24 plant. There is a difference so we can discuss it

1 later if you choose. But the way the consolidated
2 controls people designed the SFRCS and whatnot,
3 there's a difference.

4 MR. LANNING: Okay.

5 MR. ROSSI: Does anyone have any other
6 questions? This is to the stenographer. Do you
7 have the fact that Mr. Lewis is here on the record.

8 THE NOTARY: Yes.

9 MR. ROSSI: Okay. Fine.

10 MR. LANNING: I'd like to know if these
11 gentlemen requested Mr. Lewis to be here?

12 MR. FEASEL: No, not specifically. We met
13 Bill Rowles out in the hall. He said that Mr. Lewis
14 would be available. He led us to believe that from
15 their standpoint it would be advantageous to have
16 him in the room, and we had no objections.

17 MR. LANNING: Okay.

18 MR. LEWIS: For the record I am here at
19 their invitation.

20 MR. ROSSI: At whose invitation?

21 MR. LEWIS: Mr. Lehman and Mr. Feasel.
22 And if they have any concerns they would like to
23 express to this room alone, I'll be glad to leave
24 and give them the opportunity.

1 MR. BEARD: Do you have any such concerns?

2 MR. FEASEL: I don't.

3 MR. LEHMAN: I don't.

4 MR. LEWIS: My concern is really
5 everything they want to say gets said, that it gets
6 said accurately.

7 MR. BEARD: I think it's time to ask the
8 classic question we ask at the end of every
9 interview. Is there something else you want to tell
10 us?

11 MR. FEASEL: No.

12 MR. ROSSI: We conclude the interview then.

13 - - - - -

14 Thereupon, the interview was
15 concluded at 2:10 o'clock p.m.

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CERTIFICATE

I, Anne I. McBrayer, a Registered Professional Reporter and Notary Public in and for the State of Ohio, do hereby certify that I took the Interview of Ted Lehman and Steve Feasel 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 20th day of June, 1985.

Anne I. McBrayer

ANNE I. McBRAYER RPR and
Notary Public in and for the
State of Ohio.

My Commission expires February 3, 1988.

