

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

THREE MILE ISLAND  
INVESTIGATIVE TASK FORCE

Taped Interview No. 1  
August 24, 1979

8308230570 790824  
PDR ADOCK 05000289  
T HOL

8308230570

B&W 347A

lbl

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25P R O C E E D I N G S

VOICE: This is a meeting of the Investigative Task Force with the operating crew who were on duty in the control room on the morning of March the 28th.

The purpose of the meeting is to have a dialogue with respect to the events which occurred and some of the factors which related to those events.

A list of names of those present will be provided separately to the typist.

The first item of investigation and discussion will be the factors related to the trip of the feedwater pump which initiated the series of events on March 28th.

I would like to start the discussion by asking for the operators to comment on the following items:

The investigation after the course of the transient showed that there was air -- I mean, water in the air lines that led to the controllers on the condensate polisher valves.

There were a series of tests run to determine whether the water could have closed the condensate polisher valves. That series of tests was inconclusive.

The water caused the valves to flutter, but did not cause them to go closed.

It is my understanding, based on a memo that Bill Zewe sent me, in a subsequent activity, that water

1b2

1 in that line did cause the valves to go closed.

2 I would like the comment on the part of the  
3 operators, as to whether they feel that that was, in fact,  
4 the thing that triggered the valves going closed and any other  
5 information that you might have on this that we don't have.

6 MR. ZEWE: This is Bill Zewe. I -- from the  
7 first that I realized that we had the loss of feed and I  
8 knew that we had work going on at the polishers, I felt at that  
9 time that the reason was the polishers. It's still my personal  
10 opinion, yet, that it was the water in the air to these  
11 valves that caused them to go shut, because that subsequent  
12 letter that you just talked about that Sean Barry had written  
13 was that they were trying to put the one polisher, number 8,  
14 on the line, and it, indeed, did isolate, and they found  
15 out that there was water right at the controller itself.

16 And I have been -- the only conclusion that I  
17 could reach is that the reason for it to go closed was the  
18 water -- and also from the I&C group, particularly from  
19 Doug Weaver, the I&C foreman of Unit 2.

20 And he says that -- or he believes that or feels  
21 if you do get water into that positioner, that you can cause  
22 that valve to fail shut on loss of air, just because of the  
23 way that the valve is piped up to the air system.

24 MR. KEATEN: Part of the objections that I have heard

25

lb3

1 raised to this theory are associated with the fact that the  
2 data traces which measure the delta P -- I guess across the  
3 polishers, although you clearly know that better than I do,  
4 that those data tracers, I have been told, indicate that the  
5 delta P went to zero very sharply at presumably the same time  
6 as the flow went to zero.

7 And the objection that was raised was that had the  
8 polisher valves slammed shut, they would have expected to see,  
9 first, an increase in the delta P's followed by a decrease,  
10 rather than just simply a decrease to zero.

11 Are you familiar with this data in your view?

12 MR. ZEWE: I have heard that this data is available,  
13 but I have not personally looked at that data, no.

14 VOICE: (Inaudible) zero -- (inaudible) --  
15 the pneumatic records, too. (Inaudible) -- water got into  
16 the recorder. (Inaudible) recorder (inaudible) zero  
17 (inaudible).

18 VOICE: We have had cases -- I have seen cases  
19 before where water has actually come out of the recorders  
20 themselves.

21 VOICE: Yes. That was -- we found that on one  
22 of the (inaudible.)

23 (Inaudible.)

24 VOICE: Tom, let me please ask you to identify  
25 yourself and speak up more.

1b4

1 MR. KEATEN: Bill -- this is Bob Keaten again --  
2 have you had a lot of previous experiences where you got  
3 water into the air lines in that system?

4 MR. ZEWE: Bill Zewe.

5 I really can't say, you know, that I have a lot  
6 of experience with it. I have known of cases where we have  
7 had water in the air systems, and I have talked at some length  
8 with Doug Weaver, our instrument foreman, and we went along  
9 and identified the lines in relationship to how we could get  
10 water from the service air system back through the -- from  
11 the condensate, back through the service air systems,  
12 and then back into the instrument air system. And all these  
13 pipes were all marked and everything.

14 And then he had installed five or six moisture  
15 traps, which should have helped alleviate the problem that  
16 were put in place some time ago. But we have found that they  
17 weren't quite large enough to alleviate these problems.

18 But other than cases like that, not a lot of times,  
19 because I am aware of maybe three or four times that this has  
20 happened.

21 MR. VAN WITBECK: In that flow to get the water back  
22 -- (inaudible) flow path is from the back, the water back --  
23 we're talking about going to a cross connect and the service  
24 instrument air.

25 MR. ZEWE: Yes, they are always cross-connected.

And if we had looked at it, I had asked for

1b5

1 consideration to have the cross ties between service air and  
2 instrument air shut normally, instead of open, and placing  
3 cross-connect valve in a different position, so that you'll  
4 have more separation between service air and instrument air.

5 MR. VAN WITBECK: Is that cross-connect open?

6 MR. ZEWE: It's always open now.

7 It complete cross tied, and it has been.

8 VOICE: Is the instrument air system of an  
9 adequate size to be operated by a cross connect shut?

10 MR. ZEWE: Not in its present condition, to my  
11 knowledge, no.

12 Also, we had checked -- the check valve at 4:01  
13 or 4:02 -- that service area check valve that is the inter-  
14 face valve between the fluffing air valve to the condensate  
15 polishers which taps into the outlet of the condensate polishers  
16 -- from there back to the service air system.

17 And I know that the GPU checked it after the  
18 accident, and the check valve had rusted open, and they had  
19 replaced it.

20 And again, just about two weeks ago, we had calls  
21 again, and I was involved in isolating that, to recheck that  
22 valve. And we found that not only did the check valve leak  
23 now again, but both of the manual isolation valves from the  
24 service air side and from the fluffing air side both

25

lb6

1 leaked. And our maintenance department were working on  
2 repairing those two manual valves. And I'm not sure at this  
3 point if they have completed that or not, because we have held  
4 them up -- that we couldn't remove service air completely  
5 from the turbine building because of the penetration job that  
6 we have in the M-20 area for the sump sample.

7 So, we held them up somewhat. So, I'm not sure  
8 yet if those valves have been repaired.

9 MR. KEATEN: When the check valve in the air line  
10 was replaced, after the accident, was it replaced with  
11 another valve of the same design, Craig, do you know?

12 MR. FAUST: As far as I know it was.

13 The -- George Lehman, I guess it was, was involved  
14 in that testing, and I went through the lineup now and how  
15 to test it that day. And then when he told me that the  
16 test results were that it leaked in excess of about five  
17 gallons a minute and it was rusted open.

18 And I assume that they did replace it with a  
19 like check valve, except he had talked about replacing that  
20 check valve with one that had a spring in it. The original  
21 one did not have a -- a spring in the check valve.

22 And I believe that he may have gone to replace  
23 it with one that had a spring in it. But I don't recall  
24 whether he ever had that done or not.

25

lb7

1 MR. KEATEN: The intent of -- this is Bob Keaten --  
 2 the intent of my questions is are we seeing a case where the  
 3 check valve that was put in that line was just inadequately  
 4 designed for the purpose -- you know, if the main reason that  
 5 it was put in there was to keep water from backing up in the  
 6 line, and if when you get water on it, it's going to rust  
 7 open, it makes you wonder whether that's the right valve.

8 Any comments?

9 MR. ZEWE: I really don't because from an engineering  
 10 standpoint, I really haven't looked at it, you know, to say,  
 11 with any definition, whether yet it made the application or  
 12 not. I really didn't get into that, nor did I ask anyone on  
 13 it.

14 I really --

15 VOICE: (inaudible).

16 It seems obvious it doesn't need it -- or there's  
 17 no question about it.

18 Let me ask, (inaudible), to your --

19 (Inaudible conversation).

20 MR. KEATEN: Bob Keaten.

21 To your knowledge, did -- was anyone aware of the  
 22 fact that the valve was rusted open until the investigation  
 23 had been done, after the fact?

24 VOICE: No. To my knowledge, that check valve had  
 25 been checked before from previous water problems and it

lb8

1 was found to be in operable condition -- as I understand it  
2 anyway.

3 (Pause.)

4 MR. KEATEN: One more point that bothers me, back on  
5 the initiating event -- this is Bob Keaten again -- in order  
6 to get this very rapid termination of flow that the charts  
7 appear to indicate, does that mean that it would have been  
8 necessary for the water in the instrument air line to simulta-  
9 neously close all of the condensate polisher discharge valves?

10 And if so, is that something you would really  
11 expect to have happen? Or am I misunderstanding the question?

12 MR. ZEWE: Bill Zewe here.

13 As far as I'm concerned, it wouldn't need to have  
14 all of the valves go shut at the same time, because we  
15 operate fairly close to the low section pressure trip on the  
16 condensate booster pumps.

17 And I feel that just closure of one or two of those  
18 polisher valves rapidly would reduce the suction pressure  
19 sufficiently to trip the booster pump, which, in turn, would  
20 trip the main feedwater pump.

21 So, I don't believe that -- that seven polishers  
22 would have to isolate at the same time in order to have that  
23 happen.

24 (Pause.)

25 MR. KEATEN: Bill, would you or any of the other

lb9

1 operators care to comment on the -- what you see as the  
2 adequacy of the -- of the design of the condensate feedwater  
3 system?

4 The intent of my question is, is this a system  
5 that you feel like you are operating pretty much on a  
6 ragged edge, and it was very easy for it to trip out? Or was  
7 it one which you thought had a lot of margin? Was it one in  
8 which you felt you had adequate status information as to what  
9 was going on?

10 I'd be very interested in just your general  
11 comments on how comfortable you felt with that system from  
12 the design operation standpoint.

13 MR. FAUST: Craig Faust speaking.

14 Myself why --

15 When I started training on Unit 2, why one of the  
16 things that bothered me -- in just the sense there's a --  
17 we didn't have any automatic bypass around it. If you  
18 went out on a high DP be (inaudible) -- we just lost it,  
19 lost our feed.

20 (Pause.)

21 MR. KEATEN: You're referring to an automatic  
22 bypass around the polishers?

23 MR. FAUST: Right. It was just in reference that  
24 unit One has automatic bypass around it and the operators  
25 over there -- it can come in handy there -- didn't have it  
there.

1b10

1           The other thing, when it's operating -- always  
2 operating at the capacity of the three pumps, the system  
3 just was designed initially that we only had to have two  
4 on line, where we almost needed three.

5           And so we got the -- heater drain pumps going,  
6 right?

7           But then you always have --heater drain pumps are  
8 one of the sorest problems in the system, and you were  
9 always questionable as to whether you were going to have a  
10 heater drain pump there or not, and which, if you lose one,  
11 you would have lost the rest of the two along with it.

12           Now, what will guess you whether it was adequate  
13 to meet it, it was adequate. When I think I can lose a  
14 component in it. But I'm not going to trip off the line.

15           MR. KEATEN: Do you know why it was that there was  
16 not an automatic bypass on the condensate polisher?

17           MR. FAUST: No, I don't.

18           MR. KEATEN: Was this ever raised by the operating  
19 people as an improvement that should be made?

20           MR. FAUST: It was raised, but I don't know if it  
21 was written down, like -- I think it was just stated: Why  
22 isn't this -- why don't we have a bypass valve around the  
23 thing automatically?

24           So, it's where it went from there.

25           This is Bill Zewe.

1b11

1 MR. ZEWE: On that matter alone, there had been  
2 written down papers on -- any concerns to this area of the  
3 automatic bypass valves, COV-12. And it had been raised, you  
4 know -- I'm not sure how high -- at least to the superintendent  
5 level on written documentation.

6 As far as the feedwater system goes, from my  
7 viewpoint, just quickly, as I had three preconcerns with the  
8 feedwater condensate system myself. And one is that we were  
9 always at the limit of our seven polishers.

10 We have a definite flow limit for the deep bed  
11 demineralizer.

12 And we were always very close to those limits --  
13 the maximum power level that we were able to obtain.

14 Also, the hot well level control system was  
15 always troublesome. As a matter of fact, the day of the  
16 incident, I devoted more of my time than what I should have  
17 to the hot well level control problems and also the recirc  
18 capability. Recirc lines have always been a problem, but  
19 condensate pumps and condensate booster pumps -- they have  
20 always been, in my opinion, in need of revision, and they  
21 have been changed in various stages, but I don't feel  
22 that they're quite 100 percent adequate yet.

23 And the hot well level problem also extends  
24 over to where the suction for the main vacuum pumps also.  
25 Whenever you have a hot well level problem, you always have

b12

1 a problem with the suction for main vacuum pump, which has  
2 been a problem in the past.

3 So, those areas myself -- always been a concern,  
4 along with the ones that Mr. Faust just mentioned about the  
5 automatic bypass or cov 12 -- in almost every heater  
6 drain pump capability.

7 MR. KEATEN: This is Bob Keaten.

8 Following up a little bit, Bill, could you say a  
9 few more words about what you felt was inadequate about the  
10 recirc lines?

11 MR. ZEWE: Well, the recirc lines from the  
12 beginning, when we first started operating, up until now,  
13 have been changed quite a bit. There's been a lot more support  
14 of the actual supports that were originally in the first or  
15 second modification were shaken loose from their foundations.  
16 And it has been redesigned and resupported to a large degree.

17 Also, I could never understand -- and it's just  
18 basically based on Unit 1 experience -- why we don't have  
19 bypass valves around the feed pumps and why we don't have  
20 bypass valves around our condensate booster pump. But you  
21 always have to windmill loads in order to run a condensate  
22 pump or a feed. You always had to go through a condensate  
23 booster pump and a main feedwater pump.

24 And I'm not sure whether that's a large problem,  
25

1b13

1 but its never been adequately answered to me as to why we  
2 -- why we would chose to do it that way, other than the  
3 original design -- I didn't think, by and large, a lot of the  
4 things that -- that we have, we rather accept what we have,  
5 so to speak, rather than, you know, try to redesign something  
6 new, and that is true for any portion of the plant. You  
7 accept the cutoff, operate with what you have.

8 And it's just like anything else.

9 MR. KEATEN: This is Bob Keaten.

10 Let me pursue that a little bit. When you find  
11 things like this -- like, for example, the condensate  
12 polisher bypass automatic valve, that you mentioned earlier,  
13 what is the procedure that's set up for you to request plant  
14 modification for plant improvement. And what kind of  
15 response do you get from the suggestions?

16 MR. ZEWE: We have GPU problem reports -- start-up  
17 reports that we institute. Or we could just write a letter  
18 bringing up our concerns and show avenues to take.

19 And I know the problem report, what is generated  
20 on the condensate polisher bypass valve, though I do  
21 not have or know of any -- any very good mechanism for  
22 feedback from the status of the problem report on how it was  
23 closed out or why it was not done, or if it was intended to  
24 be done.

25 It's more of a word-of-mouth fact back through the

1b14

1 chain of command, if you will.

2 If you're the originator of the -- of the problem  
3 report, you hear more of a formal response. But I knew that  
4 there was one written, so I didn't write another one. So, I  
5 was not directly involved in that chain.

6 The directly involved chain that I was in for that  
7 problem was just a handwritten letter by me that addressed a  
8 few other problems, amongst that was the cov-12.

9 MR. VAN WITBECK: Tom Van Witbeck.

10 You mentioned that the bypass valves going to  
11 recirc lines were inadequate from the vibration standpoint.  
12 But what about from a capacity standpoint? Did you ever have  
13 any problem with pumps heating up and operating the discharge  
14 shutoff bypass on a recirc valve?

15 MR. ZEWE: No, they -- not that I am aware of.

16 Now, the orifice size and the lines themselves  
17 provided adequate flow, as far as I'm aware.

18 MR. VAN WITBECK: On the heater drain pumps?

19 I have a question. Who noticed -- or who shut them  
20 off?

21 MR. FAUST: I did -- Craig Faust.

22 I shut them off. Sometime --

23 VOICE: Later?

24 MR. FAUST: -- when we were sitting with all the  
25

1b15

1 pumps off and I said something like, "I believe if we had  
2 a low heater drain tank level."

3 And I think (inaudible) take them off -- (inaudible.)

4 VOICE: The pumps were on and running.

5 VOICE: Yes. They're running on the recirc to the  
6 tank.

7 I hope.

8 (Laughter.)

9 MR. VAN WITBECK: Have you had any problems with  
10 heater drain pumps in terms of tripping off the line?

11 MR. FAUST: Yes, in the past we've had problems  
12 with losing the feeder drain pumps, mainly just, a lot  
13 of times, from when securing the pump. With the piping  
14 modification that was made, you try to alleviate that.  
15 Let it just freeze up on -- on their own, from being -- I  
16 think it was inadequate recirc that was to the pump.

17 VOICE: (Inaudible.)

18 (Inaudible) seemed to be wiping them out. But I'm  
19 just talking about just the operation of the heater drain  
20 pump, not only the Unit 2, but Unit 1 -- these pumps are  
21 always being worked on.

22 VOICE: And have you had any problems with suction  
23 for those pumps during normal operations (inaudible.)

24 (Inaudible) section (inaudible).

25 MR. FAUST: I don't remember specifically losing a

lb16

1 pump. It seemed like everytime you come in, one was out.

2 VOICE: They just lost it or something like that.

3 VOICE: They froze up or something like that --  
4 but during transient positions, they weren't ripping off --  
5 because the system's faulty.

6 VOICE: No.

7 VOICE: Because the system is fine.

8 VOICE: Not that I know of.

9 MR. BRYAN: This is Ken Bryan.

10 I think Unit one heater drain pumps fall into  
11 most of the seal problems. Unit 2 pumps ran fine as long as  
12 they were running, I think. I never had too much problem with  
13 them running. But once you shut one down and start one up,  
14 (inaudible.)

15 And I think that the manufacturer had a note  
16 (inaudible).

17 We got to a point where we were you could turn them  
18 off, but when we went down, in power we just as soon leave  
19 them run on recirc. Till we went back up again.

20 As long as they were running, they seemed to do an  
21 adequate job.

22 VOICE: Problem, seal leakage was excessive.

23 VOICE: Yes.

24 VOICE: Very much excessive, because we had to put  
25 in an auxiliary line to the condenser tube to make up for that  
water capacity we lost through the seals. Because the seals

b17

1 were also a problem.

2 VOICE: There was the fact that the seals were  
3 leaking so bad that the water pumps didn't burn up.

4 They --

5 MR. KEATEN: I have a question -- this is Bob  
6 Keaten -- on a different piece of equipment.

7 I've seen some of the testimony along this line,  
8 and I am a little bit confused. And that has to do with the  
9 operated -- under the automatic operation of the EFV-11 values.

10 The intent of what I believe I have read in your  
11 earlier testimony is that those values automatically came  
12 open, but not all the way open. Is that correct, or --

13 VOICE: (Inaudible) got two versions of this now.

14 (Laughter.)

15 VOICE: I'll give you the first one, what I am  
16 not sure happened, is that when I came back over the panel to  
17 the steam generator area (inaudible) level below, one of the  
18 things I looked at was the (inaudible) value -- the positions  
19 I saw on the indicators. I'm not sure if I saw a full  
20 demand for the valve to be fully opened, and I looked at the  
21 indicators and saw they weren't fully open.

22 VOICE: Uh-huh.

23 VOICE: Or now I even wonder if I actually saw,  
24 when -- the first time I looked at the dual indication --

25

lb18

1 when I came back, I thought it out -- shot it.

2 VOICE: Uh-huh.

3 VOICE: (Inaudible) put it back (inaudible) valves --

4 VOICE: Uh-huh.

5 MR. FAUST: -- manually, which I'm really not sure  
6 which way I had it, because I was looking at light demand on  
7 it, and also I think I hit it two or three times, as far as  
8 taking manual control on it -- just to be sure I had it  
9 and I wasn't missing something.

10 MR. KEATEN: This is Bob Keaten.

11 Are you aware of any tests that have been done  
12 since that time to see that those do open automatically,  
13 correctly.?

14 VOICE: Automatically.

15 I'm aware of two tests that were done. One is  
16 manually -- we did on our shift.

17 VOICE: Uh-huh.

18 VOICE: But the valve didn't really respond to the  
19 demand -- the manual, but it automatically went, from what I  
20 heard, that did respond.

21 VOICE: Uh-huh. But manually it did not respond?

22 VOICE: Yes. (Inaudible).

23 MR. ZEWE: This is Bill Zewe.

24 I reviewed the results of both those tests, and  
25 I was there for the one test. It responded very well on

b19

1 automatic. In manual, the valves responded, but it just  
2 took about a 50 percent demand signal on the Bailey station  
3 before the throttle valve, EFV 11-B, began to open.

4 And once you got to 100 percent, the valve then  
5 would open 100 percent.

6 But it took a 50 percent demand signal before the  
7 B valve started to move when we were operating it in manual  
8 control.

9 As far as I know, that was the only portion of the  
10 test that was not -- that didn't perform totally satisfactory.

11 MR. WALLACE: (Inaudible) Wallace.

12 Did you ever have any previous experience during a  
13 normal operational sequence, where you had to step in and  
14 take over for the automatic (inaudible) action for the emergency  
15 feedwater?

16 VOICE: Other than that day, no.

17 MR. ZEWE: I don't -- Bill Zewe here. I don't,  
18 for one.

19 MR. FAUST: We've taken manual control -- Craig  
20 Faust.

21 I'm not sure which one, but we've taken manual  
22 control of valves in the past. For what reason did you do it?

23 VOICE: Because it didn't respond, or what?

24 VOICE: I'm trying to remember.

25 I know that we were given hand control of it for

1b20

1 various times, but not because it didn't respond, and I (inaud-  
2 ible.)

3 VOICE: When I was on -- in fact, I was on at noon.  
4 It had to do -- I can't remember the incident -- what we were  
5 going through, when we did it.

6 We -- what it amounted to was I couldn't tell if  
7 the valve was moving. It was before we had the indicating  
8 lights installed when we -- it was on another transient --  
9 (inaudible) trip. I just can't remember.

10 And it ended up with the result that the indicating  
11 light being put in -- to tell us we had valve movement. We  
12 could do anything they had with a demand on Bailey.

13 MR. VAN WITBECK: Tom Van Witbeck.

14 Are you going to confusing using those Bailey  
15 stations, where you don't have problems of indication of  
16 a response in the system so far as the components reaction in  
17 controlling. What you're looking at is signals and feedback,  
18 but you're not actually looking at the position of the control  
19 element?

20 VOICE: I do, yes. I would much prefer to have an  
21 actual -- and some sort of indication that I got positive  
22 movement of what I am going to operate -- not a demand signal  
23 going to it.

24 VOICE: Did you get problems with that before?

25 VOICE: Yes. (Inaudible.)

VOICE: Most of your operators, I mean, have to

b21

1 have problems at one time or another, taking a quick look at  
2 something and saying, "That's open," when it was really  
3 saying 100 percent. Demand signals transient through it or,  
4 you know, just (inaudible), tend to translate it into that --  
5 (inaudible) indicating to them --

6 VOICE: Well --

7 VOICE: -- it's still open.

8 VOICE: -- the first --

9 VOICE: I notice you've done like a lot of plants  
10 that have these type of controllers. You've got a little  
11 graph sitting around in the control room, (inaudible), which  
12 really indicates to me that this instrumentation is not  
13 (inaudible) -- (inaudible) made an inadequate presentation.

14 VOICE: That came later. That came after the 28th.  
15 A lot of those little graphs weren't there before. Okay?

16 (Inaudible) --

17 VOICE: (Inaudible).

18 VOICE: Well, you are talking about bypass valves,  
19 the turbine "bypass" mainly.

20 You know, the position indicator doesn't tell what  
21 the actual position of the valve is. It's not a direct  
22 function of it.

23 So, it's questionable.

24 VOICE: Let me get a --

25 (Break in tape recording.)

1b22

1 VOICE: This (inaudible) they were sort of on the  
2 ragged edge. And the question really is was that something  
3 that was a design problem in your mind, or is it something  
4 that degraded with continued operation as a result of maybe not  
5 sufficient maintenance or care given to those systems?

6 MR. BRYAN: Ken Bryan.

7 (Inaudible) talking about feedwater pump?

8 MR. KEATEN: Yes, feedwater condensate.

9 MR. BRYAN: I feel its design problems, (inaudible),  
10 with everything working right, is still running on edge.

11 MR. ZEWE: Bill Zewe.

12 I felt the same way, too. I felt that we -- in  
13 certain areas, we try to take action, like for the hot well  
14 level control, we be getting to installed another sight glass  
15 (inaudible) or another recorder on the cold side of the  
16 condenser, and that we were still looking for evaluating the  
17 problem between us and the vendor, in trying to come up with a  
18 -- a solution to the hot well level problem.

19 And, of course, the recird lines were redesigned  
20 for more strength, and the heater drain pumps were being  
21 modified. So, all of the changes were in -- positively stacked  
22 to the original design of the system.

23 You know, I don't feel that inadequate maintenance  
24 or any degradation in the system from the initial operation  
25 of it really had much effect.

1b23

1 MR. KEATEN: Okay.

2 You also mentioned that you had recourse of  
3 problem report or writing a letter, and I also got the feeling  
4 that you didn't feel like you got a lot of attention when you  
5 did that.

6 Do you feel that you had adequate support from  
7 someone else out there whenever you did highlight a problem  
8 or ask for some help? Or do you sort of feel like you were  
9 on your own?

10 MR. ZEWE: I did get feedback on my letter from the  
11 unit superintendent -- technical support -- saying that he  
12 had reviewed my comments, and that he had assigned at least  
13 one other individual that he named, all right, to look into  
14 the feasibility of the changes that we had indicated.

15 But that's -- we had discussed that same subject  
16 somewhat later, but I really don't know from that point, until,  
17 you know, the trip here -- I don't really know how to -- how  
18 to put this, but where it was in the works, you know, if it  
19 was planned on being done or if it was shelved for one reason  
20 or another, or if further evaluation indicated that the  
21 changes that I expressed weren't valid or some other change  
22 that would incorporate that to make it even better. I wasn't  
23 really informed of that.

24 And the time between the letter and the trip, I'm  
25 not sure of that time frame. But it was around a year at

b24

1 least.

2 MR. KEATEN: Was that a typical time frame for  
3 getting things done when you suggested it? I mean, was it  
4 usually a fairly slow turn-around time?

5 MR. BLACK: This is Ken Black.

6 I feel like if -- when we have a problem that puts  
7 the plant down, it doesn't take too long to get a result.  
8 And if it doesn't -- if it works in (inaudible), we're getting  
9 by, then it took a lot longer to get something through.

10 MR. VAN WITBECK: Tom Van Witbeck.

11 If you're saying a year, that means these must have  
12 been identified sometime in the startup phase of the plant;  
13 is that correct? These problems then became apparent during  
14 the startup?

15 MR. ZEWE: Well, (inaudible), yes, they were iden-  
16 tified during startup.

17 As a matter of fact, in the letter that I had  
18 written, I had an awful lot of the input, particular on the --  
19 on the separation between the service air and instrument air  
20 systems -- from a startup engineer. Our lead startup engineer  
21 would, in fact, he had input into that.

22 VOICE: (Inaudible).

23 VOICE: (Inaudible).

24 MR. WALSCH: Bill, on that -- GPU form -- you talk  
25 about the problem report. Is that strictly a startup type

1b25

1 of form? Does it apply after the unit is in commercial  
2 operation?

3 MR. ZEWE: We have startup reports or problem  
4 reports, and we also have GPU problem reports.

5 MR. WALSH: So that they apply, say, for Unit 1  
6 now, if you wanted a report to go into the GPU chain for review  
7 of that (inaudible) form now exists.

8 MR. ZEWE: (Inaudible) yes.

9 VOICE: Also, we can also write a work request which  
10 could precipitate an engineering change form.

11 VOICE: What hasn't been made clear yet?

12 This is Ed Frederick.

13 And that there really isn't any kind of set proce-  
14 dure for an operator or a supervisor to suggest a change, put  
15 it in writing, give it to the person who's supposed to take  
16 action on it, and refer him to the right committee and get  
17 an answer back, instead of "Yes, we're going to do this" and  
18 know nothing. There is no procedure that outlines that.

19 As far as bringing up changes in hardware -- or just  
20 the way we do things -- other than procedural changes, that's  
21 all -- that's all right, you can do that fairly easily -- and  
22 you get good feedback on that -- the hardware changes.

23 Now, I might have an idea and discuss it with Bill.  
24 He's going to write it down and try to explain it. And I'll  
25 show it to an engineer or to -- the superintendent.

But really there is no set committee or anybody in

1b26

1 particular who that you can go to and say here is an idea,  
2 what do you think we should do with it. That's what we looked  
3 for is an answer. That's the way it stands.

4 MR. FAUST: Craig Faust.

5 (Inaudible), you know, if you're looking for that  
6 kind of backup, why most of the operators might have, at one  
7 time or another, put down an opinion on something, passed it  
8 up the line, and that was the end of it.

9 And didn't hear anything else back, didn't see any  
10 change, and then you sort of get tired of doing that. And you  
11 say it's not making any difference anyway, so you just don't do  
12 anything -- and operate till it breaks.

13 VOICE: Tsaggaris.

14 Bill, you mentioned one of the Met Ed mechanisms  
15 was perhaps initiating the change mod. In the way that that  
16 procedure is written, do you make the determination that a  
17 change mod should be evaluated and then submit some piece of  
18 paper to Engineering, let's say, that says, "We think we need  
19 a change mod here"?

20 Or is the procedure written so that you initiate a  
21 piece of paper that says, "We have a problem here, and what  
22 do you think we ought to do about it," to get back to Ed's  
23 comment. In other words, you submit some problem, and someone  
24 else makes the determination down the line whether a change  
25 mod is -- makes the initial assessment of whether a change mod  
is needed.

1b27

1                   Where does that assessment occur initially? At  
2 your level? Or at some level above you?

3                   VOICE: I feel it's really both ways.

4                   If you identify a problem and if you feel that you  
5 have a positive solution, you should certainly say, "I think,  
6 you know, that something is inadequate."

7                   And you say, "Well, what are the alternatives?"  
8 Maybe this, this, and that, all right, but I feel that the  
9 engineering group -- like Dick Klingman's group or GPU Systems'  
10 Engineering Group, you know, should evaluate the problem, and  
11 the initiators comment. But then they should certainly make  
12 their own judgment to see, indeed, if it is adequate enough or  
13 if it isn't.

14                   But in some case, like anyone, I can raise an  
15 awful lot of questions, and I really don't have a lot of  
16 answers.

17                   So, I could also issue it saying, you know, that  
18 this is poor, this is designed bad. I really don't have a  
19 better alternative. But at least you raise that question for  
20 other -- other groups -- at least you -- that might have more  
21 input into the selection of a solution.

22                   So, I think it really goes both ways. If you can't  
23 initiate it from what you think or your capability.

24                   VOICE: Tsaggaris, where does -- where does that  
25 piece of paper flow to?

1b28

1 VOICE: I gave it to the supervisor of operations  
2 for his review. And then, from there, to engineering staff on  
3 site, and then to off-site -- if the help is needed.

4 And all of our change mods, to my knowledge, all  
5 get approved off-site anyway from engineering group in Reading  
6 for the GP assistance.

7 So, ultimately, our engineering group and the off-  
8 site group work together to complete the action required.

9 MR. WALLACE: (Inaudible) Wallace.

10 Is there any way to identify your -- the emphasis  
11 you want placed on a change recommendation or prioritize it,  
12 so that the people who are receiving this recommendation don't  
13 necessarily have the same perception as you do of the need?

14 VOICE: (Inaudible) the first way that I do that  
15 is is we can identify a problem and put it on our daily or  
16 biweekly plan of the day meeting list, all right.

17 In Unit 2, we have a plan-of-the-day list and also  
18 a biweekly list of items that doesn't necessitate being  
19 reviewed every day, all right.

20 And ECMs and so forth and the problems in ordering  
21 parts and everything else are identified there, and they're  
22 brought up at that frequency.

23 And even we assign Priority 1, the highest priority,  
24 to the items that we feel should be pushed. And then every  
25 day or twice a week, then, we cover, you know, for the

lb29

1 cognizant department, where that item stands.

2 So, that's one way that we can focus on a very  
3 regular basis for any item, which includes any change monitor  
4 problem we happen to find.

5 VOICE: As I understand what you just said, that  
6 would, then, focus on -- internal on the operational staff and  
7 support staff, but wouldn't reflect any priority to any of the  
8 offside or support organizations that might be reviewing  
9 their recommendations or request changes? Is that --

10 VOICE: Well --

11 VOICE: -- particularly if had to leave the island.

12 VOICE: Each of the items is assigned either to an  
13 individual or to a department. So, they would, then, if they  
14 could not adequately give the status or update of the item  
15 for which they're responsible for at this level in this  
16 meeting, they would then call up or in some way contact, all  
17 right, the off-site group if it would be all right to call  
18 them up and to find out where it stands, what's being done,  
19 what a prospective date on it is, because we date everything,  
20 too, for what date we expect the parts in, what date we expect  
21 the change mod to be in, and so forth.

22 So, we try to track that by some due date. And  
23 also, there's a date that says when we first put it on there.  
24 So, we know when it originated, what the problem is, and then  
25

1b30

1 what the current status of it is that we keep updating,  
2 saying that "half the parts are here, but we still need part  
3 number" -- and it's under a certain P.O., so we could ask the  
4 warehouse, you know, to find out what the delivery date is on  
5 it. And that's true with the ECMS, also.

6 MR. WALLACE: With items like the change or request  
7 for a change that take over a year to get considered, continue  
8 to stay on this work list for that period of time and get  
9 status review, you know, biweekly or something.

10 MR. ZEWE: It all depends on plants needs at the  
11 time, because these items on our weekly and our biweekly list  
12 really focus more on short-range plans. Some of these do  
13 take several months to clear up and even as far as a year,  
14 I guess, is conceivable for one item or another.

15 But the longer term and day-to-day is put on a  
16 biweekly record. Anything that is very, very long term may  
17 or may not be on that list, depending on how important we  
18 feel that is.

19 MR. KEATEN: (Inaudible) -- item warning -- this is  
20 Bob Keaten.

21 For an item like adding an automatic bypass  
22 condensate polishers, would that normally go on our list as  
23 soon as somebody suggested it or only once you had agreement  
24 that it was going to be done?

25 VOICE: Normally, when you bring up any problem,

1 at the plan of the day meeting, it is entered on the list  
2 because it is a concern.

3 At that time, if it is a concern or if the person  
4 bringing it up is wrong in his assessment of it, the group  
5 there then says, you know, it doesn't need to go on the list  
6 because of this and that or they track it some other way --  
7 brought up at that point, directly to the person that is  
8 trying to put it on the list.

9 By and large, I -- we identify problems from one  
10 day to the next. And is added on to the list and assigned  
11 a priority, and we ensure that work request are entered and  
12 somebody's tracking that.

13 And it's a case to where -- say that it requires  
14 a plant shutdown or something like that, we have what's called  
15 a "no-name outage list," which includes change mods and that  
16 are planned on being done. But they aren't feasible to be  
17 done at this particular plant status.

18 Also, some work that needs to be done on a critical  
19 component that would require the plant to be shut down  
20 hot, shut down cold, or what have you.

21 So that our no-name outage list, then, further  
22 breaks it up into department groups for certain work request  
23 items that are listed by work request and for certain depart-  
24 ment and certain plant conditions.

25 On there, also, is that -- we list a responsible

1b32

1 person, whether you need that procedure or QC -- and various  
2 blocks to further identify the status of that particular work  
3 item.

4 And it's also tracked there -- and the no name  
5 outage lists are gone over on a rather frequent basis, like  
6 every -- once a week or once every two weeks or something of  
7 that fashion, depending on how soon you are to a known outage  
8 maybe.

9 Like if headed toward a refueling outage, you would  
10 certainly review these items more and more the closer you got  
11 to make sure that you were prepared for it.

12 So, that time there is so inflexible, but it is  
13 reviewed in a -- in a certain time frame, so that you can  
14 accomplish that work. So, that's another way that we can  
15 track all the items.

16 VOICE: Well, let me ask you specifically, did this  
17 suggestion of having an automatic bypass for the condensate  
18 polishers, was that on one of these lists?

19 VOICE: No, it wasn't. To my knowledge, it wasn't  
20 on any list of the no name outage or any of the other lists  
21 that I've just mentioned -- no one has it on there.

22 VOICE: And that was because this wasn't perceived  
23 as something that had to be done immediately, it was just  
24 -- it's a desirable improvement, but you could live without  
25 it; is that the reason it was not on the list?

1b33

1 VOICE: I believe so, that operationally they --  
2 I'm sure that we expressed that -- everyone involved -- that  
3 it would certainly be desirable to have it, and it could lead,  
4 you know, to severe transients.

5 But I'm not sure at what level it was determined  
6 that we would wait and at some period have it done if, in fact,  
7 it had been decided to have it accomplished at all.

8 MR. LONG: This is Bob Long, who were the partici-  
9 pants in this plan of the day?

10 VOICE: Well, the shift supervisor, the supervisor  
11 of operations. And then there was also a person from each of  
12 the departments there, too.

13 It was like typically (inaudible) from the Mechan-  
14 ical Maintenance and Hillary Mitchell from the Electrical  
15 Department, and Doug Weaver from I&C.

16 So, it was groups in there -- represented there.

17 They had Engineering Support there. Normally the  
18 unit superintendent and/or the unit superintendent technical  
19 supporter is there and the normally the lead mechanical engi-  
20 neer is there who is -- also our PORC chairman is there, our  
21 (inaudible) chairman is there also.

22 So, there are typically seven or eight individuals  
23 that attend that meeting.

24 VOICE: How long has this been going for?

25 VOICE: What, the plan of the day meeting?

VOICE: A year or so.

b34

1 VOICE: Quite a while.

2 I thought maybe that bypass valve might have been  
3 identified before they really got geared up into the meeting  
4 that he was talking about.

5 MR. LONG: Would -- Bob Long -- would you ever have  
6 somebody, one of the CROs be there if they had a special con-  
7 cern, to express it themselves?

8 VOICE: I can't recall an instance where we had that  
9 done, but we certainly wouldn't exclude that from happening.

10 I have had many shift foremen, you know, attend  
11 that meeting also, just for a status update and also for any  
12 other operational input that they have.

13 Typically, if the foreman is free, we have him  
14 attend, also.

15 But the real basis for this meeting, you know, is  
16 to look at a day-to-day type, planning type status (inaudible.)  
17 And it really doesn't lead to a real long term type problem,  
18 though some get identified at that meeting as operational  
19 problems, all right, that effect on a long-term basis. But  
20 this is really just a tracking mechanism that we view for  
21 current problems of the plant.

22 MR. WILLIAMS: This is Ron Williams.

23 Do any of you have the experience -- or do you  
24 know of anyone who had the experience -- where you may have  
25 suggested or recommended a change that wasn't taken into

1b35

1 account or that you didn't get any feedback for that did  
2 prove to be a serious problem of any sort or perhaps even  
3 being, in some form, related to the March 28th accident?

4 Bill?

5 VOICE: Positive indication of that relief valve,  
6 nobody -- I don't think anybody put anything in. What we got  
7 was what we have right now. But that's not saying we were  
8 happy.

9 VOICE: Have you identified that to anyone as being  
10 something that you felt should be corrected?

11 VOICE: I think it was more along the lines of,  
12 well, this is what we got.

13 VOICE: All right.

14 So, you had not actually submitted a letter or a  
15 change request or brought it formally to someone's attention?

16 VOICE: The only thing that was submitted.

17 Didn't you write that up?

18 I thought that was the one you wrote up.

19 MR. FREDERICK: This is Ed Frederick.

20 Fred is referring to a letter I wrote to Jim  
21 Seelinger after the April 23rd, 1978 transient. And I'm not  
22 sure whether that's (inaudible) or not.

23 MR. VAN WITBECK: It was -- Van Witbeck.

24 There was a change made though and that light --  
25 that red light was put in?

lb36

1 VOICE: Right.

2 But it was --

3 VOICE: What prompted that? Something --

4 VOICE: That was prompted from a loss of power, I  
5 think. But it didn't have any indication on the valve  
6 (inaudible).

7 (Simultaneous conversation.)

8 VOICE: (Inaudible) when they lost power to the  
9 relief valve, and they didn't know it was open. (Inaudible.)

10 VOICE: Well, they lost (inaudible).

11 MR. ZEWE: This is Bill Zewe.

12 On March 29th, the day after initial criticality  
13 in '78, they had a loss of power from a vital buss that went  
14 to supply a pressure switch that sensed high pressure for the  
15 reactor coolant system, which caused the relief valve to open  
16 up on a false pressure signal.

17 The actual power to the relief valve was not  
18 affected. It was just that the controlling switch that says  
19 "open on high pressure/close on low pressure" had lost power  
20 and it had filled in a high-pressure condition. So it just  
21 sent a signal to the relief valve saying that it was high, so  
22 open up.

23 VOICE: Is that switch still that way -- de-energize  
24 to open the valve?

25 VOICE: The -- there has been a modification, so

1b37

1 that loss of power does not cause that pressure switch to  
2 show high pressure.

3 Also, in addition to that, they installed that red  
4 light, which is a command logic signal to the relief valve,  
5 saying that it had the command signal open or not.

6 That's a result of that accident.

7 MR. KEATEN : It was as a result of that accident, I  
8 believe -- this is Bob Keaten -- that the lights that  
9 indicated the demand signal to the valve were installed in  
10 the control room; is that correct?

11 VOICE: Installed in the control room?

12 VOICE: Right.

13 VOICE: That was given --

14 VOICE: Yes, (inaudible).

15 VOICE: That's why we --

16 VOICE: But it was as a result of that March 29 --

17 VOICE: Yes --

18 VOICE: -- (inaudible).

19 VOICE: That red light.

20 VOICE: Right.

21 VOICE: Yes, but --

22 (Simultaneous conversation.)

23 VOICE: -- your memo that you're talking about is  
24 the one that resulted from the April transient, where the  
25 steam valve stuck open.

b38

1 VOICE: Exactly.

2 VOICE: And you wrote them a memo making recommenda-  
3 tions with respect to position indication on relief valves,  
4 or --

5 VOICE: I believe (inaudible). I think steam or the  
6 main steam (inaudible).

7 I don't think I included anything about the power  
8 operated relief valve in that letter.

9 VOICE: Okay. And what was -- what feedback did  
10 you get from that suggestion?

11 VOICE: On the main steam relief valve?

12 VOICE: Yes.

13 VOICE: The letter I wrote -- I don't know why it  
14 didn't go through.

15 VOICE: I have seen it, later. All right --

16 VOICE: I know. Bernie Smith was the supervisor --  
17 Bill was away.

18 VOICE: We had to change shifts that day.

19 VOICE: But anyway, the letter went to Jim Seelinger,  
20 who was the superintendent of technical support (inaudible).  
21 And he answered the letter, item by item, explaining what he  
22 was doing, about each item.

23 The suggestion I made about main steam relief valve  
24 position indication was he addressed that, saying if they  
25 hadn't thought of an alternate method, then they would probably

lb39

1 go with audible signals, rather than mechanical signals. And  
2 it turned out to be a better idea.

3 VOICE: But to your memory, you did not adjust the  
4 relief valves of the primary system?

5 VOICE: I don't think so.

6 MR. FAUST: I think I'm just going from -- this is  
7 Craig Faust -- I'm just saying that what was put in didn't  
8 satisfy the operators, because I heard this (inaudible),  
9 which I didn't know whether somebody put paperwork in on it  
10 further, after that. I think it was just -- I think it's  
11 just poor (inaudible), what we got, when we went into the  
12 operated with it.

13 MR. WALSH: Pat Walsh.

14 Do you know the reason why they chose to go with  
15 the demand signal indication, rather than the valve indication?  
16 Do you have any knowledge of what the background was in the  
17 situation?

18 VOICE: There's really no way to indicate that valve  
19 position.

20 VOICE: So, this is the best thing available, I  
21 guess.

22 VOICE: No, it's not the best.

23 VOICE: Well, in other words --

24 VOICE: At the time, it was an indication of valve  
25 position, assuming that the valve was operating properly.

1b40

1 But on an absolute indication --

2 VOICE: Was it ever considered, to your knowledge,  
3 to put an indicator -- some sort of a feedback indicator on  
4 the valve itself? Or was that ruled out, as being unfeasible?

5 VOICE: No, but they considered several different  
6 ways of indicating and they didn't come up with any that they  
7 felt would work reliably.

8 Now, it is -- now, they're proposing the same type  
9 of thing you have on the main steam valve, an audible signal.

10 MR. ZEWE: This is Bill Zewe.

11 I was surprised, when we had that change, that we  
12 didn't go to the indication we had in Unit 1, which may or  
13 may not be much -- much better. But it comes off the solenoid  
14 itself in the reactor building, which you could have a failure,  
15 yet -- between the solenoid and the pilot operator in the  
16 valve, but I was surprised at -- at that time that we at least  
17 didn't go to that.

18 And I didn't get the gist of the valve design is  
19 such that it -- that we haven't found an adequate way, like  
20 Ed said, to adequately ensure that we have accurate valve  
21 position for that valve.

22 MR. WILLIAMS: This is Ron Williams.

23 It's sort of like asking whether you feel you get  
24  
25

1b41

1 enough pain or enough love. But do you really feel you get  
2 attention when you have a problem? Or do you feel like  
3 the operator requests are sort of ignored or not given  
4 the proper attention?

5 VOICE: I don't know if we can answer that.

6 VOICE: Well, hang on. It's a difficult one.

7 (Inaudible) --

8 VOICE: I think the operators feel like they're --  
9 they have a tendency to be ignored. But that's not saying  
10 they are. We just may never hear anything back about it, but  
11 somebody did look at it.

12 VOICE: All right. So it just may be a failure  
13 to feed back, rather than a failure to consider what you've  
14 really suggested.

15 VOICE: Uh-huh.

16 VOICE: Personally, I feel I have -- as far as  
17 suggesting part of our changes or change mods -- I think you  
18 already -- you realize that you can live with what you have,  
19 there's no sense submitting change modification requests,  
20 because they're going to comeback and say, "Can you live  
21 with it?" And you'll say, "Yes." And then that will be the  
22 end of it.

23 If it's for convenience, you know, someone else  
24 would consider convenience what I would consider, you know,  
25 a more accurate indication of our -- I guess a more convenient

1b42

1 way to read some parameter. Then, they'll look at it and  
2 say, "Well, you have that indication all you have to do is go  
3 through an extra step or two to -- to derive whatever you want  
4 to interpret from the reading.

5 VOICE: (Inaudible.)

6 VOICE: So, you can live with it.

7 MR. VAN WITBECK: Van Witbeck.

8 You said if you could live with it. But was there  
9 any change in attitude, (inaudible) back, somebody says, "Can  
10 you live with this?" and you say, "Yes, under normal operating  
11 conditions, but if I had a transient, et cetera, it may  
12 become a problem" -- did that invoke any more response?

13 Or did, in fact, anybody every say that about  
14 (inaudible).

15 I'm not trying to lead you on, but I'm trying to  
16 get at whether or not there was any consideration given to  
17 these being problems in off-normal conditions including  
18 normal operation, if that drew any more response from the  
19 group that was reviewing it?

20 VOICE: The only thing that comes to mind when you  
21 ask that question is the valve indication on the EFV-14 chart  
22 high pressure valve in the feedwater system.

23 We never had valve indications or control of the  
24  
25

lb43  
1 valves in the control room, and that was rather important as  
2 far as maintaining the feedwater pump.

3 You could lose feedwater flow to the steam  
4 generator but not know why, because those two valves were  
5 shut. We complained about that all during startup.

6 And it wasn't until after the April 28th, '78  
7 incident that they began to agree, "Well, maybe we do need  
8 that indication", because prior to that we had said, you  
9 know, we can live with it under normal operation, because  
10 you can go around outside the door and look at the valves and  
11 tell what the position is. But during an emergency, we might  
12 not be able to run outside and look at it.

13 So, then, after April 28th, they said, "Well,  
14 maybe they can't run out the door and look at it. We'll give  
15 them a light." So, we got a light.

16 VOICE: The other thing would be due to that  
17 incident he's talking about -- or one of them -- (inaudible)  
18 was ours, where we had the steam release lift on us and  
19 take us down pretty long.

20 Why, one of the strong suggestions at that time was  
21 -- and I think that had been taken care of by Mike -- was  
22 some form of tape recorder or something in the control room  
23 taping what was going on at that time. And it never -- as far  
24 as I know, no action was taken on that, because we had a  
25 difficult then trying to reconstruct what happened, when it

b44

1 was obvious.

2 MR. KEATEN: That's very, very interesting --

3 Bob Keaten.

4 And you're saying that that was a specific  
5 suggestion . . .

6 (End of tape recording.)

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25