

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

1 In the Matter of:  
2 IE TMI INVESTIGATION INTERVIEW  
3 of Mr. Bill Zewe  
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6  
7  
8

9 Trailer #203  
10 NRC Investigation Site  
11 TMI Nuclear Power Plant  
12 Middletown, Pennsylvania

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NRC PERSONNEL:

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1 INTERVIEWER: This is tape one, side one of the interview with Bill Zewe.  
2 I'm sorry, say it again.

3  
4 ZEWE: Zewe.

5  
6 INTERVIEWER: Zewe.

7  
8 ZEWE: This I believe is the fourth time that I have been taped. I had a  
9 tape there with GPU before with Long. And also I was interviewed with the  
10 NRC individually and then we were interviewed as a group. And the group  
11 session, I thought, was much better than the rest of them because we were  
12 all doing different things and looking at things a little bit differently  
13 at the time and that interview, more than anything else, helped us, you  
14 know, to say, to bring it more into a time perspective because personally I  
15 was very far off in the times. Times were much longer and I felt they were  
16 much shorter. As it ended up, we sort of got a better perspective for what  
17 times the things happened, more so than what we had at the beginning, even  
18 individually, we were all fairly close to the times that we thought that we  
19 had and then once we got together we seemed to think times were quite a bit  
20 different. And judged on a few of the graphs and things that we had seen,  
21 we had noticed that the times there were a lot different than what we had  
22 previously imagined.

23  
24 INTERVIEWER: We were finding it out also in reviewing the strip charts and  
25 what not, it seemed like looking at your original interviews that the times  
didn't jive with what the real world was doing.

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1 ZEWE: Probably the time that we compressed the most as a group, were the  
2 times we were in the emergency feed actuation. I could have sworn that we  
3 had emergency feed going within two minutes. And we actually had it going,  
4 but everything that we see was more like eight minute period had elapsed.  
5 And I still can't believe that, but it is true because it has to be true.  
6 And then plus other people entered the control room at about the six minute  
7 point and they remember they we didn't have it on at that point. So that  
8 was true. That was one area in particular, that it just seemed like, you  
9 know, that it couldn't have been that long. How else ... do you want to go  
10 on and just ask questions on it and I'll just try to answer the questions  
11 or what.

12  
13 INTERVIEWER: Can you tell me what time to your recollection the atmos-  
14 pheric dump valves were opened?

15  
16 ZEWE: I purposely had the atmospheric valves opened up, but it was quite  
17 some time. It was -- I am trying to remember -- it was sometime just  
18 before we broke bacuum alright, I went down to two circ water pumps which  
19 automatically forces the turbine bypass valve controls to shift to the  
20 atmospheric dumps. So I did that on purpose on only the A side, because I  
21 had what I felt at the time was a confirmed leak in the B steam generator,  
22 primary to secondary side. And I didn't want that activity to be dis-  
23 charged to the atmosphere, but we had lost steam from the aux boilers from  
24 Unit 1 feeding the seals in Unit 2 turbine and I had a choice of either  
25 dedregating that or going to the atmospherics. And I was reasonably sure

1 that the A generator was still intact. I didn't have any reason to believe  
2 any problem from the A. So we did get on to two circ water pumps and then  
3 go on the atmospheric dumps to the A valve only, until we regained the  
4 boilers from Unit 1 and then we reestablished seals for the Unit 2 turbine  
5 and then we went back on to the turbine bypass valves, but we did break  
6 vacuum. And then it took us a considerable amount of time to get steam  
7 back from Unit 1 and then draw vacuum again, because we did have vacuum off  
8 completely for quite some time. And that would probably approach, you  
9 know, well over an hour or two hours. But we did shut the turbine bypass  
10 valve alright, going to the atmospheric sometime before we reestablished  
11 vacuum and came back to the condenser, but I am not sure of the time frame  
12 there.

13  
14 INTERVIEWER: You can't put it into perspective, with respect to running  
15 the 2B reactor coolant pump and getting some of the radiation alarms ...  
16 breaking vacuum and lifting the atmospheric?

17  
18 ZEWE: Prior til -- as close as I can remember -- somewhere around 6:30 or  
19 so, we decided to feed the B steam generator and also to try to start a  
20 reactor coolant pump. We did these rather closely together as I remember.  
21 We fed the Bravo steam generator and then shortly thereafter, we tried to  
22 start any coolant pump that we could. We first tried the 1A, 1B, 2A pumps  
23 and we weren't able to get them to run. So we finally got the 2B, I believe,  
24 to run but it only drew about 100 amps and we weren't sure if the pump was  
25 actually running or not. So we went and checked the amperage at the breaker  
too and it read just under 100 amps what we read up in the control room.

1 INTERVIEWER: Was the B steam generator isolated when you ran the B coolant  
2 pump?

3  
4 ZEWE: Yes, the B steam generator, as far as I know, we had it isolated up  
5 until that time, just before we started the coolant pumps alright, but we  
6 unisolate B as far as feeding it goes, just before we started the coolant  
7 pumps, of which 2B was the only one we were successful in getting to run.  
8 Shortly thereafter was when we really had the first signs that we had a  
9 problem with radiation levels. The offgas condenser monitor came into  
10 alarm. And then we started to see all the alarms for the auxiliary buildings  
11 and the fuel handling buildings everywhere then they started to come in at  
12 once. Prior to that the only real alarms that we had, that I can remember  
13 and I looked at it pretty hard, was the intermediate letdown coolers. They  
14 were in high alarm fairly early after the accident. But they have a very  
15 low setpoint. And they are very susceptible to background. And they are  
16 right down by the RB sump themselves. So I didn't figure that was too much  
17 of a problem, because they are usually in alert, in high alert during  
18 normal operations, just from background. And we have proven that as we  
19 escalate in power, background comes up on these monitors.

20  
21 INTERVIEWER: Did that alarm come in before you had stopped the ... all  
22 four reactor coolant pumps?

23  
24 ZEWE: Oh yes, yes before that. Those were in quite early and I am not ...  
25 oh yes, yes long before that.

1 INTERVIEWER: Did you have your reactor coolant sump pump on at the time?

2  
3 ZEWE: I uh.

4  
5 INTERVIEWER: This is around the time that you started the 2B pump, were  
6 the reactor coolant sump pumps running?

7  
8 ZEWE: No, because there was approximately forty five minutes after we  
9 tripped, the operator informed me that the high sump alarms were in for the  
10 reactor building. So I had the Control Room operator contact the aux  
11 operator on the primary side to turn off the Reactor Building sump pumps.  
12 So he turned them off and at that point, it was like probably quarter to  
13 five in the morning, somewhere before 5:00, but they had been on previous  
14 to that, because the alarm that we get up in the Control Room is that the  
15 "pump run" up on the computer.

16  
17 INTERVIEWER: Let me just ask this question just to see how you answer it.  
18 We know that you let down on the 2B side particular letdown (unintelligible)  
19 would that have given you the alarm, you know ... would that give you the  
20 alarm that you saw in the auxiliary building? It is hard to figure out why  
21 you got an alarm in the Auxiliary Building.

22  
23 ZEWE: I don't know.

24  
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1 INTERVIEWER: How did the radiation get out, saying, there has got to be a  
2 path?

3  
4 ZEWE: That I don't know yet. All right because we did confirm later on in  
5 the next day and a couple of times, that the operator did turn off both  
6 sump pumps. So they weren't in automatic start so they were off alright.  
7 I just have to assume that nobody returned them to normal or started them  
8 prior to that. But I don't know that to be the case alright.

9  
10 INTERVIEWER: Do you think the computer would have printed it out if they  
11 did?

12  
13 ZEWE: If the pumps were to come back on, the computer should have picked  
14 that up. I am not sure if the status on the computer is true or not in  
15 that respect.

16  
17 INTERVIEWER: We lost about ... the computer lost about an hour or so of  
18 time. It was turned off or out of commission or something.

19  
20 ZEWE: I don't know that, alright.

21  
22 INTERVIEWER: After the're shutoff I can find no ... no other, you know,  
23 reactor building sump alarms all through the rest of the day, either on or  
24 off. It went off for 38 minutes. I would imagine that ...  
25

1 ZEWE: That is what I thought, because he said that it was approximately 45  
2 minutes after the trip that he turned it off. So we said, you know, it was  
3 probably quarter to five or 5:00, so 38 is probably in the ballpark area  
4 you know.

5  
6 INTERVIEWER: What time did the auxiliary building high radiation alarm?

7  
8 ZEWE: Not until just before we declared the site emergency, ten to seven.  
9 So I'm saying that they started to come in somewhere between like twenty to  
10 seven and ten to seven. Long after we ... and we thought maybe we had  
11 gotten water in somewhere from the letdown system. The letdown relief  
12 valve goes into the miscellaneous waste holdup tank system. And that tank,  
13 as far as I know, never got higher than 7.4 feet, so it never overflowed.  
14 So I don't -- there are other reliefs like on the makeup tank. That one  
15 goes into the bleed tank. But there are some downstream of the makeup  
16 pumps themselves, which go directly to the floor. One of those could have  
17 been blowing or something else that I haven't determined yet, I don't know.  
18 But I felt sure then and now until somebody could prove me that somebody  
19 turned on the sump pump, plus the sump pump should have been lined up to  
20 the miscellaneous waste holdup tank, and we never overflowed it, to my  
21 knowledge. There -- you can put it into the sump, but it should have been  
22 lined up to the miscellaneous wastes holdup tank.

23  
24 INTERVIEWER: What tank overflowed? Where did you get the water on the  
25 floor?

1 ZEWE: Aux building sump and the aux building sump tank.

2  
3 INTERVIEWER: Where did that water come from?

4  
5 ZEWE: That is what I don't know.

6  
7 INTERVIEWER: Okay. All right.

8  
9 ZEWE: I am not sure.

10  
11 INTERVIEWER: So where ever the water came from, that is the same place the  
12 activity -- the airborne activity -- came from and you are just not sure  
13 what the source is?

14  
15 ZEWE: I don't not at this time. And then the operator all right, after he  
16 turned off the sump pumps alright, he had been in the basement in the aux  
17 building, after that and I am talking about probably forty-five minutes to  
18 an hour after that time, he was still in the aux building and the and the  
19 drains were not backed up to where we had found them after we had all the  
20 alarms.

21  
22 INTERVIEWER: This is when Terry Dorgey went down there?

23  
24 ZEWE: He was there and also Don Miller was there, because I sent him down  
25 to the valve alley to check the pressurizer level there by MEV 17 and 155,

1 was behind the compensated pressurizer level indication. And they're both  
2 those valves are in the basement there and there was no water coming out of  
3 the floor drains at that point and it looks like all the water was concen-  
4 trated around the floor drains and that the water just came from the floor  
5 drains themselves, but where it was from, I don't at this time. Maybe  
6 somebody else does but I haven't found that out yet.

7  
8 INTERVIEWER: Where does the reactor drain tank pumps pump to?

9  
10 ZEWE: They pump to the aux building oh the ...

11  
12 INTERVIEWER: Reactor drain tank -- quench tank I guess it is.

13  
14 ZEWE: Right. We direct that alright to the bleed tanks.

15  
16 INTERVIEWER: Were they pumping in automatic?

17  
18 ZEWE: No, no. We manually do that on high level, alright. We manually  
19 throttle a valve and then put it into the bleed tanks and we were not doing  
20 that to my knowledge at all, no.

21  
22 INTERVIEWER: Were you letting down most of the time?

23  
24 ZEWE: Yes we were. We were trying to determine why the pressurizer was  
25 going up so rapidly, alright. I had my shift foreman assigned to the

1 makeup system and the pressurizer level alright, and I let him and a control  
2 room operator try to handle that, while I was trying to work with emergency  
3 feed and trying to work with hotwell level and try to isolate a leak in the  
4 turbine building, plus I had hauled over the other shift supervisor that  
5 was onsite Ken Bryant to the control room. So with my foreman there and a  
6 control room operator plus with Ken and the other control room operator, I  
7 was trying to get some of the other things wrapped up, alright because we  
8 had lost the feed pumps and the one feed pump doesn't have a turning gear  
9 on it. And I diverted a lot of my attention to those items, while they  
10 were looking at primary plant. I didn't know why the pressurizer level was  
11 indicating so high, nor why the pressure was holding low, but we seemed to  
12 be fairly stable in all other indications and I left the control room,  
13 probably I don't know, fifteen minutes after it happened, to go down and  
14 try to recover the condensate to reject from the hotwell. We were flooding  
15 out the hotwell and we had some leakage down there by the condensate pumps  
16 and so forth and I had gone down there to try to get the bypass on the  
17 polishers open and find out some other details. And then when I got back  
18 to the control room and I am not sure how long that I was gone, and we were  
19 joined by George Kunder then, who we had called right after we tripped and  
20 I guess George was there then, within about 20 minutes after we tripped and  
21 with George and Ken and Fred and Ed and Craig in there, I was still trying  
22 to wrap up some other things alright. And then we just went through,  
23 trying to put our heads together, trying to come up with weird indications  
24 that we had alright. The high level and it really didn't don on me or  
25 anyone else at that point, you know, that we had really transferred that

1 bubble. And uh I don't know at that point, we were just trying to come up  
2 with alternatives and the problems and checking out our pressurizer level  
3 on the computers, compensated and uncompensated, local and remote, compen-  
4 sated levels and our reactor coolant system temperature then looked real  
5 good to us, at that point alright. We didn't really have a lot of problems  
6 until we began to get some flow oscillations on the reactor coolant pumps  
7 and then George and I then agreed that we close to the net positive suction  
8 heads for the pumps plus the fuel pin compression... And then we secured  
9 the coolant pumps and then it was probably twenty minutes or so later that  
10 we tried to go on natural circulation and secured the last two pumps and  
11 fed steam generator A up to about 85 or 90%.

12  
13 INTERVIEWER: When did you take the sample of the coolant system for boron  
14 did you check ...?

15  
16 ZEWE: I am not sure of the exact time. But as soon as we tripped we had  
17 informed the lab you know we had tripped and they would have to start to  
18 take samples. So the first sample result that I got back was about 700ppm  
19 boron and it didn't make any sense to me at all. I said that it had to be  
20 wrong because we had been on high pressure injection from BWST for a while  
21 and the boron concentration had been over a thousand to begin with and so  
22 then they resampled and they came up with 400.

23  
24 INTERVIEWER: What time was that event involved related to (unintelligible)  
25 400? Can you think of any other things that were more than one around that  
time ...

1 ZEWE: Not really, you know, I -- I'm not sure of their exact sample time  
2 at the point and uh I ...

3  
4 INTERVIEWER: Were all the coolant pumps off at the time?

5  
6 ZEWE: When I finally got those samples, yes they were alright, and then I  
7 was joined in the control room, and I am not sure on the times, by several  
8 other people, by Mike Ross and Brian Mehler, Joe Logan, Rick Faraduit and I  
9 am not sure of exactly where we were when they got the sample, but I am  
10 sure that are our pumps were off, yeah.

11  
12 INTERVIEWER: They were in the control room at that ...

13  
14 ZEWE: Yes, George was -- plus there were there other than the normal shift  
15 was Ken Bryant was there and probably 5 or 6 minutes after it happened and  
16 then George was there within 20 minutes and then Mike and Brian Mehler were  
17 there, I don't know, probably less than an hour at the most when they were  
18 there and then Joe Logan and several other people showed up at varying  
19 times and I am not sure.

20  
21 INTERVIEWER: Did you ever determine what was the reason for the bad boron  
22 analysis?

23  
24 ZEWE: I think that we have ... that we were actually flashing the letdown  
25 and it was evaporating the letdown sample and we leaving the boron behind.  
I think that is what ultimately it was.

1 INTERVIEWER: Do you know when you shut RC RV2?

2  
3 ZEWE: Alright, well I had isolated the B steam generator, first of all  
4 because I had some indications that I had a steam leak off of it, so the  
5 pressure in the B steam generator was about 300 pounds less than A and we  
6 had a building pressure somewhere around 2 pounds alright, so when I isolated  
7 the B steam generator and the pressure stopped going up and started to come  
8 down on the RB pressure, so I thought oh that was it, but then a short time  
9 later we shut RCV 2 the block for the electromatic and pressure took a  
10 marked drop right there and that would be timed on the building pressure  
11 recorder, but I am not sure of the exact time, it was not until ...

12  
13 INTERVIEWER: ... you saw a unique change in the building recorder, in the  
14 reactor building recorder ...

15  
16 ZEWE: Right away.

17  
18 INTERVIEWER: Right away.

19  
20 ZEWE: Right. I did see a change right away too when we isolated the B  
21 steam generator but not near of the magnitude as when we shut RCV 2.

22  
23 INTERVIEWER: Would that be about 6:15?

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1 ZEWE: That's about when we were indicating. Okay, that could have been  
2 it, yeah. When was ... when was the boron sample relative to that -- that  
3 the ...

4  
5 ZEWE: I'd say probably four, but not a great deal before that, but I am  
6 just guessing here, see I don't know for sure.

7  
8 INTERVIEWER: So you got the results for ... (unintelligible)

9  
10 ZEWE: Yeah.

11  
12 INTERVIEWER: That would tell us how ... (unintelligible)

13  
14 ZEWE: I am not sure exactly. We had checked the discharge relief valve  
15 temperature fairly early. As soon as Ken Bryant got to Unit 1, I asked him  
16 to look over the computer alarm, you know, to help us out. And then had  
17 him checked the discharge temperatures of the relief valve. And he said,  
18 you know, that RCRV 2's a little high, but you know, about 30 degrees high  
19 and then we knew that it had lifte<sup>d</sup>, so we felt that was still cooling  
20 down. So that's why that I went off of the RCRV 2 problem and went back on  
21 something else, because I just felt from that it was alright and but it  
22 ended up that I should have gone back to it, but I didn't until Brian  
23 Mehler and Ross was there and then Brian was looking over the computer  
24 again and then he said well it's a little high, well let's try to isolate  
25 it, I don't think it is anything and that is what it was, but we didn't  
have ...

1 INTERVIEWER: ... a couple of scrap metal in there, it is not an RTD and  
2 the highest it ever gets is ...

3  
4 ZEWE: Well the -- all it was then was about 228 or something like that and  
5 they had been running around 190 and then knowing that we had it lifted and  
6 plus that we had higher than normal temperatures I didn't see that was much  
7 of a problem. So we didn't go back to it to that point really not knowing  
8 for sure, but just saying let's isolate it you know and see and that was  
9 the problem.

10  
11 INTERVIEWER: What happened that could ... did you put the high pressure  
12 injection pumps on after you isolated RCRV 2?

13  
14 ZEWE: We had partial high pressure injection most of the time alright,  
15 because we had high pressure injection within, you know, a couple minutes  
16 of the problem and then we had complete actuation, we bypassed it and then  
17 I told my foreman then to try to establish, you know, normal pressurizer  
18 level. So then he went and then he was throttling back on the 16 valves  
19 and then he turned up the makeup pumps and then it went on one makeup pump.  
20 Then he tried to establish that. That is when I left to go over to help  
21 with the emergency feed, because it was just about that time that the  
22 operator had said that we are still at ten inches and the -- well at first  
23 he didn't have full open indication on the 11 valves -- BF 11's -- so I  
24 told him, you know, to take manual control and then open them up all the  
25 way, because it looks like that we weren't feeding alright. And so as soon

1 as he had full open indications on those, we looked and he still didn't  
2 seem like he was feeding, so then we checked real quick and found the  
3 valves were shut alright, and then he's on them just as I walked over to  
4 where they were controlling the pressurizer again and then he yelled that  
5 12's were shut. And I said why'd you shut the 12's. And he said no they  
6 were shut, they weren't opened up. So then we opened them up right away  
7 and then I was with him for awhile trying to establish a good level with  
8 about 30 inches, when we had considerable problems trying to maintain  
9 level, because bravo steam generator wanted to go high on us alright, it  
10 seemed harder to control it. So somewhere down the line we ended up cycling  
11 the EFV 5's -- the header isolation valves upstream to control flow to  
12 generators, because even with 11B and 12B shut the B steam generator was  
13 still increasing.

14  
15 INTERVIEWER: That was from what about maybe a half an hour into it on that  
16 you were cycling the five valves to maintain level?

17  
18 ZEWE: I would think so yes, as far as I can remember, yeah.

19  
20 INTERVIEWER: This ... if I can ask William one more question, when you  
21 closed that block valve you could see in the one graph reading reactor  
22 coolant system pressure started coming up pretty good. In a space of about  
23 45 minutes it came up to 2100 or so pounds. Did you throw makeup pumps on  
24 at that time, both four makeup tanks to get you pressure all the way down.  
25 Is that when you put the makeup pumps on to deal with these valves?

1 ZEWE: Yeah.

2  
3 INTERVIEWER: (Unintelligible) at that time?

4  
5 ZEWE: I think we only had on two at that point but I can't remember for  
6 sure , I really don't recall.

7  
8 INTERVIEWER: Once you come up to pressure then were you starting to worry  
9 that you were going to overpressurize?

10  
11 ZEWE: Yeah, well we were watching it closely at that point to make sure,  
12 you know, that did have some control of pressurize at that point. But I  
13 really wasn't worried at that point we really weren't concerned about  
14 overpressurizing at that point I was just glad that we had some of the  
15 pressure back.

16  
17 INTERVIEWER: I was wondering if shortly after that it looked like you  
18 opened up the automatic (unintelligible)? What the reason was on that?

19  
20 ZEWE: We went through a couple of evolutions there to where one that we  
21 tried to come up in pressure to compress the system up alright, with the  
22 bubble and everything and then after that then we thought to come down and  
23 try to float the core flood tanks on the reactor coolant system, so that we  
24 opened up and sprayed down, alright, all that we could to try to get down  
25 to get the core flood tanks in and also to try to get down low enough in

1 pressure to go on decay heat removal, but we weren't able to get down any  
2 less than about 410 or 420 pounds or so. So we weren't able to do that, so  
3 then we sat there for some time and then we decided to just inject again,  
4 try to go back up and compress the bubble again and try to rerun a reactor  
5 coolant pump at that point and now we are talking about early afternoon and  
6 I would say, you know, 3:00 ...

7  
8 INTERVIEWER: Were you lifting atmospheric dumps into that time?

9  
10 ZEWE: What?

11  
12 INTERVIEWER: Were you lifting atmospheric dumps during that time?

13  
14 ZEWE: We had indication of somewhere around like 11:00, 12:30 during the  
15 day ... 9:00 at night or something like that.

16  
17 INTERVIEWER: About 12:30 is when they stopped because that is when Gary  
18 Miller and all had to go to a meeting with the Governor see and they had  
19 them shut so they wouldn't dump anymore.

20  
21 ZEWE Right. We had it opened only when we broke vacuum and then for a  
22 short time after that, alright, and then we shut them, even though we  
23 didn't have vacuum until and then we didn't reopen them again until we  
24 reestablished vacuum again to dump it to the condensers and again only the  
25 A side was ever affected. We never unisolated B again after we had uniso-

1 lated it to feed it just before we started the pump and we had all the  
2 alarms and I reisolated B ... and it stayed isolated, I think until right  
3 now and it's still isolated just as we left it, the steam and feed both.  
4 So it was unisolated for really a fairly short period of time. There  
5 whenever we had the offgas monitor, we went and isolated it and we didn't  
6 use it since then, either the atmospheric dump, nor the turbine bypass  
7 dump.

8  
9 INTERVIEWER: Okay the offgas monitor came in before you ran the reactor  
10 coolant pump?

11  
12 ZEWE: No. It seemed like that we fed the generator and started that 2B  
13 pump and shortly thereafter -- after we did both of those, the alarms all  
14 came in, we had off the pump then, alright, the pump was only running for,  
15 I don't know, maybe 15 minutes at the most, alright, but as soon as we got  
16 the alarms alright, we went and isolated the B steam generator again and we  
17 already had that coolant pump off at that time. That it was after we fed  
18 and started the pump that we had the problem.

19  
20 INTERVIEWER: Okay so you had B steam generator isolated for awhile then  
21 you unisolated it and fed it to and started the B pump and at that time  
22 steam off the steam generator was going to the condenser you still had  
23 vacuum on the condenser.

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25

1 ZEWE: Yeah. We still had vacuum till quite some time after that. We were  
2 able to run with one aux boiler, trying to fix the other one up, but then  
3 finally we lost them both and then we had lost ... our primary had been  
4 supplying our turbine with sealing steam but we were down cool enough now  
5 to where we losing that because our pressure in the steam generators at  
6 this point, we had A was on very low, Bravo was at about 350 pounds or so.  
7

8 INTERVIEWER: That is why I was wondering why you had the atmospheric open  
9 at the time when the A steam generator pressure low. That's definitely a  
10 manual route, you can operate it in manual.  
11

12 ZEWE: You can operate it from the control room at the Bailly station.  
13

14 INTERVIEWER: In the first hour or so was there any specific reason for not  
15 going on natural circulation?  
16

17 ZEWE: No, not really as long as we had coolant pump flow I really didn't  
18 think, you know, to go on natural circulation or why I should do so.  
19

20 INTERVIEWER: When did you notice the source range increase?  
21

22 ZEWE: I noticed that after all the pumps were off.  
23

24 INTERVIEWER: It was after all the pumps off ...  
25

1 ZEWE: As far as I can remember, it was after all the pumps were off as I  
2 recall and then as soon as we seen that, then we started to inject boric  
3 acid into it and I believe then is when we started to get the sample back  
4 about the 700 ppm boron, because it confused me a bit at the time the we  
5 had just done a shutdown margin calculation and they said that we were 6%  
6 shutdown and the count began to come up and I think, John was there at that  
7 point too. And then the counts were coming up and the boron samples were  
8 coming back low and I said it is real, it is actually ... counts are increas-  
9 ing boron is low while shutdown margin isn't what it is, so we started to  
10 inject boric acid in there. Well I think we secured the pumps somewhere  
11 around quarter to six or so. So it was somewhere around then at that point  
12 we had quite a few people in the control room there and I remember John was  
13 there at that point I believe.

14  
15 JOHN: It was anout 0900 they asked me about when came in if I thought it  
16 was real at that time.

17  
18 ZEWE: Okay. That's right because I had asked you that, I remember that  
19 but we had several people there, but I just didn't understand, you know,  
20 why the boron was so low, we had been on high pressure injection plus added  
21 some acid prior to this and we were 6% shutdown but then when John said the  
22 explanation of it I guess that is probably what happened and it took the  
23 flux from the core then from the under moderation.

1 INTERVIEWER: I am just trying to establish whether that occurred before or  
2 after the pump stopped?

3  
4 ZEWE: I am almost positive that it was after the pump stopped.

5  
6 INTERVIEWER: The lapse of time after it took to record and log it...

7  
8 ZEWE: And also we noticed a rapid change in the source range and interme-  
9 diate range levels whenever we started that 2B pump. The counts were going  
10 up as soon as it ran, it came right down.

11  
12 INTERVIEWER: That is when your call was flashing pumps ... you've cut your  
13 pumps off (unintelligible) you start your pump again, you pumped up water  
14 your count rate will go down and you cut it off shortly thereafter they  
15 come up a little again.

16  
17 INTERVIEWER: You say that is when after the pump shut off was that the  
18 first little rise that you saw or was that the one where it went up to the  
19 intermediate range?

20  
21 ZEWE: They both had ...

22  
23 INTERVIEWER: Well there was ...

1 ZEWE: Well the first two were when the pumps were shut off. There was  
2 probably 20 minutes or so between whenever we went from four to two and  
3 then from two to zero.

4  
5 INTERVIEWER: (Unintelligible)

6  
7 ZEWE: I can't -- I think we started to add the acid whenever we went down  
8 to two pumps. That was the point.

9  
10 INTERVIEWER: You were running one makeup pump and then for some period of  
11 time and then kicked off two reactor coolant pumps and I am wondering at  
12 what point that you went back to full makeup flow and (unintelligible)  
13 makeup pumps relative to the coolant pump operation.

14  
15 ZEWE: I think that we were in back to much more injection flow so that we  
16 secured the pumps.

17  
18 INTERVIEWER: And was that before or after you sample ...

19  
20 ZEWE: I think that would be before the sample came out.

21  
22 INTERVIEWER: At 4:00 ... was there any switching going on, were they going  
23 to try to shift the condensate pump or was the dispatcher -- does he normally  
24 do something at 4:00 -- it seemed strange that at exactly 4:00 this whole  
25 mess starts and that you lose so many things in such a short period of

1 time, the condensate pump, the feed pump and the turbine and the differen-  
2 tial trip and everything all happens within a period of just seconds. It  
3 usually doesn't on a loss of feed pump, you know, loss of feed trip.  
4

5 ZEWE: I don't know because at that point as far as the electrical plant  
6 goes is normal. Everything was normal. We were running the normal running  
7 equipment. The only real problem that we had, you know, was the -- we had  
8 resin that was stuck in the line between the number 7 polisher and the  
9 receiving line and we had been trying to unclog that from about 4 p.m. the  
10 previous shift, so that was like 12 hours of trying to free up the resin  
11 from that number 7 polisher.  
12

13 INTERVIEWER: Were you running on fewer than normal polishers than you  
14 normally do?  
15

16 ZEWE: No.  
17

18 INTERVIEWER: The same number.  
19

20 ZEWE: Seven polishers with one standby and it was the standby 1 that we  
21 were transferring out we already had a charge for it to put back into it.  
22 But we couldn't get all the resin out of it, that the -- I don't know  
23 alright, because everything else, why we actually tripped I felt sure at  
24 the time, after I tried to start a condensate pump from the control room  
25 alright, I couldn't get one started, we reset the breakers. I finally got

1 one of the condensate pumps to start and then we couldn't get any suction  
2 pressure over to the booster pump, over the booster pump wouldn't start  
3 alright, we had good discharge pressure from the condensate pumps, so then  
4 I said, well the only thing between them is the polishers, so I tried to  
5 open up the bypass valve from up in the control room COP 12 from up there  
6 but it wouldn't come open so that's when the operator called saying that we  
7 had a bad leak on the suction of COP 2A booster pump. Well I went down  
8 there then to help him isolate it and to try to open up COP 12 or see what  
9 the problem was and why we weren't getting pressure pump from the polishers.  
10 So I went down and we isolated that leak and I looked at the polishers and  
11 all the polishers valves were failed shut, so then I went up and the hand-  
12 wheel was off of COP 12, it had fallen off and was down behind the ventila-  
13 tion ducts. So I sent an operator for a wrench, so that we could open up  
14 12 manually. The hotwells were outasight high at this point and we couldn't  
15 reject the water. So when he went for the wrench I -- I was looking around  
16 for another handwheel to use and I found that one laying down behind the  
17 duct work. So I crawled up there and started to open it up, got it open  
18 partially, called the control room and had them open it up all the way.  
19 And then we started to reject the hotwell back into storage tanks at the  
20 time that I was out of the control room and then I went up in the control  
21 room. At that time I felt that the problem was that the polishers had  
22 isolated themselves and it wasn't til several hours later that we received  
23 on the computer printout that the condensate pump had tripped first or was  
24 the first real alarm that they had.

1 INTERVIEWER: The hotwell pump was on then?  
2

3 ZEWE: Yes. We were successful in rejecting the hotwell once we had the  
4 12's open, we took manual control of the reject valve and rejected to the  
5 hotwell -- or to the storage tank.  
6

7 INTERVIEWER: Okay, that was about twenty minutes.  
8

9 ZEWE: It seemed like two, but I'd say twenty, yeah.  
10

11 INTERVIEWER: After you left the control room about 15 minutes after it  
12 started, you were in here for about 15 minutes ...  
13

14 ZEWE: And up until Friday we didn't even overflow a bleed tank. Friday we  
15 did.  
16

17 INTERVIEWER: Well somebody mentioned to us that -- that they -- that  
18 Wednesday you lost the seal injection, feed water injection for all you  
19 radwaste pumps.  
20

21 ZEWE: Yes.  
22

23 INTERVIEWER: Would that have caused the release of all the water onto the  
24 floor?  
25

1 ZEWE: When I came in, I guess, it was quarter to four Thursday morning,  
2 alright. I looked at the bleed tank and I noticed that the bleed tanks  
3 were at a lower level than what they were when I had left at 8:00 the night  
4 before. So then, I noticed that the bleed tanks were less than what they  
5 were before and, I said, they were still putting water into the sumps  
6 somewhere that either one of the tanks are leaking and it looked like that  
7 all the bleed tanks were showing it, so it had to be something rather  
8 common. So then, in a couple of minutes, we sort of figured it out that we  
9 had lost bus 32A and 42A, probably 4:00 the afternoon before alright on the  
10 the day it happened and they there was still trying to restore it and they  
11 had restored partial loads to it. So then, my control room operator,  
12 Ed Frederick, was checking through all the loads off of there and he said,  
13 you know, the seal water pump units are off of there too and I said ooh  
14 that's probably good that all the pumps are draining back through their  
15 seals because they don't have any sealing water. So then, we had an operator  
16 go into the building, -- in the aux building and I had him close the electric  
17 breakers alright, and then we were able to restore the cooling water unit  
18 and things like the boric acid pumps were off, and the oil pumps, reactor  
19 coolant pumps, and the aux building sump pumps, the aux building sump pump  
20 tank was off and so forth, so that we restored that and then the levels  
21 were normal.

22  
23 INTERVIEWER: What time do you think it was that you started to get water  
24 coming up out of the drains in the auxiliary building in Unit 2?  
25

1 ZEWE: When I first knew about it, it was from the alarms that I know of  
2 and that was, you know, twenty to seven or something. Prior to that point,  
3 they had seen a little bit of water collected around the drains, you know,  
4 very minimal amount, but it was the rad chem tech that said that he had put  
5 a radiac on it and that there was no activity. I think that may have been  
6 boric acid from the boric acid pumps and that's a relief valve at that  
7 point, and that was sometime before we actually found the great deal of  
8 water on the floor.

9  
10 INTERVIEWER: What time did you -- well I know you shut off the reactor  
11 coolant sump pumps at around 38 minutes and what was giving you indication  
12 that you needed to do that?

13  
14 ZEWE: Just that the sump only goes up to six feet, and then down at the  
15 radwaste panel, whenever we talked to the operator before he secured it, we  
16 asked him what the level was, and it was offscale high down there at six  
17 feet, and I knew that when we came over that, we really weren't in good  
18 shape as far as primary inventory goes, that our aux building sump and aux  
19 building sump tank were rather full to begin with, and I didn't want to  
20 bring over anymore water and overflow in to the sump because I knew that we  
21 couldn't handle it, and plus what was in the building, I wanted to keep in  
22 the building. I had so many other things I was looking at with the RC  
23 drain tank, you know, and so forth, and I knew at this point that we either  
24 had the relief valve was soaping on it, or the rupture disc had blown, but  
25 at this point, the highest pressure that I had seen in the plant, which is

1 from the corridor, the primary pressure corridor, showed about 2360 maybe.  
2 That is as high as I had seen on any instrumentation.  
3

4 INTERVIEWER: Did you say that both of the reactor building sump pumps were  
5 running when you had this high level?  
6

7 ZEWE: They should have, yeah. I don't recall asking if both of them were  
8 on or not, but as soon as Dick, I, knew that the sump was full and the  
9 pumps were on, pump or pumps were on, when I said let's go ahead and shut  
10 them off. I don't want them going into the aux building.  
11

12 INTERVIEWER: It would have to be a fairly substantial leak for the one  
13 pump not be able to handle it. Apparently, one pump kicked on and the  
14 level continued to go up, right? What does one pump, pump about?  
15

16 ZEWE: You are only talking alright, if I remember right, the aux building  
17 sump from the pump down area is only like 117 gallons or something like  
18 that, alright so, we are talking about a great volume from when the pump  
19 starts and stops on levels. You are not talking about thousands of gallons.  
20 You are talking about just over a hundred of gallons normally. So to have  
21 them both come on really isn't a great deal of volume.  
22

23 INTERVIEWER: Doesn't that happen periodically?  
24  
25

1 ZEWE: Oh yeah.

2  
3 INTERVIEWER: Oh I see, even under the normal operation?

4  
5 ZEWE: Yeah, because like we know that the RV sump or the RV core the  
6 AHE-11 fans, alright, that they have a pencil stream of condensate water  
7 coming out of their drains all the time alright, so that this, added into  
8 any other leakage that we have in the building, and we have some from the  
9 seals for the letdown monitors on the intermediate side of the letdown.  
10 They leak quite a bit and they go over to the sump. So all this draining  
11 into the sump, periodically the RV sump pumps come on I'd say once a shift  
12 normally just to pump that water down, which is really non radioactive  
13 waste water but it still goes into the sump.

14  
15 INTERVIEWER: I was trying to make something of both pumps running at the  
16 same time. It looks like it was a big leak there and one pump couldn't  
17 handle it, so the second one had to turn on, since you say that is routine.

18  
19 ZEWE: Well, normally only one would run but I knew that we had a problem  
20 with the RC drain tank in there, blowing the water out of the RC drain  
21 tank, and normally we have about 75 inches of water in the RC drain tank.

22  
23 INTERVIEWER: What volume is that equal to?

1 ZEWE: (Unintelligible) ... Because it's a horizontal tank that lays on it  
2 side and I don't recall the volume changing once your up past the point of,  
3 I don't remember there is a chart that says some many inches and so much  
4 level, but it isn't one inch per quarter or whatever or eight gallons per  
5 quarter, anything like that.

6  
7 INTERVIEWER: Did the one panel of pumps (unintelligible). Didn't they run  
8 a lot longer than you expected?

9  
10 ZEWE: What?

11  
12 INTERVIEWER: Didn't they run a lot longer than you expected? Did they run  
13 you that long to pump a 100 gallons out or how long did it take?

14  
15 ZEWE: Oh, no. They normally don't run long, but I really don't have a  
16 feel for how much, because it depends on the filter conditions that they  
17 pump through with everything else, but really I hadn't dwelled on the fact  
18 that the sump pumps were on for so many minutes. I didn't even realize  
19 that they were on as long as they were. I was just going by the RV sump  
20 levels full and I knew that they should have been transferring the water  
21 over to the aux building and I just didn't want it, so I just had to turn  
22 it off regardless of how long they were on or how much was in there until I  
23 had room for the water and I knew exactly where it had been.

1 INTERVIEWER: Bill there was a (unintelligible), there was a remark made  
2 about you had an intimated alarm of the electrical type coming in, and you  
3 weren't certain whether it was spurious or not. Aand there was a comment  
4 made that they couldn't see, I think it was off the aux transformer, they  
5 couldn't see the effect. Does that ring any bells?  
6

7 ZEWE: I was unaware of any intermittent electrical alarm, no. The only  
8 one that Craig Faust, the one control room operator that was taking readings  
9 at the time, said that when he had alarms, electrical alarms, he mainly  
10 focused on, you know, that the generator breakers had opened up and that to  
11 any and the alarms, that he was over on the computer side of the control  
12 room, so the electrical panel you know is 30 feet from him, so you can't  
13 read the alarms unless your very familiar with their position but he was  
14 mainly interested, you know, in seeing alarms and he'd look and the breakers  
15 were open on the turbine trip. So I don't know of any intermittent alarm  
16 that we had that night. At least, I don't remember anything.  
17

18 INTERVIEWER: When were you aware of lines pressure tap line breaking off a  
19 one of the waste gas decay tanks? Did you hear any stories like that?  
20

21 ZEWE: No. No I didn't at all, no. I knew that we did have considerable  
22 transfer of waste gas directly to the aux building from some unknown source,  
23 because everytime that we tried to vent the makeup tank we would have a  
24 pretty good release into the aux building, meaning that either the line was  
25 open or that a valve was leaking by, or one of the relief lines in the

1 waste gas header was open. But are you asking, at this time did I know  
2 that or what?

3  
4 INTERVIEWER: No. That right now, you didn't know that.

5  
6 ZEWE: No I didn't. I didn't know it.

7  
8 INTERVIEWER: Somebody mentioned that to me the other day. As far as the  
9 makeup tank, was that being vented at all?

10  
11 ZEWE: The makeup tank was normal. The makeup tank, normally, we hold  
12 about 18 to 22 pounds of hydrogen overpressure in the tank. We were main-  
13 taining that alright. We weren't venting it at the time. The real problem  
14 that we had with the makeup system, the makeup tank, was later on whenever  
15 we were trying to degas the reactor coolant system, then we couldn't control  
16 the pressure in the makeup tank, and that was quite sometime after that  
17 which resulted in the release that we had on Friday. We actually opened up  
18 the relief valve between the makeup tank and the makeup pumps and overfilled  
19 two out of the three RC bleed tanks before we finally terminated that.  
20 That happened about 7:00 in the morning, I guess it was, on Friday morning.

21  
22 INTERVIEWER: When did you finally get the hotwell pump down when you were  
23 working on that?

1 ZEWE: Well, we were rejecting it pretty heavily before I came up with the  
2 control room and then I assigned an operator down there you know to just,  
3 reject as much as he had to to get level back in the sight glass.  
4

5 INTERVIEWER: Okay. And you eventually did that?  
6

7 ZEWE: He eventually did that yes.  
8

9 INTERVIEWER: Do you remember the approximate time that you lost your  
10 heaters and pressurizer?  
11

12 ZEWE: Well, we started to get heater ground going that was sometime later.  
13 I would say approaching mid morning alright, but I am not sure. Whenever  
14 we first had the problem and the pressure was lower than what I thought it  
15 should be, I suspected then that we may have had some problems with our  
16 pressurizer heater capacity because we had blown the reliefs and it has  
17 been a problem in the past that whenever the M20 area or the control building  
18 area west gets warm that we have considerable tripping of the pressurizer  
19 heater breakers, and I and I felt during that time period that we had lost  
20 some heaters and I had asked an operator, you know, to be dispatched down  
21 there to check out the heater breakers. But, as far as the grounds bit and  
22 everything goes, that was considerably later and I would say mid morning to  
23 the best recollection on that.  
24  
25

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1 INTERVIEWER: So then you dispatched the operator down there, you didn't  
2 have any report back to the, that you had lost breakers, heaters at that  
3 time?

4  
5 ZEWE: As a matter of fact, I don't remember him reporting back at all on  
6 it alright, because at that point, I just didn't follow up any more on it.  
7 I asked to have it checked and I really didn't ask the operator myself. I  
8 asked the control room to and have it done as soon as he had somebody free,  
9 and I not sure at this point whether he did check it and reported to the  
10 operator and the operator didn't tell me, or he did and I didn't hear him  
11 or what have you. But I don't remember any feedback at all from it and I  
12 really didn't pursue it any further. I didn't think about it much after  
13 that.

14  
15 INTERVIEWER: Okay, when the initial condensate pump tripped, feed pumps  
16 tripped, were you operating three booster pumps and the two condensate  
17 pumps at that time prior to ...?

18  
19 ZEWE: Three booster pumps, no. There was two condensate pumps and two  
20 booster pumps and two feed pumps.

21  
22 INTERVIEWER: Okay, when the one condensate pump tripped and the two feed  
23 pumps tripped, do you recall whether the booster pumps also tripped?  
24  
25

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1 ZEWE: Well when I first seen that we had a problem and I came out of my  
2 office and I looked, I had seen the turbine tripped, then the reactor  
3 tripped just as soon as I took another step. I announced a trip to let  
4 everybody know and to get my shift foreman back to the control room alright,  
5 and then we went through the starting the makeup pump and everything and  
6 just about that time that I realized what caused the turbine trip alright,  
7 I didn't realize at that point that we had lost feed and I didn't get, as,  
8 it was my one control room operator that said, you know, that he was trying  
9 to get emergency feed and I realized that the cause for the turbine trip  
10 was loss of feed and when I looked, we didn't have anything running; no  
11 condensate pump at all, either one of them; no booster pump or feed pump;  
12 everything was tripped.

13  
14 INTERVIEWER: Do you have an idea as to when that was?

15  
16 ZEWE: What, that I noticed that?

17  
18 INTERVIEWER: Yeah.

19  
20 ZEWE: It should be a couple of minutes into it, I would say.

21  
22 INTERVIEWER: Two minutes or five or six?

23  
24 ZEWE: I don't know. I'd say just a couple minutes alright. I had -- I  
25 think that Craig yelled out that we had lost all feed, alright, but I

1 hadn't looked at it for say maybe two or three minutes later to verify the  
2 fact that everything was off.

3  
4 INTERVIEWER: That was then about half way to the time that you realized  
5 they still weren't feeding? About half was...

6  
7 ZEWE: Yes. Because one of the things I noticed that as I traced it that  
8 appeared that condensate booster pumps continued to run to the sump pump  
9 and at the discharge of feed pump, it came back to through the sump to the  
10 feed pump and then discharged to the booster pump and that is what caused  
11 that bang and I didn't get any indication of the computer printout booster  
12 pump pressure until five minutes later.

13  
14 INTERVIEWER: Five minutes later.

15  
16 ZEWE: Time right then, you know, I really don't know but I had assumed it  
17 had tripped when the con feed pumps had tripped on their low pressure trip.  
18 But they had low suction pressure trips on both the booster pumps and the  
19 feed pumps, so I assumed that that would take it out.

20  
21 INTERVIEWER: What are the booster pumps low suction pressure trips set at?

22  
23 ZEWE: They're at about 20 pounds. They are really low, because normally  
24 we run with a booster pump suction pressure of 50-60 pounds. And the  
25 suction to the feed pumps at about 400 pounds. And the feed pumps trip at  
about 280. Suction pressure is staggered, 275 and 280.

1 INTERVIEWER: What was that B:11? At what point do they trip? What's the  
2 set point on the feedwater trip?

3  
4 ZEWE: They trip at about 280 suction pressure, but A and B aren't exactly  
5 the same point. They are separated by about 15 pounds, so that one trips  
6 sooner. But I wouldn't know why the booster pump would run after the  
7 condensate pump was off.

8  
9 INTERVIEWER: I think the suction pressures came up. The suction pressures  
10 stayed up. I had a reading of like 38 pounds on suction pressure.

11  
12 ZEWE: That would have held it up probably yeah.

13  
14 INTERVIEWER: The feedwater pressure was low enough for the feedwater pumps  
15 to trip, and it looked like they tripped and the booster pumps continued to  
16 run, and then when that pressure surge came back and discharged to the feed  
17 pumps through the suctions of the feed pumps and hit the discharge booster  
18 pumps and that kept the pressure up also for awhile. I don't know how they  
19 kept the suction pressure booster pumps up, but they were high for awhile.

20  
21 ZEWE: That I don't know, that is brand new to me. I had thought they all  
22 went together because ... go ahead.

23  
24 INTERVIEWER: Did you ever have a bang like that on loss of feedwater flow?  
25

1 ZEWE: We had, alright, we have isolated the condensate before while running  
2 one condensate pump and one booster pump on feedwater heating, where the  
3 polishers had gotten water in them and they had isolated themselves. And I  
4 was on for one such incident where we did have a tremendous hammer when  
5 they went shut, but the pumps were only running at about 2500 gallons then,  
6 not at the flow rate that we had now of about 16,000 to 17,000. So I am  
7 sure that the surge was a lot worse now, but I really didn't hear the  
8 hammer either. I don't recall hearing it. I did hear release going on the  
9 feedwater heaters, which I thought was release on the feedwater heaters.

10  
11 INTERVIEWER: Okay. Back on the steam generator feedwater pumps, emergency  
12 pumps, okay, did you take the steam driven pump off line?

13  
14 ZEWE: After we had established approximately 30 inches in the steam  
15 generators, then the operator did secure the steam driven feed pump and the  
16 one electric driven feed pump and we just were feeding on one electrical  
17 feed pump at that point.

18  
19 INTERVIEWER: Okay. You indicated that the steam generator atmospherics  
20 and turbine bypasses, they all opened when the initial spike went right?  
21 You went through the bypass valves and the atmospherics, and assuming all  
22 the safeties are set at the right points, you picked up about six or eight  
23 safeties on each generator that's if the pressure spike (unintelligible),  
24 but after you started coming back down, you dropped off the code safeties  
25 and then came back on the atmospheric dumps, did anybody take control of it

1 manually then? It wasn't covered in any of the interviews, so I am just  
2 asking you how you were controlling your bypass flow in total?

3  
4 ZEWE: At this point, we should have been just on the turbine bypass valves  
5 to the condenser, alright, and then at this point we should have been in  
6 automatic, and we should have been controlling that ten-ten alright, as far  
7 as their setpoint goes.

8  
9 INTERVIEWER: Right. That's with the 125 pound bias after trip.

10  
11 ZEWE: Right.

12  
13 INTERVIEWER: Okay. Were you doing that? I mean nobody made an action  
14 that you are aware of to do other than...?

15  
16 ZEWE: No, no. Right. As far as I know, that was in automatic the whole  
17 time at this point, until we began to isolate the B steam generator and so  
18 forth is when we changed it.

19  
20 INTERVIEWER: When you isolated the B, you changed it?

21  
22 ZEWE: We isolated the bravo term bypass valve also, part of the isolation  
23 part.

1 INTERVIEWER: So you just wrapped up the B generator completely, split this  
2 down, and were steaming the A?

3  
4 ZEWE: Exactly.

5  
6 INTERVIEWER: How many times when you got into establishing circulation,  
7 natural circulation, attempting to establish it, how many times did you  
8 attempt to establish, I mean, did you feed up the generators and try to  
9 establish it?

10  
11 ZEWE: Well we, as soon as we tripped the pumps, then we began to feed up  
12 to 50 inches or 50% on the operating range, 21 feet, on the A side only  
13 because bravo was still isolated, and then we felt that probably wouldn't  
14 be enough so then we started to feed up A higher than that since we only  
15 had one generator that would be used. Bravo was still holding level,  
16 alright. At some point and I'm not sure what alright, when, but the bravo  
17 steam generator kept on coming up and up and up and then finally it leveled  
18 off at some time and then I didn't even, I didn't notice when it began to  
19 not come up anymore, but then sometime later we noticed that the Bravo  
20 steam generator had stopped a ramp up and that we were actually somewhat  
21 holding a level in the B steam generator. But I am not sure exactly when  
22 that occurred and I am sure it is on the chart and it's all timed, but I  
23 don't recall how long a period it was.

24 000 273  
25

1 INTERVIEWER: When you isolate that steam generator, what valves do you  
2 close?

3  
4 ZEWE: Well, we isolated normal and emergency steam to it, alright, the  
5 normal startup valves, the normal feed reg valves, the block valves, the 14  
6 valves automatically go shut when the startup valves go shut, and we isolated  
7 the main steam valves, 4's and 7's, isolated the turbine bypass valves.

8  
9 INTERVIEWER: What do you attribute the problem to early, or do you have  
10 any ideas on it? You were having trouble feeding the B generator?

11  
12 ZEWE: Yes, well, even had some problem feeding the A from the standpoint  
13 as that we found it was a little hard to control, the desired level. It  
14 seemed like the 11 valve, the automatic valves were controlling level what  
15 we thought they would be at 30 inches, so we did have it in hand and then  
16 we found out that we had to overfeed and underfeed to hold the desired  
17 levels that we wanted to hold. And after awhile, we ended up to where the  
18 levels were going high on us and we ended up shutting the 11's, shutting  
19 the 12's, and finally cycling the EFV-5A and B to try to control level.  
20 And then sometime thereafter, then we lost the breaker for the EFV-5 bravo.  
21 It must have tripped on thermal. So then we lost that. So then sometime  
22 thereafter then we went to normal feed using the one condensate pump feeding  
23 into the normal startup valve and that is how we spent most of the day past  
24 mid morning was using normal feed.

1 INTERVIEWER: Okay. Say ten or eleven, that is when you did that type of  
2 shot?

3  
4 ZEWE: May even been a little earlier than that, but in that neighborhood,  
5 give or take, I'm not sure, because the operator automatically did it. He  
6 informed me later on, you know, that he had problems that he isolated, that  
7 he had lost that breaker and everything, that he was going back on normal  
8 feed, and at that point, I didn't have any objections to it because he  
9 could control it better.

10  
11 INTERVIEWER: Right. So then we got a lower discharge pressure that should  
12 keep the valves open so that...

13  
14 ZEWE: At that point, we were down rather low on generator pressure anyway.

15  
16 INTERVIEWER: Is there a procedure, now I am not familiar with your plant,  
17 so I am just asking this off the wall, is there a procedure for feeding a  
18 dry generator that is different from feeding a normal generator, you know,  
19 a generator with say, 30 inches or more in it?

20  
21 ZEWE: Yes. Well the thing was alright, at the time, I never considered it  
22 to be a dry steam generator.

23  
24 INTERVIEWER: You hadn't any indication.  
25

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1 ZEWE: Because everytime that I looked, I had greater than ten inches.  
2 Normally, we consider a dry steam generator eight inches or less alright,  
3 and I always had feed. If I had realized that it had taken us 8 minutes to  
4 establish that feed, which I didn't, I'd have known that it had to been  
5 dry, alright. But even on the operating range, it indicated like 5% or 6%  
6 on the operating range, and it showed greater than 10, 11, 12 inches on the  
7 startup range, alright, so I didn't think that it was dry, that it was  
8 still coming back, and that we were actually holding some level before we'd  
9 seen any significant increase. But knowing that it was actually an 8 minute  
10 period here that I was talking about, it would've gone dry.

11  
12 INTERVIEWER: The reactor coolant high radiation alarm (unintelligible)?

13  
14 ZEWE: Right around the same time that everything else happened. That's  
15 when I noticed the dome monitor was coming in hot.

16  
17 INTERVIEWER: By everything else, you mean all the other radiation alarms?

18  
19 ZEWE: All the other alarms, right. I really don't remember seeing very  
20 much up until that point and then everything began to come in at once.  
21 Really, the first one that I noticed was the 748, the offgas monitor. That  
22 was the first one because I felt sure that we did have a problem with the B  
23 steam generator and then once we fed it, it came in, I was sort of keyed to  
24 that one anyway.

1 INTERVIEWER: Does anybody else have any ... I've got a question; before  
2 you ran the coolant pump or after?

3  
4 ZEWE: After.

5  
6 INTERVIEWER: All the radiation...

7  
8 ZEWE: It seemed to me, afterwards, right. But we did one and then the  
9 other in fairly rapid succession, you know, just a few minutes apart, so  
10 Fred started the pump and then it was x number of minutes after that that  
11 everything came in.

12  
13 INTERVIEWER: Do you know or could you differentiate between where along  
14 that line of pumps that it came in? Was it before you ran the last one  
15 that stayed on or was it somewhere in between?

16  
17 ZEWE: Before I ran the last one?

18  
19 INTERVIEWER: Well I am thinking back to one of the other...

20  
21 ZEWE: We had started another pump, alright, sometime after this, alright,  
22 because we started that 2B pump and then we were concerned if it was really  
23 running or not, and we checked the amps and everything and we knocked it  
24 off. And then we tried to start another pump which was a A side pump  
25 sometime later, alright. I am not sure of the time frame. It may have

1 been an hour later. I don't know. But then we tried to start another one  
2 and that one acted normally at first, alright. It started and we got the  
3 amps were real high on the offscale amps. Normally the amps, you know, are  
4 offscale for about the first 10 seconds and then they come down to about  
5 600 amps normally alright. But the first pump that we had on, I never  
6 really seen the amps, you know, the starting current come up and then come  
7 down; but on that pump, the starting current came up; in ten seconds she  
8 dropped back down but she kept on going down to about 100 amps. So we felt  
9 sure that, alright, at that time, we weren't 100 percent sure that that 2B  
10 had been running actually before alright, but then the A pump that we ran  
11 once we had the starting current, she held and she came down and we were  
12 sure that she actually had started.

13  
14 INTERVIEWER: And it stayed on, okay?

15  
16 ZEWE: Yeah.

17  
18 INTERVIEWER: And that meant that the other one had done the same thing.

19  
20 ZEWE: Yeah. But then ...

21  
22 INTERVIEWER: Where did that alarm come in?

23  
24 ZEWE: I didn't have any flow indication, there.

1 INTERVIEWER: On neither of the two runs?

2  
3 ZEWE: Neither of the two runs, no.

4  
5 INTERVIEWER: Where did the alarm come in along that pattern of starting  
6 pumps?

7  
8 ZEWE: Alarm of what?

9  
10 INTERVIEWER: I thought that's where you got one of your radiation, high  
11 radiation..

12  
13 ZEWE: Sometime after we started that 2B pump.

14  
15 INTERVIEWER: After the 2B pump.

16  
17 ZEWE: That is as I remember it.

18  
19 INTERVIEWER: The last pump.

20  
21 ZEWE: Which was the first one.

22  
23 INTERVIEWER: Or the first pump, okay. So it was the first one of the  
24 others.

25  
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1 ZEWE: Yes, that's as I remember, because there was sometime between the  
2 first pump start and second pump start. It was, I'd say, maybe an hour.  
3 I don't...

4  
5 INTERVIEWER: Any other. One thing, is there any power dispatcher records  
6 that would show the spike maybe when these pumps started?

7  
8 ZEWE: The coolant pumps? I don't remember if they would have recorders  
9 that would see. Well, there again, I don't remember but I don't think so.  
10 But there is a possibility that they do. Maybe the Lebanon dispatcher  
11 might have that, but I don't remember, alright. The only place that I've  
12 ever been is at the Reading dispatcher and I don't recall seeing it up  
13 there. But since the, I have never been to the Lebanon dispatching, I  
14 don't know. I would think that if they would, they would have gotten the  
15 second pumps to start with the amps and I am not even sure that we just  
16 missed seeing the starting current on the 2B or not, but the operator  
17 remarked that he don't see it either, and that is one of the first things  
18 that he checks as he starts it and he times how high the amps are up for a  
19 locked rotor indication alright, and he don't remember seeing it at all  
20 either because that's when he closed it in and the breaker went right, red,  
21 night, meaning that it closed. But he didn't have really any other indica-  
22 tion because 100 amps is just about the first mark on the amp gauge there.  
23 It is really hard to tell, so we weren't sure at that point. The second  
24 one, I did see it come up and come down.  
25

1 INTERVIEWER: Any other questions? Anything else. Okay that ought to do  
2 it.

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