

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

1 In the Matter of:

2 IE TMI INVESTIGATION INTERVIEW

3 of

4 Ex-Control Room Operator (CCRO)

5
6
7
8 Trailer #203
9 NRC Investigation Site
10 TMI Nuclear Power Plant
11 Middletown, Pennsylvania

12 May 22, 1979
(Date of Interview)

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16 (Tape Number(s))

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20
21 NRC PERSONNEL:

22 Mr. James S. Creswell
23 Mr. Anthony N. Fasano
24 Mr. Robert Marsh
25

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889 001

1 MARSH: The date is May 22, 1979. The time is 6:49 p.m. This is Bob
2 Marsh, MARSH, and I'm an investigator with the U.S. Nuclear Regulatory
3 Commission assigned to Region III, Chicago, Illinois. This evening we
4 are located in Room 119, the Red Roof Inn, in Swatara, Pennsylvania.
5 That's SWATARA, and we are here to conduct an interview of CRO
6 , who is an ex-CRO for Met-Ed at the Three Mile Island site.

7 At this time I'd like the other individuals in the room to identify
8 themselves, to spell their last name, and to identify their position.

9
10 CRESWELL: This is James S. Creswell, CRESWELL. I'm a reactor inspector
11 located at Region III.

12
13 FASANO: I am Anthony N. Fasano, FASANO. I am an Inspection Specialist
14 out of Region I.

15
16 CRESWELL: I'd like to make a reference to CRO first name being
17 CRO.

18
19 MARSH: Thank you. CRO you indicated that you go by CO even though
20 your name is CRO right.

21 CRO: Right.

22
23
24 MARSH: CRO, before we turn the tape on we had sat here and discussed
25 this two paged memo and I just want to make a few items in there a

889 002

1 matter of the taped record. As I indicated the memo does cover the
2 purpose and scope of our investigation and goes to some degree into
3 the rights of the individual being interviewed. On the last page
4 there's several questions which I just would like to get your response
5 to on the tape and that is (1) do you understand the above which
6 addresses the two page memo?

7
8 CRO: Yes.

9
10 MARSH: The second question reads, do we have your permission to tape
11 this interview?

12
13 CRO: Yes.

14
15 MARSH: And thirdly, it says do you want a copy of the tape?

16
17 CRO: Yes.

18
19 MARSH: Fine. On the tape I will get you a copy of this tape probably
20 tomorrow and I will get a copy of the transcript when its available
21 mailed out to you so you have that also. There's a fourth question
22 covered in the body of the text that does not pertain specifically to
23 you, but it addresses the individuals rights. We can abide by it if
24 you so want, and that indicates that for the Met-Ed employees in that
25 if they so desire, they could have a union representative or a Met-Ed

1 representative present. I think you've indicated that you did not,
2 but can I get your response now?

3
4 CRO: I waive my right have any...

5
6 MARSH: Fine. Thank you. CRO, to get going with, we'd appreciate it
7 very much if you could give us some words regarding your background,
8 you association with the nuclear field, and your experiences with Met-
9 Ed. I'd also like to include the dates that you went to work for Met-
10 Ed and the date that you separated.

11
12 CRO: I started my nuclear career in the United States Navy. I
13 went to basic nuclear power school in Bainbridge, Maryland. I graduated
14 in the top quarter of my class there. I went to West Milton S3G
15 prototype in West Milton, New York. I was then transferred to the
16 Woodrow Wilson. I served aboard her 2 1/2 years. I was transferred
17 to the U.S.S. T _____ who was in overhaul in Pearl Harbor Naval Ship
18 Yard. I was separated from the navy in November '73. I started work
19 with Met-Ed, January of 1974. I believe it was the 28th. I was hired
20 there as an auxiliary operator. I went through six months of technical
21 training on the operations, systems, and technical training, some
22 reactor theory about Babcock and Wilcox reactor plants. I spent 2 1/2
23 years as an auxiliary operator and was promoted to Unit 2 control room
24 operator in September of 1976. I attended the 8 week cold licensing
25 program at Lynchburg, Virginia, the simulator training. I graduated

1 there No. 1 out of 6 and in October of 1977 I passed the requirements
2 for a Nuclear Regulatory Commission operators license. From October
3 of '77 until April 13 I served in the capacity as a licensed control
4 room operator in Unit 2 and I resigned my employment as of April 13,
5 1978, 1979. And that's about it.

6
7 CRESWELL: CRO, I wonder if you could go back to the time of March 28,
8 1979 and tell us briefly when you got on shift and what went on as you
9 got on shift.

10
11 CRO: This is gonna be amusing because I was in Lynchburg, Virginia
12 at the one week reactor operation training course down here. So I
13 was in Lynchburg on the morning of the 28th. I guess, well I woke up
14 about 7:00 that morning and my shift foreman came over and said that
15 his girl said Unit 2's down. The safety's were blowing for a couple
16 of hours. I thought that was rather odd since they should never blow
17 that long. And through the course of the day we just gathered bits
18 and pieces of information as it went by, as they became available to
19 us down there. Mostly from B&W people. In fact, we had a shift
20 supervisor, Bernie Smith, he was there with us at the time my supervisor
21 of operations in Unit 2, Jim Floyd was there, at the time and I guess
22 later in the day when they figured things weren't so hectic, they
23 called up and got a little bit more technical information as to what
24 happened. And the way I understood it at that time was that they had
25 a reactor...a loss of feedwater to both steam generators...and for

1 some reason they didn't have auxiliary feed. Now we didn't know the
2 real reason why they didn't have auxiliary feed when the pumps failed
3 to start, or we didn't really know. So the rest of the day was then
4 just spent simulating the accident, trying to see exactly what happened.
5 We had several parameters that we knew happened, the pressure excursion
6 in the primary system. They assumed that they had maybe one tube, had
7 ruptured, it separated in the tube sheet on the B steam generator,
8 because that's where the activity came from, that they knew was released
9 at that time. We just, basically then, well, Jim Floyd and Bernie
10 Smith, they left Thursday in the afternoon. They took a plane out and
11 came back to the site and they left myself and the two other operators
12 and the shift foreman down there just to continue with the training.
13 And really the only information we got back then was either from the
14 news papers, the television, or what we could get from Babcock and
15 Wilcox and they didn't want to admit too much. Especially about fuel
16 damage and any design deficiencies that may have been present or have
17 thought may have been a cause of the accident. I got back from Lynchburg
18 on Friday and I didn't really find too much out then. But I did hand
19 in my resignation that day, it was the 31st of March. Or the 30th of
20 March, excuse me, it was a Friday. And I went in to work then the
21 next Wednesday and basically the accident was over. They were still
22 in a state of general emergency according to the radiation, emergency
23 plans. And my duties there were, I was only there for three days from
24 the time the accident happened until I resigned. The three days that
25 I spent there were basically a data taker, a log keeper, and such as
that. I didn't really get into the operation of the plant.

1 CRESWELL: Okay, CRO. Who was your shift foreman that was with you up
2 there on the...

3
4 CRO: It was Dick Hoyt.

5
6 CRESWELL: Dick Hoyt?

7
8 CRO: Dick Hoyt is my shift foreman, yes.

9
10 CRESWELL: Do you recollect who the other CROs were there?

11
12 CRO: Yeah. Ray Doyer and he's a licensed CRO, and John Blessing,
13 he is a trainee.

14
15 CRESWELL: Now you, if I recollect properly, learned of the event
16 through your shift foreman...

17
18 CRO: Yes, who had learned through a phone call from his girlfriend.

19
20 CRESWELL: His girlfriend where was she located?

21
22 CRO: Well, I didn't really get that personal with Dick, but to
23 the best of my recollection he was dating a guard. It was a Gregg
24 guard. Or...

25
889 007

1 CRESWELL: Gregg's Security?

2
3 CRO: Gregg Security. And I'm not sure if she was on that evening
4 or what. Her information may have been second hand, I don't know.

5
6 MARSH: I think that was the point as to whether she just lived in the
7 area or...

8
9 CRO: Yeah. She lived in Mount Gretna. As best as I can remember
10 she lived in Mount Gretna which is a small mount community about
11 10 miles from the site, I believe.

12
13 MARSH: But also employed in and around the site, right.

14
15 CRO: Yes.

16
17 CRESWELL: Okay. Now basically at that point in time was, is it a
18 fair characterization that the information was restricted to the
19 relief, the safety relief valves blowing for a substantial period of
20 time?

21
22 CRO: Yeah. At that time when she said that the safeties had
23 blown for two hours and it raised a question in my mind that the
24 safties, they couldn't have blown for two hours unless something was
25 really wrong. The reactor would have had to stay at power in order
for those things to blow.

889 008

1 CRESWELL: Okay.

2
3 CRO: So there's no two ways about it.

4
5 CRESWELL: So you...

6
7 CRO: So I assumed that they were the atmospheric relief valves.
8 Now I, the atmospheric dump valves, yeah. I really didn't know the
9 circumstances which opened. I knew how they could open, but I really
10 didn't know the specifics on why they opened on the morning of the
11 28th.

12
13 CRESWELL: Okay. What happens after, are you at breakfast eating
14 when you found this out or...

15
16 CRO: No. We just got, we were in the motel room.

17
18 CRESWELL: Oh, you were in the motel room.

19
20 CRO: Um um.

21
22 CRESWELL: Okay. So then what do you do? You go on into work...

23
24 CRO: Yeah. We went in, we went right into the training center
25 there.

889 009

1 CRESWELL: On Old Forest Road. Does Jim Floyd try to get in touch with
2 the plant or anything at that int in time?

3 CRO I really can't remember. I know, I think he did. But the
4 information, yeah, as a matter of fact he did. He called up and he
5 got, he was really interested in finding out some of the parameters,
6 some of the things, sort of the events, the sequences of the event,
7 some of the readings that they were getting on the radiation monitors,
8 and some primary and secondary chemistry analyses so that we could
9 simulate it, so that we could see if we could simulate it, see some of
10 the transients that took place. They had said that the pressurizer
11 went solid. They said that the primary system pressure went up above
12 the safety limit. At the time we didn't know that the pressurizer
13 relief valve, electromatic, I guess it was, it was stuck. I don't
14 even know at this time, to this date. I just assume that it was the
15 electromatic relief valve. We didn't know that until I think it was
16 Thursday morning we finally simulated that the valve actually failed
17 opened.

18
19 FASANO: This is Fasano speaking. CRO you did mention that, in the
20 conversation and the information that came to you on the first day,
21 that you knew that the aux feed was not feeding. Were you told that
22 over the phone?

23 889 010
24
25

1 CRO Yeah. They had said that the auxiliary feed, they didn't
2 get it into the generators at the initial point. We didn't at that
3 time, we didn't know how the feed was stopped. We didn't know whether
4 it was a malfunction of the pumps, the piping, or valves. We really
5 know what the cause was.

6
7 FASANO: Do you know what valves they were talking about?

8
9 CRO: Absolutely. I checked those every time I come on shift.

10
11 FASANO: Why?

12
13 CRO: They're important. And I is they're always doing surveil-
14 lance. They do a monthly surveillance on each one of those three
15 pumps when we're at power. In fact, they have to do a once a month in
16 mode 4 or above and I know that those two valves had to be shut in
17 order to do the surveillance so that they didn't feed the water through
18 the air operated regulating valves into the generators.

19
20 CRESWELL: This is Jim Creswell again. Have you ever found those
21 valves closed before?

22 CRO: Yes.
23
24
25

889 011

1 CRESWELL: How many times?

2 CRO: Once, that I can remember.

3
4
5 CRESWELL: Why was it, why were they closed?

6 CRO: I can't recall why they were closed. I asked my foreman,
7 when I found them closed, I asked my foreman if this was a general
8 procedure that I follow, I asked him do you know why the ESV 12 valves
9 are shut. He said no, I don't. I said okay, Dick, I'm gonna open
10 them, and then I opened them and everything lets loose.

11
12 CRESWELL: The foreman's name is...

13
14 CRO: Dick Hoyt.

15
16 CRESWELL: Dick Hoyt. Do your recollect when this happened?

17
18 CRO: There were so many things that, there were so many things to
19 recollect, I really can't even put a time frame on it. I really don't
20 know.

21
22 CRESWELL: Would it be like weeks before the event?

23
24 889 012
25

1 CRO Yes. It would have been weeks. Maybe, perhaps months.

2
3 CRESWELL: Okay.

4
5 CRO: Several months.

6
7 CRESWELL: Okay. But as far as you know it, there's not a practice of
8 leaving those valves closed for a specific reason? You know of no
9 reason?

10 CRO: No. None whatsoever except that the surveillance procedure
11 calls for them to be shut when the actual test is being conducted.

12
13
14 CRESWELL: Do you know if that was reported to the NRC that those
15 valves were shut?

16 CRO: No, I do not.

17
18
19 CRESWELL: Do you know if the unit was operating at power when that
20 happened?

21 CRO: I can't recall that either.

22
23 CRESWELL: Okay.

889 013

1 CRO: But it doesn't make any difference, in Mode 4 they're required.

2
3 CRESWELL: Okay. Getting back to the sequence of the event, the time
4 sequence of that day, you went on into the B&W facility on Old Forest
5 Road in Lynchburg and you started simulating the event on the simulator
6 and I guess all of you were in the simulator at that...

7
8 CRO: Well, it was, they kind of pushed us aside, really. And
9 every once in a while if we get a break, we had some classroom training
10 when they were running this and the three CRO's, in fact, it was the
11 three CRO's, well myself, and two other guys, and Dick Hoyt, the
12 foreman. We spent most of the morning in class while they ran the
13 tests...

14
15 CRESWELL: When you say they...

16 CRO: Jim Floyd, Bernie Smith, there was one or two other instructors,
17 I know then later there was some of the big wheels down there from B&W
18 that were on the test site, I don't know their names. But I guess
19 they conducted tests from like 10:00 in the morning when they got the
20 information that they needed until probably 2:00 in the afternoon.

21
22 CRESWELL: Okay. What basically was the information that they were
23 using when they started at 10:00 in the morning? Did you run down
24 through it?

25 889 014

1 CRO: Loss of both feed pumps caused by low suction pressure and
2 that caused a high pressure reactor trip and they said that 8 minutes
3 later they got emergency feed. So that's when we simulated turning on
4 the emergency feed pumps. It was 8 minutes into the accident. We
5 also simulated, we also assumed, we didn't get this I don't believe we
6 got this from any information that was sent down that morning, but we
7 knew that the pressurizer was on continuous spray to equalize boron or
8 to keep boron in the pressurizer and the RCS equalized.

9
10 CRESWELL: And that was the because of the leaking valves on the pres-
11 surizer?

12 CRO: The leaking pressurizer code safeties.

13
14
15 CRESWELL: The safety valves.

16
17 MARSH: Excuse me. Have you nodded in affirmation to that statment,
18 right?

19 CRO: Yes, yes.

20
21 FASANO: CRO, you knew that the code safeties were leaking, I mean...
22

23 CRO: Absolutely. They were leaking, I know for at least 3 months
24 before the accident.
25

1 FASANO: Now, my understanding the electromotive, the electromatic,
2 was the main cause of leakage prior to the event. Now this is a
3 little different so...

4
5 MARSH: Well, this is his understanding.

6
7 FASANO: I understand...I just wondered where he gets his information.

8
9 CRO: I can look at the computer. They have an analog value of
10 the temperatures at the outlets of these valves.

11
12 FASANO: These would be the thermocouples?

13
14 CRO Right. The thermocouples downstream. The electromatic
15 relief valve was the lowest of the three and it had been for 3 months.
16 The other two would kind of weep up and down and they would sometimes
17 maybe every once in a while you'd see them above 200 degrees, but most
18 of the time they stayed between 150 and maybe 180 which before they
19 started leaking they were always down around 100, 105. I know for a
20 fact a leak rate is required every 3 days. That leak rate had to be
21 fudged every time we got, just about everytime that we got it, we had
22 to do something to make it right. We as control room operators on my
23 shift, I know, we kept asking what are you gonna do about these valves.
24 They're leaking. We can't get a leak rate out of the computer. We
25 can hardly even do a hand calculation and have it come out right. We

889 016

1 don't have to maybe go look at something. It was just a bad situation.
2 I didn't like it.

3
4 CRESWELL: Let me ask you this. Who did you inform?

5
6 CRO: This would be Dick Hoyt knew about it. I know Bernie Smith
7 knew about it, and every other shift supervisor and shift foreman and
8 control room operator that operated the plant in the previous 3 months
9 had to know about it.

10
11 CRESWELL: Now you said that you felt that the figures were inaccurate.
12 What other evidence did you have?

13
14 CRO: I mentioned that when we simulated the accident we simulated
15 it down at the simulator with the spray valve open and the pressurizer
16 heaters on. And the reason that I know that this, relief valves, were
17 leaking was the fact that if you turned the spray valve off and put
18 the spray system back in its automatic mode that you'd have a continuous
19 rod motion in which indicated that the plant was deborating. When you
20 turn the spray back on and recirculated the pressurizer, force that
21 borated water that was in there back into the primary system the rods
22 would move out.

23
24 CRESWELL: Okay,...

889 017

1 CRO: We fought that for 3 months. I hated it. Every minute of
2 it.

3
4 CRESWELL: So this was a substantial boron change that you were getting
5 in system.

6
7 CRO: Absolutely.

8
9 CRESWELL: Due to distillation in the pressurizer.

10 CRO: Right.

11
12
13 CRESWELL: Okay. So we should be able to look like at the power range
14 charts or the rod positions. Probably rod positions.

15 CRO: This was during the early days. You know there's a lot of
16 people up there, a lot of, I consider, top notch operators. But when
17 sometimes it comes down to the basics of knowing what happens, you
18 know, they really, they look for the complicated picture a lot of
19 times. They don't go back to the basics. I picked up how to operate
20 this system right off the bat. You just put it in automatic and you
21 leave it there. If something happens, ...or not in auto I mean you
22 put it into manual...and you just let it continuously recirc that way
23 you have no boron change to worry about except normal leakage, maybe
24 you have to add some demin water for fuel burnout just to bring the
25

1 rods back in a little bit for control. A lot of the operators didn't
2 understand that and they'd get themselves in trouble with all the rods
3 out at 98% power or they get them down in too far so that you get
4 close to the rod index curves and I don't know...

5
6 CRESWELL: Let me ask you this, cro. Regarding the reactor coolant
7 drain tank, the leakage from those valves could go into the reactor
8 coolant drain tank.

9
10 CRO: That's correct.

11
12 CRESWELL: Now if there was excess leakage it would require frequent
13 startup of the transfer pumps. Correct?

14
15 CRO: That's correct.

16
17 CRESWELL: Was that an operation that you customarily go through?

18
19 CRO: Since the relief valves were leaking I ca. remember, and
20 there of late we had to pump it at least 4 times a shift.

21
22 CRESWELL: Okay.

23
24 CRO: And that was, I can't even remember the number. We pump it
25 for about 5 minutes and it was probably 100 gallons per minute. So
probably a total of 500 gallons each time.

899 019

1 CRESWELL: Or 2000 gallons per 8 hour shift?

2 CRO: Right. In fact, I took a backlook at the logs from the time
3 that we started to have to add water into the makeup tank to keep RCS
4 inventory. And at one time I can remember they would pump 3000 gallons
5 of demin water a day. Now that is your information. You can get that
6 right out of the control room operators log to verify that. I even,
7 you know, they, the people that I had to report to didn't even understand
8 the seriousness and I believe that that was a serious problem.
9

10 CRESWELL: In what way?

11
12 CRO: Control wise, because everybody had a different way of con-
13 trolling. One time I would come in and the spray would be on automatic
14 building up boron in the pressurizer. Pretty soon I'd end up with my
15 rods at the index limit. Now, where's my boron in the RCS? I don't
16 know. Now, what do I have to do to get the rods out? Well, I can
17 only assume that the boron is in the pressurizer and manually spray.
18 How long it was there, the only thing I can do is go back to the log.
19 If the records were kept accurately, then I could make a pretty good
20 judge of, you know, whether my rods were gonna go out the top or
21 whether I was gonna have to add some demin water to keep them in.
22

23 CRESWELL: Well, let me ask you this, CRO. Could ask for a sample on
24 the pressurizer and ask for a sample on letdown, would that help?
25

1 CRO: Yeah. I'm not sure how often those samples were taken. I
2 know they were taken at some interval and I believe it was once a
3 week. And I can remember at one time a sample came back and it was
4 100 and, well to the best of my knowledge, it was around 120. Difference
5 between pressurizer boron...

6
7 CRESWELL: 120 ppm difference between the pressurizer and the reactor?

8 CRO: Right, between pressurizer and reactor. And if I remember
9 correctly, that was with continuous spray. After a while we had
10 gotten to the point where everybody was kind of operating the pressurizer
11 spray system in a, I don't want to say it, a coordinated fashion,
12 where everybody kind of did it the same that you could know where you
13 were at, how to operate it.
14

15
16 CRESWELL: What brought about this consistency of operation?

17 CRO: Well, I did a lot of screaming.
18

19
20 CRESWELL: Do you have any indication that management beyond operations
21 was informed or knew about this problem?

22 CRO: Oh, they had to. My supervisor, Bernie Smith, would, he
23 would make a reminder to all the operators on our shift, the operator
24 that had the panel, the console that day, hey, don't forget to spray
25

1 the pressure and don't forget to recirc the pressurizer for at least a
2 couple of hours. And one of the operators, Ray Boyer, he always just
3 liked to put it on recirc for a couple of hours and then take it off.
4 And maybe he'd do that two times a shift and everytime he did it he
5 would end up with rods out. And, you know, it wasn't really funny but
6 then again you kind of had to laugh at the guy because he was ignorant.
7 He didn't you know, I don't like to make any bones about the way a
8 fellow operates but...

9 CRESWELL: Let me ask you this. Why wouldn't management have shut
10 down and repaired those leaking valves?

11
12 CRO: My impression of Met-Ed management was number one, they put
13 the reactor into commercial operation before it was ready. It was so
14 obvious I could run down a list, and maybe I will later, I don't know.
15 I'll run down a list of problems, design deficiencies, that really
16 they should have never gone up with them. They should it even have,
17 never have, attempted to up with them.

18
19 CRESWELL: Let's go into that list, let's go down.

20
21 CRO Right now? Okay.

22
23 CRESWELL: Just take you time and we'll give you plenty of time to
24 think.

25 889 022

1 CRO: We started power operations back in, well I won't say power
2 operations, maybe we did too, back about a year, almost a year before,
3 back in March, I believe we made initial criticality. We did the low
4 power physics testing and I believe we escalated to 15 or 20% power.
5 No, I take that back. We got up to 40% when we had the safety valve
6 problems. There was one of the biggest design deficiencies that cost
7 them millions of dollars for that job. And to me it was just misdesign.

8
9 CRESWELL: That was when they replaced the Lonergan valves with the
10 Dresser...

11 CRO: Dresser...

12
13
14 CRESWELL: Dresser valves.

15 CRO: Dresser valves. The condensate polishing system. It was a
16 nightmare. They didn't have an automatic bypass. If you lost instru-
17 ment air, all 8 discharge valves from the polisher vessels would fail
18 closed. If that happens the booster pumps loses suction pressure,
19 they trip, they cause the feed pumps to lose suction pressure and they
20 trip. Seven vessels is normally all we were designed to operate with.
21 Okay, you could operate with 8 but that's bad engineering practice.
22 Seven vessels could hardly take the load at 98% power let along 100.
23 The condensate reject valve which was located between the condensate
24 booster pump suction and the polishers, if it would cycle because of a
25

1 high hotwell level, if we are...or a low hotwell level...if it would
2 cycle open because of a low hotwell level, it would starve the booster
3 pumps of water that they desperately needed to pump and a booster pump
4 would trip on low suction pressure, taking a feed pump along with it.
5 This really wasn't too evident until we got up to, to higher power
6 levels, when two feed pumps were really required to supply all of the
7 feed flow. Whenever the turbine bypass valves, I can't remember the
8 numbers...23 A & B, 24 A & B I believe they are. .whenever those
9 valves open on a transient, say we had it in a trip, and the bypass
10 valves would open...dump steam into the condenser ...hotwell level
11 indication would fail low. It would also cause the controller that
12 controls the normal and the emergency makeup valves to see a low level
13 and those valves would fail open, or they would go open thinking that
14 there was a low level. Now the operator at this time saw less than 10
15 inches in the hotwell and I don't know how many of the other operators
16 realized this, but when I see less than 10 inches in the hotwell and
17 I've got 3 pumps setting there sucking at 1,000 horsepower apiece, I
18 am very concerned about that-equipment damage. So I would watch the
19 hotwell level, it just would stay low. It was horrible. And I would
20 watch the amps on the on the pump, and watch the discharge pressure.
21 That way I could tell if the level was actually low then. That was,
22 yeah. Other than I knew the indicator said less than 10, I can only
23 believe my indication, but I also realized the necessity for condensate
24 flow during a transient like this. So I was a little hesitant to cut
25 the pumps off at that particular point.

889 024

1 CRESWELL: That was the indication you had of hotwell level was the
2 absence... that the condensate pump won't run. Turn the pump off? If
3 you lost the condensate flow, you would trip the main feed pump?

4
5 CRO: Trip the booster pumps on low suction pressure trips the
6 feed pumps.

7
8 CRESWELL: So, you got a loss of feedwater event?

9
10 CRO: Right.

11
12 FASANO: How many of these did you have?

13
14 CRO I can remember for sure 2 times. I don't know the exact
15 dates. It was during one of the many trips they had there. Well, I
16 wasn't really on them but I was a bystander. I was on dayshift. I
17 was probably on the lead shift or training shift or something when
18 they had a trip and I ran up to the panel to see what I could do.
19 Then I saw it. But then see, the next problem is with that, I mentioned
20 that the normal and emergency makeup valves saw that low level. They
21 would open and they would dump tons of water in the condensor. Now,
22 the actual level is going high. Now, if it gets too high, vacuum
23 pumps. You also use all that space that normally was vacuum, is now
24 water, and any steam that you've got coming into the thing, it covers
25 tubes, you can't condense the steam as well. So what happens? The
vacuum, pow. You lose vacuum, atmospheric dump valves open!

1 CRESWELL: What about them?

2 CRO: If you got OSTG tube leaks, you're in bad shape.

3
4
5 CRESWELL: Have they operated properly, the atmospheric dumps?

6
7 CRO: The only time I ever remember those things operating, we had
8 just gotten off shift at 3:00. At 3:30, the oncoming shift had a trip
9 and they lost, I don't know how they lost vacuum. Maybe they lost
10 circ water. I think it was one of the same type transients I just
11 described with the emergency makeup. They just lost vacuum because of
12 a high level in the hotwell and the atmospheric dump valves opened and
13 just if there was anybody down in that room, they would have been PAR
14 boiled, they totally wiped out the pressurizer heater cabinets with
15 steam. Steam was noted to have escaped through the area where they
16 are located. I guess that was called the M20 area. Through the
17 piping holes in the concrete structure down over into the control
18 building area and it went as high as the control room floor, back into
19 the instrument shop. They had steam from the bellows rupturing on the
20 discharge of that valve.

21 FASANO: Both bellows ruptured or one bellow?

22
23 CRO: One that I can recall. I know that one bellows did rupture.
24 I can't recall, I don't think the other one did, but they replaced it
25 with one of the similar design to the other one.

889 026

1 FASANO: Okay. Other equipment problems?

2 CRO: Main steam line supports. Two years ago I can remember
3 somebody coming up to me and saying I don't want to be around when
4 they trip the turbine from 100% with the restraint system that they
5 have on those pipes. You'll have steam, pipes and lagging everywhere
6 if that turbine trips. I don't really know, I know we went up, we
7 heated up so we did have saturated steam in those pipes before the
8 restraints were put in. I believe those restraints were put in during
9 the relief valve outage when we replaced all the relief valve, they
10 redesigned the pipe hangers and snubber arrangement down there on
11 those. (1) I'm not too hot on Burns and Rowe because they never
12 designed a pressurized water reactor plant, they only ever designed
13 boiling water reactors which is obvious because of the 5 foot concrete
14 wall between the turbine building and the control room. I don't know.
15 Did you ever notice that?

16
17 FASANO: There is a, okay, you're talking about where the fire door is
18 between the turbine building and the...

19
20 CRO And the control building, yeah, where they are.

21
22 CRESWELL: I've often wondered about that wall that's, not the wall
23 between those two buildings but if you'll notice there's a wall that
24 comes down in that hallway where that door opens up and its separated
25 from the floor by an inch to 2 inches.

889 027

CRO

1 Yeah, I've seen that. I never really wondered why that was
2 there but I just kind of chalked it up to the rest of the crazy things
3 I saw.

4 CRESWELL: Okay. What about the engineered safety features equipment
5 itself? The high pressure injection pumps, where there ever any problems
6 with them?

7
8 CRO

9 No. I can't really recall any problems with those. Unit
10 2's kind of lucked out. We hadn't burned any up. Unit 1 went through
11 4 of them, I guess, before they learned their lesson.

12 CRESWELL: I understand the suction switches, low suction switches
13 have been taken off those pumps.

14
15 CRO

16 That's correct. They used to have a 3 pound low suction
17 pressure trip on them, I believe. I don't really remember too much
18 that far back, but I knew that I didn't like that particular thing
19 because a lot of times you would start the pump up and it would trip
20 right away because of the low suction pressure. It also had a low
21 discharge pressure. No, no it didn't. It just had a low discharge
22 pressure alarm that I can remember. No, those pumps, everytime I've
23 operated them I never really had any problems with them.

24 899 028
25

1 FASANO: Sounds like most of your design deficiencies are concentrated
2 on the balance of plant on the secondary side at least, were there any
3 on the, I mean about, are there any more you that you have in mind?
4 Can you continue on you list? And if indeed on the NSS side?

5
6 CRO Well, the whole nuclear steam supply system, in fact the
7 whole plant was designed for a place down in New Jersey. So in order
8 to accomodate fuel handling buildings they had to take and rotate the
9 reactor building, the guts of the reactor building, the inside part,
10 90 degrees. So that you could go into the reactor building and look
11 at the wall and you'd have another 150 foot of pipe running around the
12 outer edge of the walls that should have never been there. It should
13 have gone straight out but I can't help but think that because of
14 trying to, having a plant on the drawing board 15 years ago for Forked
15 River, New Jersey, and then just take and modifying those plans, bringing
16 them to Three Mile Island and constructing a power plant of that
17 complexity that things aren't going to be wrong. You know, there are
18 definitely going to be design deficiencies. Somebody that designed
19 the system, somebody else is gonna come along and change it to fit
20 TMI. One thing that I have...that I never really had close contact
21 with, I know that the auxiliary operators, just because they were out
22 in the plant, they had a close contact with it, was the fact that they
23 had extension controls that went through the wall and they had clutches
24 that operated the valve behind a concrete wall for radiation. Those
25 each limit, limiting type thing. And most of the time the valves

1 would never operate, so you'd have to go through these, back into the
2 valve alley to operate the valve anyway and you had to spend anywhere
3 from 2 to 3 times as much time in the valve alley, crawling over all
4 these extension controls that were in your way that, you know, the
5 poor guy would end up getting three times as much radiation than he
6 should have.

7
8 CRESWELL: Is this a wide spread problem or an isolated problem?

9
10 CRO This is wide spread. Especially in filter rooms, the makeup
11 valve suction alley, the discharge alley and the 305 valve alley.

12
13 CRESWELL: Those are only high radiation areas during operation?

14
15 CRO Yes. Now I'm not sure, I know the levels were creeping up
16 there in the later days of power operation. I know they were climbing
17 up there and there were still valves in there that had to be operated
18 for surveillance procedures, valve lineups and the like. Filter rooms
19 is the same way only the filter rooms, you can't get into them.

20
21 CRESWELL: Do you recollect a trip that occurred back in around November
22 3rd, November 4th of 1978, a loss of feedwater type of trip? This is
23 where an instrument technician threw the wrong switch and in condensate
24 polishing system, all feedwater was lost. Do you remember any of the
25 details of that event?

889 030

1 MARSH: You were nodding in affirmation, were you not?

2
3 CRO: Yes, I was. I remembered. I'm trying to think. I have to
4 reprogram myself, here. I have got to get back into that. I've been
5 through two total loss of feedwaters.

6
7 CRESWELL: Here?

8
9 CRO: Yes. One was at zero power or very low power and the other
10 one was at 20% power. And I really don't remember too many of the
11 details. I do know that the switch that the guy threw was control
12 power for all of the valves in the condensate polishing system that
13 made them shut cutting off all condensate flow path.

14
15 CRESWELL: Do you remember any operators on shift discussing that with
16 you, hearing anything about it?

17
18 CRO: Well, I remember, they had the LER that was circulating and
19 they had a synopsis of the event that we read in. We had to sign and
20 initial.

21
22 CRESWELL: Well, this particular event that I'm speaking of, I don't
23 believe there was an LER generated.

24 889 031
25

1 CRO: I see.

2
3 CRESWELL: There was one November 7th that was a loss of one feed
4 pump, but that was with the run back. Okay. At this point in time
5 we're getting very close to the end of the tape, so we'll break right
6 here and continue with a new tape.

7
8 MARSH: Time is 7:32. I'm gonna break at this point and turn the tape
9 over.

10
11 MARSH: Resuming at this time, the time is 7:33.

12
13 CRESWELL: Okay. What about you training at Three Mile Island Unit 2,
14 how's that been?

15 CRO: I hate to say this but I'm gonna have to. They train, my
16 training I thought was very well done. They put us through a pretty
17 comprehensive program, the 8 weeks at Lynchburg, plus we had lots of
18 time to ourselves just constructing the plant when things weren't very
19 busy. We could get out into the plant trace systems and alike. We
20 went through a mock NRC test that was given by a General Physics, the
21 walk around and the test and then we had the actual test. We had a
22 lot of prelicensing training that I thought was a big help. Onshift
23 we had several lectures. They weren't always done as planned but we
24 did get in some training onshift. The guy would take a system and
25

1 give everybody on the shift a lecture about it. But the licensed
2 operators that have come on since the cold licensing groups, since the
3 initial group of operators that went up, those operators are trained
4 to take an NRC examination. They are not trained to operate the
5 plant. They have copies of NRC tests, the questions, you know.
6 They're...

7
8 CRESWELL: CRO, let me ask you this. You stated that general physics
9 conducted a dry run of the licensees. Do you find that the NRC exams
10 are predictable, the way the test will be conducted?

11 CRO: Yeah. I think they are fairly well predictable. TMI has
12 got an excellent record. I don't know the records of any of the other
13 operating plants. But I do know that TMI's record is good. I don't
14 think we've had but one failure and that was in Unit 1. We've had
15 several senior operators that went for a senior's license but did
16 fail the senior part but got a reactor operators license. And, you
17 know, I can just say that I feel that this operating record is indi-
18 cative of knowing what to expect. They can build up on it. If they
19 know that a certain examiner is going to come, they can dig out all
20 his old tests, they can, we have old interviews that somebody might
21 have snuck a little tape recorder in their pocket and taped the entire
22 walk around and you can get the tape conversations of those. I've
23 seen those flying around.
24
25

899 033

1 MARSH: Have you actually seen a tape or heard a tape before this was
2 done, or just transcripts thereof?

3
4 CRO: I've just seen transcripts, no tapes. In fact, I don't even
5 know of anybody at Three Mile Island making a tape.

6
7 CRESWELL: Do you know what the source of the tape was?

8
9 CRO: I do know this, I know that it was a Babcock and Wilcox
10 reactor.

11
12 CRESWELL: Okay.

13
14 CRO: And it was a specific examiner. I can't even remember his
15 name. No, I wouldn't even begin to attempt to remember his name. I
16 don't remember.

17
18 CRESWELL: One interview, it was one interview that you had heard of?

19
20 CRO: I think there was one, one for sure, maybe two.

21
22 CRESWELL: Okay.

23
24 MARSH: Where would I look if I wanted to find a set of those? Who
25 would be my best shot that I could talk to?

1 CRO: I threw all my old stuff away.

2
3 MARSH: You had had a set of them?

4 CRO: I had a set at one time.

5
6
7 CRESWELL: Did you receive those through your employment at Three Mile
8 Island?

9 CRO: Yeah. I can't recall who I got them from. I can't remember
10 if it was the training department, which I don't think it was. I
11 think it was one of the other operators and he might have gotten it
12 from training.

13
14 MARSH: Okay. If you have any additional recollections on those, I'd
15 appreciate you get in touch with me. I'll give you a card and a phone
16 number and all that where you can reach me.

17
18 CRO: Yes.

19
20 CRESWELL: You mentioned before you'd come on shift and found those
21 twelve valves shut before. What about, have you done your lineup on
22 your panel before and found other valve mislineups?

23
24
25 889 035

1 CRO: I came in one day, this is just an example of some of the
2 things that I've had to come into. Met-Ed was always famous for per-
3 forming an evolution 20 minutes before shift relief. Turning the
4 plant over in total chaos. I hated to turn the plant over that way
5 myself and I more than hated receiving a plant like that. I came in
6 one day to relieve the shift that had had a trip and I can't recall
7 the exact, what happened, but I know that there was an operator was
8 trying to control pressurizer level with MUV 16B. Now that's a high
9 pressure injection valve on the A loop. He was throttling this valve,
10 pressurizer level would go up, he would close it, it would come back
11 down again, and he would just keep doing this. And I asked him, "what
12 are you doing?" He said, "I'm maintaining pressurizer level." I
13 said, "what happened to the normal?" "I don't know, it just doesn't
14 work." And he went over to the pneumatic controller for MUV 17 and he
15 showed me, nothing happened. I said "did you check MUV 18?" That's
16 the manual isolation to 17.

17
18 CRESWELL: You're indicating something there...

19 CRO: I'm indicating that I pointed to MUV 18 and that valve was
20 in fact shut. And he says, "Ah," and other explicitives. And you
21 know, I says you gotta wake up. I said you can't operate a plant this
22 way. I came in another time. Now, I wasn't really taking over the
23 shift but we were walking out the passage way coming in from Unit 1
24 which is normally the way we came in and every once in a while we'd
25

889 036

1 hear a safety go. And it would go for maybe 30 seconds then it would
2 reset. We'd walk a little further and it, pow, went again. What are
3 they doing up there? I was with another CRO, we were just about ready
4 to take the shift. I don't know. They're not testing them. I thought
5 we were at power. You know, what would they be testing them now for?
6 We got up there and what had happened was they lost feedwater, pressure
7 in the steam generators went down to the point where they actuated in
8 the feedwater latching system which cuts off all feed to the generators
9 from the normal feedwater pumps, and it also shuts MSV 4A, B, 7A, and
10 B, which are the main steam isolation valves. The sensing point for
11 turbine header pressure which controls the turbine bypass valves is
12 downstream of the MSV 4's and 7's. They restored normal feed, but
13 they forgot to open the MSV 4's and 7's. So that the turbine bypass
14 valves were seeing 750 pounds pressure and the turbine, the relief
15 valves in the steam generators were seeing 1050, 1060. So everytime
16 they tried to control pressure with the bypass valves, they had those
17 in manual, they would close them down because they'd see pressure was
18 starting to decrease, in closing down the pressure would come back up
19 again and poof. It wasn't two minutes into the shift and Ray Boyer,
20 the guy that was taking the panel said, "what are you trying to do?"
21 He said, "you're blowing safties out there." "But we can't control
22 pressure enough. And look at header pressure. It's down low." Right
23 next to it is OTSG pressure. It was 1050. He says, "Man, what's the
24 difference here." And he looked up and the MSV 4's and 7's were shut.
25 He says, "crack those valves." They cracked the valves, they closed

1 the turbine bypass valves, put them in automatic and the thing came
2 right on up. Now these are trained operators. I don't like
3 to say that my shift was the best but, you know, I think we were.

5 CRESWELL: Let me ask you this. What are the difficulties that you
6 encounter in operating a plant of this design?

7
8 CRO: Feedwater is very sensitive. It, I don't know. I don't
9 want to say that feedwater is sensitive. When you move 11 million
10 pounds of water an hour, that, needless to say, is going to be touchy,
11 you know, whatever it's just that a slight change in flow is gonna
12 cause a big change in the steam generator, but not only that the
13 primary system is very sensitive. The pressurizer was totally too
14 small. Any decrease in primary system temperature, which would result
15 from an increase in feedflow, would cause the pressurizer level to go
16 down and the pressurizer pressure to go down. It was really very hard
17 to control in this respect. You know, I, in fact, when we, when I
18 control the feedwater, the amount of feedwater to know how much to put
19 into the steam generators to keep the reactor basically as stable, as
20 stable as I can keep it in a transient situation. I look at reactor
21 pressure. If pressure goes up I feed a little more. When I start to
22 see it come down again, I back it off a little bit. And that's how I
23 know where to keep feedwater flow.

24 899 038
25

1 CRESWELL: How do you, after a reactor trip, what are the immediate
2 actions that you take? Could you walk us through what actually goes
3 on?

4 CRO: Well, the first thing that you do is you insure that, you
5 mainly trip the reactor. Okay, that just insures that, well, I don't
6 know why it would, but the second thing says that you look up on the
7 PI panel and verify that all the rod in-limit lights are on. You
8 check to make sure that the turbine is tripped. That it's auxiliary
9 oil pumps are operating. Make sure that the turbine bypass system is
10 controlling steam header pressure at 1010. You close MUV 376, which
11 is a letdown isolation valve. If pressurizer level gets down below
12 100 inches, you're supposed to start a second makeup pump and just
13 keep it ready to go if you need it. If pressurizer level gets down
14 below, I think its 20 inches, then you're supposed to open MUV 16B to
15 admit more water. If the makeup tank is low and the pressurizer level
16 is low, then you shut, or you open the DHV 580, which is allows the
17 BWST to come down to the suction of the makeup pumps and then you shut
18 MUV 12.

19
20 CRESWELL: Is that a valve you have to go out and manipulate manually
21 or do you...?

22
23 CRO: Its one you have walk around 20 feet of panel and back 20
24 feet to open.

1 CRESWELL: What about the feedwater control...?

2
3 CRO: Well, if you have any feedwater stations in hand, you should
4 verify it, you should run those back consistent to the parameter that
5 they should be, in other words just take it and take it all the way
6 down.

7
8 CRESWELL: What if they're in auto?

9
10 CRO: Well, if they're in auto you just verify that feedwater flow
11 is coming back at a rate consistent with the header pressure.

12
13 CRESWELL: Now, they're set, the feedwater is set for 30 inches,
14 right?

15
16 CRO: On the low level limits, right, yeah.

17
18 CRESWELL: Has that always been the case? It's always been set at 30
19 inches?

20
21 CRO: Well, 30 inches is the nominal, is a nominal number. It
22 could be plus or minus. What they do is they set the levels in the
23 steam generators at 532 degrees so that they could get 532 degrees 885
24 psig. If they need a little bit more heat transfer to get that 885,
25 then they would raise the level slightly, you know, varied maybe plus

1 or minus 3 inches from 30 on either generator. I knew one that was
2 about 32 and the other's 28.

3
4 CRESWELL: I guess you've had a chance to talk to the operators since
5 the event. Have they noted anything to you that was peculiar about
6 the event? Where they had to take special actions and...?

7
8 CRO: I really didn't get that specific with them. The only time
9 I ever talked was in a bar room. And I, you know, I don't like to
10 repeat what I hear in bar rooms.

11
12 FASANO: You mentioned that you at one time found MUV 18 shut. What
13 reason would anyone have to have that valve in a closed position?

14
15 CRO: To the best of my knowledge that particular event came when
16 somebody tried to change a light bulb in the ICV 5 valve controller.
17 They removed the lens covers and everything. They pulled the old
18 light bulb out and they went to stick the new one in and, you know,
19 these were those PSB 120's that they're telephone lights. They're
20 about that long and they have a contact making surface on either side
21 of them about maybe a half inch. And as they slid this thing into the
22 socket, it made contact with the hot side and the grounder it blew the
23 fuse for that indicating circuit. It also took away the indication
24 for all the other valves and happened to fail when MUV 18 shut, when
25 they re-energized that.

1 CRESWELL: Was it, did maintenance repair it promptly?

2
3 CRO: I really don't know the time frame. What I saw, I understand
4 it, how it happened. I can't remember when the trip happened. I knew
5 they had a trip on that particular instance. I can't remember what
6 the time frame was between the time that the fuse actually blew and
7 the time they got it fixed. I wasn't on shift at that time. Then I
8 do recall a sign back on that particular operating panel that said
9 operators are not to change light bulbs in this panel, call the elec-
10 tricians. So we have to call the electricians and have a light bulb
11 changed. Another one of Burns and Roe's designs.

12
13 CRESWELL: Okay. One thing we haven't talked to you about is why you
14 quit.

15
16 CRO: Why I quit? About a year ago, well, it was even, no, it
17 wasn't a year ago. It was a year ago. Back in June I had wanted to
18 leave this racket for a while. I think it can be a good career. In
19 fact I enjoyed my work up there. What I did, or what I had to go
20 through to do what I did, it was hectic. When I left Met-Ed my blood
21 pressure was 180 over 110, which for a man of 30 years old is outrageous.
22 My blood pressure had been high for over a year. In fact, I had gone
23 job hunting back about this time last year and I had gotten a job but
24 it was a little less money than I really wanted to take and it was in
25 St. Louis, and I didn't want to move. So it wasn't really a spur of

1 the moment type decision, which a lot of people thought it was because
2 of the accident. I did know that once the accident happened, when I
3 realized the severity of the accident, I knew that it was gonna be a
4 long time. I had just gone through 2 1/2 grueling years of bullshit,
5 which is what it was, with GPU startup, UE&C startup, and then Met-Ed.
6 And I didn't like being hassled by 3 or 4 different foremen and 2 or 3
7 different supervisors plus 3 or 4 shift test engineerings and various
8 other mechanical and electrical engineers, you know, it was just too
9 much. I couldn't take it anymore. I thought I was a good... There
10 was shift supervisors that would actually stand over your shoulder and
11 tell you exactly what to do. Raise steam water, you gotta get feedwater
12 up, now check this and check that. It was, you know, ridiculous. I
13 knew how to operate the plant. He should have been back there taking
14 care of his paper work, but instead, he was right up there in the
15 front lines, and trying to keep myself oriented in my own head I
16 always had to listen to this guy. And if I wouldn't do something he
17 told to do, well, he was right on me. He says why didn't you do that,
18 why didn't do that. Well I didn't see any importance to do that right
19 at that particular time. And most times I was right.

20 CRESWELL: Well, did they know what they were doing? The shift super-
21 visors?

22
23 CRO: Yeah, for the most part, but they worried about the wrong
24 things. You know, they put their priorities a little different than I
25 did.

1 CRESWELL: What should they've been worrying about?

2
3 CRO: The overall picture. They should have been back staying
4 taking a big, a big look at everything that was going on around them
5 and not getting themselves involved in what the control room operator
6 or the shift foreman is doing. The shift foreman could direct. Its a
7 team effort and I tried to promote that my 2 1/2 years that I spent on
8 that shift, I tried to promote team work. And it just didn't work.
9 There were personnality conflicts, conflicts of interest, period, you
10 know, the guy just doesn't do it the way I tell him, or the way I ask
11 him or the way I show him that maybe that's the best way of doing...
12 He wouldn't do it just plum because I told him, and he would do it
13 just to defy me. Now, this, you can't have team work that way.

14
15 CRESWELL: Let me ask you this. When the supervisor was standing over
16 you shoulder, was this during a trip condition or during normal operation?

17
18 CRO: No, this was during, in fact, I remember this startup really
19 well. My problem has been diagnosed as labile hypertension which
20 means it goes up and then I'm gradual to bring it back down. I don't
21 have a constant high blood pressure problem. I keep things bottled up
22 inside of me. This particular night I came in, I had the panel, we
23 were scheduled to do a startup from 1% shutdown to 15% power. With
24 all the paper work and everything that's involved in mode to mode
25 checklists and the surveillance tests that had to be done prior to

1 going critical, getting the operators stationed where they needed,
2 just getting the plant in a general stable condition to perform this
3 thing, it takes a lot of concentration. It takes a lot of effort on
4 the part of the control room operator to do that. At that particular
5 time there was, in our alarm system is totally ridiculous, there were
6 too many of them and the system that they have is it fails all the
7 time. An alarm card could go bad and it would just send an alarm. It
8 would just keep flashing in and out. You would silence it and it
9 would just keep coming in. And that God-awful horn, it would just,
10 you know, you're trying to concentrate on doing a startup and you got
11 this buzzer going off and I'm particularly conscious of alarms because
12 if you just ignore this stupid thing, what if you get one that's
13 important. If you get one that's important and it goes unrecognized
14 because you're ignoring this one over here you might as well not be in
15 the control room. My job is to keep the plant safe. If I, you know,
16 if I can't see what's going on around me then I felt apprehensive
17 about the whole thing. I didn't feel like I can keep as close a
18 surveillance on the whole thing as I really wanted to. I asked this
19 supervisor, I'll even mention his name, Brian Mehler. I asked, I
20 said, "Brian, could you have an instrument tech take a look at that
21 alarm?" I said, "its driving me nuts." I said, "am I gonna have to
22 listen to that all night through this startup?" "Well, I guess you're
23 gonna have to." Those were his words pretty close. And with that I
24 told him, I said, "I won't do the startup under those conditions." I
25 said, "either get that thing fixed or find me a relief." And he said,

1 "you know if you become, if you are relieved you might as well get
2 your lunchbox and take off." Well, at that particular point I wasn't
3 ready to leave my employment there. Maybe it was a prayer, I don't
4 know what it was. The alarm settled down and I didn't have to listen
5 to it at that point. It did come back later but not until after the
6 whole thing was done. They had an ECP there ready for me. I looked
7 it over and I can generally tell whether the thing is gonna be close
8 by just looking at the numbers. I've done enough of them, you know.
9 And by just looking at the numbers I can tell whether they're gonna
10 be...

11
12 FASANO: ECP end concentrator pointer...

13
14 CRESWELL: No, estimated critical position.

15 CRO: Estimated critical position, yeah. And this one looked
16 good. It was, I think, somewhere around 60% on groups 6 and 7. It
17 was where they wanted it no, no, I'm sorry. It was about 68%, its the
18 closest I can remember, on group 5. No wait, no wait, I'm getting
19 screwed up here. I've been away for a month and a half and it's a
20 little...

21
22
23 CRESWELL: Well, I don't think that this is critical information.

24 809 046
25

1 CRO: Anyway. Well, just the way they operate. Its, the estimated
2 critical position was something. We have a guideline if you go critical
3 before half a percent less than when you're anticipated to go, you
4 should shut back down. You should put all the rods in until you get
5 the safeties in and then investigate why. So, I wasn't even, I was
6 just getting to the minus .5% position and all of a sudden I looked up
7 and I had an alarm, it was the startup rate rod withdrawal inhibit
8 circuit. The only thing that throws that into count is 3 dpm in the
9 source range. And I locked down and I did have 3 dpm in the source
10 range. It stopped the rod motion. I put the rod stick in and he
11 says, "no, no, no. Just take it down one." I said, "what do you
12 mean. We just went critical here at 28% on group 5." I said, "the
13 ECP called for a half a percent above that or better." Now that's
14 alright. That's alright. We'll calculate a new ECP for where we went
15 critical. Now that's what they did. Now that doesn't show on any log
16 books or anything like that. But that is a fact...

17
18 CRESWELL: Was Mr. Mehler still a shift supervisor at this point?

19
20 CRO: Mr. Mehler is still a shift supervisor at that plant.

21
22 CRESWELL: At that point.

889 047

23
24 CRO: Yes, yes.

25

1 MARSH: Mehler was the one that was on duty at that time...

2
3 CRO: Yes. He was the one that I kept telling you that he would
4 look over my shoulder. So I told him, I said, "I don't believe that
5 that's right. I think that that is unsafe. I think that there's
6 something wrong here." Well, we'll recalculate it and make it right.
7 Which is what they did. They redid the numbers and somehow they
8 fudged them, I don't know. They...

9
10 CRESWELL: Did they have a nuclear engineer come in?

11 CRO: To the best of my knowledge, no. This was on a midshift.
12 This was pretty late at night, which normally that doesn't hamper them
13 from calling anybody out but I don't recall any nuclear engineer
14 coming in.

15
16
17 MARSH: CRO, you say they. Who else besides Mehler would be involved
18 in that calculation?

19 CRO: The shift foreman.

20
21
22 MARSH: Which would be who? ...

809 048

23 CRO: That was. I can't recall.
24
25

1 CRESWELL: Okay.

2
3 CRO: I don't want to name any names if I can't be sure. Because
4 we were well, Mehler is not my normal shift supervisor so I'm not sure
5 that I was with my normal foreman at the time.

6
7 CRESWELL: Could you estimate when in time, it would help us to pursue
8 this matter if you could give us the approximate date. Was it early
9 in the startup test program?

10
11 CRO: Yeah, I believe it was right back before the relief valves.

12
13 CRESWELL: And that would have been like in April or May in 1978.

14
15 CRO: Right. Yeah, it was about that time.

16
17 CRESWELL: Okay. You mentioned team work before. Are the panel
18 assignments clearly indicated to people when they're onshift?

19
20 CRO: Generally on our shift what we did was we had a panel operator.
21 He was in charge of taking the, filling out the log book and just
22 generally overseeing the operation of the plant in a wide scope.
23 Normally we were at steady state. We also had a person that was
24 assigned to what we call the switching and tagging desk, and he would
25 take care of any safety tags that needed to be hung. He would also

1 perform the daily logs and the shift and daily surveillances and any
2 computer information that had to be obtained that day. Then we usually
3 had a third operator that was assigned to surveillance desk and he
4 would oversee the, take care of coordinating the control room and the
5 auxiliary operators in performing monthly or weekly surveillance
6 tests. If anything went wrong generally what would happen the closest
7 guy to a section of panel, you know, like we used to divide it up into
8 3 sections. We had the secondary, we had the reactor plant and we had
9 the nuclear steam supply system which was basically makeup pumps, low
10 pressure injection and that sort of thing. And then the foreman, he
11 would kind of rove around and maybe if he was in the back panel and if
12 there was some valves back there that he could operate. This is
13 generally the way we worked. If something happened, you know, you'd
14 yell out and say...analyze the problems as best you could...and say,
15 "we lost feed water." And at that time the three operators would come
16 up and they would key in on a position that wasn't occupied and then
17 take over.

18
19 CRESWELL: What about shift turnovers? What sort of turnovers did
20 people ordinarily make to your knowledge?

21 CRU: Well, they varied between shifts. It depended who you
22 turned over to and I always turned over to major stuff, any, I always
23 let them know where they were in rods, what they were doing, whether
24 they were coming in or going out. I let them know of any abnormal
25

1 conditions that existed in the secondary plant, you know, like they
2 are doing a polisher vessel, regenerating that. Or we throttled this
3 down and put this in automatic and something, maybe a major change
4 throughout the day. Any jobs that were in progress, I'd go over to
5 the computer and show him the primary system parameters, pressure,
6 boron concentration, reactor power, and such things like that. We
7 generally have a written sheet. Sometimes guys would draw it out for
8 3 or 4 pages and they would put the most miniscule items on there
9 that, you know, generally I looked over those. But the major stuff,
10 the turnovers, I guess, were generally pretty good and I say that on a
11 steady state basis. Like, I don't know how many times I've taken the
12 plant over in a transient and it was total chaos. You know, they'd
13 leave you know...

14
15 CRESWELL: You would have a turnover in the middle of a transient?

16
17 CRD: Well, maybe not necessarily in the middle of a transient.
18 I, let me rephrase that. Let me say after the transient was over,
19 perhaps during the recovery which sometimes took days. But generally,
20 you could get things straightened out in a shift to the point where,
21 you know, the major work is done. The big things that have to be done
22 and the small things. Most of the small things are done. The big
23 things and they can come later, you know. But it's really hard when
24 you have a trip. There's so many things that you might have seen that
25 you took some corrective action for, that maybe somebody else might

1 not have done that or maybe the procedure didn't call for but it was
2 okay to do it. It was safe, it was conservative. And you forget to
3 mention that to your relief, and you go this valve open and then you
4 go and try and do something else and, you know, it just doesn't respond
5 right and you looking around for a problem-why that dummy left that
6 valve open. Why did he do that? You get mad at the guy because he
7 didn't tell you about it but, you know, it was an honest mistake. I
8 very seldom got mad at guys for poor turnovers because I generally
9 made a pretty good tour of the, right after he left I would go around
10 the plant, the panels, and look for abnormalities that I saw. If I
11 had any questions I would ask the foreman.

12
13 FASANO: Did you have a check sheet or did you do this just by knowing
14 the system, its all in your head.

15 CRO: Just by knowing the system, knowing how the board was to
16 look. The positions of valves, you know, its like it almost becomes
17 instinctive after a while.

18
19
20 FASANO: After a while.

21 CRO: Yes.

22
23
24 FASANO: You mentioned that you did have design concerns on both the
25 nuclear and the steam side of the plant. Are there any ways other

1 than complaining verbally that you could have reported these to your
2 management? I mean, are you people...

3
4 CRO: Yeah.

5
6 FASANO: Allowed to report things on paper?

7
8 CRO: Yeah. We can generally write a little letter to, you know,
9 the cognizant engineers of the problem. And generally some of the
10 operating conveniences, they used to take care of but things like, and
11 we'd write these or even a verbal comment, they would normally jot it
12 down themselves. They were pretty good. Sometimes they never got
13 done, but at least they'd listen. But the major things, you know,
14 like the relief valves, condensate hot well thing. I don't even know
15 if he has yet today, whether that system has been modified. But,
16 yeah, you could write him a letter and even a little diagram showing
17 what you'd like to see, explaining maybe even perhaps how to go accomp-
18 lishing the change.

19
20 FASANO: How about reporting to say other agencies? I mean can you, I
21 mean talk to other people like ourselves or...?

22
23 CRO: Well, that is, I forget the part number. 10 CFR 20? I
24 can't remember the regulation...?

25
809 053

1 FASANO: 21?

2
3 CRO: Yeah. Its the one where if you see the company doing something
4 in violation of any rules that you can go to the NRC with the complaint.

5
6 CRESWELL: Have you done that?

7
8 CRO: No.

9
10 CRESWELL: Why not?

11
12 CRO: Because I felt that if I had of gone there, to the NRC, then
13 they would come down on me. I was a little afraid of that.

14
15 MARSH: What makes you think that way? Do you know of other instances
16 where this has happened? Have you been told anything formally or
17 informally?

18
19 CRO: No. They never really came right out and told us that, you
20 know, that you would be "prosecuted." But I just felt that knowing
21 the way they operated that it would be kind of like being the black
22 sheep now all of a sudden and it was tough enough to get along. I
23 found it was tough enough trying to get along with the other people up
24 there. Just, you know, team work type thing. And trying to develop
25 the rapport of the other shift supervisors as well as with my own.
That would just make it totally miserable for myself.

1 FASANO: You're mainly on Unit 2?

2
3 CRO: Unit 2.

4
5 FASANO: Do you have any knowledge that this is similar type of operation
6 on Unit 1 or are they different? To your best knowledge. You know, I
7 mean if you don't know, you don't know. If you do...

8
9 CRO: The only thing I can make is an assumption. The only thing
10 I can assume is that the shift supervisors that are at the plant today
11 were either former control room operators in Unit 1 or they were
12 former shift supervisors in Unit 1. Now I can't help but think that
13 they gained some experience in Unit 1. That's all I'm gonna say.
14 There's nothing really else I can say about it.

15
16 CRESWELL: How about the performance of surveillance tests at TMI.
17 Can you comment on that?

18
19 CRO: Surveillance procedures, I guess, sometimes I, well, I did a
20 lot of them. In fact, I did the one that caused the first safety
21 features actuation where I tripped the alternate feed supply to the
22 inverter and lost a DC supply. I corrected that too, by the way,
23 while everybody else stood around, looking around like they didn't
24 know what was going on. Now generally, the surveillance procedures,
25 we did them and sometimes they required a change, you know, like well

1 there was a small procedural deficiency or maybe a valve number was
2 wrong or maybe there was a better way of doing it to get the end
3 result. We would change those, the TLNs would take two licensed
4 operators or two senior licensed operators unless nuclear safety was
5 involved, then it would take PORC approval. We would change those,
6 make them right. Sometimes in the performance of a test you couldn't
7 get the required results and we'd go back out with the shift foreman
8 and he would get the proper results. Sometimes we'd..

9
10 CRESWELL: Excuse me. Could you elaborate on that?

11 CRO: Well, an example, the emergency feed pumps, running at
12 surveillance, it was a bear. Every time that we did the surveillance
13 that they called for a thrust bearing vibration measurement and it
14 also called for a temperature reading on the bearing and called for a
15 certain differential pressure, suction pressure had to be between a
16 certain amount. We've never done that test where it came out the same
17 way twice. So we tossed up our hands and we say, you know, what do we
18 do? We can't get the reference values, we can't get the proper data.
19 Okay, well never mind. I'll take this procedure and I'll throw it
20 down at the surveillance... I assign people, the inservice inspection
21 type and they would evaluate the data and then they would come up with
22 a new set of reference data everytime. And of course the surveillance
23 that we did would fall right into that. I never did understand that.
24
25

1 CRESWELL: Any other systems besides the emergency feedwater system
2 involved?

3
4 CRO: I can't recall. I know that a lot of the balance of plant
5 surveillance. It wasn't tech specs or balance or anything like that,
6 that would go by the wayside. You know a lot of time it would call
7 for maybe the secondary service coolers to be backwashed and we don't
8 have time for that. Then you just sign it, you know, throw it in the
9 basket not completed, and it would come back next week to do it, you
10 know, never get done. There was a lot of things like that on the
11 secondary side. We normally did all the surveillance that was required
12 for tech specs, but there was a lot of times, you know, I can't really
13 name any specific instances but...for specific procedures...but I know
14 that there was exceptions and in the exceptions they could paper those
15 away somehow. I never did really understand. I don't go in for that
16 kind of thing. I figured if it can't be done by the surveillance
17 procedure, you change it so that it can be done correctly and within
18 the scope of the surveillance requirement or you don't do them, you
19 know, you get the thing right and then do them.

20
21 CRESWELL: CRO, are there any other operators like you that are concerned
22 about some of these occurrences?

23 CRO: Yeah. I would imagine that there's quite a few that are
24 concerned. I'm not sure that their attitude is the same as mine. I
25

1 know that they like money. I mean obviously I didn't quite up there
2 for a higher paying job and that I know that a lot them stay around
3 there just because of the money, that they're afraid to leave because,
4 you know, they like money so much. But not only that, I guess they're
5 a little bit more, well, they are just cut out of a different mold.
6 They're not as, they don't say things the way I say them. They have
7 to be concerned. I can't really see where they couldn't be concerned.
8 I have respect for everyone of the operators up there. I have respect
9 for the supervisors too because well they went through hard times but
10 somethings that they do I really lose respect for. There's a couple I
11 just, you know, I wouldn't work with them for anything and that's one
12 of the reasons I left.

13
14 MARSH: We are getting towards the end of the tape. The time being
15 8:14, so at this time I'm gonna break for a moment while I put a new
16 tape on.

17
18 MARSH: The time in 8:15 p.m., the date is May 22 and we're continuing
19 with the second cassette on interview of CRO. Jim, you
20 were asking some questions when we broke to put a new tape on?

21
22 CRESWELL: At this point Hal, I'd like to ask you if you have any
23 comments, any other comments. These are of an open nature, they can
24 be directed toward NRC, Met Ed, whatever you feel like commenting
25 about.

899 058

CRD: Well first, I don't know...this whole accident seems to me like a nightmare. When it happened, I didn't really want to dissociate myself completely from the accident, I wanted to be there to take part. But I realized that my health was endangered at that point, I knew that I had a problem. They say that high blood pressure has no symptoms but I could actually feel it. It was so tense inside that it was just indescribable. That's why I resigned, on the spot. I was looking, I had said before that I had looked for other employment and couldn't find any satisfactory to that point. I figured that by doing this that they would, that I would force myself into it and I would be finally rid of this, this emotional pressure. The emotional pressure- I operated the plant a lot of times, especially during transients or tests, knowing that the plant was already 40 years old and they weren't even in commercial operation, and the plant was a wreck. It was dirty, there were oil leaks, there were water leaks, there were steam leaks, the design deficiencies that I had mentioned before, pump controllers not functioning, you know, if you want to start the booster pump because you need it, maybe it doesn't start because the auxiliary oil system has got so many leaks then it can't build up pressure. Just not being able to tell myself that when I go to do something at that panel, that what I want to do is going to actually take place. You know, I operated it a lot of times up there when I had the panel and I dreaded it. I really dreaded it. I would go in there and my stomach would be in knots for eight hours, I wouldn't eat anything, and I was on the verge of becoming an alcoholic, I would go out after

1 a shift and drink and it was terrible because I was becoming a physical
2 and emotional wreck, and it was due to these things-the design of the
3 plant, I knew how the GPU startup program and the people that performed
4 those tests were all very smart men, but they had no common sense.
5 They would have a test procedure, it would have more E's and D's than
6 it had pages. And you can't conduct a startup program like that.

7
8 CRESWELL: What are the E's and D's?

9
10 CRO: Oh, those are exceptions and deficiencies. Let me say,
11 maybe not deficiencies, I'll say exceptions for sure. But they had
12 many exceptions to the test procedure. When Met Ed took a system and
13 accepted it as operating properly, we still had the oil leaks, we
14 still had the water leaks, we still had impellers in backwards, we
15 still had suction strainers that would clog up every two hours of
16 operation. It was a nightmare to operate the plant. Over a year ago,
17 I told Bob over the phone when he contacted me that I told my wife
18 over a year ago that that plant was an accident waiting to happen.
19 Like I said, teamwork, interdepartmental teamwork was one of the
20 biggest things that I saw was a detriment to that plant. Operators
21 were always trying to pin something on maintenance, maintenance was
22 always trying to pin something on the engineers, it was just a constant
23 fight back and forth, the operators would get stuck with this because
24 maintenance didn't want to do that. You have the maintenance people
25 from Unit 1 would come over to do maintenance, "Man this place is

1 fucked up, who'd ever want to work over here?" Now how does that make
2 an operator who has any pride in his work, any pride in his unit, how
3 does that make me feel? After a while, it drags you down. Then
4 pretty soon, you start taking on the same attitude. Management recognized
5 the problem but they didn't do anything about it. In fact they probably
6 did more detrimental to moral than anything else. They bring in a
7 Navy captain to be Unit superintendant just because Jack Herbein, up
8 there, wants to be a captain in the reserves. I don't know that to be
9 a fact, but that's the rumors that go around. The administrative
10 assistant that they appointed up there, four months ago, five months
11 ago, a Navy captain. They had perfect qualified people, with a masters,
12 they had a guy, a master's degree in personnel management, they brought
13 in a Navy captain. I don't care how long you've been in the Navy, I
14 don't think that Navy people have got an ounce of leadership capability.
15 They don't know how to lead people. If you're in the Navy, they tell
16 you to do something, if you don't you go to the brig or you go on
17 report. Well, see I'm getting the job done, but they have to do the
18 job. And it was getting to that point with me that they were telling
19 me I had to do something and I cut them off, I fired him. You're
20 fired. You can't fire me, I'm supposed to fire you. No, I'm firing
21 you as my employer. You know, that was the type of atmosphere that was
22 generated, I, and I finally had it. I know that with all good conscience
23 all the other operators up there felt, feel the same way as I do, but
24 they're just not willing to get out.

889 061

1 CRESWELL: I've got one other point that I'd like to cover. You're
2 experiences with the alarm computer printer.

3
4 CRB: Yeah. I've had several experiences with that thing.

5
6 CRESWELL: Can you go into that in a little bit of detail? I'm interested
7 in history of that printer and the problems that had been encountered
8 with it.

9
10 CRB: Well first off, the mid-shift is supposed to gather up the
11 paper that has been pushed through it during the day and then they
12 make a nice neat package of it and give it to the operating engineer.
13 A lot of times I'll see the printout for the day, I usually go over
14 just to see what happened. But they, you can see where the typer
15 would stop or the paper would tilt and it would just print a bunch of
16 garbage. The alarm typer itself, it'll back up sometimes for, I've
17 seen it backed up for as far as an hour, where it was printing out it
18 was two o'clock in the afternoon and it was still printing things from
19 one o'clock.

20
21 MARSH: Misalignment, and paper feed, paper jams, was that a frequent
22 occurrence? I'd say in a weeks time or a months time, what would you
23 expect in terms of difficulties?

24 889 062
25

1 CRD : Sometimes we'd go a whole week and not have any problems,
2 but then other times we'd go and again, it was an operating problem,
3 people didn't understand how the roller-feed mechanism worked and they
4 would take and they would clamp the roller down to the, and make the
5 paper tight in the roller where it shouldn't have been. And then if
6 there's any misalignment in the back feed, and that roller overcomes
7 the force of the little pins that stick out through the holes. And
8 then that would cause it to run off the track and a lot of times
9 you'd find that to be the problem. We never really had too much
10 problems on our shift, but like I said, going back and looking through
11 the logs for the day, when I would collect them, I'd say that I'd see
12 maybe three or four times in a week, or on a shift, that we'd have
13 problems like that.

14
15 CRESWELL: Have you ever known of an operator shutting the alarm
16 printer off purposely?

17
18 CRD : No that depends for what purpose. Sometimes I've seen
19 people turn it off, but the only time I can ever say that I saw anybody,
20 in fact it was me that turned it off, was the fact that the alarm
21 printer itself has the selectric and there's a little tape in there
22 that moves the ball back and forth for upper and lower case. Well the
23 thing got stuck on upper case and it was just printing garbage. So,
24 at that time, I turned that typewriter off and then the utility typer
25 is supposed to take over in that case and it didn't. In our case, now

1 I can't really say. I've have never personally seen anybody intentionally
2 turn it off when it was functioning properly. I don't really see any
3 need to do that.

4
5 FASANO: I have a couple of things I'd like to ask you. In the training
6 when you were at the B&W simulator, did you go through simulated
7 events where you actually did some practicing? Where they adequate in
8 your opinion?

9
10 CRO: Yeah, we went through reactor trips, we went through turbine
11 trips, they had individual instrument failures that we had to respond
12 to with various stations at hand. It, for me, it helped me a lot. In
13 the Navy reactor program, everything was done just manually, everything,
14 there was no computer involved. It was such a simple system, it
15 worked so well and then you come up here to a complicated mess like
16 that is up there. In fact, I want to make that, I think the place is
17 complicated beyond any technical ability to operate it. And maintain
18 it. But I feel that the training that I got down at Old Forest Road
19 down there was some of the best training that I ever got, in plant
20 operation.

21
22 FASANO: Was the simulation pretty much what you can anticipate at
23 TMI-2?

24 809 064
25

1 CRO: I used the control reactor pressure the same way.

2
3 FASANO: Yes?

4
5 CRO: Yes, it was very close. The only thing that wasn't really
6 close was the size of the control room. The Old Forest Road simulator
7 panel would fit inside this motel room, where you might be able to get
8 panel 6-A of Unit 2's in here. It was a lot closer and working with
9 it for 8 weeks, like we did, you became very familiar, it was very
10 easy to have a reading become instinct to you where you can just scan
11 the panel and see something, that was abnormal, it was good training
12 that's really what I kind of worked on myself.

13
14 FASANO: Then, in your comments I gather, could you elaborate on how
15 you would like to see a control room and what would you have different
16 in this control room that could help the industry, for nuclear power
17 import, for nuclear safety, and ease of operation to keep it safe.

18
19 CRO: Unit 2, the general comment that I have is that there is too
20 much, well the panel, the front console is just entirely too big. And
21 there's too many components that have to be operated from the back.
22 Like, if you want to open a feed-water valve to recycle feed-water for
23 clean up, it takes two people to do it, sometimes three. One guy to
24 watch the pump, the other guy to jog the valve open from the back of
25 the panel and another guy over at the computer to read the flow. Just

1 for a simple, ordinary manipulation, the whole control room could be a
2 lot smaller, they could have less indication there. That may seem
3 kind of dumb, but in Unit 2 they have so much needless information,
4 like panel 6-A. I still don't know what those things were, those
5 meters. I couldn't instinctively look at a meter and say that that is
6 bus 26 volts, I couldn't do that, in fact, I just put it totally out
7 of my mind, except for the ones for the generator and then I could
8 look at those and say that's close, it's what it should be. And the
9 other ones, it was a very hard control room to become instinctively
10 familiar with, just due to the nature that you had so many gages that
11 were not necessary, or if they were necessary, they could be located
12 maybe somewhere off to the side, where you look at them every now and
13 then.

14
15 CRESWELL: Could you comment on the location of the leakage recovery
16 system panel.

17 CRO. Yes, you can't see it from where you have to operate. So,
18 if you're the only one in the control room, and the drain tank needs
19 pumped down, you can go back there according to the procedure for
20 routine operations, or to investigate alarm and correct that alarm, in
21 which case you would, but you would have to leave the main operating
22 console, with nobody there, which is entirely within the scope of the
23 procedure. There's supposed to be at least one licensed operator in
24 the control room at all times, and the procedure, operator at the
25

1 controls, it shows a shaded area where you can go, it shows during
2 normal operations and normally it was within the confines of straight
3 lines back to the wall to the shift supervisor's office there from the
4 computer to panel 6, the electrical panel. If you had an alarm condition
5 you could leave that area and go back along the side panels to the
6 leakage recovery system, the ventilation control panel and then back
7 to the RPS cabinets and some of the electrical relays back there, you
8 could go back there to investigate an alarm. Which if you got a high
9 drain tank or a low drain tank level you would have to go back there,
10 if you were the only one in. In panel 25, the annunciator system
11 there doesn't give you a flash on the front panel that you have an
12 alarm back there. So, again if you're only one there and you push the
13 button, it doesn't silence any alarms on panel 25, you have to run
14 back, around the back of the panel, and push the annunciator silencer
15 button on the panel 25.

16
17 CRESWELL: Previously you mentioned that you were having to pump down
18 the RCDT about 4 times during a shift. Could you tell us what impact
19 that would have if you were the only operator in the control room?

20 CRO: Well generally if I was the only one in there and I had to
21 pump the drain tank down, what I would do is, it's one of those instinct
22 things again, or not an instinct, but it's kind of like an operating
23 method, so to speak. I would see the high drain tank level. What I
24 would do is I'd go over and push the valve that admits the water to
25

899 067

1 the bleed tank from the drain tank at maybe 50 gallons a minute. And
2 I would just let it pump. And then I would get the low level alarm
3 and I find it, or I'd get an alarm, I'd find I couldn't silence it
4 from up on the console itself and I would walk back and then secure
5 the pump down at that time. A lot of guys would stand back there and
6 wait, they'll just push the valve and stand and wait for it to pump
7 out 10 or 15 inches of water.

8
9 CRESWELL: I've got three questions to ask and they may seem a little
10 bit silly to even bring them up, but I do want to cover it and I would
11 like to get any knowledge you've got personal, heresay, or even borrowing
12 knowledge on any of these matters because they are relatively serious.
13 First of all, would you know of any information regarding personal
14 action by anyone that would have brought this event about or increased
15 the severity of it? Anyone who would have had an axe to grind that in
16 any way could of kicked this thing off?

17 CRD: Absolutely. I don't know. I've never heard anything to
18 that nature.

19
20
21 CRESWELL: Then you are indicating in the negative?

22 CRD: That's correct. I don't know of anything like that.
23
24
25

1 CRESWELL: Secondly, from your experience, your work experience with
2 TMI, what are the demeanor of the work crews when they are on duty?
3 I'm specifically addressing getting lost, sleeping on duty type of
4 thing. Do you have any comment on that? Any knowledge of people that
5 going out and taking a nap when things are running in a good steady
6 state?

7
8 CRO: On our shift we were pretty good, but we did have our sleepers,
9 now the auxiliary operators, I know they used to sneak off for maybe
10 an hour, two hours, something like that. To my knowledge, the plant
11 was covered in his absence, that somebody else was if he was supposed
12 to be someplace at a panel, he was covered. The only thing I guess
13 really detrimental to the plant's safety would be if he was a fire
14 brigade and didn't hear the fire alarm go off, or if we had a small
15 break loca and he was the respondee and he wouldn't be able to take
16 his action.

17
18 CRESWELL: Could you go into that a little bit, the small break loca
19 respondee?

20
21 CRO: Well, we had two, one was a control room operator who had so
22 many minutes... A month ago I could have spit these things out, no
23 sweat. The control room operator would have like two minutes to
24 recognize that you did have a problem. A loss of coolant accident,
25 with the failure of a diesel on the side of the break, or the side of

1 the makeup pump didn't start. The control room operator would then go
2 down to the, whichever affected valves, whichever valves did not have
3 power and he would get on the phones and throttle open those valves
4 two turns. And then at that time he would be in communication with
5 the control room operator at the panel. The auxiliary operator, at
6 that time, was to go down and open up the one remaining shut suction
7 cross connect valve, so that all three makeup pumps suction valves, or
8 suction lines would be tied to one common source, which would be from
9 the borated water storage tank outlet valve to the decay heat suction
10 header on the unaffected side. All this had to take place within ten
11 minutes after the discovery.

12
13 CRESWELL: Do you have any comments on that?

14 CRO: Well, we were supposed to check the communication headsets
15 once a shift, and I'm just as guilty as everybody else. It was just
16 one of those things that if the guy called you up and said, yeah,
17 lets check the Ioca headset, we did it. I guess generally the feeling
18 was that it was being done and it was being done at an adequate interval.
19 I don't really think that there was any safety lost. I don't believe
20 that it did that, but we didn't do, we had drills every month that we
21 were supposed to run and generally those were run with a great deal of
22 consciousness. I know that that one valve down there that they had to
23 open was a bear, it was a bear to get open. But, I think that the
24 requirement was for like 2 or 3 turns open and the requirement, it
25 didn't have to be fully open.

1 CRESWELL: Do you feel that it was in your capability to respond as
2 required, as control room operator for a small break loca?

3
4 CRO: Yes. Unless...they had scaffolding down there...if they
5 ever took the scaffolding away, it would be tough. It would be tough
6 on both sets of valves, the A and the B valve. There's no permanent
7 scaffolding leading up to those valves. We've been lucky so far that
8 it has been there, and you climb up and get it. As of today, I don't
9 know if it's still there.

10
11 FASANO: This wasn't there purposely for the purpose of doing this?
12 It just happened to be there?

13
14 CRO: It was there. I don't know if it was there for that reason
15 or not, I really don't know.

16
17 FASANO: It might have been there for that purpose?

18
19 CRO: It might have been there for that purpose.

20
21 FASANO: In your opinion is it?

22
23 CRO: Yes, but then again, it may not have been.

24
25 809 071

1 MARSH: I have one last question addressing those areas that I wanted
2 to cover. That's the fact that this event occurred on March 28th,
3 which happens to be an anniversary of the plant. Do you have any
4 information, or have you heard anything at all regarding the possibility
5 of a party going on, concurrent with this or any type of celebration
6 that may have been planned or taken place?

7
8 CRU: No. I have no knowledge of that. I haven't even heard
9 anything about that.

10
11 MARSH: That's all I've got. Do either of you have additional questions?
12 I'll open it you one more time, Hal if you have anything else, more
13 you'd like to put on tape?

14
15 CRU: I don't think I should. No, I'm about drained. I really am.

16
17 MARSH: I would also indicate that if more comes to mind, or in cleaning
18 your stuff up and moving around, you come across something you think
19 would be of value to us, you have a phone number, you have my address,
20 you have several phone numbers where you can get hold of me and I'd
21 very much appreciate anything that you do come across additionally.
22 Likewise, if in going over the tape, we do have some interests we
23 would like to pursue a little deeper, do not be concerned if I get
24 back to you again and would like to talk to you again. It does not
25 indicate problems, it just indicates that we've found something of

1 interest that we'd like to pursue in a little more detail, so I'm
2 going to hold on to your local number and don't get concerned if I try
3 to get hold of you.

4
5 CRO: Okay, fine.

6
7 CRESWELL: We would like to say, very much thank you coming in on your
8 own time. I know you've got to travel a ways to get here, and we've
9 taken up most of your evening, we very much appreciate it. You've
10 given us some good meat to consider and get into. We'd just like to
11 say thank you for all of NRC.

12
13 MARSH: The time being 8:41 p.m., at this time we are going to terminate
14 the interview of CRO, the meter reading on the second cassette
15 is at 466, so I'm ending at this time.

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