

UNITED STATES NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:
DAVIS BESSE INCIDENT

DOCKET NO:

(INTERVIEW & MEETING)

(CLOSED)

MEETING BETWEEN THE NRC FACT-FINDING TEAM AND TOLEDO EDISON
ON
SEQUENCE OF EVENTS

LOCATION: OAK HARBOR, OH

PAGES: 1 through 24

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NATIONWIDE COVERAGE

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Sim 1-1

1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

3 - - -

4 WEDNESDAY, JULY 10, 1985

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6
7 MEETING BETWEEN THE NRC FACT-FINDING TEAM AND TOLEDO EDISON
8 ON
9 SEQUENCY OF EVENTS

10 - - -

11 NRC FACT-FINDING MEMBERS PRESENT:

12 ERNEST ROSSI

13 J. T. BEARD

14 LARRY BELL

15 OTHER NRC MEMBERS PRESENT:

16 W. ROGERS

17 N. JACKIW

18 TOLEDO EDISON MEMBERS PRESENT:

19 V. MacDONALD

20 J. MARLEY

21 J LINGENFELTER

22 J. WOOD

23 - - -

4-A
Sim 1-2

P R O C E E D I N G S

(1:12 p.m.)

MR. ROSSI: Why don't we go ahead and start then.

What we are going to do now is talk about the sequence of events and additional information that the licensee has that may warrant corrections to a couple of the items in the team's sequence of events that was dated June 24th, 1985.

You have given us a couple of pieces of paper here.

MR. BEARD: They will be entered as exhibits to this meeting.

MR. ROSSI: Both of them have been?

MR. BEARD: Yes.

MR. ROSSI: Okay, fine.

MR. BEARD: There is the memo from Mr. Jain, and then there is a one-page handwritten document.

(The documents referred to were marked Exhibit No. 1 and were submitted for the record.)

MR. ROSSI: Okay. Why don't you go ahead and explain what the changes are.

MR. LINGENFELTER: Okay. We will do the simple item first, the one handwritten page. This was just a typo on the times for when low suction pressure was developed

Sim 4A-3 1 on the No. 1 aux feed pump. The original sequence of
2 events read 1:57:33, and we feel that should be changed
3 to 1:57:53 to go along with what was in the alarm printout,
4 which is a minor item.

5 MR. BEARD: So actually, if I understand it, there
6 are two changes. One is in the time that the entry should
7 be entered, and the time should be 1:57:53 instead of 33 ---

8 MR. LINGENFELTER: Right.

9 MR. BEARD: And the corresponding changes, the
10 duration was 34 seconds instead of 54 seconds.

11 MR. LINGENFELTER: Correct.

12 MR. BEARD: Questions?

13 MR. BELL: Yes. This low suction pressure
14 condition did result in a shift of suction from the CST
15 to the surface water system though, right?

16 MR. LINGENFELTER: That is correct. It was just
17 in the time that we thought it was a typo there.

18 MR. ROSSI: Later on it talks about the shift in
19 the suction and I assume that that time is correct.

20 MR. LINGENFELTER: That is the 1:58:40 entry.

21 MR. BEARD: Let me back up. There is an entry
22 in the sequence of events wherein we believe that the
23 suction actually did transfer, okay, and that was later,
24 and it was returned manually by the operator. But now this
25 entry that you brought up here was intended to say that

Sim Sim 4A-14

1 according to the information that we had, there had really
2 been a true low suction condition like a minute before that
3 lasted for some number of seconds and then it cleared prior
4 to the actual transfer.

5 MR. BELL: But wasn't suction pressure restored
6 to normal when the service water supply valve opened?
7 Wouldn't that raise the suction pressure back to this
8 normal value?

9 MR. MARLEY: The point which I was trying
10 to make on the clarification on this sheet was that it
11 appeared to my mind that there might have been a typo-
12 graphical error made just in the item that was referenced,
13 being the item at 1:57:33 appeared like it correlated to
14 the item on the alarm which was shown to be 1:57:53, and
15 that was the alarm point P006 for aux feed pump suction
16 pressure low. It did return to normal at 1:58:27. The
17 only clarification I was trying to make at that point was
18 that it appeared that the wrong time was referenced for
19 that change in state.

20 MR. BEARD: What was the data point on that one
21 again?

22 MR. MARLEY: The point number was P006.

23 MR. LINGENFELTER: Then the actual transfer
24 occurred later.

25 MR. MARLEY: Later, that is correct.

Sim 4A- 5

1 MR. BEARD: I think that it is a typo type of
2 mistake, but we will look into it and if we are convinced,
3 then we will make the correction. I think you are right.

4 MR. LINGENFELTER: The second document, the
5 memo from Susmil Jain to John Wood in regards to the aux
6 feed pump turbine controls is discussing a little more
7 detailed understanding of what the operators were doing
8 with respect to aux feed pump No. 2.

9 And the suggested changes in here, and there
10 are specifically two of them, one at 1:53:22, the sequence
11 of events currently makes reference to the fact that the
12 pump could not be controlled from the control room.

13 Our feeling now is that indeed the pump could have
14 been controlled from the control room at this time had
15 he attempted to do it.

16 MR. BEARD: Is this a change in the information
17 that we have been previously given? In other words, is
18 someone's memory now different? I am trying to understand
19 whether we misunderstood what someone said in one of our
20 interviews or something, or whether they now remember
21 differently.

22 MR. LINGENFELTER: I think we are just getting
23 down to more details of what happened. We have had a
24 better chance to talk to the operators and find out what
25 they were doing and getting all the details of the data

1 understood, and it now appears as though ---

2 MR. ROSSI: Well, you know, one of the things
3 that I think there has always been a question on how we
4 had our sequence of events worded here compared to what
5 we have been told. This we have discussed in a couple
6 of earlier meetings, as I recall.

7 MR. BEARD: That entry has been discussed many
8 times.

9 MR. ROSSI: Yes. And I think that Wayne is
10 preparing a write-up on the sequence of events that is
11 based primarily on the various transcripts. So he is
12 looking at what we can tell from the transcripts compared
13 to what you have given us here compared to what you can
14 get from the sequence of events printouts and so forth.

15 There may be some of these things where we are
16 just not going to ever know for sure. I don't know. If
17 it is totally dependent on what somebody remembers from
18 the event and it is different in the transcripts compared
19 to what is in here, or if the equipment operators say
20 something that is a little different than the control
21 room operators, we may just not be able to resolve it.

22 I don't know whether this is one of those or not.

23 MR. BEARD: That is what I was trying to
24 understand.

25 MR. LINGENFELTER: I think that there is

Sim 4A-7

1 evidence for this, and let me go back and explain to you
2 what I can tell you about what I recall.

3 I told you before what I understood about control
4 of the No. 2 aux feed pump around this time. As I recall,
5 and I did not go back to the previous transcript, but as
6 I recall, my understanding previously had been that the
7 operator locally was attempting to control aux feed pump
8 No. 2 to bring the pump up to speed, and indeed at this
9 time he had established steam flow to the turbine.

10 My understanding previously was that he had
11 difficulty getting the trip throttle valve all the way
12 open, and in fact the pump was coming up to speed with the
13 trip throttle valve not fully opened.

14 If that had been the case, then control from
15 the control room would have been difficult since the
16 majority of the differential pressure drop, and the
17 pressure drop was across the trip throttle valve.

18 After looking at all of the data closer, the
19 alarm printout shows something I had missed before, that
20 the trip throttle valve showed that it was fully opened
21 at this time, and in fact the flow was coming up and the
22 control room operator, I guess as I understand it now,
23 basically left local control. In other words, he told the
24 guy down in the aux feed pump room to try to bring the
25 pump back, and he then closed the trip throttle valve.

Sim 4A-8

1 He was trying to maintain control locally.

2 Had the control room operator attempted to use or
3 taken enough time to use the aux feed pump control in the
4 control room, he would have succeeded, but he did not do that.

5 It is a relatively minor point, but the fact is
6 that we feel now that he could have controlled the pump at
7 that time, for what that is worth.

8 MR. BEARD: So it is somewhat different and more
9 recent information than we have previously been given.

10 MR. BELL: How does this significantly affect the
11 event?

12 MR. LINGENFELTER: I don't think it does. It is
13 only a matter of trying to clarify whether or not we indeed
14 had any kind of real big problems with the controls themselves
15 at that point. I mean you obviously had some troubles with
16 the things going out at a lower speed and you had some
17 trouble getting the trip throttle valves reset, but we
18 originally had thought that if something was wrong with the
19 circuitry up there, and we don't think that is the case
20 now.

end Sim
Sue fols

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#5-1-SueWalsh

MR. BEARD: I think that that's one change that you are proposing in this area. And I believe there is a second change that says: In an area where we may not have indicated there was a control problem there now seems to be there was.

In other words, as I read this memo that you have given us, the third paragraph indicates that later there was a control problem. So, as I understand the essence of the change that you are proposing is to the place where we indicated there may have been a control problem, you are saying: Well, no, that's not really the case as we understand it now. But there is a case later where there is a control problem.

That's the way I read the bottom line.

MR. LINGENFELTER: Okay. Now, you are referring now to this third paragraph where it says he later had difficulty assuming manual control of aux feed pump 2.

MR. ROSSI: And this you are saying here, as I read this, because the throttle valve wasn't --

MR. LINGENFELTER: Wasn't all the way open.

MR. ROSSI: Because he had been locally controlling it for some period of time and just didn't have it all the way open.

MR. BELL: But even if the throttle valve wasn't all the way open, shouldn't the operator have been able to

#5-2-SueWalsh1 decrease turbine speed from the control room?

2 MR. LINGENFELTER: He should have.

3 MR. BELL: But was he able to decrease speed?

4 MR. LINGENFELTER: I don't think he tried up
5 front, at least not at the time we are making this initial
6 change.

7 MR. BELL: We are talking about the 201 --

8 MR. BEARD: Yes.

9 MR. BELL: Let's break it up into the later part,
10 the 201 time frame because it says that steam generator
11 levels were about seventy-five and eighty inches. And that
12 would be closer like where you would like to hold level
13 constant.

14 MR. BEARD: I think it also says, Jack, the
15 sentence in the middle of that paragraph, it says: Further,
16 according to him even the auto essential level control --
17 and gives the times -- did not show any response for steam
18 generator Number 2 level.

19 So, I read that as later on there was apparently
20 some problem. And then I think in your fourth paragraph you
21 go into more of an explanation as to what the conditions
22 were that made this problem seem to appear.

23 (Mr. Lingenfelter is looking at a document.)

24 MR. LINGENFELTER: At 1:52:53 the alarm printout
25 shows that the trip throttle valve was all the way open.

#5-3-SueWalsh,

MR. BEARD: Repeat that.

2 MR. LINGENFELTER: At 1:52:53 shows that the trip
3 throttle valve was all the way open. That's .2002.

4 And then at 1:53:51 the trip throttle valve is
5 no longer all the way open.

6 MR. BEARD: 1:53 what?

7 MR. LINGENFELTER: 51.

8 MR. BEARD: So about a minute later, it's no
9 longer open?

10 MR. LINGENFELTER: Right.

11 MR. WOOD: No longer full open.

12 MR. LINGENFELTER: Right. No longer full open.

13 And quite frankly, I wish Sushil were here. He was the one
14 that has been doing all the talking. But, as I understand it,
15 my understanding was that the operator locally started crank-
16 ing back on the valve at that point.

17 I guess my point is that with that valve not fully
18 open, you can't guarantee whether you are going to have any
19 good control of the governor.

20 MR. BELL: But my point is that if -- even with the
21 trip throttle valve only partially open you should be able to
22 fully close the governor and slow the speed of that turbine
23 down, which apparently the operator wasn't able to do.

24 MR. LINGENFELTER: It depends on how long he gave
25 it a chance to work.

#5-4-SueWalsh

MR. BELL: Yeah.

2 MR. LINGENFELTER: You know, sixty seconds --

3 MR. BELL: But my only point is, based on -- I
4 don't think that we can honestly say that there was no problem
5 with manual control from the control room based on this letter.

6 That's my only point.

7 MR. LINGENFELTER: Okay.

8 MR. BELL: Do you agree or disagree?

9 MR. LINGENFELTER: I don't think that I can adequately
10 explain it to you.

11 MR. ROSSI: Well, at 2:01 their change says that the
12 control room operator experienced difficulty in manual control
13 of the pump, and the pump was initially locally controlled.

14 That's what it says.

15 MR. BEARD: That's the 2:01 time?

16 MR. ROSSI: Yes. That's the 2:01 time.

17 MR. BEARD: Yeah. But I guess what I'm trying to
18 understand is that the third paragraph of the letter says that
19 he tried to go into auto essential about 2:01 and got what he
20 said did not show any response.

21 So, at 2:01 I read that thing as saying that the
22 automatic controls appeared not to be working.

23 MR. LINGENFELTER: If you use the word "appeared" I
24 don't have any trouble with that. From what we have seen,
25 there is no way to tell whether there was an actual circuitry

#5-5-SueWalsh1 problem or not. The real question is whether or not the
2 operator gave the automatic controls enough time to respond.

3 There is reason to believe that with the governor,
4 with the trip throttle valve rather closed to some degree
5 that it's going to take a lot longer for the thing to work
6 than it would otherwise.

7 MR. ROSSI: Well, is there another possibility
8 that if the guy that's controlling the trip throttle valve
9 locally is moving that valve in one direction and the opera-
10 tor in the control room or the auto essential control is
11 trying to move the governor in the opposite direction, it
12 would appear to the guy in the control room that it's not
13 controlling properly?

14 Is that a possibility?

15 MR. LINGENFELTER: It's possible. But I again
16 don't know exactly what he was seeing at the time he saw --
17 he made that statement.

18 MR. ROSSI: Yeah. I -- that's directed to you
19 Larry and J.T. also.

20 MR. BEARD: Yeah. I think it's clearly a pos-
21 sibility because, you know, this was a high stress situation.
22 People were trying to get aux feed working. The situation
23 in the pump room was, I'm sure, noisy. Communications were
24 at optimum.

25 And I could envision a clear possibility of one

#5-6-SueWalsh1 guy going up and the other guy going down. But, you know
2 it's still in the possibility range. We don't really know.
3 Okay.

4 But I do have a question, Jack, in this 2:01 type
5 of time frame. As I read your third paragraph here again,
6 that I keep coming back to, what I get out of it was it
7 appeared that the auto wasn't performing to him. Okay. And
8 I can understand that based on what you are telling us about
9 the time and how long he allowed it to try before he decided
10 it wasn't working, et cetera.

11 What I'm trying to correlate now is, you are
12 proposing a change that we add to 2:01 that said: The control
13 room operator experienced difficulty in the manual control.

14 And I'm trying to relate those two together. And
15 I don't -- I get a disconnect.

16 MR. LINGENFELTER: Between manual control and
17 automatic control?

18 MR. BEARD: I read the third paragraph saying he
19 had problems in auto-essential. I don't see anything in the
20 third paragraph that said he had troubles beyond that.

21 MR. ROSSI: Well, the third paragraph also has
22 this thing in there that says that the DADS data showed that
23 the auto control function was working properly between 2:01:04
24 and 2:01:19.

25 MR. BEARD: Where are you reading now, Ernie?

#5-7-SueWalsh1

MR. ROSSI: That's the sentence right after the one
2 that you read. "...the DADS data showed that this auto-control
3 did function correctly..." that is since the auxiliary feed-
4 water pump turbine speed was indeed decreasing because the
5 steam generator level was significantly higher than the level
6 control setpoint.

MR. BEARD: And that could have been the auto con-
8 trol; it could have been the manual control; or, it could have
9 been the local operator. We don't know that.

10 All they are doing is making a judgment that level
11 was going in the right direction.

MR. ROSSI: Can you tell from the printouts when
13 he was in auto-essential level control?

MR. LINGENFELTER: You can tell when he switched
15 back and forth between.

MR. ROSSI: So that you can tell that between
17 2:01:11 and 2:01:24 in some printout that he was indeed in
18 auto-essential level control, I assume?

(Mr. Lingenfelter is looking at a document.)

MR. LINGENFELTER: Okay. Yeah, during -- between
21 2:01:11 and 2:01:24 the switch was in the auto-essential
22 position.

MR. ROSSI: So you know now that between those
24 times the switch was in auto-essential and the next sentence
25 is saying that the data shows that the pump speed was decreasing,

#5-8-SueWalsh which is what you would have expected for that steam generator level?

MR. LINGENFELTER: Yes.

MR. ROSSI: Does that clarify anything or not?

MR. BELL: We are at a disadvantage because we don't have the printouts nor the plots to look at to agree or disagree with this gentleman.

If I might make a suggestion, I would like to take the time for the Team to look at those plots.

MR. ROSSI: Okay. Why don't we go off the record for a few minutes.

MR. BEARD: Well, let me make an alternate suggestion.

MR. BELL: I wasn't finished.

MR. ROSSI: Well, let Larry finish first.

MR. BELL: Toledo Edison is going to troubleshoot the governor of the aux feed pump turbine through some action plan because of the over-speed trip. If there are any problems in the circuitry, will your action plan discover those problems regardless of this letter from Mr. Jain?

MR. LINGENFELTER: I hope so.

MR. BEARD: My understanding is quite different from that.

MR. BELL: If the action plan will reveal a control circuitry problem within the control room either in manual or automatic-essential, then my concern goes away.

#5-9-SueWalsh¹

MR. BEARD: Well, let me tell you what my understanding is. Maybe you guys can set it straight.

I don't have in front of me, but my memory from reading this action plan is that the lead responsibility is proposing that the plan be closed on the basis that the reason there were control problems apparent in the control room was purely because the trip throttle and associated equipment downstairs wasn't in the proper position. Therefore, it was an apparent problem and not a real problem.

And the resolution of the action plan is to consider it not a real problem. Therefore, I don't see a great deal of troubleshooting on the governor coming out of that action plan.

MR. WOOD: Okay. That is a correct assessment of the Plan 1-C. Plan 1-A and 1-B, which is the turbine over-speed action plan and does troubleshoot the governor. Also, in the testing it will, by necessity, have to use the manual and the auto-essential control features.

So that the -- I don't recall offhand whether 1-C actually does bring to light that during the testing of the aux feed pump turbine those controls would be further invalidated. That perhaps is in there. I don't recall offhand that it is.

But you are correct in saying that the action plan 1-C is being at this time generated to say that the apparent

#5-10-SueWalsh

problem was auto-essential or manual control from the control room was in fact an apparent problem and not a real problem.

MR. BEARD: I would like to make a couple of suggestions, Ernie, and then you can go from there. One is a very general thing, that as I see it the Licensee is bringing us new information and proposing that we -- or, asking us to consider it and make appropriate changes to our sequence of events.

And I think that we will do that. We will consider them and if we find them validated we will make changes. And like Ernie said earlier, if we find that it's not resolvable we may have to indicate it that way.

But we certainly want to have our sequence of events as accurate as we believe we can get it. And --

MR. ROSSI: I believe --

MR. BEARD: -- a second point is that in this question about the control re: aux feedwater pump, it seems to me that the number of times that we have discussed this in meetings, the fact that there has been a memo written on it, and the fact of this, that and the other, it seems to me that even without reading the memos, one could say: I need to look and see -- I need to have an action plan to investigate the controls that were available during that period of time after this thing was latched, relatched, rather than close it out.

#5-11-SueWall

And I would -- I'm just saying the fact that we

2 have had this much discussion should suggest that you might
3 want to reconsider closing that other plan out.

4 END #5
5 JoeWalsh flws

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1 MR. ROSSI: It would appear to me that
2 you have to do a thorough test, both the auto essential
3 control and manual control on these pumps to demonstrate
4 that they are working properly before you close out the
5 action plan.

6 That is what it would appear to me. Before
7 you conclude what the root cause of the problem is, and
8 your conclusion apparently may be that there wasn't a
9 problem, that you do a thorough enough test to demonstrate
10 that there isn't a problem.

11 MR. WOOD: I think the purpose for us coming
12 forward with this information is a follow-on to the meeting
13 that we had in Bethesda, where Action Plan 1-C was bringing
14 information that potentially was conflicting with the
15 sequence of events.

16 We wanted to make sure that we brought to the
17 Fact Finding Team as much information as what we understood
18 at this point in time, and granted, it may change at some
19 later time, but as it stands right now, this is the best
20 information we feel we have on this subject.

21 MR. BELL: I think it is good, and I appreciate
22 the fact that you are bringing this information.

23 MR. ROSSI: Walt, do you have anything to
24 add to this?

25 MR. ROGERS: I guess one comment on page 11 of

1 22, 14104, when Actuation Channel 1 actuated, I believe
2 it isolated main feedwater to both steam generators at that
3 time, and that is not mentioned in the sequence of events.

4 MR. ROSSI: You are looking at the LER
5 sequence of events.

6 MR. ROGERS: Yes.

7 MR. BEARD: We are on a different document.

8 MR. ROSSI: Yeah, we were talking about
9 possible corrections to the NRC sequence of events, but
10 --

11 MR. ROGERS: Oh.

12 MR. BELL: May we have time to look at this?

13 MR. ROSSI: There are a couple of questions;
14 we can look at it and then come back and ask more questions
15 about it if we need to, or we can take all the information
16 that we have, which is apparently everything that exists.

17 We have got all the printouts. We have them
18 all. We don't have them here right now. We got all the
19 DADS data on pump speeds, levels, and all that.

20 We got the interviews with all the people,
21 and we got this additional information that they gave us.
22 We got the transcript of what they told us, and we can
23 decide how we word the sequence of events.

24 MR. LINGENFELTER: That is fine.

25 MR. WOOD: Again, the purpose of this was not

1 to tell you what it should be, but only -- here is some
2 recommended changes for your consideration.

3 MR. LINGENFELTER: What time is Sushil coming
4 in?

5 MR. BEARD: He has been here all day.

6 MR. LINGENFELTER: He is coming back to talk
7 to you. I was going to suggest that perhaps you might want
8 to let him address this. He wrote the thing, did the
9 research, and he probably could certainly justify it better
10 than I can.

11 MR. ROSSI: Well, the only significance to
12 this, as I see it, is that you don't want to decide for a
13 wrong reason that you don't have a problem with the control.
14 That is the significance. And, you know, if there is any
15 question at all that can't be resolved, then what you
16 obviously ought to do is make sure that your control systems,
17 both manual and auto essential, are thoroughly checked out
18 and tested before you declare that they are operable.

19 And that is the real key.

20 MR. BEARD: That is what I was trying to say.

21 MR. WOOD: There is additional information
22 in Action Plan 1-C beyond this, including testing that was
23 done immediately after the event, so that there is more
24 basis to saying that apparently there is a problem. Actually
25 may have been -- but your point is well taken as to finally

1 putting the root cause to rest. And whether further
2 testing beyond what we have addressed in Action Plan 1-C
3 is appropriate, we will take that under consideration.

4 I am not certain right now that that is, in
5 fact, not a part of 1-C. It may even be some of that in
6 1-C as it stands right now.

7 MR. BEARD: Is there anything more that we need
8 to discuss at this meeting?

9 MR. LINGENFELTER: (Nods head negatively.)

10 MR. ROSSI: What we will do then -- go ahead,
11 Larry.

12 MR. BELL: For clarification, is the sequence
13 events in your LER 85-013 your latest sequence of events?

14 MR. LINGENFELTER: Yes.

15 MR. ROSSI: I went through that this morning
16 fairly quickly, and it looks like it is in agreement almost
17 down to the word with ours, except in a few cases.

18 Some of them were things like we are talking
19 about here. They have said things differently than what
20 is in our sequence of events, but most of the information
21 appears to be the same.

22 They even know how to spell, 'acoustical,'
23 correctly, compared to the team's spelling.

24 MR. BEARD: I guess that shows that even the
25 government can make mistakes.

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I suggest that we adjourn, Dr. Rossi.

MR. BELL: No, sir.

MR. ROSSI: Okay. We will adjourn.

(Whereupon, at 1:45 p.m., the meeting
concluded.)

* * * * *

CERTIFICATE OF OFFICIAL REPORTER

This is to certify that the attached proceedings before the UNITED STATES NUCLEAR REGULATORY COMMISSION in the matter of:

NAME OF PROCEEDING: DAVIS BESSE INCIDENT
(Interview & Meeting)

(CLOSED)

MEETING BETWEEN THE NRC FACT-FINDING TEAM AND TOLEDO EDISON
ON

SEQUENCE OF EVENTS

DOCKET NO.:

PLACE: OAK HARBOR, OH

DATE: WEDNESDAY, JULY 10, 1985

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

MYRTLE H. WALSH
Official Reporter
Ace Federal Reporters

MARY C. SIMONS
Official Reporter
Ace Federal Reporters

(sig) Garrett J. Walsh, Jr.
(TYPED) GARRETT J. WALSH, JR.

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Reporter's Affiliation

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was left in the 'lower' position for a longer duration, the governor valve would have closed further enough to make its position more limiting than the trip throttle valve in controlling the AFPT speed.

The following conclusions and recommendations are drawn from the above discussion:

1. The NRC sequence of events (pages 4 and 5) should be revised as attached.
2. Action plan 1C should be supplemented with the information contained in this memo regarding auto-essential and manual control of AFPT-2.

Upon your concurrence, I will take steps to revise/supplement Action Plan 1C. Should you have any questions, please do not hesitate to call.

sm a/10

cc:

B. R. Beyer
S. N. Batch
R. J. Gradowski
S. G. Wideman
B. Young

SEQUENCE OF EVENTS

01:50:13 OTSG #1 Atmos. Vent Valve opened.

01:51:17 OTSG SG #1 level falls below eight inches.

*01:51:18 Pzr. PORV opens (third time) at 2435 psig; did not close.

01:51:30 Obtained flow from startup feed pump to OTSG #1.

01:51:42 Operator started to close Pzr. PORV block valve at 2140 psig.

01:51:42 RCS Loop #1 reaches a minimum pressure of 2081 psig.
Loop #1 T-hot = 588.6°F; Tave = 587.5°F.

01:51:49 Accoustic monitor indicates less than 20% flow through PORV/block valve.

01:52:33 Pzr. spray valve closed.

01:53:00 RCS loop #1 T-hot reaches peak value of 593.5°F.

01:53:22 AFW #2 has significant flow, with control locally via the trip throttle valve. The pump could not be controlled from the control room.

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01:53:25 RCS Tave reaches peak value of 592.3°F.

01:53:35 OTSG #2 returns to above 960 psig.

01:53:56 PORV Block Valve reopened by operator.

01:54:45 OTSG #1 return to above 960 psig.

01:54:46 AFW #1 has significant flow, with control locally via the trip throttle valve.

01:56:58 OTSG #2 Atmos. vent open; SG #2 below 960 psig and decreasing.

01:57:05 SG #1 below 960 psig and decreasing.

*01:57:33 Low suction pressure developed on AFW #1; 54 seconds later, suction pressure was recovered.

01:58 Tave restored to normal post-trip temperature. The cooldown had lowered RCS pressure to about 1720 psig. Operators manually started the HPI pump #1 in the piggyback mode (LPI pump 1 supplying the suction to the HPI pump 1). A slight amount of water (about 50 gallons) was injected.

01:58:08 RCS loop #1 reaches a minimum pressure of 1716 psig.
Loop #1 T-hot = 546.6°F; Tave = 546.2°F.

SEQUENCE OF EVENTS

01:58:28 OTSG #1 Atmos. vent closed.

01:58:33 AFW #1 flow reduced to control OTSG level.

*01:58:40 AFP #1 suction automatically transferred from the condensate storage tank (CST) to the service water system. The operator realigned to CST.

02:01 When AFP 2 was returned to service, the control room operator controlled the pump in manual rather than returning it to Automatic. (AUTOMATIC CONTROL BRIEFLY ATTEMPTED FROM 2:01:11 TO 2:01:24)

02:01:13 AFW #2 flow reduced.

02:02:27 SG #1 returns to above 960 psig.

02:02:30 SG #2 returns to above 960 psig.

02:04 Plant conditions essentially stable.

Additional Complications

When vacuum was restored and the MSIVs opened, a water slug damaged one of the main turbine bypass valves.

Notes

1. Adequate subcooled margin was available throughout the transient. The Reactor Coolant Pumps remained in operation. The Quench Tank contained the discharges from the PORV.
2. There is a question on the operability of S/U control valve SP-7A, which would be used to provide S/U feed pump flow to OTSG #2.
3. There is a question regarding the operation from the control room of the atmospheric vent valves.
4. The above sequence of events is based upon combining information obtained from plant computer printouts and operator interviews. Due to time responses of instruments providing input to plant computer systems and the inability to obtain the precise time of events from the operator interviews, there is some potential ambiguity in the exact times; however, such ambiguity is not considered to be significant in understanding the event.

CONTROL ROOM OPERATOR EXPERIENCED DIFFICULTY IN
MANUAL CONTROL OF AFP#2. PUMP INITIALLY LOCALLY
CONTROLLED

SEQUENCE OF EVENTS, NRC FACT FINDING TEAM, DS JUNE 9, 1985
PRELIMINARY REV 2

Pg 4 ITEM *01:57:33 LOW SUCTION PRESSURE DEVELOPED ON AFW*1
54 SECONDS LATER, SUCTION PRESSURE WAS
RECOVERED

CHANGE TO READ

*01:57:53 LOW SUCTION PRESSURE DEVELOPED ON AFW*1
34 SECONDS LATER SUCTION PRESSURE
WAS RECOVERED.

BASIS: THE CTAM ALARM TYPER PRINTOUT INDICATES
THE LOW SUCTION PRESSURE ALARM P006 WAS
RECEIVED AT 015753 & CLEARED AT 015827.

JWM 7/9/85