

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 210,
Davis-Besse Nuclear Plant, Oak Harbor, Ohio,
commencing on Thursday, June 20, 1985, at 5:30
o'clock p.m.

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1 PRESENT:

2 J. T. Beard (NRC)

3 E. Rossi (NRC)

4 wayne Lanning (NRC)

5 T. L. Bell (NRC)

6 W. D. Shafer (NRC RIII)

7 Steve Wideman (TED-Senior Licensing
8 Specialist)9 W. C. Rowles (TED-Assistant to the V.P.
10 Nuclear)

11 Sushil Jain (TED/Davis-Besse)

12 Larry Grime (TED/Nuclear Safety)

13 John Johnsons (TED/Operations)

14 Dennis Mominee (TED/Quality Assurance)

15 Rick Gradomski (TED/Nuclear Fac. Engg.)

16 Phil Hildebrandt (MPR Associates)

17 Dan Wilczynski (TED/Nuclear Fac. Engg.)

18 Chuck Rupp (TED/Nuclear Fac. Engg.)

19 Pete Whold (NRC RIII)

20 Ned Choules (NRC RIII)

21 Jim Dunne (TED/Nuclear Fac. Engg.)

22 Bernie Beyer (TED/Nuclear Projects)

23 Don Missig (TED/Operations)

24 walt Rogers (NRC RIII)

Thursday Evening Session

June 20, 1985

5:30 o'clock p.m.

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MR. ROSSI: Why don't we go ahead and begin. We are going to talk about the trouble-shooting action plans for the auxiliary feed pumps overspeed trips that occurred during the June 9th event and the auxiliary feedwater pump overspeed trip throttle valve problems. We will talk about the auxiliary feedpump overspeed trip one first. This is Action Plan No. 1A and 1B.

And before we start, I would like to say a couple of things. This action plan has some testing in it that requires the plant to go to Mode 3. And I want to make sure that the release of just this particular action plan doesn't mean that we have approved you going to Mode 3.

So the discussion on what you are going to do with the plant in terms of taking it to Mode 3 has to been resolved with Region III and whatever other limitations exist on going to Mode 3 have to be followed, and our discussion on this action plan

1 shouldn't imply that we have approved you going to
2 Mode 3 in any way.

3 MR. GRIME: Can I ask a clarification on
4 that? You are saying that Region III would be the
5 only block with approval of the plan or with review
6 of this plan of going to Mode 3?

7 MR. ROSSI: The question of going to Mode
8 3 ought to be handled separately from agreement of
9 this plan.

10 MR. BEYER: We did not anticipate and
11 expect that by approving this you were in any way
12 approving going to Mode 3. We understood whatever
13 would be required to go to Mode 3 would take place
14 before we would complete whatever parts of this
15 action plan required Mode 3.

16 MR. ROSSI: Okay. The other thing is I
17 know some of the members of the team and they are
18 going to speak in a minute or so have some concerns
19 that you may not have identified all of the
20 possible alternatives on what could have caused the
21 overspeed of the aux feedwater pumps, and I would
22 like to just reiterate that, you know, this was a
23 serious problem where redundant pieces of equipment
24 both failed simultaneously, and it's very important

1 that you make sure that you have done everything
2 you can to have an action plan that identifies the
3 actual cause of the problem.

4 Because if you go through all of this
5 thing and you can't figure out what caused the
6 problem, that's going to create a lot of concerns,
7 because it's going to be very important that people
8 understand that we really know what the problem is
9 and it's been corrected before the plant starts up
10 again.

11 So I just want to reiterate that you
12 really need to look carefully that all of the bases
13 have been covered and all problems that your
14 vendors can think of that could have caused this
15 are included in the trouble-shooting so you don't
16 end up going through all these steps and coming
17 back saying, gee, we can't find the problem, but it
18 looks like it works okay now. Because I think
19 that's going to give people a lot of concerns.

20 I would like to make a comment on some of
21 the things that I see --

22 MR. WIDEMAN: Ernie, how about if I start
23 with an introduction of the people that were
24 involved in developing this action plan before we

1 get involved with it so you know who the key
2 participants were in developing the action plans;
3 okay?

4 Rick Gradowski, who is in nuclear
5 facility corporate offices; Phil Hildebrandt, as
6 you know, is an MPR consultant; Dan Wilczynski, who
7 is in nuclear facility engineering at the site;
8 Chuck Rupp -- I drew a block there for a minute --
9 who is also in nuclear facility engineering at the
10 site; Don Missig, who is in station operations
11 department in the red shirt; and then Jim Dunne,
12 who is in facility engineering at corporate
13 headquarters.

14 MR. ROSSI: One of the things that I
15 noted about the write-up on the overspeed trips is
16 that there is a flavor in here that these pumps
17 have not been routinely tested supplying the steam
18 for the turbines via these cross-over lines, and
19 supplying steam to the turbines for the pumps
20 through the cross-over lines is a design feature of
21 the plant that is required for some accident
22 conditions.

23 And it appears that that mode has not
24 been tested on any kind of periodic basis over the

1 lifetime of the plan. And I think that these modes
2 that haven't been tested -- and I think there are
3 probably some others in here too -- routinely over
4 the lifetime of the plant, that in your summary of
5 looking at maintenance and testing history, that
6 ought to be pointed out in here because that may be
7 a key item in terms of what happened on June 9th.

8 Because had these kind of tests been done
9 like even every refueling under the conditions that
10 the pumps might be expected to operate under, I
11 mean, there are cases where you have steamline or
12 feedline ruptures where you might really have to
13 start these pumps up and use them feeding steam
14 through the cross-over lines, that had they been
15 tested that way, some of your apparently
16 hypothetical problems here might have been found
17 before the June 9th event.

18 They might have been found in tests and
19 so I think your summary of maintenance and testing
20 history ought to include a discussion of the kind
21 of tests that perhaps have not been done that would
22 have revealed this problem.

23 MR. BEARD: Could we just ask the
24 question at this point, is the flavor that Dr.

1 Rossi's just explained in fact true?

2 MR. WILCZYNSKI: That is in fact true
3 that the cross-over valves were not used during
4 testing.

5 MR. BEARD: You say it is or is not?

6 MR. WILCZYNSKI: Is, is true.

7 MR. ROSSI: You see, I think that may be --
8 well, I think it may be a key thing. If that turns
9 out to be a problem, that testing would have
10 probably found it a long time ago and then it
11 wouldn't have been found during the real event on
12 June 9th. I think you ought to put that in here.
13 I think that's an important piece of information in
14 summarizing what you have learned from the review
15 of past trips and surveillance testing.

16 And also on page two, Item 2A where you
17 talk about past trips and surveillance testing,
18 even aside from the comment I just made, there
19 isn't really a summary of what you learned from
20 reviewing that history. And there may be some
21 other lessons that you learned from reviewing that
22 history that ought to be discussed in a little
23 summary at the end of section A here.

24 Let's see, with that, let me turn it to

1 J. T. Beard who has a number of more specific
2 questions, most of which I think are related to
3 concerns about whether you have really looked for
4 all the hypotheses that might have caused the
5 overspeed and our concerns that you could go
6 through this and not find the root cause. J. T.

7 MR. BEARD: Okay. I don't know whether I
8 should be addressing this to Dan or Chuck, but let
9 me throw it out. On the first page where in the
10 introduction, you are describing I think what took
11 place on June the 9th and then there is a list in
12 the middle there that says item one, the valves
13 MS-106 and MS-107, the implication those valves
14 were closed.

15 I guess my question is not the single
16 aspect of it, but the question has to do with do we
17 know at this time whether those valves, in fact,
18 did close as it's described in here?

19 MR. WILCZYNSKI: Yes, it is documented on
20 the alarm printer from the control room that those
21 valves did close.

22 MR. DUNNE: It's documented 106 closed?

23 MR. RUPP: 106 closed, 107 would have
24 closed, but it did not get a signal to open so it

1 should have remained closed.

2 MR. ROSSI: Had it opened, that would
3 have been apparent from the review of the computer
4 printouts from the event?

5 MR. DUNNE: It did open later on in the
6 event and we got a signal that it opened.

7 MR. BEARD: I guess what I'm trying to
8 decipher is that how does this aspect of what
9 valves closed and what didn't close relate to the
10 formulation of the investigation? Because I had a
11 question of, you know, which one of these actually
12 did close during the event and how that relates.

13 Maybe you can elaborate a little bit on,
14 for example, if 107 did not close, does that have
15 any impact on the trouble-shooting plan that you
16 formulated?

17 MR. RUPP: Do you want to address it or
18 do you want me to?

19 MR. WILCZYNSKI: I'm not really sure what
20 it is you are looking for, but let me say this.
21 That MS-106 opened as designed and then received
22 its close signal and did in fact go closed at that
23 time. That No. 1 turbine would be running on the
24 cross-connect valve. MS-106-A, MS-107 was not

1 called on to open by the first SFRCS actuation, but
2 was called upon by the manual trip of SFRCS low
3 pressure.

4 MR. DUNNE: 107-A in this case.

5 MR. BEARD: 107-A, that was called on by
6 the low pressure actuation?

7 MR. WILCZYNSKI: Right.

8 MR. RUPP: And 107 got the signal to
9 close at that time and it remained closed from all
10 indications.

11 MR. BEARD: It was previously not even
12 open?

13 MR. WILCZYNSKI: Right.

14 MR. BEARD: And later didn't there turn
15 out to be another actuation that would have lid 107
16 off on low level?

17 MR. DUNNE: Yes, and it did open. We got
18 an indication it did open later on after the low
19 pressure trip cleared we had low level trips still
20 existing, and 107 opened and we postulate 107-A and
21 106-A would have then closed.

22 MR. BEARD: Now, did 106-A and 107-A
23 actually reopen during the event?

24 MR. DUNNE: To the best of our knowledge,

1 they only opened once, and that was on the low
2 pressure trip signal that the operators sent.
3 106-A and 107-A should have opened, and with that
4 trip -- when that signal cleared, they should have
5 closed. But we don't think we have indication of
6 that.

7 MR. BEARD: I said that wrong. Let me
8 restate the question. Did 106-A and 107-A -- let
9 me back up.

10 When the low pressure type actuation
11 occurred, I understand 106-A and 107-A were
12 signalled to open. They did in fact open?

13 MR. WILCZYNSKI: Yes.

14 MR. BEARD: Did 106-A and 107-A
15 subsequently close during the course of the
16 transient?

17 MR. WILCZYNSKI: No.

18 MR. BEARD: Does that have any impact,
19 this one open, one closed, one up and one down have
20 any impact?

21 MR. RUPP: Most of that though was later
22 after they tripped.

23 MR. WILCZYNSKI: We address that --

24 MR. RUPP: We didn't go that far past the

1 actual overspeeds.

2 MR. BEARD: You mean later past the
3 overspeed trips?

4 MR. RUPP: That's when the other ones are
5 reopening.

6 MR. BEARD: In follow-up to Ernie's
7 question about the summary on your past trips on
8 page two and your past surveillance data, I see
9 that you looked at speed data for a number of
10 events between March 2 in 1984 and the current one.
11 You didn't give us any summary of conclusions or
12 what you learned from looking at that data, but
13 could you tell us here what you learned?

14 MR. WILCZYNSKI: Okay. The speed data
15 for the No. 1 pump, we have the speed all graphed
16 out versus time and you can see a definite pattern
17 that the governor responds -- let's say it has a
18 footprint, and you can see that pattern in each
19 trip. The same type of pattern exists on No. 2
20 pump except that the difference there is the No. 1
21 footprint includes three or four oscillations
22 before reaching rated speed.

23 MR. RUPP: On a cold start, with the
24 pipes initially cold.

1 MR. WILCZYNSKI: Right.

2 MR. BEARD: This is No. 2 footprint has
3 some oscillations?

4 MR. WILCZYNSKI: No. 1.

5 MR. BEARD: No. 1. Three or four
6 oscillations for cold start?

7 MR. WILCZYNSKI: Right.

8 MR. BEARD: Can you give me some rough
9 idea as to the magnitude of these oscillations in
10 terms of percentage of rated speed or something?

11 MR. RUPP: They are approximately what?

12 MR. WILCZYNSKI: 30 percent.

13 MR. RUPP: Eight hundred or a thousand
14 rpm.

15 MR. BEARD: Now, if the -- help me
16 remember some numbers here. What's the normal
17 rated speed for these things?

18 MR. WILCZYNSKI: Thirty-six hundred.

19 MR. BEARD: And the trip value?

20 MR. WILCZYNSKI: Forty-five hundred.

21 MR. BEARD: So if you had a thousand rpm
22 swing, would it likely hit the --

23 MR. WILCZYNSKI: Okay. The swing appears --

24 MR. RUPP: Before rated speed.

1 MR. WILCZYNSKI: -- right before rated
2 speed as it's on it's way out. It might jump on
3 the top.

4 MR. HILDEBRANDT: The average is well
5 below rated speed.

6 MR. BEARD: I see. That's what I'm
7 trying to understand. And these footprints for
8 No. 1 and No. 2 were different from each other?

9 MR. RUPP: Yes.

10 MR. BEARD: But were consistent
11 throughout the sets of data you reviewed?

12 MR. WILCZYNSKI: Yes. The only one
13 difference was on the June 9th, testing that was
14 done on No. 7 listed there on aux feedpump No. 1,
15 there were no oscillations seen in that data.

16 MR. BEARD: No oscillations.

17 MR. WILCZYNSKI: Right.

18 MR. BEARD: Is that of any significance?
19 You have a history of previous tests where you do
20 see oscillations and now you don't?

21 MR. RUPP: On the June 9th test it was
22 approximately ten hours after the trip and the
23 lines are insulated, and we assumed those that
24 didn't have the oscillations, that there wouldn't

1 be as much condensation in the lines and the lines
2 would still be considered warm.

3 MR. ROSSI: So you believe the
4 oscillations are related to condensation and water
5 going through the turbines?

6 MR. RUPP: Right.

7 MR. WILCZYNSKI: Yes.

8 MR. BEARD: Okay.

9 MR. GRADOMSKI: Knowing full well the
10 governors on pumps one and two are different and
11 that the March 2nd, 1984, data would not include
12 PGG, the new governor that was installed on the No.
13 2 pump in our last outage.

14 MR. SHAPER: During the June problem, you
15 had erratic control on No. 1 aux feedpump, the same
16 example, did you not? During the June incident
17 when the aux feedpump came in, you had erratic
18 indications?

19 MR. WILCZYNSKI: Same oscillations were
20 present.

21 MR. SHAPER: And you were using then only
22 the 106-A, not the 106-A valve.

23 MR. RUPP: Right.

24 MR. SHAPER: You are saying condensate

1 builds up in either line --

2 MR. RUPP: Right.

3 MR. SHAFER: -- from disuse. There is no
4 traps in those lines.

5 MR. RUPP: Yes, there are traps.

6 MR. DUNNE: But there is about two
7 hundred to three hundred feet of piping between the
8 closed isolation valve and the inlet to the turbine.

9 MR. ROSSI: And the piping runs are such
10 that the traps won't insure --

11 MR. DUNNE: The traps will drain the
12 condensate, but you have the upstream isolation
13 valve that is closed, that piping is going to cool
14 off and when you get an open signal, that isolation
15 valve opens and it's now dumping steam.

16 MR. ROSSI: To the cold pipe, so it's
17 condensation that occurs after you put the steam in
18 the cold pipe.

19 MR. DUNNE: At the startup of the system
20 of the turbine.

21 MR. ROSSI: See, I had a question that --
22 at the top of page three in the maintenance history,
23 you indicate that the -- there was several items
24 replaced and adjusted in June of '85, June 2nd of '85.

1 and I was curious as to what necessitated that, the
2 three items that were done on June 2nd, with
3 respect to pump No. 1?

4 MR. WILCZYNSKI: During the June 2nd
5 event, control from the control room of the speed
6 setting motor on the No. 1 governor was lost.
7 After the event, that was investigated and it was
8 found the Bodine motor was burned out. That motor
9 was changed out, and also internal inspection
10 showed that the low speed stop roll pin was bent.
11 So that also was replaced.

12 MR. BEARD: The roll stop -- what was the
13 pin?

14 MR. WILCZYNSKI: Low speed stop roll pin.

15 MR. SHAFER: Is that normal? Did you
16 determine why it was bent at that time or you just
17 replaced it?

18 MR. GRADOMSKI: In conversations with
19 maintenance personnel, when they adjust the
20 governor's slip clutch setting in order to torque
21 the nut that holds the clutch on to the speed
22 setting shaft, they must either run it to the high
23 speed stop or to the low speed stop in order to
24 come up with an opposing force for them tightening

1 or loosening the nylon lock nut that is installed
2 in that clutch.

3 we have determined in testing that it
4 takes approximately 24 inch pounds in order to bend
5 that roll pin. We think that was sufficient during
6 that slip clutch setting evolution that they could
7 in fact bend those roll pins.

8 MR. BEARD: Did you determine the cause,
9 the reason that Bodine motor burned out?

10 MR. GRADOMSKI: I do not know that.

11 MR. BEARD: Does anybody know the cause
12 of the burnout of the motor?

13 MR. DUNNE: No.

14 MR. BEARD: Was there any investigation
15 conducted to determine the cause other than just
16 replace the broken pieces, so to speak? Does
17 anyone know?

18 MR. WILCZYNSKI: Not to my knowledge.

19 MR. BEARD: I would like the record to
20 show everyone said nobody knows.

21 MR. BEYER: We might also say, I don't
22 know that anyone here is aware that there may be
23 some investigation going on as well.

24 MR. GRADOMSKI: This is true. This is

1 true.

2 MR. BEYER: That's basically a week
3 before the June 9th occurrence and it's quite
4 possible that somebody has initiated follow-up
5 action.

6 MR. ROGERS: I have got a question. Were
7 they slowing the thing down on a slow speed stop to
8 adjust the clutch?

9 MR. GRADOMSKI: In order to either remove
10 that nut that holds the clutch on or to tighten
11 that nut, they would have to be either running it
12 to the high speed stop or to the low speed stop.

13 MR. ROGERS: Do you know which one they
14 were putting it on?

15 MR. GRADOMSKI: I do not know

16 MR. SHAPER: You said the individual that
17 was doing that could have bent that.

18 MR. GRADOMSKI: It takes 24 inch pounds
19 force on that roll pin to bend it.

20 MR. BEARD: That's not a large amount of
21 force, is it?

22 MR. GRADOMSKI: It's not. It's not a
23 large roll pin.

24 MR. BEARD: 24 inch pounds, is that what

1 you said?

2 MR. GRADOMSKI: Yes, sir.

3 MR. BEARD: Is that two pounds a foot?

4 MR. GRADOMSKI: Yes.

5 MR. SHAPER: Was there anything in the
6 procedure that described caution in that area or
7 criteria for setting that?

8 MR. GRADOMSKI: No, sir, I do not think
9 there is. There is an internal memo that was
10 supplied by myself on the testing that was done
11 when the roll pins were investigated September 2nd,
12 1983, that does in fact have a summation of the
13 test data that says 24 inch pounds will bend the
14 roll pins.

15 MR. SHAPER: That was 1983?

16 MR. GRADOMSKI: September 2nd, 1983, at
17 the conclusion of some major modifications we made
18 to the PGPL governors.

19 MR. BEARD: Ernie, I would like to ask a
20 question of you. This is a procedural question.
21 Could we or should we ask as an action item as a
22 result of this meeting that the licensee come back
23 and answer the question or provide an answer to the
24 question of whether or not some investigation into

1 the root cause of the burned out motor and the bent
2 pin was initiated or has been initiated to date and,
3 if it has, what the status and the results are?

4 MR. ROSSI: Well, I think what you ought
5 to do is, you know, you have a maintenance history
6 here, and I would say that it is probably not
7 complete without that kind of information. So I
8 think that information ought to be included in the
9 maintenance history.

10 MR. BEARD: I think if there was no
11 investigation, it ought to be stated that way.

12 MR. ROSSI: And if there was, that ought
13 to be also indicated.

14 MR. BEARD: Okay. But in view of this
15 discussion that you provided about these June 2nd
16 actions, what was your basis for the statement here
17 that says a review of these maintenance records
18 does not reveal any evidence that would support the
19 overspeed trips? I guess I fail to see how you
20 draw that conclusion.

21 MR. WILCZYNSKI: What we were looking for
22 in the review of the maintenance history was a
23 problem that indicated or that showed up on both
24 governors.

1 MR. BEARD: You were looking for a
2 problem on both governors?

3 MR. WILCZYNSKI: Right.

4 MR. ROSSI: You mean a common problem on
5 both governors?

6 MR. WILCZYNSKI: A common problem, right.

7 MR. ROSSI: I don't think you ought to
8 rule out the possibility that you could have
9 different problems with each governor.

10 MR. BEARD: I was hoping you weren't
11 going to say that, because I had a general comment.
12 I previously noted that I read a flavor in this
13 that the process through which Toledo Edison
14 developed this product here was such that there was
15 an inordinate amount of emphasis on a common
16 problem to the point that I was left with a feeling
17 that maybe there was not enough attention to two
18 separate problems. That's the feeling on my part.

19 MR. HILDEBRANDT: I think you will find
20 one of the hypothesis clearly points out that was
21 specifically considered, that there may be two
22 problems.

23 MR. BEARD: Could you show me or direct
24 me to where that is? I mean, I could have very

1 easily missed it, you know.

2 MR. HILDEBRANDT: On Hypothesis C, page
3 four, paragraph three, second sentence of that
4 paragraph three.

5 MR. BEARD: Could you help me a little
6 more. I'm trying to understand, you said the place
7 where it points out you were actually considering
8 separate problems that could cause these two
9 different pumps to trip out. I guess I --

10 MR. HILDEBRANDT: Well, I guess in the
11 context -- and this is perhaps you are close to the
12 reading, the paragraph C(3) in that second part,
13 there is a point that there has been a long
14 experience of no overspeed on the PGPL governor.
15 However, there is a shorter experience with the PGG,
16 and that's only been installed since the last
17 refueling outage. And it is the only installation
18 of that governor we are aware of on a Terry Turbine.

19 Therefore, the emphasis would be on looking
20 for a potential problem with the PGG because there
21 is a shorter history with it. The PGPL there is a
22 long history both on these turbines and on other
23 turbines in the industry, and so that the suspect
24 may be that PGG governor. That was the intent of

1 that paragraph.

2 MR. BEARD: But this is the paragraph I
3 should have gotten the message that you were
4 considering --

5 MR. HILDEBRANDT: If you didn't, perhaps
6 that should be clarified.

7 MR. ROSSI: This comes back to the
8 general thing of make sure you looked at everything,
9 because if you go through it and you don't find
10 anything, we have all got a problem.

11 MR. SHAFER: Can I ask a clarifying
12 question there? The pumps tripped on an overspeed
13 within seconds of each other; is that correct?

14 MR. WILCZYNSKI: True.

15 MR. SHAFER: Have you looked to determine
16 whether the first trip contributed to the second?
17 I don't recall seeing anything -- any statement in
18 here.

19 MR. WILCZYNSKI: No, we haven't. I guess
20 we had no reason to suspect that. There is really
21 no ties between the two that we could see to lead
22 us toward that direction.

23 MR. BEARD: Ties between the two sort of
24 suggests you are looking for a common problem.

1 MR. WILCZYNSKI: No. What I mean there
2 is that there is no tie between the No. 1 pump and
3 the No. 2 pump such that something that happened on
4 1 wouldn't cause something to happen on No. 2.

5 MR. SHAPER: That may be part of your
6 explanation as to why it's not a problem. You know,
7 I would suggest you not reject anything. If you
8 are very comfortable with the idea that regardless
9 of what happened with one of them it would not
10 affect the other one, it would pretty well put that
11 to bed.

12 MR. WILCZYNSKI: So your point is to
13 include it in the report?

14 MR. SHAPER: Absolutely.

15 MR. ROSSI: Don't prematurely reject it
16 is really what he said.

17 MR. SHAPER: That's right.

18 MR. WILCZYNSKI: All right.

19 MR. BEARD: I would like to go on then --

20 MR. LANNING: Can I ask a clarifying
21 question for my benefit? On the summary of the
22 data on page two, which of the feedwater pumps are
23 experiencing those five trips?

24 MR. WILCZYNSKI: First, the first five

1 trips, both aux feedpumps were called upon to
2 initiate.

3 MR. LANNING: And both tripped.

4 MR. DUNNE: That's plant trips.

5 MR. WILCZYNSKI: These are plant trips.

6 MR. DUNNE: These are actuations of the
7 system by a plant trip, and that's not a trip --

8 MR. HILDEBRANDT: There are no overspeed
9 trips listed there.

10 MR. LANNING: Okay.

11 MR. HILDEBRANDT: Zero.

12 MR. BEARD: The first experience on an
13 overspeed trip I believe is listed on -- well, I
14 guess it's in a separate report having to do with
15 the trip throttle valve. Why the two reports are
16 separate is beyond me, but I think that's where it
17 shows up.

18 Okay. In the area of Section III on
19 change analysis, I would like to understand better --
20 I guess maybe I missed the point -- but in item No.
21 1 there is a parenthetical statement that says it
22 is noted that the aux feedwater turbines previously
23 prior to February '84 started against AF-360 and
24 AF-388 being closed, colon, at turbine speeds of

1 twenty-eight hundred rpm, these valves would open.
2 Are you telling me that there is a difference
3 between that configuration and what what occurred
4 on June the 2nd -- or June the 9th, rather?

5 MR. WILCZYNSKI: There is a difference
6 there that the reason that statement was added was
7 to show that in fact we have called upon these
8 pumps to operate when only min restart flow is
9 available.

10 MR. ROSSI: But not all the way up to
11 speed?

12 MR. DUNNE: Right.

13 MR. WILCZYNSKI: That's true in this case.
14 The surveillance testing that is done is done only
15 with min restart flow and it is a quick start all
16 the way to rated speed.

17 MR. ROSSI: That's the way you normally
18 do the surveillance test?

19 MR. WILCZYNSKI: Yes.

20 MR. ROSSI: So the way you do the
21 surveillance test is consistent with starting these
22 pumps with AF-599 and 608 closed?

23 MR. WILCZYNSKI: Yes.

24 MR. ROSSI: That's what you are saying?

1 MR. RUPP: No. There are other valves
2 that are closed. The path is isolated.

3 MR. HILDEBRANDT: The path is isolated.

4 MR. RUPP: Right.

5 MR. ROSSI: But as far as the
6 characteristics that the pump sees, it's the same
7 thing.

8 MR. RUPP: Right.

9 MR. ROSSI: So the fact the AF-599 and
10 608 were closed during this particular start of the
11 pumps, you have tested them in similar situations
12 with other valves closed but at least that would
13 indicate that it's unlikely, it's just tied to the
14 fact that AF-608 and 599 were closed.

15 MR. WILCZYNSKI: Yes.

16 MR. ROSSI: Okay.

17 MR. BEARD: I guess I still fail to
18 understand, the paragraph says these are the
19 differences and conditions listed below existed
20 only on the 6-9-85 trip. And I thought what I
21 heard you say was in Item 1 that the test
22 conditions which those valves AF-360 and 388 closed
23 is quite similar of having that pathway blocked by
24 599 and 608. Is it too late in the day, am I dense,

1 or what you saying here?

2 MR. WILCZYNSKI: The reason that's listed
3 as a difference, if this is what you are looking
4 for, is because that was what happened on 6-9-85
5 but had not happened during other trips.

6 MR. BEARD: I think you are saying the
7 difference is not significant.

8 MR. WILCZYNSKI: Yes.

9 MR. BEARD: Okay. So you are not saying
10 it is not a significant difference?

11 MR. HILDEBRANDT: The attempt is, as has
12 been requested, the attempt here is list all the
13 differences that can be pointed out regardless of
14 whether they may be important.

15 MR. BEARD: Okay. At the bottom of the
16 page where you got hypotheses, causes of the
17 overspeed, I would like to make a general comment I
18 think we made, and that is you hypothesized A, B,
19 C, D, E, I guess through E, and I read this section
20 as saying we considered these various things and on
21 the basis of analysis or whatever reasons as
22 presented here, they are not considered viable and
23 because of that you are down to one hypothesis.
24 And all you are testing is based on a single

1 hypothesis, and this goes back to some comments
2 made a little while ago.

3 On the loss of pump suction, I understand
4 that later during the event or after the actual
5 overspeed occurred, there was an unexplained
6 switchover in the aux feedwater suction to the
7 service water, and I understand further that that
8 switchover can be caused by low pump suction, and I
9 would have expected therefore to see something in
10 here that would address that occurrence as it
11 relates to Item A here and maybe a discussion as to
12 why it is not relevant or not significant, but I
13 don't see any discussion.

14 I'm just wondering if you could give us
15 your thoughts at this time.

16 MR. WILCZYNSKI: I thought it was
17 explained in the next paragraph there, that --

18 MR. BEARD: Next paragraph is the one on
19 sudden decrease on pump load.

20 MR. WILCZYNSKI: No. The bottom of page
21 three. The switchover that occurred later on in
22 the event was -- there is two pressure switches on
23 that pump suction line. Only one of those switches
24 actuated, and there is another investigation going

1 on as to actually what happened there but it was
2 the lower pressure switch that had actuated.

3 MR. BEARD: I think you have a two-pound
4 switch and a one-pound switch.

5 MR. DUNNE: Right.

6 MR. BEARD: And the one pound switch is
7 the one that spuriously actuated.

8 MR. JAIN: The two pound switch is the
9 one that transfers --

10 MR. BEARD: The two pound switch is the
11 one that transfers the pump.

12 MR. JAIN: Just the tolerances is what he
13 was talking about.

14 MR. WILCZYNSKI: But at the same time
15 that switch actuated, there was no flow going
16 through the pump.

17 MR. DUNNE: Going to the steam generator
18 it was just recirc flow going through the pump.

19 MR. BEARD: And that's your basis for
20 ruling out this case?

21 MR. DUNNE: If we had loss of suction
22 during the trip, we would have gotten one of those
23 pressure signals coming into play and indicating a
24 low suction pressure which we did not see. And we

1 did see a low suction pressure trip later on after
2 we had restored flow, but not before the overspeed
3 trip.

4 Consequently because we didn't get the
5 indication of low suction pressure before the
6 overspeed trip, we don't think we had a loss of
7 suction source.

8 MR. HILDEBRANDT: All plant indications
9 indicate no loss of suction.

10 MR. BEARD: I guess I agree with you, you
11 had some funny behavior going on a little after the
12 overspeed trip. I guess if you had funny behavior
13 within a day, so to speak, I would have considered
14 that as a viable thing even though you didn't get
15 the alarm printout on it. That's all I'm saying.
16 In the general context of ruling out possible
17 sources of the root cause, you may want to rethink
18 that.

19 The next page, page four, under Item C,
20 actually No. 1 says a speed grasp for the trip
21 indicates that the governors were controlling speed
22 as designed during the initial turbine acceleration.
23 The two questions, are we talking about the speed
24 grasp for the June 9th event?

1 MR. WILCZYNSKI: Yes.

2 MR. ROSSI: They are taken from where?

3 They are taken from the DADS system or --

4 MR. RUPP: Yes.

5 MR. BEARD: Which grasp are you looking
6 at, the DADS system?

7 MR. ROSSI: The DADS system.

8 MR. BEARD: You are saying your view of
9 those indicates the speed was being controlled as
10 designed?

11 MR. WILCZYNSKI: Yes.

12 MR. ROSSI: During the initial part?

13 MR. WILCZYNSKI: During the startup
14 operation.

15 MR. RUPP: Right. There was no
16 difference between those and the other ones that we
17 have seen.

18 MR. HILDEBRANDT: The footprint was the
19 same.

20 MR. BEARD: These kinds of prints, this
21 was the smaller reduced version?

22 MR. DUNNE: You can't see it on there.

23 MR. BEARD: Is this the reduced version
24 of the kind of thing you looked at?

1 MR. RUPP: NO.

2 MR. BEARD: You have a different print of
3 pump speed?

4 MR. RUPP: We have the computer printout
5 from the DADS system.

6 MR. BEARD: You mean the numerical
7 printout?

8 MR. RUPP: Right.

9 MR. ROSSI: Hand graph, hand graphed it?

10 MR. DUNNE: Yes.

11 MR. BEARD: So if you take this kind of
12 data and spread it out, it looks like typical
13 prints?

14 MR. DUNNE: For the first fifteen seconds
15 of the startup of the turbine, the footprint is
16 similar to what we have seen in the 3569 startups.

17 MR. BEARD: Then does it then take off
18 for some reason?

19 MR. DUNNE: It takes off then.

20 MR. BEARD: Does it go over to the
21 overspeed reading?

22 MR. DUNNE: One did. The other
23 oscillated a little up around four thousand and
24 forty-one hundred and continued on at forty-five

1 hundred. One of them just went straight up past.
2 The second one, and I don't know if it's one or two,
3 tended to oscillate around forty-one hundred for a
4 while for a couple of seconds and then one of the
5 oscillations kicked it over forty-five hundred and
6 tripped.

7 MR. BEARD: Then it suggests that the
8 governor was at least initially controlling it,
9 coming off high speed?

10 MR. DUNNE: Looks like it was initially,
11 yes.

12 MR. BEARD: And then something happened.

13 MR. DUNNE: Yes.

14 MR. BEARD: That's helpful information.

15 MR. ROSSI: Before you go off page four,
16 I have a question. On the bottom of page four on
17 the last paragraph under D, this talks about the
18 fact that the Terry Turbine, if the steam flow is
19 stopped and restarted when it's already rolling, it
20 may cause it to overspeed.

21 It seems to me that with the way you had
22 the SFRCS system used with MS-106 and 106-A, that
23 there are actual accidents and events where that
24 might very well happen. In other words, isn't it

1 possible if I have a steamline break or a feedline
2 break, that MS-106 can open and get opened and then
3 I detect low pressure in a steam generator and I
4 then close MS-106 and open up MS-106-A and indeed
5 I'll stop the steam flow and then restart it?

6 MR. RUPP: Yes, that's correct. But the
7 reason we just discounted it here is because both
8 valves were open at the same time and steam should
9 have been flowing through there prior to the --

10 MR. ROSSI: My point is you may have a
11 basic design problem with this pump in combination
12 with the way the SFRCS system is designed that you
13 ought to be looking at.

14 MR. JOHNSONS: In that event you just
15 described, when MS-106 is going closed, MS-106-A is
16 opening at the same time, you always have the
17 steamlines pressurized. So the turbine never stops.

18 MR. ROSSI: So you would always have a
19 steam flow. You would not interrupt the steam flow
20 to the turbine and then restart it.

21 MR. JOHNSONS: Right. The SFRCS is
22 designed that one of the two valves is either
23 always opened or in a transition of about 30
24 seconds. You have actually both valves open. It

1 wouldn't be you close one, then you open the other.

2 MR. HILDEBRANDT: Very similar to the
3 vent that just occurred basically.

4 MR. JOHNSONS: Yes.

5 MR. HILDEBRANDT: Transferred from 106 to
6 106-A.

7 MR. GRIME: This is John Johnsons from
8 operations section, by the way, that joined our
9 meeting.

10 MR. BELL: But one of these valves is on
11 a freeze list and was placed on the freeze list
12 because you people said it didn't achieve it's full
13 position, it appeared to change directions in
14 midstream.

15 MR. WIDEMAN: Preliminary indications. I
16 don't know where that action plan stands for
17 MS-106.

18 MR. BELL: Based on that, can you
19 guarantee 106 was all the way open and 106-A closed?

20 MR. DUNNE: No.

21 MR. BELL: Can you guarantee this switch
22 took place as designed since the valve changed
23 direction in midstream? Such that this statement
24 is not -- is incorrect, that there may have been a

1 period such that 106, since it didn't travel to the
2 open limit shut before 106-A opened?

3 MR. HILDEBRANDT: The assumption stated
4 in here are based on computer printouts of what you
5 have reported by the computer.

6 MR. BELL: We are getting data from on
7 that valve based on the computer. It only travels
8 for eighteen seconds

9 MR. HILDEBRANDT: Yes, sir, I was going
10 to state that. And the movement of that valve and
11 the conclusions that are here are based on what was
12 said on the computer, the scenario that --

13 MR. JOHNSONS: The one just described
14 would have not been exactly as described here.

15 MR. ROSSI: His scenario is based on
16 everything working properly and what happened in
17 the event that happened here is still being looked
18 at on 106 and 107-A.

19 MR. HILDEBRANDT: Yes, sir. We start on
20 a different action plan.

21 MR. WILCZYNSKI: This might help. If you
22 look at the timing, the MS-106 begins to open, two
23 seconds later the manual SPRCS initiation on low
24 pressure is operated by the operator, that begins

1 to open 106-A at that time and then you don't see
2 MS-106 being full closed until 20 seconds --

3 MR. RUPP: It's 16 seconds later.

4 MR. WILCZYNSKI: -- 16 seconds later.

5 MR. HILDEBRANDT: You may recall these
6 are also gate valves which means almost to the
7 point they are closed they are effectively open.

8 MR. BEARD: I think that you ought to
9 consider that in a trouble-shooting effort and also
10 in the consideration of the adequacy of the design
11 of the plant, I think it's a very risky assumption
12 to assume everything is going to work perfect. I
13 think the event of June 9th is adequate
14 demonstration that it's unreasonable to assume that
15 everything is going to work and you might want to
16 consider if a valve doesn't work right would that
17 then set you into the situation you just described
18 here of a stop/start on steam and hence lead to an
19 overspeed of one or more on the speed turbines.
20 And consider that, that's all.

21 Okay. If there are not any more
22 questions on that area, I would like to go to page
23 five, Item E. I'm particularly intrigued by a
24 statement in what looks to be about the forth

1 paragraph that sort of reflects something that was
2 mentioned earlier; that is, because of the various
3 reasons, you do expect some water slugs will be
4 formed in these long pipelines.

5 And my first general comment on this
6 section is that I and several other people have
7 been told for years and years that these Terry
8 turbines are very rugged and they can run basically
9 on water, et cetera, et cetera, and I read this
10 Section E as, No. 1, not discussing that type of
11 previous information, I'm sure it's very general in
12 the nuclear industry, and not addressing what
13 appears to be a complete change in that story in
14 that now I read this as your turbine design is
15 considered susceptible to increased speed
16 excursions when water slugs are introduced. And I
17 just don't understand the drastic reversal of
18 stories.

19 MR. ROSSI: When did you first learn that
20 the Terry turbines were susceptible to increased
21 speed excursions with water slugs? Did you learn
22 that after the June 9th event when you went back to
23 Terry Turbine or was that known before or --

24 MR. WILCZYNSKI: It was known after the

1 June 9th. And to clear something up, we had always
2 known that water slugs in Terry turbines, that
3 Terry Turbine was built to handle that water slug
4 and that is in fact true based on testing that
5 Terry has done.

6 But when they did that testing they used
7 quantities of cold water which they said actually
8 balked the turbine down. They didn't even think of
9 the fact that hot water might be a worse condition
10 such that being at saturation point might flash
11 through the nozzles and give you a control problem.

12 MR. BEARD: Are you saying that some
13 testing was done by the Terry Turbine folks?

14 MR. WILCZYNSKI: Yes. They told us that
15 in 1968 they did testing.

16 MR. HILDEBRANDT: Cold water testing.

17 MR. GRADOMSKI: And of course this is the
18 most conservative when you are dealing with a
19 turbine that is running at full speed and injecting
20 a large amount of cold water from any thermal shock
21 standpoint. I think we all realize that.

22 The point that is being made now is not
23 for the integrity of the turbine, per se, but the
24 potential for overspeed considerations with water

1 at saturation conditions.

2 MR. ROSSI: And the problem is the water
3 in saturated conditions carries more energy through
4 the turbine because it is water that flashes and
5 more gets through valves into the turbine?

6 MR. HILDEBRANDT: Imparts more energy
7 into the turbine.

8 MR. ROSSI: How did Terry Turbine
9 determine that this was the case? Had they gone
10 back and done analyses since June 9th or testing or
11 what?

12 MR. WILCZYNSKI: They didn't say that
13 they had done testing. I would imagine that they
14 have done analysis and based on what we have just
15 said here, it does impart more energy, you would
16 expect a control problem, possible overspeed.

17 MR. ROSSI: Does anyone including either
18 you or Terry Turbine know of any other plant
19 experience where this has occurred?

20 MR. WILCZYNSKI: No, they do not.

21 MR. ROSSI: Did you ask them whether they
22 knew of any plant experience?

23 MR. WILCZYNSKI: Yes. We talked about
24 overspeed and other overspeed problems. We were

1 not able to find any other data that says other
2 plants have had problems with this.

3 MR. BEARD: Do you know if Terry Turbine
4 as a vendor would have been informed of overspeed
5 events had they occurred in other plants?

6 MR. WILCZYNSKI: No. You can't say that.

7 MR. BEARD: Did they have experience in
8 other applications in the nuclear industry where
9 the vendor is often not told? In fact, it's more
10 infrequent than we would of course like, so that I
11 guess what I'm trying to get to is the fact they
12 are not aware of any doesn't mean it hasn't
13 happened.

14 MR. WILCZYNSKI: Right.

15 MR. ROSSI: I don't know, you might see
16 if there is some way you can do some sort of check
17 with other plants through your owners groups or
18 INPU to see if there is some experience, because
19 you are kind of placing your bets on this one thing
20 which comes back to the general problem that we
21 have of being concerned that you go through all
22 this and not know what caused the problem.

23 MR. BEARD: Does the NOTEPAD system
24 afford you the opportunity to ask that question on

1 the air, so to speak, and get prompt responses?

2 MR. RUPP: Yes, we did look at that and
3 it shows no indication of that. The only place
4 that even had any kind of problems was -- well,
5 this is off of our MPRDS, and the only plant that
6 had any problem was one other company.

7 MR. ROSSI: What was the nature of their
8 problem, overspeed from water slugs or possible
9 overspeed from water slugs?

10 MR. WILCZYNSKI: Let me get to the right
11 page here. There are many problems here. They --
12 they have one mechanical speed governor was not
13 tripped at the required speed setpoint.

14 MR. BEARD: While you are looking, this
15 is an MPRDS printout you are looking at?

16 MR. WILCZYNSKI: Yes.

17 MR. LANNING: Could we have a discussion
18 off the record for a second?

19 (Discussion held off the record.)

20 MR. ROSSI: We are back on the record now.
21 Why don't you just tell us what you did find from
22 one other utility or one other plant; you don't
23 need to name the plant.

24 MR. WILCZYNSKI: Okay. We had only one

1 instance of an overspeed, and it was found that the
2 Woodward governor ramp generator had failed, and we
3 have no indication that that's what happened there
4 because after we -- later on June 9th we tested
5 them and they both worked as designed.

6 MR. ROSSI: So that was not related to
7 water slugs?

8 MR. RUPP: Right.

9 MR. ROSSI: So you are really betting on
10 something that hasn't been seen anywhere else as
11 far as anybody knows for the cause? I mean, just
12 keep that in mind as you are thinking about what
13 you are doing because, you know, one would think
14 that that kind of thing would have shown up before
15 now.

16 MR. BEARD: I understand that after the
17 June 9th event, you called Terry Turbine folks and
18 they told you this possibility; is that correct?

19 MR. WILCZYNSKI: Yes.

20 MR. BEARD: Did they tell you how they
21 happened to come across this information in terms
22 of -- I think you suggested it might be through
23 analysis. Did they tell you when this analysis was
24 conducted or performed?

1 MR. WILCZYNSKI: No, they didn't.

2 MR. ROSSI: Did they already know this
3 when you called them or did you call them with your
4 problem and they go off and think about it for a
5 couple of days and then come back and agreed it
6 could happen?

7 MR. WILCZYNSKI: We called them with a
8 problem with overspeed, and through the
9 conversation we told them of the problem that we
10 are experiencing with the hanger problems and
11 possible water in the lines.

12 And the conversation led to the fact that
13 if there were water near the saturation point, then
14 you could expect control problems and possible
15 overspeed.

16 MR. BEARD: So they were aware of the
17 possibility as soon as you brought up the situation?

18 MR. WILCZYNSKI: Yes.

19 MR. BEARD: I don't want to go into it at
20 this point personally unless I'm directed to, but I
21 would like to suggest that you recontact your
22 vendor and remind him of his responsibilities under
23 10 CFR Part 21, because these turbines are used
24 throughout the industry.

1 MR. ROSSI: That's a good point.

2 MR. BEARD: I trust the Region will take
3 whatever action is appropriate in this matter so
4 the Fact Finding Team doesn't have to get into that
5 aspect.

6 But along that line, I would like to ask
7 if this information had been given to you, would
8 you as a company consider it an appropriate thing
9 to advise other utilities of this information via
10 something such as NOTEPAD?

11 MR. WIDEMAN: Let me see if I can address
12 that. I think that we would probably want to
13 contact Terry Turbine to verify if they have indeed
14 done this under analysis and then possibly put that
15 information out under NOTEPAD if that is indeed the --
16 is indeed the true case here of what happened.

17 MR. BEARD: What difference -- I'm trying
18 to understand what you are saying. What difference
19 would it have made whether they determined this
20 through analysis or testing or reported operational
21 experiences or whatever? If this is their belief a
22 failure mechanism, it seems like that's what other
23 utilities would certainly like to be informed of
24 before they run into a problem.

1 Because you are saying that at your plant,
2 your best shot at this point in time, this document
3 right here, says that the reason that you had a
4 complete loss of safety function of aux feedwater
5 on both redundant trains is due to a phenomena that
6 your vendor has just told you about and basically
7 it's possible that no other utility in the country
8 is aware of. It would seem to me that as a
9 responsible utility, as you folks are, you would
10 want to share that with your other utility friends
11 in the industry.

12 MR. WIDEMAN: You are probably correct.
13 I don't know for sure if we would have put that
14 information out; okay?

15 MR. BEARD: I'm just saying you ought to
16 consider it.

17 MR. ROSSI: I think we said enough about
18 it. I think you do need to contact Terry Turbine
19 and inform them of their obligation under Part 21,
20 and I think it is important that other people know
21 about this.

22 MR. SHAFER: I would like to point out
23 too, earlier in the year you identified in fact
24 damage on the aux feedwater system piping which

1 would contribute to the potential for water hammer
2 or water slugs.

3 MR. HILDEBRANDT: Not piping. Piping
4 supports.

5 MR. SHAPER: All right. So be it, piping
6 supports. But at that time, there was no
7 indication that your aux feedpumps tripped --

8 MR. HILDEBRANDT: That's true.

9 MR. SHAPER: -- during the incident where
10 that damage occurred?

11 MR. HILDEBRANDT: That's correct.

12 MR. ROSSI: You also got no damage to
13 hangers that you found during the June 9th event.

14 MR. HILDEBRANDT: Yes, sir. That's
15 correct.

16 MR. LANNING: Let me understand one other
17 thing. There is an interaction between the
18 governor and the turbine on the pump, is there not?

19 MR. WILCZYNSKI: Yes.

20 MR. LANNING: And has the governor been
21 handled separately from the turbine in the action
22 plans or should you ask the same question of the
23 governor concerning the potential water and steam
24 supply?

1 MR. WILCZYNSKI: The contact was made
2 with Terry Turbine because they were the suppliers
3 of the system including the governor and the pump.

4 MR. LANNING: All right.

5 MR. WILCZYNSKI: They know best.

6 MR. ROSSI: Now, it's my understanding
7 from your action plan that the both vendors are
8 going to be here when you work on this stuff, both
9 the vendor for the governor and the vendor
10 representative from Terry Turbine.

11 MR. WILCZYNSKI: Yes.

12 MR. ROSSI: Larry?

13 MR. BELL: This water damage that was
14 reported previously, that's through its normal
15 steam supply 106 and 107?

16 MR. RUPP: Right.

17 MR. DUNNE: Not necessarily. Initially
18 part of the modification made during the last refueling
19 was to open all four valves simultaneously. 106,
20 106-A, 107, 107-A.

21 After we started seeing damage, we
22 postulated part of the damage may be due to the
23 fact that we have all four valves open
24 simultaneously and we changed back to the original

1 design scheme, which is just opening 107, 106 and
2 107.

3 MR. BELL: Since you have changed back to
4 the original design scheme, only opening 106 and
5 107, have you seen any other hanger damage?

6 MR. DUNNE: Yes, I think we have. It
7 hasn't been to the magnitude of the damage we
8 expected earlier in the year, but we are still
9 expecting some hanger damage.

10 MR. BELL: Even if the steam coming out
11 of the turbine as you said, there is water in the
12 steam, why didn't the turbine oversteam when it
13 starts on the regular steam generator supply if
14 that hypothesis is true?

15 MR. DUNNE: Less water.

16 MR. RUPP: The other lines are a lot
17 longer in length, the cross-over lines.

18 MR. ROSSI: Would you tell us
19 fractionally how much longer?

20 MR. DUNNE: About twice.

21 MR. RUPP: One line is three times, on
22 the other it is twice as long.

23 MR. HILDEBRANDT: The cross-overs are
24 longer.

1 MR. ROSSI: They are more likely to have
2 water. The amount of water may not just be
3 proportional to the pipelines?

4 MR. HILDEBRANDT: Yes, sir, that's
5 correct.

6 MR. ROGERS: I wonder if I can ask a
7 couple of questions?

8 MR. ROSSI: Sure.

9 MR. ROGERS: No. 1, when you guys are on
10 the aux boiler, do you use the cross-over line to
11 feed that other aux feedpump to run it before you
12 cross into Mode 3?

13 MR. HILDEBRANDT: A cross-tie is used,
14 it's not the cross-over.

15 MR. ROGERS: It's the cross-tie.

16 MR. HILDEBRANDT: A lower cross-tie.

17 MR. ROGERS: So the hanger damage, you
18 did see some damage on the cross-tie, didn't you?

19 MR. DUNNE: Yes.

20 MR. ROGERS: Okay. So you did see some
21 damage on the cross-tie. When you all went off on
22 MPRDS, did you talk to the boilers to see if HPCI
23 and RCIC has seen any overspeed problem?

24 MR. WILCZYNSKI: At the request of MPRDS

1 I don't believe was sent out just the BWRs. I
2 imagine it was sent out through the various --

3 MR. ROGERS: You are saying PWR and BWRs
4 aren't seeing any overspeed trip?

5 MR. DUNNE: To the best of our knowledge,
6 yes.

7 MR. ROGERS: Okay.

8 MR. WILCZYNSKI: It doesn't show that.

9 MR. ROGERS: Okay. One other question.
10 Have you all calculated how much water, saturated
11 water should be in the line that would cause an
12 overspeed trip of the turbine, and have you been
13 able to correlate that amount of water to the
14 amount of water you think is actually in your
15 steamlines?

16 MR. HILDEBRANDT: That calculation is
17 being done now.

18 MR. ROGERS: Thank you very much.

19 MR. WHOLD: I would like to ask a
20 question on the piping design. Is it common
21 practice to supply a turbine with cold piping at
22 startup or is it more common to keep that piping
23 heated and drained and ready to start with the hot
24 piping up to the trip and throttle valves? It

1 might be common industry practice to have hot
2 piping and this would be an unusual design.

3 MR. ROSSI: That would at least explain
4 why other plants haven't seen this problem and it
5 does exist here.

6 MR. BEARD: I think also the question of
7 the layout of the pipes in avoiding horizontal
8 runs, particularly long horizontal runs, it may be
9 replaced where you can have short ones, but it does
10 raise questions concerning the piping. And I guess
11 the obvious follow-up to your question is the
12 utility looking into the design aspects.

13 MR. WHOLD: Right.

14 MR. BEARD: Would that be a part of their
15 now expanded trouble-shooting program?

16 MR. WHOLD: I think it should be found
17 out whether or not they have a unique design.
18 Maybe that's the only reason they are experiencing
19 the problem.

20 MR. HILDEBRANDT: This work was already
21 in the process as a result of the hanger support
22 damage and they are looking at those particular
23 aspects including calculations on moisture, and
24 this event occurred in the process of that

1 investigation.

2 MR. BEARD: Do you know whether or not
3 with regard to this design it is unique along that
4 line?

5 MR. HILDEBRANDT: We don't have that
6 answer yet. It is ongoing at this point.

7 MR. BEARD: You don't know yet.

8 MR. HILDEBRANDT: No, sir.

9 MR. BEARD: I guess if I can go back, I
10 only had one or two quick items. I just want to
11 reiterate when we get over here to the details of
12 the action plan, my general comment was it does not
13 appear that this scheme says all the things
14 necessary to rule out all the other causes prior to
15 going to Mode 3, but we talked about that quite a
16 bit.

17 I had a concern or question in regard to
18 the vendor representatives as to whether or not the
19 people from Terry and Woodward are going to be
20 service representatives of the sup technician
21 variety or whether they are going to be people with
22 the design knowledge that we talked about previously.

23 MR. WILCZYNSKI: The man that will be
24 coming from Woodward would be just a service

1 representative to give a once-over of the governor
2 after pulling the cover off. The turbine, Terry
3 Turbine representatives, the first person that
4 would be here would be a service representative for
5 the disassembly and reassembly and also the
6 inspection in between there.

7 MR. HILDEBRANDT: Of the turbine.

8 MR. WILCZYNSKI: Of the turbine. Plans
9 are being made for an engineering representative to
10 be here during testing of the turbine using the
11 cross-over lines.

12 MR. BEARD: You don't believe it's
13 necessary for an engineer to be there when you take
14 it apart, when you are looking for the potential of
15 water damage or water intrusion so you can analyze
16 the visual things that were observed?

17 MR. ROSSI: Well, let me ask you another
18 question. I assume that damaged parts of any sort
19 will fall under the general guidelines and be saved
20 for future analysis?

21 MR. WILCZYNSKI: Yes, definitely.

22 MR. ROSSI: But I think there is a
23 general problem here that you ought to consider,
24 and that is that I think you have a very -- you

1 apparently have a very complicated problem of some
2 sort with these governors and the turbines and you
3 may want to look harder at the engineering support
4 you are going to get out of the vendor as opposed
5 to just the people that can replace the broken
6 parts, and I think that is the point that J. T. is
7 making.

8 MR. BEARD: We have had some unfortunate
9 experience in different pieces of equipment around
10 nuclear plants where the person looked at it, it
11 was a sup technician, to use a term, and then by
12 telephone tried to communicate that visual
13 information to an engineer across the country and
14 asked for some assessment, and we found that's a
15 very poor way to analyze the effects that were
16 observed.

17 The next best thing is obviously very
18 good photographs, but I think the situation -- you
19 may want to reconsider having the people who are
20 design-oriented involved in that inspection because
21 that's the crux of your sole thesis.

22 With that, realizing --

23 MR. SHAPER: I would like to make a
24 comment.

1 MR. BEARD: -- it is 6:40 in the evening,
2 I have no further comments on this.

3 MR. ROSSI: You have the other one to go
4 through. Go ahead.

5 MR. SHAPER: This is the first action
6 plan which really describes a considerable amount
7 of maintenance work that is going to take place
8 including possible removal and replacement of parts.

9 Last Saturday or Sunday, I requested from
10 the TECO a description as to how they intend to
11 control and handle the parts that are replaced
12 and/or sent out for further analysis. I have not
13 received anything, and until such a time as I do
14 receive something, that type of work activity is
15 going to be placed on a hold.

16 MR. WIDEMAN: Wayne, this portion here is
17 only trouble-shooting; okay? And they are, under
18 the guidelines, there was no replacement of parts
19 to take place.

20 MR. BEARD: I think there is a step in
21 here that says develop a procedure for the repair
22 and replacement.

23 MR. SHAPER: Item four on the action plan
24 says prepare maintenance work order for repair and

1 replacement of components as required, then reassemble
2 turbine. So I assume if there is anything that is
3 going to be replaced, you are going to do it before
4 you reassemble the turbine.

5 See, I'm just making it a point, and that
6 goes for any work activity, any replacement of
7 parts. This is a very important part of the job is
8 controlling this equipment.

9 MR. ROSSI: Let's see. Can we go on to
10 the other action --

11 MR. BEARD: Does anyone else have any
12 comments on this? I seemed to have by default had
13 a lot of comments. Did anybody else?

14 MR. WHOLD: It may be because I haven't
15 had a chance to read this completely, but I wonder
16 if the time constants have been evaluated in terms
17 of the governor coming open and having to close and
18 the various steam supplies and opening and closing
19 and the discharge valves.

20 MR. BEARD: Especially in the presence of
21 water.

22 MR. WHOLD: Presence of water. The 599
23 and 608 valves, for instance, drop half of the load
24 on the turbine in nine seconds. I guess there was

1 no flow at that time; it closed. But these time
2 constants are important in evaluating on overspeed.

3 MR. HILDEBRANDT: Those considerations
4 are part of the same analysis that Walt was asking
5 about earlier, that all the conditions surrounding
6 the turbines and steamlines are part of the
7 analysis of going in and trying to reproduce what
8 happened and a consideration such as you mentioned
9 would be true.

10 MR. BEARD: Would that analysis be part
11 of the information you would -- the licensee would
12 present as part of telling us you found as a root
13 cause --

14 MR. HILDEBRANDT: We are doing that for
15 the licensee. I presume that is the case.

16 MR. WILCZYNSKI: Yes.

17 MR. ROGERS: One last question. When are
18 you going to start work?

19 MR. WILCZYNSKI: Pardon?

20 MR. ROGERS: When are you going to start
21 work?

22 MR. WILCZYNSKI: On these turbines?

23 MR. ROGERS: Uh-huh.

24 MR. SHAFER: I think personally you have

1 got some work to do on this and then you are coming
2 back. You are not approving --

3 MR. ROSSI: We aren't in a situation of
4 approving these at all. What we were asked to do
5 is comment on these before they started the work,
6 and I assume that you have heard our comments. And
7 I don't know that we have any provisions for asking
8 to come back and commenting on it again.

9 MR. BEARD: I guess the question is
10 whether we would like to see it again. I think
11 that's the question being put on the table.

12 MR. SHAPER: Yes.

13 MR. ROSSI: Why don't we get back to them
14 in the morning on that. If we are through with
15 this, I would like to ask if anyone would object if
16 we take a quick five-minute break?

17 (Thereupon, a recess was taken.)

18 - - - - -

19 MR. ROSSI: Let's go back on the record.

20 MR. BEARD: Do we have people here to
21 return to business?

22 MR. ROSSI: We have enough people?

23 MR. BELL: It's all right to conduct
24 business?

1 MR. WIDEMAN: We are going to be talking
2 about the throttle valve problem?

3 MR. ROSSI: We had one other thing -- we
4 have had a discussion about --

5 MR. WIDEMAN: Do we need this on the
6 record?

7 MR. ROSSI: We are on the record. I
8 think you definitely do.

9 MR. BEARD: I wanted to ask the question,
10 do you have the people that Toledo Edison wants to
11 finish the last few minutes of discussion on this
12 overspeed plan that you have presented us or do you
13 want to get some people in the room before we start?

14 MR. GRADOMSKI: I think we should wait
15 for Bernie.

16 MR. ROSSI: Fine. Let's go off the
17 record until everybody is here.

18 (Discussion held off the record.)

19 MR. ROSSI: Why don't we go on the record.

20 You have heard a lot of comments and
21 concerns and problems that we have with the one
22 that we just reviewed. Now, from our side it looks
23 like that you are probably going to be doing a
24 moderate amount of revisions to this and, based on

1 that, we think we ought to see it again, you know,
2 we ought to see this one as if we are seeing it the
3 first time after it is redone.

4 with that, the next question is what does
5 this do to your schedule if we don't go through the
6 throttle valve one tonight but we do it tomorrow?
7 I think it also brings up the question that's
8 pretty clear, we are not going to get through all
9 of these by the end of the day tomorrow, so some of
10 them are going to have to be reviewed next week.
11 What does that do to your schedule?

12 MR. BEYER: Our plans are to get these
13 plans finalized and proceed as they are approved.
14 As far as scheduling, we haven't laid out a
15 specific schedule to say we want to start this now
16 and this at given times.

17 MR. ROSSI: So you don't have definite
18 plans for the Terry Turbine people and governor
19 people to come here on a given day next week?

20 MR. WILCZYNSKI: No, we do not.

21 MR. ROSSI: So is it fair to say if we
22 don't look at this other one tonight and we look at
23 the one we just looked at, the one we just talked
24 about early next week, that wouldn't delay you?

1 MR. BEYER: When might we expect to get
2 comments back?

3 MR. BEARD: I think we had a discussion
4 with Mr. Williams this morning about these action
5 plans and how we might appropriately convey the
6 information back and forth between your engineering
7 and staff and us during the time we are in Bethesda,
8 and Bill Rowles was present for that. And I think
9 Mr. Williams had some ideas how that might be
10 conducted.

11 MR. ROSSI: Excuse me, J. T. Let me --
12 there are a couple of ways it can be done. One is
13 we can try to do it by phone. We obviously will
14 have to have the document, however. Then there be
15 other ways to speed it up.

16 But one possibility is we simply get the
17 document Telefaxed to us and we have the
18 conversation in conference call and there may be
19 other things that can be done where we could do it
20 face to face.

21 MR. SHAFER: Bernie, I believe you have
22 this on 5520, do you not, these plans?

23 MR. BEYER: I don't know if they are all
24 on 5520 word processing.

1 MR. SHAFER: I would suggest you consider
2 that possibility. The Fax are very difficult to
3 read once they reproduce it three or four times.
4 If it's possible, you might consider that.

5 MR. WIDEMAN: If they are on 5520, there
6 is a possibility that we could transmit those over
7 the 5520 to Bethesda. You know, we do that
8 frequently with our project manager.

9 MR. ROSSI: Oh, you do?

10 MR. WIDEMAN: We have that communications
11 established.

12 MR. ROSSI: If you have that, that makes
13 the problem simple on getting it there, and then
14 what we are talking about is reviewing the thing
15 and talking about it by phone.

16 MR. WIDEMAN: Okay.

17 MR. ROSSI: Which is what I --

18 MR. WIDEMAN: Understand that if we did
19 do that, it would not come out on a form like this;
20 okay? It would come out on a blank piece of paper
21 without the action plan.

22 MR. ROSSI: What we need is something
23 that's clear enough that we can review and comment
24 on it, because we are not -- we don't want to be in

1 the position of doing any kind of sign-off approval.
2 We want to, you know, give you our comments on it
3 and what the benefits are and what we think the
4 weaknesses are. And I just -- the one we just saw,
5 we are very concerned that everything depends on
6 this one hypothesis that no one else has ever seen.
7 And I would think at this point you would be
8 uncomfortable with that also.

9 MR. WIDEMAN: Okay. We can make the
10 necessary arrangements to get the documents to you.
11 Whether that means overnight Federal Express or we
12 send someone on a plane to hand carry them to you,
13 we can make whatever arrangements are appropriate.

14 MR. BEARD: Let me see if I understand
15 the other question about scheduling. Is there any
16 interrelationship between this plan on aux feed
17 overspeed that we just discussed and the overspeed
18 trip throttle valve plan that we had planned
19 earlier to discuss tonight?

20 MR. BEYER: I would ask Rick to address
21 that. I think he can better relate the technical
22 relationship between these two plans.

23 MR. BEARD: I mean, in terms of schedule.

24 MR. GRADOMSKI: Excuse me. Could you

1 repeat the question?

2 MR. BEARD: I was trying to address the
3 scheduling question, and that is is there any
4 schedule or interaction between the plan we just
5 discussed on the aux feed overspeed trips, Plan 1A
6 and 1B, and the other plan, which is aux feedpump
7 turbine overspeed trip throttle valve linkage
8 problem in terms of when we need to review these
9 and give you comments?

10 MR. GRADOMSKI: The connection between
11 the two comes in the testing of the hypothesis for
12 action Plan 1D.

13 MR. BEARD: 1D?

14 MR. GRADOMSKI: 1D, which is the trip
15 throttle valve.

16 MR. ROSSI: That's the part about going
17 to Mode 3 for tests. That's the connection between
18 the two?

19 MR. GRADOMSKI: That's the connection
20 between the two, that's true. The only way to test
21 that hypothesis is in Mode 3 and attempting to open
22 the trip throttle valve of the auxiliary feedwater
23 pumps against full steam generator pressure.

24 MR. BEARD: Okay. Let me be more

1 specific. I don't know whether you want to answer
2 it or Bernie, but in view of the hour, if we were
3 to ask about reviewing this trip throttle valve
4 problem Plan 1D tomorrow, would that impede your
5 progress in any way or is it important that we do
6 it tonight?

7 MR. BEYER: I think we can review it
8 tomorrow and still support our efforts. While we
9 were on break, we talked about our need to revise
10 the plan that you have already commented on today.

11 MR. BEARD: The one on the aux speed
12 overspeed trip?

13 MR. BEYER: Overspeed trip, and taking
14 that into consideration, we can postpone the review
15 or taking of your comments on the throttle valve
16 until tomorrow without any impact.

17 I guess maybe we ought to clarify, our
18 approach here is to make sure that we have a good
19 plan before we go out in the field. Yes, we are
20 anxious to get to the root cause of these problems,
21 get the corrective action identified, and repair
22 the equipment and put it in an operable state, but
23 we don't want to do that at the sacrifice, we don't
24 want to push the schedule to sacrifice the quality

1 of that effort.

2 And that's why I'm a little evasive and
3 cannot be specific about a given schedule. We are
4 concerned about the process here to make sure that
5 we have given these problems due consideration and
6 develop good action plans so that when we go out in
7 the field, we indeed identify that root cause.

8 MR. BELL: But there is no schedule to
9 say that, as an example, you want to work on the
10 main feedpumps next Wednesday? You don't have a
11 deadline for the action plan to be done say Monday
12 and reviewed by the parties involved by Tuesday and
13 then start the job on Wednesday? There is no such
14 schedule as that?

15 MR. BEYER: For a given action plan?

16 MR. BELL: For all of them in their
17 entirety.

18 MR. BEYER: That is correct. We have not
19 put that schedule together yet because we are still
20 in the process of developing the action plans.

21 MR. BELL: And there is no critical path
22 to the end of this that's been drawn up by the
23 utility?

24 MR. BEYER: We have not put an end date

1 on it. As I said earlier, our intention is to make
2 sure we go through it right, and until we lay out
3 our action plans, we can't logically put together a
4 meaningful schedule.

5 MR. BELL: I understand. But as a result
6 of some of the other meetings, I thought there was
7 a schedule that was going to be developed so that
8 not only we could review action plans in a timely
9 manner as to not hold up your work, but also Region
10 III could schedule inspectors in to monitor those
11 maintenance activities.

12 MR. SHAFER: I specifically requested
13 that some time ago. I have not seen any schedule
14 per se.

15 MR. BEYER: My interpretation or
16 understanding of what you had requested was that we
17 appraised you of the schedule of the work and we
18 will do that. As we initiate actions in the field,
19 we will appraise you, and when we get the total
20 package identified and can factor that into one
21 overall schedule, we will make that available if we
22 get to that point.

23 MR. BEARD: Of course you realize members
24 of this team have been working long hours, nights,

1 weekends, Saturdays and Sundays because we were led
2 to believe if we didn't, we would be holding up
3 your recovery program, your schedule.

4 MR. BEYER: I understand that, and we too
5 have been working the long hours so that we can
6 give you a plan so that we wouldn't be unduly
7 extending this effort.

8 MR. BEARD: Okay. We now understand.

9 MR. SHAPER: Could I make a suggestion
10 too in order to make these meetings flow more
11 smoothly? I received these two documents maybe two
12 hours before this meeting, and you can see that the
13 majority of the time was spent on this one and I
14 think most of us concentrated on this one. And I
15 agree with you, that we can take this one up
16 tomorrow. It would certainly give us an
17 opportunity to review it. And consider scheduling
18 the meetings for these documents giving us enough
19 time to go through this before you set the meeting
20 up.

21 MR. ROSSI: Well, some of that is my
22 fault because I have been anxious to get the meetings
23 set up while we are here. So I don't think that
24 that's --

1 MR. SHAPER: I just want to encourage we
2 take every step one step and a time and not try to
3 force it.

4 MR. BEYER: I personally looked at it
5 that you would schedule the meeting or tell us when
6 you had an opportunity to comment, review and
7 comment on these action plans. I understand that
8 you certainly have to have time to do it, an
9 adequate review, and we are the first link in that
10 path to give you a plan to review.

11 So I feel the burden is on us to get the
12 plans to you. I have no concern that you have not,
13 you know, responded reasonably with the plans that
14 we have given you.

15 MR. SHAPER: Thank you.

16 MR. BEARD: Could I ask a different
17 question? I understand that while we are talking
18 about these plans on the two things, that you have
19 broken up several of the pieces of equipment or
20 several systems I will say into various segments
21 for purposes of assigning team lead individuals and
22 development of teams and whatnot. Somebody has
23 suggested maybe the area of the aux feedpumps
24 divided up into maybe four or more parts.

1 And I don't think I would like to hear
2 the answer tonight, but at some point in the very
3 near future I would like to understand better how
4 all this is going to be brought to a head in terms
5 of overall coordination and some maybe lead effort
6 in terms of supervision of the entire say aux
7 feedwater system as contrasted to say some other
8 system. I would like to understand how your
9 management scheme is such that the engineering will
10 be coordinated, that's all.

11 MR. ROSSI: Before we adjourn for tonight,
12 does somebody have a clean copy of this one that we
13 can put with the transcript? I should have done
14 that at the start.

15 MR. BEARD: In view of the comments you
16 heard us giving at the meeting here, does this give
17 you any feel for what time would be involved in
18 terms of when we might see this again? I mean, I
19 take it that is not an hour, but is it tomorrow or
20 next week or two weeks?

21 MR. BEYER: I would hope we can get it in
22 your hands tomorrow, but again I want the lead
23 individuals to take the comments and take the time
24 to make sure we have factored in the relevant

1 points.

2 MR. WILCZYNSKI: I believe that most of
3 the comments can be addressed and you could see
4 this again tomorrow. The only one that I would
5 think might give us problem is to check around the
6 industry as far as we talked about our design being
7 different from everyone else's. I don't think -- I
8 don't believe that there is any way we can get that
9 information by tomorrow.

10 MR. ROSSI: I think it's not going to be
11 feasible for us to meet on this one here again
12 tomorrow. I think the best we could do if we get
13 it is to take it back with us. But I would
14 strongly encourage you to, you know, do what it
15 takes to get it into shape and then we will look at
16 it.

17 MR. BEARD: Bernie, are you sort of
18 ramrodding the development of these?

19 MR. BEYER: Yes.

20 MR. BEARD: Do you have any feel for what
21 other plans might be arising tomorrow to be presented?

22 MR. BEYER: I think I might be able to do
23 that.

24 MR. BEARD: I don't mean anything

1 definitive, but just a feel.

2 MR. BEYER: No. 18 on SP7A is in final
3 typing, and No. 27 on MS-106 is in final typing. I
4 would expect you would have those tomorrow as well.

5 MR. BEARD: Tomorrow is Friday.

6 MR. BEYER: Friday.

7 MR. BEARD: Can you tell me roughly what
8 the status is on the PORV.

9 MR. BEYER: That is has be drafted and
10 reviewed by the group of Toledo Edison people.

11 MR. BEARD: I mean, just in the sense of
12 how many days down the road is it before we are
13 going to see that? One day, a week?

14 MR. BEYER: I would expect you would see
15 all of these by the first of the week, if it's a
16 matter we have to send them in the mail to you. I
17 would expect from our efforts what we have done to
18 date, from the comments we have received from you
19 on the ones you have reviewed, that over this
20 weekend we will have finalized them for you,
21 submittal to you.

22 MR. BEARD: It might be, considering
23 though if you have a number like that, we consider
24 some batch type of treatment rather than earlier

1 someone suggested batching one with 5520 and then
2 having a phone conversation. Maybe some other
3 method might be appropriate if there is a number of
4 them.

5 MR. BEYER: Yeah. As Steve pointed out,
6 if we finish them over the weekend, maybe we can
7 get them down to you Federal Express or however we
8 do it.

9 MR. BEARD: I was thinking more of the
10 conduct of the review.

11 MR. WIDEMAN: J.T., are you saying that
12 you are going to be in Washington next week and
13 that you would think that we might want to come to
14 Washington to discuss them with you?

15 MR. BEARD: I'm not wanting to suggest
16 that. You might consider that as a possibility and
17 you guys make some decision.

18 MR. WIDEMAN: Okay. We will consider
19 that.

20 MR. ROSSI: Okay. Are we to the point
21 where we will adjourn for the night?

22 MR. GRADOMSKI: Do you have a time in
23 your mind when you would like to review Action Plan
24 1D on the overspeed linkage?

1 MR. BEARD: Trip throttle?

2 MR. GRADOMSKI: Yeah.

3 MR. ROSSI: Why don't we work the
4 schedule out with Bill in the morning, because we
5 will have to look and see who is available for
6 interviews.

7 MR. ROWLES: Late morning or early
8 afternoon based on what I know now to be the
9 tentative schedule for tomorrow.

10 MR. ROSSI: Why don't we adjourn then.

11 - - - - -

12 Thereupon, proceedings were
13 concluded at 7:10 o'clock p.m.

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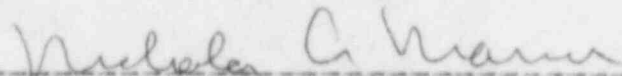
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CERTIFICATE

I, Nicholas Marrone, a Registered Professional Reporter and Notary Public in and for the State of Ohio, do hereby certify that I took the aforementioned 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 Registered Professional 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 22nd day of June, 1985.


NICHOLAS A. MARRONE, Registered Professional Reporter, Notary Public in and for the State of Ohio.

My Commission expires November 1, 1987.

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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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"VENT" SHOULD BE "EVENT".

Page No. 1

DATE

6/25/85

SIGNATURE

[Signature]

16	22	BELIEVE THE FIRST 106A SHOULD BE 106
45	5	MPRDS SHOULD BE NPRDS

