

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

1 In the Matter of:

2 IE TMI INVESTIGATION INTERVIEW

3 of Mr. James R. Floyd, Supervisor Operations, Unit 2  
4  
5  
6  
7  
8

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

13 June 2, 1979

14 (Date of Interview)

15 July 5, 1979

16 (Date Transcript Typed)

17 #285

18 (Tape Number(s))  
19  
20  
21

22 NRC PERSONNEL:  
23 Mr. Douglas M. Collins  
24 Mr. Larry L. Jackson  
25 Mr. Owen C. Shackleton

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1     SHACKLETON: My name is Owen C. Shackleton, I am the moderator. This  
2     is an interview of Mr. James R. Floyd, Mr. Floyd is presently Supervisor,  
3     Operations of Unit 2 of the Three Mile Island Nuclear Power Station,  
4     operated by the Metropolitan Edison Company. This interview is taking  
5     place at 9:08 a.m., Eastern Daylight Time, Saturday, June 2, 1979.  
6     Present from the U.S. Nuclear Regulatory Commission to conduct this  
7     interview is: Mr. Douglas M. Collins. Mr. Collins is a Radiation  
8     Specialist assigned to Region II. Also present from the Commission is  
9     Mr. Larry L. Jackson. Mr. Jackson is a Radiation Specialist assigned to  
10    Region II. My name is Owen C. Shackleton, I am an investigator assigned  
11    to Region V. Prior to going on tape for this interview, I discussed  
12    with Mr. Floyd a two page document that we had presented to him on a  
13    prior interview on May 2, 1979. This document advises Mr. Floyd of his  
14    rights to refuse to be interviewed, and, on the second page of the  
15    document, Mr. Floyd answered three questions that appear there in the  
16    affirmative. And now, as a matter of record I would like to repeat  
17    these questions and have Mr. Floyd answer orally. Mr. Floyd, do you  
18    recall the statement that I'm referring to, the document?

19  
20    FLOYD: Yes, sir.

21  
22    SHACKLETON: And did you understand it clearly?

23  
24    FLOYD: Yes, sir.

25  
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1 SHACKLETON: And do we have your permission to tape this interview?

2  
3 FLOYD: Yes, sir.

4  
5 SHACKLETON: And would you like a copy of the tape and/or transcript?

6  
7 FLOYD: I would prefer the transcript.

8  
9 SHACKLETON: Alright. That will be provided to you. And now I will  
10 turn this interview over to Mr. Collins.

11  
12 COLLINS: Mr. Floyd, in an earlier interview you discussed your activi-  
13 ties on the 28th, which were mostly centered in Lynchburg. We'd like  
14 now for you to, as you can recall, recount your activities of the 29th  
15 and 30th with regard to the actions you took at Three Mile Island.

16  
17 FLOYD: I arrived on the site at about 2:30 in the morning of the 29th.  
18 I was in the control room until about 5:00 a.m. During that time I do  
19 not remember issuing any orders but merely trying to fatten the plant  
20 status. About 5:00 a.m. I departed the site, went home, and went to  
21 bed. About 6:00 a.m. I received a call from Mr. Joe Logan to return to  
22 the island, which I did. I found out that Mike Ross and I were on 12  
23 and 12 relieving each other in the Unit 2 control room in charge of  
24 plant operations. I don't remember if Mike was still there or if he  
25 had gone home, but I assumed responsibility for the Unit 2 control room

1 about 6:00 a.m., 6:30 a.m., whenever I got in here, on the 29th. I  
2 stayed until Mike returned to the site, Mike Ross, in which time he  
3 relieved me, and I went home to get some sleep. I don't recall anything  
4 of particular importance that morning. If you need any details of what  
5 happened that morning I suggest that you refer to the control room,  
6 operator's log book and/or the shift foreman's log book to help refresh  
7 my memory.

8  
9 COLLINS: I have copies of those here if you would like to look those  
10 over.

11  
12 FLOYD: I don't know the anything that's in there is pertinent to why  
13 I'm here now, but if it is, we can always go back and pick it up. At  
14 any rate, I left the site, I think the north gate log would probably  
15 show around 2:00 in the afternoon on the 29th, and returned to the  
16 site, probably somewhere in the area of 10:00 in the evening on the  
17 29th at which time I did relieve Mr. Ross probably around 11:00 since.  
18 At that point in time it was taking us at least an hour to transfer the  
19 current plant status on to the other in making a relief. Even though  
20 the plant status was well known at that time between us, it still  
21 required about an hour of verbal discussion before the on-coming man  
22 would feel confident that he has mind wrapped around the entire situation.  
23 This being now, late on the 29th, one of the instructions I received  
24 was that we were venting the makeup tank through MUV 13, as necessary,  
25 to keep the pressure in the makeup tank at a reasonable number. I

1 cannot recall what that number was, but it was in the area of 60 to 80  
2 pounds. Based on that relief, I assumed we had permission to use MUV  
3 13 as we saw fit. I did not question whether or not we had NRC concu-  
4 rence, approval, or even understanding of what we were doing or when we  
5 were doing it with MUV 13. I assumed the watch and I think the control  
6 room log will show that MUV 13 was opened several times, prior to the  
7 situation starting to move a little bit faster, about 3:30 in the  
8 morning. As I recall about 2:15 the control room log shows that we  
9 closed MUV 13 and at about 3:30 in the morning, the makeup tank level  
10 dropped precipitiously to zero. The cause for this was unknown to us  
11 in the control room at that time. However, we had been using either or  
12 both sources of water to the makeup pump, that was running, and those  
13 two sources are the makeup tank and/or the BWST, the Borated Water  
14 Storage Tank. There was a known small leak in the system, and I guess  
15 now hindsight, I might say that, it appeared as a small leak. It may  
16 not all of been leakage, it may have been bubble collapsing that was  
17 taking the additional inventory. At any rate, we had a continuing  
18 requirement for small amounts of makeup to the reactor coolant system.  
19 We were, for the most part, operating with MUV 12 open which, and MUV 8  
20 in the through position. That combination makes the purification  
21 system, the letdown in the makeup system, a closed hoop extension of  
22 the reactor coolant system boundary. As we require additional makeup  
23 we would, without changing that lineup, open DHB5A, which would allow  
24 water from the BWST to come into the makeup pump suction and add inven-  
25 tory to the reactor coolant system. When the makeup level increased to

1 our satisfaction, indicating additional inventory had been introduced,  
2 we would then close DHB5A and the continued leakage would slowly decrease  
3 the makeup tank level. When the makeup tank level dropped precipitiously  
4 from 30 or 40 or 50% indicated level to zero, we either had DHB5A open  
5 or we immediately opened it and closed MUV 12 so as not to loose suction  
6 on the makeup pump. The operating staff of the plant is very aware  
7 that those makeup pumps would not run for several seconds without a  
8 source of suction water. A makeup pump, at this time, was supplying  
9 seals to the reactor coolant pumps, one of which was running and pro-  
10 viding us with forced convection cooling of the reactor core. It was  
11 highly desirable to maintain that forced convection cooling and to  
12 continue to assure, to the best of our ability, the operational integrity  
13 of that reactor coolant pump, which was running, and of additional  
14 pumps should that one stop. Therefore, seal injection was desired to  
15 be maintained and to do that the makeup pump had to be kept running.  
16 So, when the makeup tank level dropped rapidly to zero, we shifted  
17 suction to the BWST. The BWST was now our source of inventory to the  
18 reactor coolant system. The makeup tank pressure, which is not recorded  
19 but only indicated; I remember as being around 80 pounds when the level  
20 dropped. With the BWST supplying water to the makeup suction, makeup  
21 pump suction, and to the reactor coolant system, it was also supplying  
22 water to the minimum flow recirc line on the makeup pump through MUV 36  
23 and 37, through the seal return cooler to the makeup tanks. I think if  
24 we examine the makeup tank recorder trace, the level trace we will find  
25 there are several little indications of level, that is the level in the

1 tank would just start to increase, and then suddenly decrease to two,  
2 three, not more than 5 percent. It was still unclear to us that the  
3 relief valve in the makeup tank discharge pipe, MUVR 1, had lifted, or  
4 was lifting repeatedly. The net result of that valve lifting repeatedly  
5 was a transfer of water from the BWST, where it was available as a  
6 source of emergency core cooling water, to a reactor coolant bleed tank  
7 where it was not available as a source of water for emergency core  
8 cooling. The BWST, at this time, had about 20 feet of water in it. It  
9 may have been 18, it may have been 17, but it was somewhere in that  
10 range. It was brought to my attention, about 7:30 in the morning, that  
11 the BWST level had decreased several feet, and several can be from 2 to  
12 5, I cannot recall but that's many gallons of water. The BWST level  
13 had decreased and that the reactor coolant bleed tank level had increased.  
14 It was at that point in time that I recognized the flow path through  
15 MUR 1. The relief valve on the discharge line of the makeup tank,  
16 which is normally set at 80 pounds per square inch. And I recognized  
17 the need to reduce the pressure in the makeup tank far enough to let  
18 that relief reseal so that it would not continue to dump the emergency  
19 core cooling water into the reactor coolant bleed tank. I think it was  
20 7:40 in the morning that this realization came to me and I ordered MUV  
21 13 opened. At that time, before I ordered the valve opened, I recognized  
22 the potential of a radioactive gaseous release due to the fact that  
23 each time we opened that valve during the night, prior, previous times  
24 of the night, we would get a small gaseous activity increase in the  
25 auxiliary and fuel handling buildings, indicating some small amount of

1 leakage between MUV 13 and the gas compressors, or between the gas  
2 compressors and the waste gas decay tanks, where that gas would normally  
3 be compressed, sampled, prior to releasing it. I knew that the majority  
4 of the bubble was hydrogen, but, I guess I can't say that I knew that.  
5 I suspected that, we had not had a sample of that gas, so I guess I  
6 can't say that I knew it, it's sort of like the first law of Thermal  
7 Dynamics. You know, its true but you never proved it yourself, and yet  
8 you can stake your life on it but that's not first hand knowledge, I  
9 guess. At any rate, I thought the gas was predominately hydrogen with  
10 some Xenon and Krypton, which is what was showing up on our radiation  
11 monitoring recorders whenever we opened MUV 13. Since I had just  
12 ordered MUV 13 opened and recognized the possibility of some Xenon and  
13 Krypton escaping to the public, as soon as I ordered the valve opened I  
14 picked up the red phone, which is a tie to the Unit 1 control room  
15 where the offsite teams were being controlled from, the offsite radi-  
16 ation monitoring teams, and they also had communication with the helicopter.  
17 After, immediately on ordering MUV 13 opened I ordered the helio in the  
18 air over the stock, which would be the point of discharge to the environment  
19 of any gases which would escape from the system. I also ordered the on  
20 and offsite monitoring teams in a downwind direction to look for any  
21 increases in activity being released to the public. I then turned and  
22 went immediately to the Shift Supervisor's office, picked up the phone  
23 to check on the readiness condition of State Civil Defense to evacuate  
24 people. I did not expect that I would have to evactuate pople. If I  
25 saw radiation levels which were too high, I could close MUV 13 and stop



1 the release. I had cycled the valve frequently during the night and I  
2 had every confidence that it would reclose. But if it would not reclose,  
3 I needed the contingency of knowing the status of State Civil Defense.  
4 While dialing the phone, if there was NRC inspector either in the  
5 control room, who would have heard my order to open MUV 13 or if there  
6 wasn't, if there was one in the office, I would have told him at that  
7 time that I had opened MUV 13. Whether or not he would understand the  
8 consequences of that, I am not sure. But if he were in the office he  
9 would have heard me speaking to State Civil Defense, saying that our  
10 release rate was increased and asking what their status was to move  
11 people. I was assured by State Civil Defense that they were prepared  
12 to move people, if necessary, and I probably thanked them and hung up.  
13 Went back out to the control room and started monitoring the minute by  
14 minute reports coming in from the helicopter and from the on and offsite  
15 teams. The on and offsite teams were receiving nothing of an increased  
16 radiation level, the helicopter which was hovering above the stack did  
17 start seeing an increase. As as I recall it increased to a maximum of  
18 1.2 R/hr, and then commenced a slow decrease. The rise was rather  
19 rapid as would be expected, the decrease was much less rapidly but was  
20 moving in the proper direction. As long as the decrease was continuing  
21 I left MUV 13 open to aid in the degasification of the reactor coolant  
22 system. I had not closed any of the options that were available to me  
23 at that point. I still had the ability to close 13 and stop the release  
24 if I had to. I had several backup positions which, although they were  
25 undesirable, could also have stopped that release. I'll probably stop  
here and answer questions if you have some.

1 COLLINS: If you would like to just continue until you got offshift  
2 that day then we could go back and ask for specifics.

3  
4 SHACKLETON: That was Collins speaking.

5  
6 FLOYD: Okay, I'll pickup the scenario there again when the makeup tank  
7 pressure is decreasing. I cannot tell exactly at what point the MUR 1  
8 restarted. It did not reopen again, but by taking the makeup tank  
9 pressure down to zero indicated I was assured that it would not reopen.  
10 This left us increase our letdown flow, it had been virtually nil with  
11 the 80 pounds in the tank. Now the pressure differential was working  
12 from the reactor coolant system pressure on the order of a thousand or  
13 eleven hundred pounds into a pound, tank at zero pounds, as opposed to  
14 a tank at 80 pounds. And as would be expected the letdown flow increased,  
15 I regained an indicated level in the makeup tank, was able to add some  
16 additional water to the makeup tank and then close, reopen MUV 12,  
17 close DHB5A, to complete the protection of the emergency core cooling  
18 water source, and put the makeup and purification system back into a  
19 closed-loop operating system, as an extension of the reactor coolant  
20 system boundary. The control room and that mode was maintained through  
21 Sunday. That was the mode of operation that I explained to President  
22 Carter on his tour in the control room on Sunday, April 1st, and it  
23 continued on into at least the early if not the middle part of the  
24 following week, which would be April 2, 3, 4 area. It was by degassing  
25 through the pressurizer, and periodically opening the vent valve off of

1 the pressurizer, RCV-137 and/or RCV-2, the block valve on the electromatic  
2 relief valve, was our flow path for getting the noncondensable gases  
3 out of the pressurizer. The spray flow of course brought them into the  
4 pressurizer to the reactor coolant system drain tanks through either  
5 RCV-2 or/and RCV-137. Since the rupture disc was blown on the Reactor  
6 Coolant Drain Tank that vented them directly to the Reactor Building  
7 atmosphere. Simultaneously with that method of degas we were degassing  
8 through the makeup tank in that as we brought reactor coolant system  
9 down the letdown line and cooled it and depressurized it the depres-  
10 surization allows the gases to come out of solution and operators log  
11 will show the times at which that was done. That basically relieved  
12 the heightened activity which was present in the control room and  
13 allowed the plant to be in a stable condition, continuing to degas the  
14 reactor coolant system through both the makeup tank and through the  
15 pressurizer collect on top of the makeup tank and with that vent open  
16 they were proceeding through the pipe to the waste gas compressors and  
17 the pressure, being compressed into the waste gas decay tanks, and  
18 those pressure indications were increasing, indicating that gas was  
19 being removed by that path.

20  
21 COLLINS: Excuse me. We're just interested in the first three days. I  
22 think you're getting into the next week, so we'll just...

23  
24  
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1 FLOYD: Okay. I just wanted to explain the two flow paths that were in  
2 operation at that point for degassing the hydrogen bubble out of the  
3 reactor coolant system and it was in that status that I turned the  
4 plant over to Mike Ross at the end of that shift.

5  
6 JACKSON: What is the normal method for degas of the reactor coolant  
7 system?

8  
9 FLOYD: Those two flow paths I just described are part of normal operating  
10 procedures for Three Mile Island for both Units 1 and Unit 2.

11  
12 JACKSON: Does the makeup tank vent valve stay open during normal  
13 operation?

14  
15 FLOYD: No, sir. Only when we wish to degas the system.

16  
17 JACKSON: I have a question on the, you say you were going straight  
18 through MUV 8 and I had a question on that on a log entry where one of  
19 the entries was that MUV 8 was jumpered out to provide continuous feed  
20 and bleed. Can you tell me what that log entry meant?

21  
22 FLOYD: Can you be a little more precise and tell me when that log  
23 entry was made?

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25

1 JACKSON: I have to just find the thing. One other question I might,  
2 while I'm looking for this, you might go into a little bit is, do you  
3 have the capability to put makeup in from the reactor coolant bleed  
4 tanks?

5  
6 FLOYD: Yes, sir, we do. That is something less than a hundred gallons  
7 a minute, normally, and with the high pressure that was in the makeup  
8 tank prior to opening that, then in leaving it open we were unsuccessful,  
9 like moving water into the makeup tank from the reactor coolant bleed  
10 tank with the waste transfer pump. We tried that route.

11  
12 COLLINS: What position did you occupy on the date of the 30th at that  
13 point?

14  
15 FLOYD: I was in charge of operations of Unit 2.

16  
17 COLLINS: What would that, where would that be in the emergency organi-  
18 zation?

19  
20 FLOYD: Well, we had changed organization structure several times in  
21 those first 3 or 4 days. It is not crystal clear to me, or to my  
22 memory, as to what my title was during those days, on that day in  
23 particular, but at all times when I was in the control room if I had  
24 relieved Mike Ross, then I was in charge of the control room. If Mike  
25 had relieved me he was in charge of the control room. Not only the

1 control room but the unit. We had a new position which was entitled  
2 Shift Superintendent, which was occupied by a man around the clock for  
3 a day or 2 or 3 by the unit superintendents; that is Joe Logan and Jim  
4 Seelinger in Units 2 and Unit 1, respectively, and when they were in  
5 the control room they were my boss. But I think in both cases, when I  
6 worked with both men, operations was primarily in my lap when I was  
7 there and I kept them informed of what was happening. So if that  
8 position was filled that day I had an immediate boss that may or may  
9 not have been in the control room at that time. He may have been off  
10 at some office at a meeting at that particular time. But there is no  
11 doubt in my mind that I had responsibility for the control of the unit.

12  
13 COLLINS: Who was functioning as emergency director? Would it have  
14 been Mr. Logan at that point? Is that what you're saying then?

15  
16 FLOYD: If there was, if the position of the shift superintendent was  
17 filled at that time, then he would have been functioning in that capacity  
18 which sort of paralleled the emergency director's position. I guess  
19 by definition the emergency director is the senior man engaged in the  
20 activities, and that position was not one that was bandied about a lot.  
21 We had a man in charge of the ECS, the Emergency Control Station, for  
22 directing the on and offsite teams. We had myself and Mike Ross in the  
23 Unit 2 control room, and if the position of shift superintendent was  
24 filled, then I imagine he would have been the emergency director,  
25 unless the station superintendent or manager or vice president became

1 actively involved in the situation. It was sort of the senior man  
2 present was operating as the emergency director. That was delineated I  
3 think at the time, but I just cannot recall who all the players were.

4  
5 COLLINS: During this period of time, where there any releases from the  
6 waste decay tanks?

7  
8 FLOYD: Well, as I mentioned in recognizing the potential for release  
9 of radioactivity, it, there was a leak in the waste gas system somewhere  
10 between MUV 13 and the high pressure portion of the system which is the  
11 waste gas decay tanks. From the knowledge which we had available, and  
12 from which we're still accumulating, we have not yet isolated that  
13 leak. It could have been in the low pressure portion of the piping  
14 which is the discharge of MUV 13 to the suction of the compressors, it  
15 may very well be in either or both of the compressors, themselves, or  
16 it could have been in the discharge piping of the compressors, or in  
17 the waste gas decay tanks themselves. At that point in time, we did  
18 not know where in that system nor how large that leak was.

19  
20 COLLINS: When did you first become aware of the leak in the offgas, in  
21 the vent system and how?

22  
23 FLOYD: The control room log may be some assistance in jogging my  
24 memory here, but I was aware of it when I took this shift that night,  
25 when I assumed the responsibility because in the turnover not only did

1 we have permission to use MUV13 as necessary it was passed on to me  
2 that if you opened the valve and left it open the release was larger  
3 than if you just jogged the valve open for short bursts and allowed  
4 puffs of gas to traverse down the pipe to the waste gas compressors and  
5 during that morning that was the mode of operation of MUV13 was to just  
6 jog it open momentarily and jog it closed again to try to minimize the  
7 release of radioactivity.

8  
9 JACKSON: One question on this release of gas through the vent header,  
10 is it possible that the relief valve downstream of the waste gas decay  
11 tanks was lifting when you were opening the vent valve?

12  
13 FLOYD: That would be a possibility although at the time 3:00 to 7:00,  
14 3:00 to 8:00 in the morning, waste gas decay tank pressure was down in  
15 the area of 40 to 50 pounds and that relief is set somewhere around 100  
16 or 125 pounds as I recall. It would have been very unlikely that that  
17 would have been the cause, but with a malfunctioning relief valve, it  
18 was a possibility and I recognize that possibility but not as a high  
19 probable occurrence.

20  
21 JACKSON: Is there not a bypass off of the vent header itself though it  
22 keep the pressure on the compressor suction low, bypass valve that  
23 would take excess pressure on this vent header directly around to the  
24 vent, the relief valve, without going through the decay tanks themselves?  
25



1 FLOYD: Could you be a little bit more specific on the valve number. I  
2 don't have that print memorized.

3  
4 JACKSON: I don't have the valve number with me but...

5  
6 FLOYD: If you say there is such a valve I'll believe you for now. I  
7 just don't have the print memorized.

8  
9 JACKSON: Okay.

10  
11 COLLINS: Would the lifting of MUR1 appear on Alarm Printer anywhere.

12  
13 FLOYD: Not to my knowledge.

14  
15 COLLINS: You mentioned that you had several other options available to  
16 you besides opening the vent. What were those options?

17  
18 FLOYD: Stopping letdown, to stop the rate of gas buildup in the Makeup  
19 Tank would have been one.

20  
21 COLLINS: What would the consequence of that been?

22  
23 FLOYD: The gas would have continued to buildup in the Reactor Coolant  
24 System and the hydrogen bubble would have gotten larger.

1 COLLINS: What were your other options?

2  
3 FLOYD: I don't know if I am missing any in the order of severity or  
4 not but another one would have been to try to blow the system down to  
5 come on to the decay heat removal system, the low pressure injection  
6 system if you will, and use the Reactor Building sump water as a source  
7 of continued cooling of the reactor core. And there's a variant on  
8 that one which does not require depressurization but to go into what we  
9 call a piggyback mode of operation. When the reactor coolant system  
10 pressure is higher than the discharge capability of the low pressure  
11 injection pumps it is possible to bring water out of the Reactor Building  
12 sump through the low pressure injection pump and use that as a source  
13 of water to the Makeup Pump to increase its pressure and return it to  
14 the reactor coolant system. That was another possibility of using  
15 reactor building sump water as a source of long term cooling for the  
16 core.

17  
18 COLLINS: What would have been the disadvantages of that.

19  
20 FLOYD: Well there are several. I have a technical specification which  
21 requires a limited amount of leakage to be tolerated on the low pressure  
22 injection systems. These systems had met their last surveillance which  
23 was current and they showed some small leakage. The water which I  
24  
25

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1 would have been bringing through that system was very radioactive, that  
2 leakage would have escaped to the Auxiliary Building atmosphere and  
3 would have followed the same path through the ventilation ducting and  
4 the filters to the stack as the gas was following that was leaking out  
5 of the waste gas system. On the piggyback mode I would have had that  
6 same concern plus the Makeup Pump is now running with water which is  
7 not very clean. It is Reactor Building sump water, and the Makeup Pump  
8 has very tight mechanical clearances in it. I would think the proba-  
9 bility of damaging a makeup pump when running it in the piggyback mode  
10 is much larger than when running it with a clean source of water such  
11 as the BWST presented.

12  
13 COLLINS: With regard to your calling the ECS concerning releases, did  
14 you call the ECS before each time you relieved that valve or just this  
15 one particular time. That's around 7:30.

16  
17 FLOYD: I do not recall notifying him on each little jog on MUV13. Its  
18 only when I went to the full open position with the hope of keeping it  
19 in that position, that I called them.

20  
21 COLLINS: What...you did not receive any specific instructions concerning  
22 when the ECS needed to be notified of operational actions.

23  
24 FLOYD: On the morning of the 30th I don't think we had that formality.  
25

1 COLLINS: Was there any formal system of notification of anyone either  
2 the NRC or the State, I notice you immediately notified the Civil  
3 Defense. Was that part of standard operating procedures or ....

4  
5 FLOYD: I would have to say that it was and it wasn't. That's not very  
6 emotionally satisfying to you perhaps but we had declared a general  
7 emergency several days before. It was not clear to me on the morning  
8 of the 30th whether that general emergency had ever been terminated or  
9 not. Rather than assume something in the wrong direction I attempted  
10 to act in a conservative direction by renotifying them and if they were  
11 already in a general emergency with the State, Civil Defense and  
12 Bureau of Rad Health, it would only be an information call. If they  
13 were not geared up, then it was anticipated that this call would in  
14 fact bring them to an operational readiness state which I felt was  
15 required.

16  
17 SHACKLETON: Gentlemen, we will bring this interview to a temporary  
18 close where we change the cassette to the other side. The time is now  
19 9:52 a.m. EDT.

20  
21 SHACKLETON: This is a continuation of the interview of Mr. James R.  
22 Floyd. Time is now 10:01 EDT, June 2, 1979 and this interview is taking  
23 place in a trailer, #203 which is parked just south of the South Security  
24 Gate at the Three Mile Island Nuclear Power Station. Now gentlemen  
25 I'll turn the interview back over to Mr. Jackson.

1 JACKSON: Jim, I'd asked a question earlier on the waste gas system  
2 with regard to a bypass around the compressors and the tanks and I have  
3 the prints now with the valve numbers and I was referring to a possible  
4 release path through valve WDG-V171 which is a pressure control valve  
5 which is in a loop that goes around the compressors and the waste gas  
6 decay tanks. Do you think that's a possible release path and could you  
7 briefly state what the purpose of that line is.

8  
9 FLOYD: The purpose of that line to my understanding is to bring gas the  
10 other direction back into the suction of the system when there is no  
11 other source of gas into the system. However, on a malfunction of that  
12 valve it would provide a bypass discharge path and it could be suspect  
13 as a source of our leakage so in normal operation it would not be, but  
14 if the valve is malfunctioning then it could be.

15  
16 JACKSON: Okay. Let me jump around just on one question here with  
17 regard to the reactor coolant bleed tanks and the possible relief  
18 lifting on those reactor coolant bleed tanks. Do you recall the in-  
19 ventory in those tanks the 29th or 30th were they...I am talking in  
20 generalities now, not exact feet...but did you have a 100,000 gallons  
21 capacity left or 50,000 gallons?

22  
23 FLOYD: The liquid level in the three bleed tanks was such that the B  
24 and the C tank were nearly full and the A tank had a 40, 50, 60% of  
25 free volume in it, early in the shift. This is midnightish, 1:00, 2:00

1 in the morning. When we noticed the BWST level had decreased we got to  
2 that by noticing that the bleed tank levels on B & C at least had  
3 increased because they were now indicating chock-a-block full and in a  
4 matter of seconds we recognized the only large source of water that  
5 could have provided that much water that fast was the borated water  
6 storage tank and so we checked the level of BWST in the control room  
7 and it became evident to us that the water had left the BWST and gone  
8 to the reactor coolant bleed tanks so at that point in the morning, I  
9 don't know if we were at 5:30 or 7:30, somewhere in that area, we were  
10 now aware that water had left the BWST, had brought B & C reactor  
11 coolant bleed tanks to the full indication on the level meter which is  
12 100% in the tank and I don't remember how much the level in A had  
13 increased. We were much more concerned with the inventory in the BWST  
14 decreasing than the total increase in the bleed tanks. But we had lost  
15 several feet out of the BWST.

16  
17 SHACKLETON: Thank you Mr. Floyd, you have a call from Mr. Scheimann  
18 would like to have you call so we'll just stop the tape at this time.  
19 It is now 10:05 a.m. EDT. This is a continuation of the interview of  
20 Mr. James R. Floyd, time is now 10:06 a.m. EDT.

21  
22 JACKSON: Jim, the... I believe we raised the question earlier on MUV8  
23 being jumpered out and you have some information on that now. Is that  
24 correct?  
25

1 FLOYD: Yes sir. The control room operator's log shows that on 29  
2 March 1979 at 1550 there was a jumper installed on MUV8 and we have  
3 just checked with the jumper log in the control room and that was  
4 placed on to defeat the ICS feed and bleed interlock. That was the  
5 statement I just received from the control room, let me elaborate a  
6 little bit for your information on what that interlock is supposed to  
7 do for us unless you are already cognizant of it and don't need that  
8 information. Normally I can add water in batches to the makeup tank at  
9 any time. If I wish to start what is called a feed and bleed operation  
10 where I am simultaneously taking water out of the reactor coolant  
11 system to a reactor coolant system bleed tank and making up with either  
12 DI water or some concentration of boric acid in the water. Normally we  
13 would do this in order to reduce reactor coolant system boron concen-  
14 tration. Then I have an elaborate system of interlocks, and they are  
15 really reactivity control interlocks and they are based on the control  
16 rod positions to ensure that I do not deborate too far and it was that  
17 interlock that had to be defeated because the control rods were all on  
18 the bottom and normally I have to have the safety rods withdrawn in  
19 order to feed and bleed. Because I did not have a safety rod's out  
20 light this interlock jumpered so that we could do a continuous feed and  
21 bleed without the control rods being withdrawn from the core.

22  
23 JACKSON: So at this time then you're essentially letting down to the  
24 bleed tank and making up from the borated water storage tank?  
25

1 FLOYD: Well we had the capability. It would still depend on the  
2 position of MUV8, if its in the through position the water would go to  
3 the makeup tank, if it was in the bleed position the water would go  
4 from the reactor coolant system to the reactor coolant bleed tank.

5  
6 JACKSON: Okay.

7  
8 FLOYD: It merely gave us a capability, it does not say we were using  
9 that capability.

10  
11 JACKSON: Okay. I would like to go back just for minute to the question  
12 I raised before we took the short break on the bleed tanks. Do you  
13 know off hand the relief valve setting on those bleed tanks?

14  
15 FLOYD: The reliefs on those tanks are gas relief valves that is they  
16 come off the upper portion of the tank and I believe them to be in the  
17 area of 100 to 125 psi. I cannot narrow it down any closer than that  
18 without reference to the valve setpoint book.

19  
20 JACKSON: Now on the bleed tank, I believe the bleed tanks only are  
21 designed for 120 pounds pressure.

22  
23 FLOYD: Oh! Excuse me, I'm still on the wrong relief valve. Okay. If  
24 they are designed for 20 pounds the relief are set at 20 pounds.  
25



1 JACKSON: What I am looking at is a possibility of when the makeup tank  
2 relieved to these bleed tanks those relief valves lifted and those, I  
3 believe those valves go to a relief header, that goes straight to the  
4 vent stack.

5  
6 FLOYD: That's true that they do go to a relief header which bypasses  
7 much of the gas system and goes straight out the stack.

8  
9 JACKSON: Do you have any kind of pressure indication on those bleed  
10 tanks.

11  
12 FLOYD: Yes sir. It's on the control panel in the control room. They  
13 have temperature level and pressure indication on it.

14  
15 JACKSON: When you are putting water in those tanks as a matter of  
16 course during normal operation how do you control the level in there?  
17 Is that a manual... not the level...correct that, to say the pressure  
18 because if you're putting water in pressure obviously is going to  
19 increase as an automatic relief or does the operator do that manually?

20  
21 FLOYD: That's a rather interesting system in that if I'm taking the  
22 liquid from somewhere else in the liquid waste disposal system which  
23 also has that same nitrogen cover gas on it, then as I take the liquid  
24 out of one tank and displace it to another tank the gas will flow  
25 through the gas header just in the opposite direction. If I am adding

1 new inventory to the liquid waste disposal system then I must displace  
2 gas in order for that liquid to come into the system. That is when the  
3 gas compressors would pick up that additional gas, compress it into a  
4 waste gas decay tank and the pressure in the waste gas decay tank would  
5 go up. Then if I decide to take inventory out, liquid inventory out, of  
6 the liquid waste disposal system the valve you questioned me about as a  
7 possible release path before would automatically open to supply the gas  
8 into the system to allow me to remove liquid inventory. Now I have  
9 forgotten where we started this discussion. What was your question?

10  
11 JACKSON: I was really getting at the possibility of the relief, now  
12 there's...differentiate between a relief valve and a jet valve here.  
13 During an increase of inventory in this system where say its coming  
14 from the letdown you are letting down into the bleed tanks, does the  
15 operator normally operate a vent valve?

16  
17 FLOYD: No sir. It's as I described, an automatic process for him,  
18 both adding liquid inventory and removing liquid inventory from the  
19 liquid waste disposal system, and the case you proposed is where the  
20 letdown would going to a bleed tank it would be automatically compressing  
21 gas into the waste gas decay tanks and the in cases we observed it in  
22 the control room on the morning of the 28th, 29th and 30th. On the  
23 morning of the 30th where we were adding water from the BWST to a bleed  
24 tank the same phenomena should have occurred that is as the gas pressure  
25

1 built up in the reactor coolant drain tank, excuse me, reactor coolant  
2 bleed tank, then the gas compressor should have picked up that gas and  
3 put it into a waste gas decay tank.

4  
5 COLLINS: I would like to try to pin down the times of when you opened  
6 the vent valve a little better. You mentioned 7:40, the logs have an  
7 entry at 7:10 indicating starting venting MUT1. Which would be a  
8 better time? Could that have been put in after the fact?

9  
10 FLOYD: No sir, the 7:10 would be the accurate number, from the control  
11 room log.

12  
13 COLLINS: Okay. And then you directed the valve to be opened and then,  
14 let me ask, before you directed the valve to be opened, who did you  
15 contact or consult with? Did you discuss with Mr. Dubiel or his counterpart  
16 what the identifications of this might be or with the Emergency Director.

17  
18 FLOYD: Not before the fact. I had consulted with the shift supervisor,  
19 the shift foreman, the control room operators were all there and I  
20 think we all came to the same conclusion at about the same time that  
21 our troubles were coming from the pressure in the makeup tank and this  
22 7:10 entry says started venting the makeup tank. There is no further  
23 entry in the... directly after that...except at 8:00 we started adding  
24 demin water to the makeup tank and boric acid, concentrated boric acid.  
25

1 So at that point by 8:00 in the morning we felt we had the gas pressure  
2 down far enough where the relief valve would have been reseated and so  
3 I think the 7:010 entry is accurate that would be when I ordered the  
4 valve open to, for it to remain open.

5  
6 SHACKLETON: Mr Floyd so that the stenos can understand when they type  
7 the transcript, you say demin, demineralized water?

8  
9 FLOYD: Yes sir.

10  
11 SHACKLETON: And the abbreviation is demin commonly.

12  
13 FLOYD: Yes sir.

14  
15 SHACKLETON: Thank you.

16  
17 COLLINS: So promptly thereafter you would have called Civil Defense to  
18 inform them.

19  
20 FLOYD: After notifying the Emergency Director I would have called  
21 Civil Defense directly.

22  
23 COLLINS: Who was the Emergency Director at that point.  
24  
25

1 FLOYD: Well I say the Emergency Director, I mean the man who was  
2 running the ECS over in the Unit 1 Control Room. It may have been Lex  
3 Tsaggaris in the Unit 1 Control Room, it might have been Mike Benson,  
4 could have been any number of people that I dealt with on the other end  
5 of that red phone circuit.

6  
7 COLLINS: What evaluations did you do before you opened that valve.  
8 What did you expect to be released?

9  
10 FLOYD: Well I expected xenon and kryptons to be released. I was  
11 prepared to reclose the valve if the levels at the stack or offsite or  
12 even onsite became prohibitive.

13  
14 COLLINS: What did you have...any estimate of what kind of levels you  
15 expected to see.

16  
17 FLOYD: Only from the radiation monitors sitting throughout the venti-  
18 lation systems and the Auxiliary and Fuel Handling Buildings and what  
19 we had seen from previous occasions and at those times we saw we would  
20 have a decade or two of increase on this radiation monitors and it  
21 would level off and I was using that as my expectation of what to see  
22 again.

23  
24 COLLINS: What dose rates were those that you are speaking of?  
25

1 FLOYD: Unfortunately our radiation monitors do not readout in dose  
2 rate, they read out rather in counts per minute which of course is  
3 really related to disintegrations per minute and to curies. We had  
4 been seeing release rates on...several microcuries per second in the  
5 worst cases previously and so I would have expected to see similar  
6 release rates during this evolution.

7  
8 COLLINS: So you expected the same release rates for the venting, full  
9 time, venting of the tank as you had seen in previous short burst  
10 events.

11  
12 FLOYD: Well not all the previous events were short burst events. What  
13 led us to start the short burst events were some rather long term  
14 venting which had taken place earlier and in an effort to minimize the  
15 offsite dosages we had gone to the short bursts venting so I was not  
16 going into an area that was totally unfamiliar unless the concentra-  
17 tions had changed in the gas and of course those were not known with  
18 any great accuracy to me at that time and so I was probably mentally  
19 prepared for higher numbers but not orders of magnitude higher.

20  
21 COLLINS: You mentioned that you been venting for, on a long term basis  
22 previous to going to the short term venting. When did that occur.

23  
24 FLOYD: The control room operators log mentions that the makeup tank  
25 was vented at 2045 on March 29th and that was before I think I came on  
watch but that trace was logged in the control room log as being very

1 cautiously so somewhere before then that valve had to have been opened  
2 a bit less cautiously to cause them to have caution at that time. Then  
3 I would imagine that the radiation monitoring charts for that period  
4 could be surveilled and from them a reading obtained which would have  
5 been my guidance at the time I went to open the valve.

6  
7 COLLINS: Are you expected and, when you open the valve and left it  
8 open is it correct to state that, you expected an increase in offsite  
9 radiation levels of an order of magnitude.

10  
11 FLOYD: I wouldn't say offsite. My first indicators are in the plant,  
12 in the ventilation systems and we've seen what they have done and that  
13 would be fairly reproducible or even expected to be somewhat higher.  
14 Now when you come to the offsite dose then you are into an area where  
15 it is a function of meteorology, speed, direction, and range of the  
16 wind, variability of the wind, so that for instance two microcuries per  
17 second going up our stack at one time may product a dose at the exclusion  
18 radius of 2000 yards of one number but at another time those same two  
19 microcuries per second going up the stack could produce a very different  
20 dose reading out at the 2000 yard exclusion boundary. So I was...had  
21 at my fingertips numbers of what I was releasing from the stack in  
22 counts per minute which was directly relatable to previous experience  
23 and I had a helicopter hovering over the stack to tell me a dose rate  
24  
25

1 in mr per hour and I had an onsite monitoring team immediately down  
2 wind to see how the wind was dispersing this as it traversed across  
3 the site and I had offsite monitoring teams at the point of closes  
4 contact with the public.

5  
6 COLLINS: So you...so what you expected then could I rephrase it to say  
7 you expected perhaps a order of magnitude or two increase in quantity  
8 of material out.

9  
10 FLOYD: Yes sir.

11  
12 COLLINS: You mentioned that you had some ventilation system monitors.  
13 Were any of those onscale during this period of time?

14  
15 FLOYD: I believe the gas monitors were onscale. I believe the iodine  
16 monitors were probably offscale but this is a very tenuous memory that  
17 I am relating to you.

18  
19 COLLINS: What...at what point were you prepared to close the vent?  
20 What would you have used as a basis for closing the vent?

21  
22 FLOYD: Well I probably would have closed the vent if I would have seen  
23 tens of R per hour above the vent in the helicopter or if I would have  
24 seen a 100 mr per hour for instance at the site boundary or say 1 mr  
25 increase offsite, the further away of course the lower would be the



1 number that would be acceptable. I am just picking those numbers out  
2 of the air now as I would have had a little more, a little better  
3 quantitative field from watching my recorders onsite, the rate at which  
4 they were climbing would have affected the cutoff point, the actual  
5 magnitude of the climb would have affected that, it was a dynamic  
6 situation in which I would have responded, I trust in a conservative  
7 direction.

8  
9 COLLINS: You mentioned that you had not notified the rad protection  
10 group prior to the opening of the valve. At what point did you notify  
11 them directly?

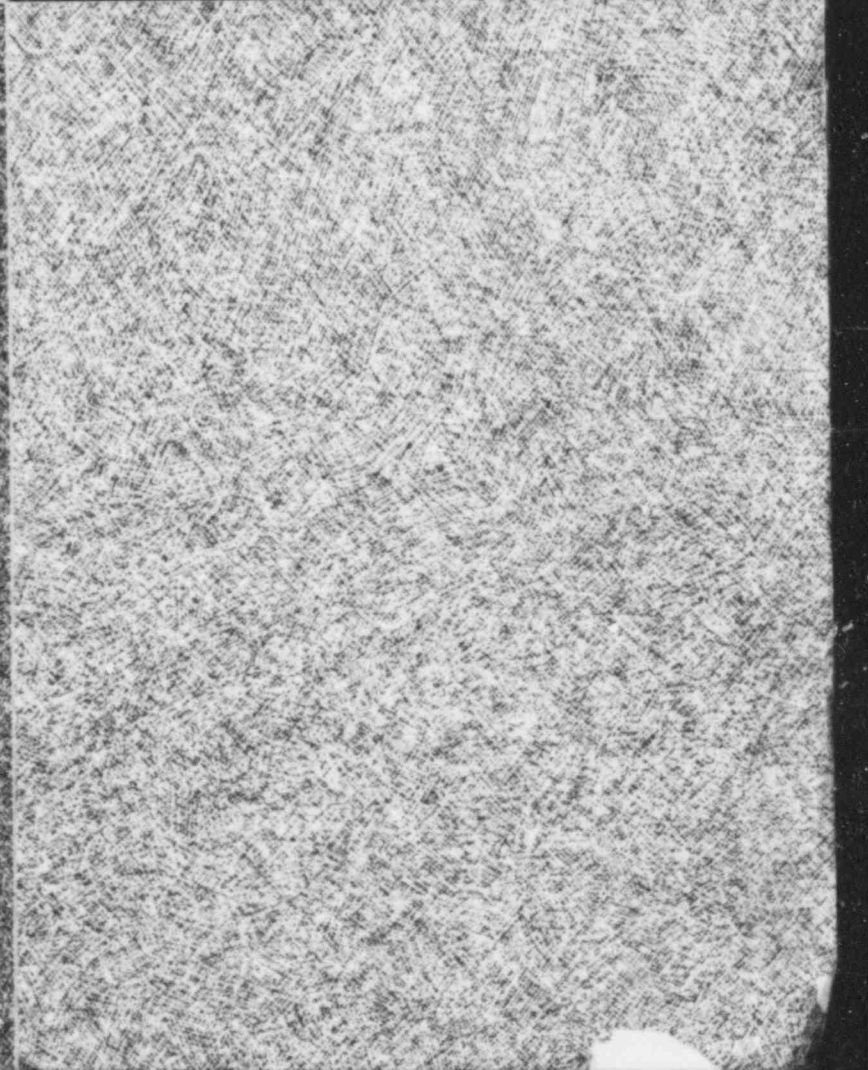
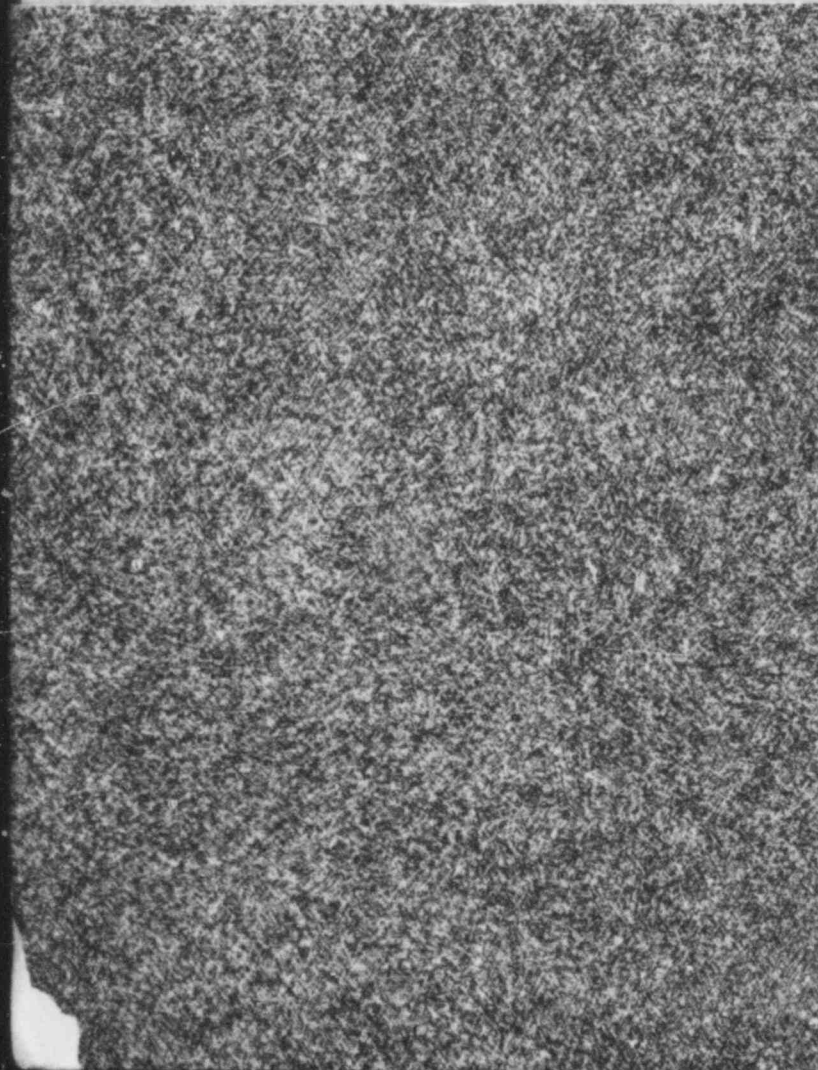
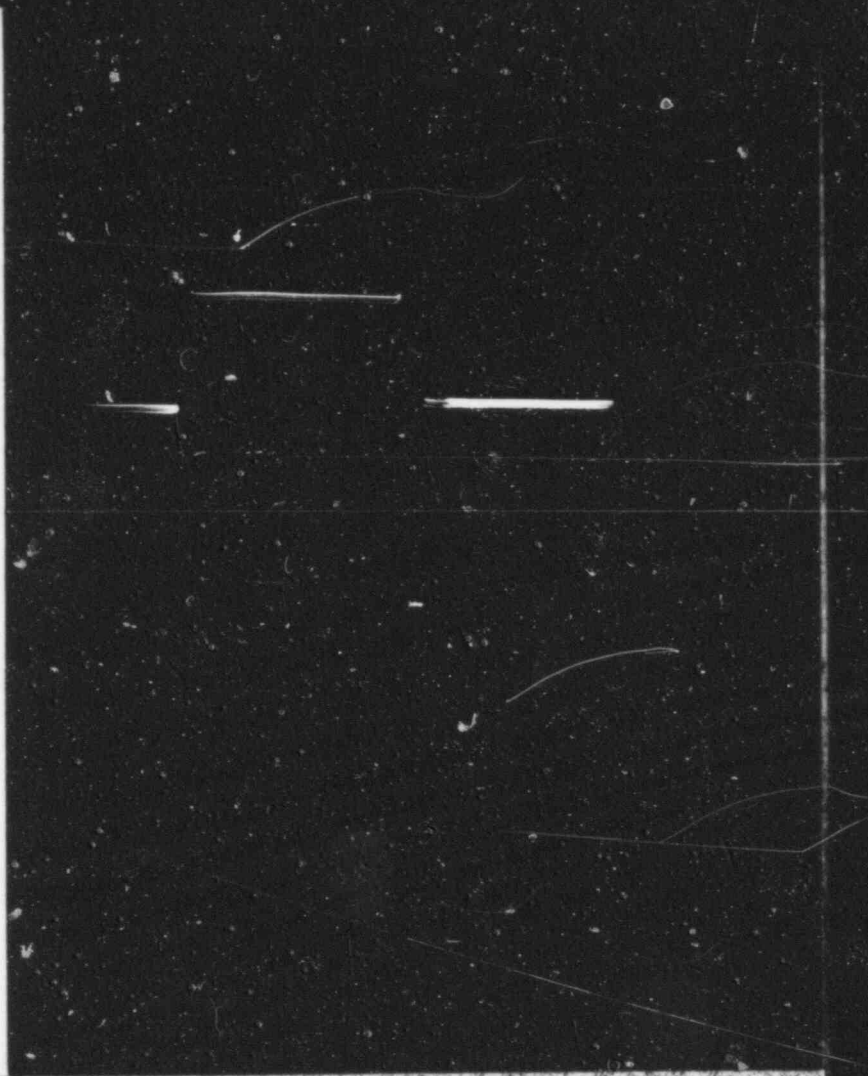
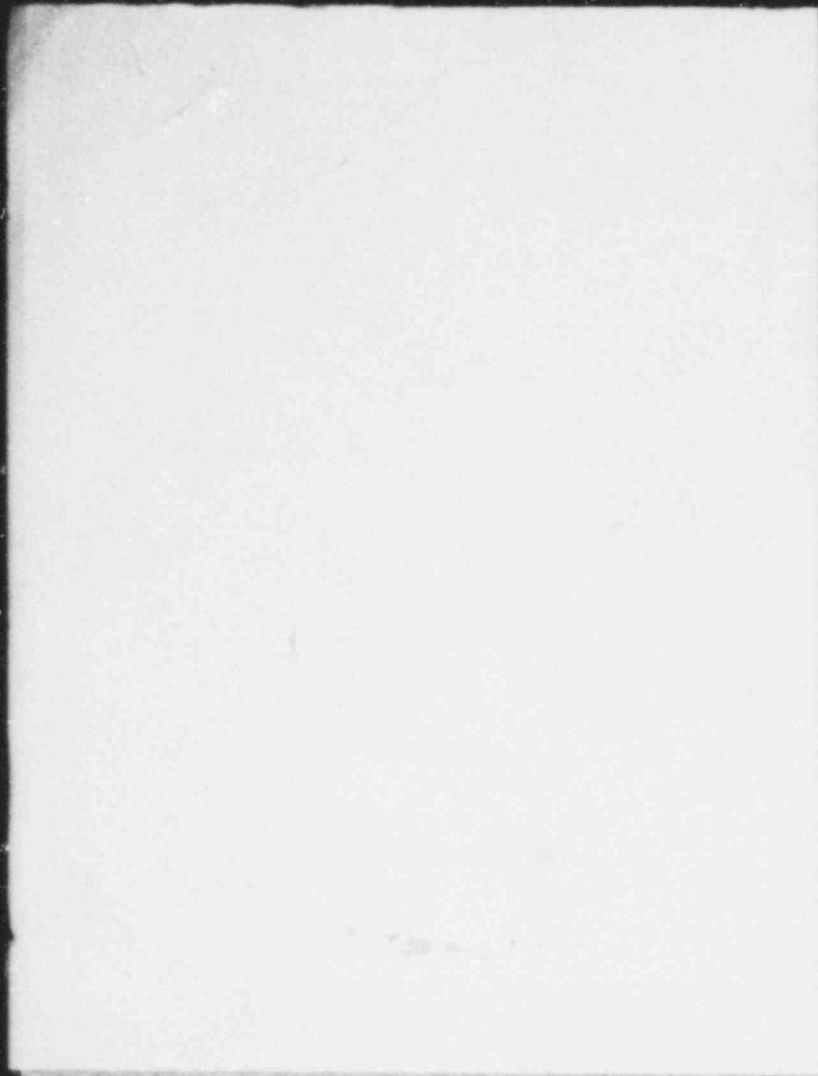
12  
13 FLOYD: Which rad protection group are you referring to?

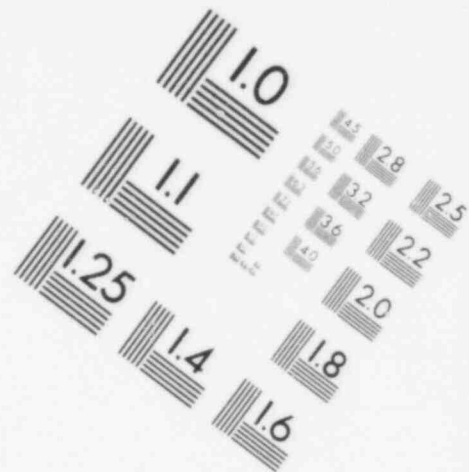
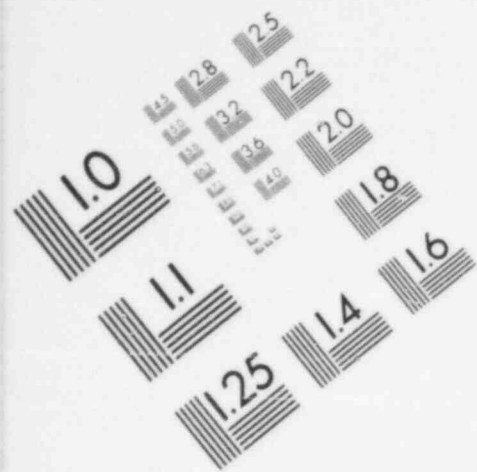
14  
15 COLLINS: I am talking about Mr. Dubiel or Mr. Mulleavy or whoever was  
16 in the control room at that time monitoring things.

17  
18 FLOYD: If he was in the control room at that time he would have heard  
19 it, my order to open MUV13. If he were not in the control room he  
20 certainly probably would have been contacted by the person who was  
21 directing the on and offsite teams in the helicopter.

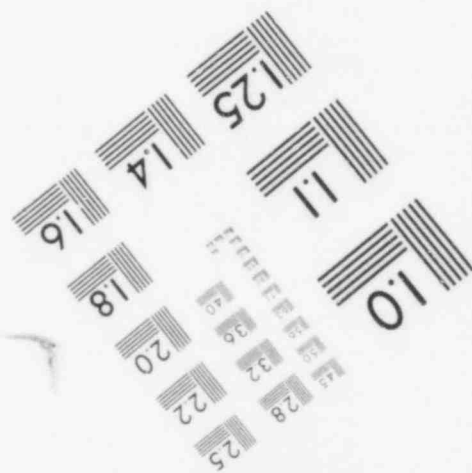
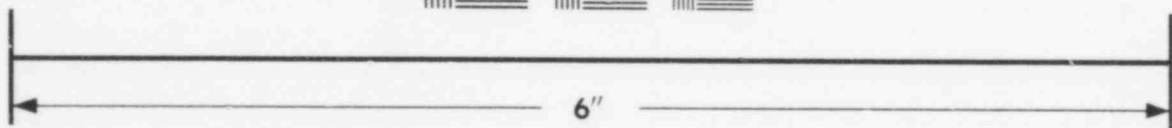
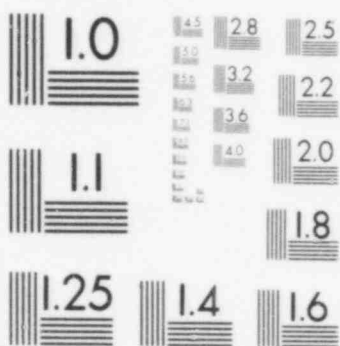
22  
23 COLLINS: So you didn't make any direct effort to notify him that this  
24 was occurring.  
25

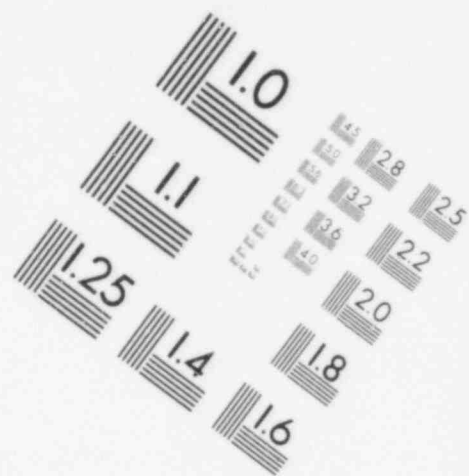
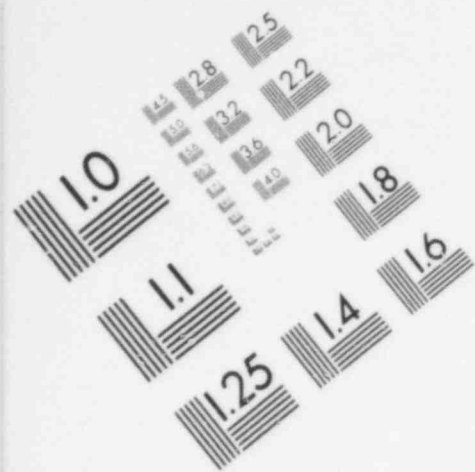
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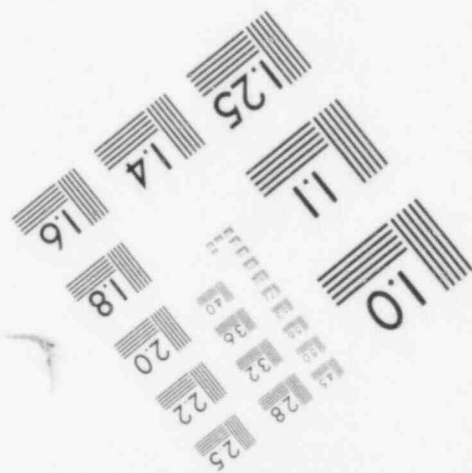
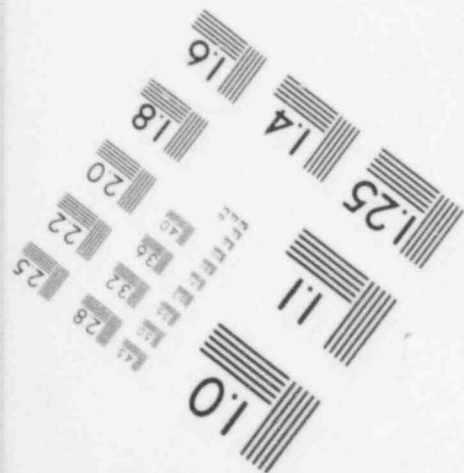
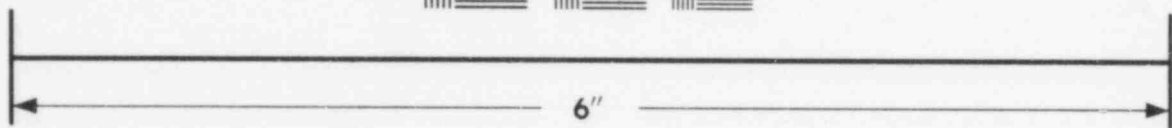
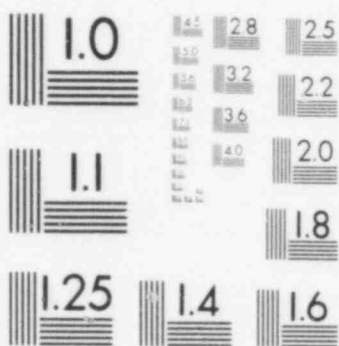


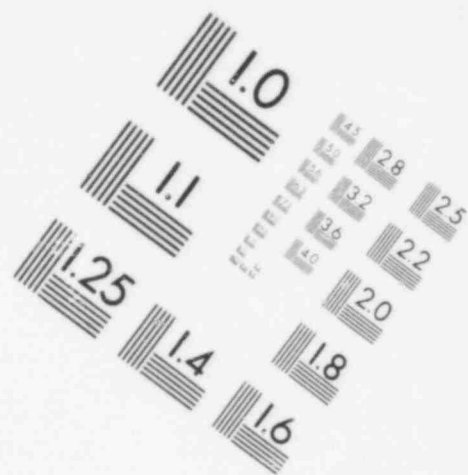
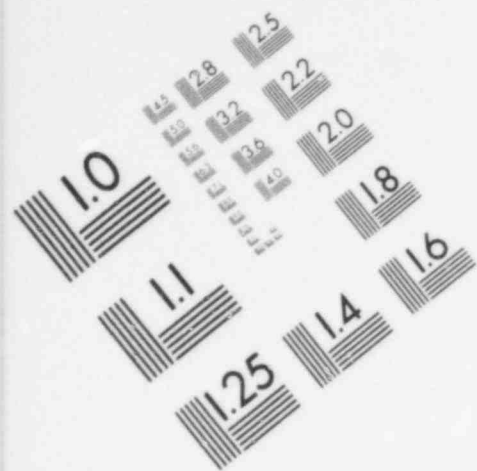
**IMAGE EVALUATION  
TEST TARGET (MT-3)**



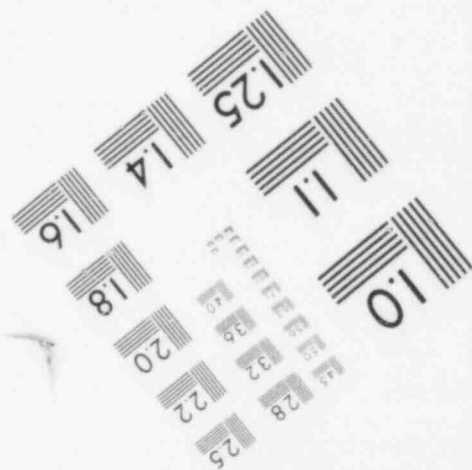
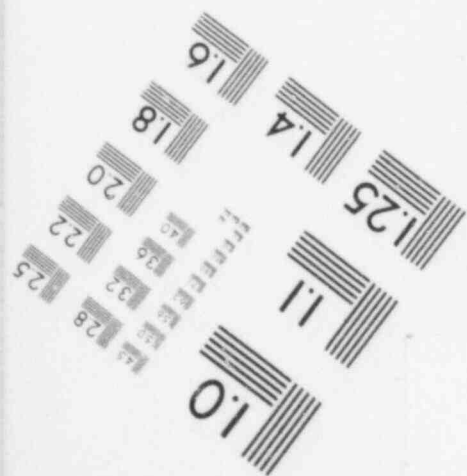
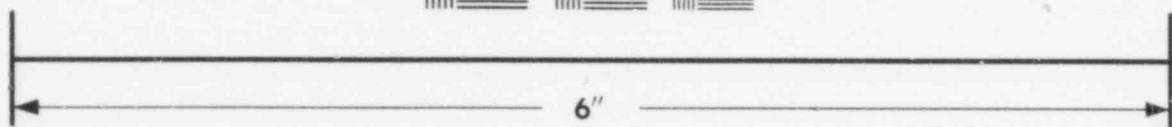
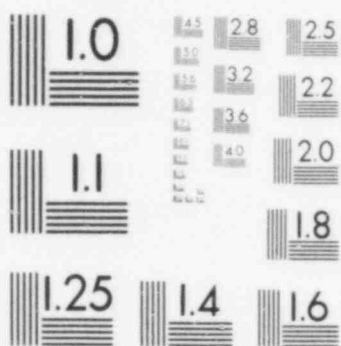


**IMAGE EVALUATION  
TEST TARGET (MT-3)**





**IMAGE EVALUATION  
TEST TARGET (MT-3)**



1 FLOYD: If he was in the control room I would have turned to him and  
2 said radiation levels are going to start up.

3  
4 COLLINS: I think in a conversation we had yesterday you mentioned that  
5 after you initially called the Civil Defense they called you back.

6  
7 FLOYD: That's true.

8  
9 COLLINS: What was the text of that second call, do you recall what  
10 that was?

11  
12 FLOYD: I interpreted it to be a confirmatory call from Civil Defense  
13 back to the site. Normally that call in a normal emergency plan after  
14 initial notification of State Civil Defense, normally the plans calls  
15 for the Bureau of Radiological Protection to contact the site to confirm  
16 the call to preclude extraneous superfluous activation of State Civil  
17 Defense by uninvolved personnel and so it caught me as slightly irregular  
18 that the call was coming back into the control room from State Civil  
19 Defense instead of the Bureau of Radiological Protection but these were  
20 trying times and I did not question the fact that it was just the  
21 confirmatory call. I do not remember the details of that call other  
22 than that I interpreted it to be the confirmatory call.

23  
24 COLLINS: The State Civil Defense shows that call to be at 8:40 rather  
25 than 7:40. Could it have been that late when you gave them the call.

1 FLOYD: I do not believe so.

2  
3 COLLINS: They indicated also that the call had informed them that you  
4 had seen 1200 mr per hour over the island and that you were prepared to  
5 evacuate the island and that you had buses and that you thought that  
6 the State ought to prepare to do the same. Do you recall that as being  
7 the context of the call?

8  
9 FLOYD: Not exactly. In fact I disagree with some of it. Let's take  
10 them one point at a time if you will please, and I will respond to  
11 each.

12  
13 COLLINS: Well they said that you already had the 1200 mr per hour, not  
14 later.

15  
16 FLOYD: That I think is a fact, I recall hearing that as I monitored  
17 the radio conversation between the helicopter and the ECS.

18  
19 COLLINS: Okay, now that was phoned in at about, called in on the radio  
20 about 8:00. So this, okay we're back to after 8:00 then. And you said  
21 that the site was prepared to evacuate?

22  
23 FLOYD: Yes sir, it is a normal state of preparedness for the people at  
24 Three Mile Island, anytime of the day or night it is just a normal  
25 state of readiness.

891 002

1 COLLINS: And that you indicated that the Civil Defense should be  
2 prepared to do the same?

3  
4 FLOYD: Yes sir, I think that is true, prepared would a very good word.  
5 The one before that about buses on the site, I disagreed with. I  
6 would...if buses came up in that conversation it came up from years of  
7 habit of participating in these emergency drills and in that I was  
8 usually the man that contacted State Civil Defense and somewhere during  
9 the course of the drill I would ask them do they have buses prepared to  
10 move people and normally in the drills the answer would come back yes I  
11 can get people moved directly and I would say how many buses do you  
12 have and the man would say maybe 54 or 72 but it was just part of my  
13 habit of checking the readiness of State Civil Defense to move people  
14 if we ever had to move people. So if the discussion of buses came up it  
15 could have been initiated by me as a matter of habit.

16  
17 COLLINS: Well it...I think my understanding of their interpretation of  
18 the call was that you had buses on site to move your people.

19  
20 FLOYD: We may or may not have had buses on site I would normally not  
21 rely on buses to evacuate the island. These were a bit unusual times  
22 and the number of people on the island was much higher than it would  
23  
24  
25

891 003



1 normally be and in fact at that point in time we may have been coming  
2 on and off the island by bus to and from work from the Visitors' Center  
3 in which case it would have been perfectly reasonable for me to expect  
4 to have buses on the island for the evacuation at that time.

5  
6 COLLINS: Did you notify the Bureau of Rad Health or any other agency.

7  
8 FLOYD: No sir.

9  
10 COLLINS: And your notification of the NRC would have consisted of  
11 whoever was in the control room.

12  
13 FLOYD: Yes sir. Control room and/or the shift supervisor's office.  
14 I'll include that as an extension of the control room.

15  
16 COLLINS: And you are not clear whether there was anybody there or can  
17 you say there was somebody there.

18  
19 FLOYD: I cannot say who if anyone from the NRC was present in the  
20 control room at that time. There may have been a dozen people from NRC  
21 in the control room at that time.

22  
23 COLLINS: Larry you had indicated you want to ask about sodium hydroxide.  
24  
25

891 004

1 JACKSON: I was trying to follow up on the problem with the boron  
2 analyses on the first morning and apparently one of the analyst, or  
3 chem techs, ran a sodium analysis as part of his normal duty perhaps  
4 earlier in the shift, but late on the morning of the 28th I believe  
5 either Harner or Reed indicated that the sodium run that morning would  
6 probably have been as the result of a request from operations people  
7 since the guy had already run a normal sodium and this raised the  
8 question of would the operations people have had reason to suspect that  
9 there was sodium hydroxide in that system as early as say 5:00 a.m. on  
10 the 28th?

11  
12 FLOYD: I was not here. I am speculating.

13  
14 JACKSON: Speculations are welcome.

15  
16 FLOYD: Yes. I think operations would have had reason to suspect  
17 sodium was in the system as early as 5:00 or 6:00 o'clock on the morning  
18 of the 28th. We have injected sodium into the plant previously. We had  
19 modified the circuitry which opens the hydroxide valves and I believe  
20 that the level in the BWST had come down far enough to automatically  
21 open those hydroxide valves at that hour of the morning on the 28th,  
22 having had experience with inadvertent sodium hydroxide injections into  
23 the reactor coolant system. The control room was probably on very firm  
24  
25

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1 ground in asking for a sodium sample to see what the concentration was  
2 in there. I would believe that they knew with assurance that they had  
3 injected sodium hydroxide as would be normal on this transient.

4  
5 JACKSON: Okay. That only gives me one problem is that the sodium  
6 analysis showed very little sodium, however, the subsequent boron  
7 analysis showed very little boron.

8  
9 FLOYD: Do we have a pH on the sample.

10  
11 JACKSON: There was not a pH taken on the sample and I have been told  
12 by the foreman that unless the technician knows that sodium hydroxide  
13 injection has been likely that they do not normally start off with just  
14 the raw pH. They throw the manitol in the solution and start titrating.  
15 So we don't have that pH data to verify whether or not that sodium  
16 number was right.

17  
18 FLOYD: Well I think I could explain to myself why the boric acid  
19 number the boron number was low, I am not sure that that same mechanistic  
20 approach would give the sodium low, but let me try a little bit for  
21 you. I don't know how you fellows are in chemistry but you don't have  
22 to be a chemical engineer. Once the voids were formed in the hot legs  
23 which was on the order of promptly after the pumps stops. About 100  
24 minutes into the transient we stopped the last two reactor coolant  
25 pumps and I don't know off the top of my head what the inventory was

1 above the core at the time, and how long it would have been until the  
2 core was uncovered, but at the time of the stopping of those pumps I  
3 believe that we drew steam bubbles in the top of both hot legs which  
4 prevented what is normally called natural circulation flow. However,  
5 there was a mechanism for heat removal at that point even so on the  
6 alpha steam generator in that we were steaming the alpha steam generator  
7 on the secondary side and that water was picking up heat from somewhere  
8 and it must have been the condensate of steam in the top of the steam  
9 generator. As that steam condensed it would be cooled and that water  
10 would circulate back to the core and keep the cold leg temperatures low  
11 as they were indicated. At the same time mass would be transported up  
12 the hot leg first as liquid and then as steam to continue to carry heat  
13 into the tubes of the steam generator. Because of the phase change in  
14 the hot leg or in the reactor vessel at a later point in time the boron  
15 solubility was probably grossly reduced and therefore you had a deconcentrating  
16 mechanism working in the steam generator so that the water that  
17 was going back to the core from the steam generator was lower in boron  
18 concentration and that is where the letdown line comes off so the water  
19 that was coming down the letdown line was reduced in boron concentration  
20 and hence the sample of the reactor coolant system which is taken off  
21 the letdown line would also be showing a reduced boron concentration.  
22 Up to there it seems fairly reasonable as a good mechanism. I think  
23 the sodium exhibits fair solubility in the steam and so I wouldn't  
24 expect that same deboring type process to be operating on the sodium  
25

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1 species. It may be operating on it to a lesser degree, however, and  
2 that could have still been the mechanistic approach to why the sodium  
3 numbers were still low. That's just a gut feel that I have not hard  
4 scientific fact.

5  
6 JACKSON: Fine. Sounds good to me.

7  
8 COLLINS: Let me try to pin down some of these times on that morning  
9 of contacts. I know we've got log entries that says at 7:10 the  
10 venting began. We have an 8:01 recorded reading from the helicopter  
11 of 1200 mr and we have a log entry in the Civil Defense stating that  
12 your call came at 8:40. Can you explain what could you have held off  
13 calling the Civil Defense or recalled them after you got the 1200 mr  
14 reading.

15  
16 FLOYD: One number I would like to know is what time did they confirm  
17 their call to me or doesn't that show in their log.

18  
19 COLLINS: I do not know. The confirmatory you are speculating that  
20 maybe the 8:40 call was the confirmatory call.

21  
22 FLOYD: I'm not really speculating anything at this point. I am just  
23 trying to sort out the facts in my own mind and I am trying to look  
24 for pieces of information which would help me do that. As I think I  
25 implied or inferred at this point in the morning things were very

1 active in the control room. We were in a very dynamic situation and  
2 I'm not sure that my recollections of time are extremely reliable.  
3 For instance if we go back to the beginning of this whole transient at  
4 4:00 in the morning on the 28th, the operator who eventually opened  
5 the EFV12 valves felt that that was like 60 seconds into the transient  
6 when he opened those valves but in fact the plant records show that it  
7 was 8 minutes. And there is a case where I guess time flies even when  
8 you're not having fun. I was in a similar situation between 7:00, and  
9 8:00, 9:00 o'clock this morning of the 30th and my recollection of  
10 time may be just as faulty as his was at the start of this transient.  
11 So I cannot put an awfully lot of faith in what I've said as what I  
12 feel are the times. This is 8 weeks after the transient and it is  
13 difficult to go back even the next day and with any consistency be  
14 accurate in times. About your only hope is to look at recorder traces  
15 and you can tie things together that way from the time scale on the  
16 recorder. You can say, well when this did this, I responded this way  
17 and then you can get an accurate time of when you did something. But  
18 you have to be able to relate it back to something that is known in  
19 time and key off of that and I don't have an awfully lot of those  
20 things available to me at this point in time.

21  
22 COLLINS: I guess one thing that I want verify is in fact that, if you  
23 can, that the 7:10 entry in the logbook would have been put in very  
24 close to the time or perhaps maybe that was a speculative time after  
25 the fact. Do you have any idea about that.

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1 FLOYD: Yes I do. At that time we had a man solely responsible for  
2 keeping a record of what was going on in the control room and all he  
3 did was stand at the console facing the operators and write on a piece  
4 of paper when they did what. So I have great faith in that 7:10  
5 number.

6  
7 COLLINS: Those numbers were ... are those manipulations that the man  
8 was writing down. Was he writing those in this log, in the CRO log or  
9 was there some other log.

10  
11 FLOYD: I think he may have kept it on a separate piece of paper and  
12 then transcribed it to the log at the end of his shift.

13  
14 COLLINS: Thank you.

15  
16 SHACKLETON: Doug, are you going to continue?

17  
18 COLLINS: No this is all.

19  
20 SHACKLETON: This will be the termination of this interview. Is there  
21 anything else Mr. Floyd you would like to say while you are back on  
22 tape.

23  
24 FLOYD: Thank you.

25  
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1 SHACKLETON: All right. We will close this interview then. The time  
2 is now 10:43 a.m. EDT, June 2, 1979.  
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