07-102A-91

# ORIGINAL

# OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: Nuclear Regulatory Commission
Incident Investigation Team

Title: Nine Mile Point Nuclear Power Plant
Interview of: BRIAN J. MOORE

Docket No.

LOCATION: Scriba, New York

DATE: Wednesday, August 21, 1991

PAGES: 1 - 27

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION
3 INCIDENT INVESTIGATION TEAM
4
5 - - - - - - - - - - - - - - - - - - - -
6 Interview of :
7 BRIAN J. MOORE :
8 (Closed) :
9 - - - - - - - - - - - - - - - - - - - -
10
11 Conference Room B
12 Administration Building
13 Nine Mile Point Nuclear
14 Power Plant, Unit Two
15 Lake Road
16 Scriba, New York 13093
17 Wednesday, August 21, 1991
18
19 The interview commenced, pursuant to notice,
20 at 4:25 p.m.
21
22 PRESENT FOR THE IIT:
23 John Kauffman, NRC
24 Michael Jordan, NRC
25

1 P R O C E E D I N G S

2 [4:25 p.m.]

3

4 MR. JORDAN: It's August the 21st, 1991 at 4:25
5 p.m. We are at the Nine Mile Point, Unit Two in the P
6 Building. We're conducting interviews concerning a
7 transient that occurred on August 13th, 1991.
8 My name is Michael Jordan, I'm with the NRC. I'm
9 out of Region III.
10 MR. KAUFFMAN: I'm John Kauffman, NRC
11 headquarters.
12 MR. MOORE: Brian Moore, reactor operator at Unit
13 Two.
14 MR. JORDAN: Okay, Brian, why don't you give us a
15 background of what your experience is?
16 MR. MOORE: I've been a reactor operator almost
17 three years at Unit Two. Prior to that I was a non-LOT for
18 five years at Unit Two. Prior to that I was in the Navy as
19 a boiler technician -- conventional Navy for four years. I
20 got out as a Petty Officer, Second Class, if that helps.
21 Prior to that I was a machinist in an instrument and control
22 type place. We made thermometers, pressure gauges and
23 before that I was in high school.
24 MR. JORDAN: That's fine. We don't go back to
25 when you were born.

1 MR. MOORE: No.

2 MR. JORDAN: Not that far back, anyway.

3 MR. KAUFFMAN: That's fine. But we could find

4 out.

5 MR. MOORE: Oh yeah, right.

6 [Laughter.]

7 MR. JORDAN: Okay. Why don't you -- let's see,

8 you were on day shift, what shift, mid-shift?

9 MR. MOORE: I was coming in on surveillance shift.

10 MR. JORDAN: Okay, why don't you tell us, as you

11 come through the gate what you saw and what happened?

12 MR. MOORE: At -- I got to work about 6:15 because

13 I wasn't shift-of-record and I didn't have to be in until

14 6:30, so I was early, but --

15 MR. KAUFFMAN: Did you have any problems with the

16 traffic?

17 MR. MOORE: I didn't have any problems at 6:15

18 coming in, however, when I got to security, they wouldn't

19 let me in because they weren't sure what was going on and

20 the initial thing is to prevent anybody from coming inside.

21 I was out in security, I'm going to say tops, 10 minutes.

22 George Moyer, one of the SSS's -- of course, they

23 know him on sight, they said, "You, in." And as he was

24 passing through the gate the first goal is to get through

25 the explosives meters. We had all requested, there was

1 probably six or seven of us, to call back down so that we
2 could get on site.
3 After that, there was a phone call, probably ten
4 minutes later and we were coming in. I then came in and got
5 my hardhat and my keys, flashlight, and headed upstairs.
6 MR. JORDAN: Any lighting problems or anything
7 like that?
8 MR. MOORE: No. Everything was already resolved
9 by then. As far as I was aware of. I didn't have any
10 problems coming in, I even used the elevator.
11 MR. JORDAN: And the elevators had lighting?
12 MR. MOORE: Yeah. The elevators were all lit, the
13 stairways were lit. At least the area I was using. I then
14 got to the control room, but instead of coming in through
15 the back door, because I knew there was a problem, coming
16 through the control room and getting into people's way, I
17 went through the south door of the control room and I waited
18 until I was recognized by the on-shift's CSO. He was busy.
19 Occasionally he would look up and he acknowledged my
20 presence in the control room by a nod or -- you know, he
21 realized, I guess, I was there. A few minutes went on
22 again. He had more than enough hands helping him. So, I
23 guess probably five minutes in the control room I was
24 trying to evaluate what had happened to kind of form my own
25 -- I guess plan of attack to help and wait for some

1 direction to do things.

2 MR. KAUFFMAN: So what do you think happened? Or

3 what did you see?

4 MR. MOORE: Well, most everything was back to

5 normal. When I got there it just looked like we scrammed.

6 We had indications, annunciators, I was like, okay, we took

7 a scram. And then I heard a lot of this and that and what

8 happened and what didn't happen.

9 So, I then -- the CSO came over to me and he says

10 I have enough help,go across the hall and wait in the

11 staging area which is our break area. I'll call you when I

12 need you. And I was in there about 10 minutes, maybe 15

13 minutes and then I was told to come over to the control

14 room.

15 MR. JORDAN: So this is probably what time? Any

16 idea?

17 MR. MOORE: 7:15, maybe. On site maybe.

18 MR. KAUFFMAN: We're really trying to establish

19 time because the alarms and things are gone.

20 MR. MOORE: It's probably around 7:15 by now. He

21 called me to come over to start flushing -- shutdown

22 cooling.

23 [Pause as interviewee peruses notebook.]

24 MR. MOORE: And then -- I've got some things wrote

25 down because I always write what I do. From day-to-day in

1 case something like this ever happens.

2 My first actions were to flush our RHR shutdown

3 cooling and get shutdown cooling in service.

4 MR. JORDAN: What systems were you using?

5 MR. MOORE: RHR and condensate transfer.

6 MR. JORDAN: Which RHR, A, B, C --

7 MR. MOORE: B. It would have been RHR B. And

8 condensate transfer would be used for the flush.

9 MR. KAUFFMAN: What pressure can you shut down

10 cooling and service --

11 MR. MOORE: Huh?

12 MR. KAUFFMAN: What pressure can you put shut down

13 cooling and service interlocks?

14 MR. MOORE: Yes. It's 128 pounds which we were

15 well above prior to that. I was also looking around at what

16 level was and there was some interlocks I still had to

17 clear. The level was -- at that time just short of

18 clearing level three and coming back slowly, at least on

19 the trip units in the back, so that would have been about a

20 level of 150 coming up.

21 I had two aux operators, Dwayne LeMay and Bob

22 Pellegrino assist me in the flush, and they had to do a

23 couple of valve manipulations out in the plant and open the

24 condensate transfer valve which is a manual valve and

25 isolate a discharge valve off of the boost -- jockey booster

Exhibit 3-1 (continued)



ADDENDUM TO INTERVIEW OF BRIAN J MOORE NAOE
(Name/Position)

| Page | Line | Correction and Reason for Correction |
|---|---|---|
| 7 | 13 | 1CSM@002 (PROCEDURE NUMBER) |
| 9 | 20 | WHEN WE TURNED SWITCH TO ON. (OTHERS WORKING WITH ME CLINT SMITH ACTUALLY STARTED PUMP WITH SWITCH) |
| 26 | 3 | 3:15 WHEN CLINT SMITH STARTED (WE WERE WORKING TOGETHER) |

Page 1 of 1 Signature Brian Moore Date 8/23/91

1 pump to keep the system full.

2 I'd say that took almost 40 minutes to do the

3 flush, so we're looking, probably around -- by something

4 close to 8:00. Sometime in between there Marty McCormick

5 took over as SED because there was an announcement made in

6 the control room that Mike Conway was no longer the SED,

7 that he was relieved by Marty McCormick. And I kind of

8 remembered that because it was right around that when I was

9 finishing up the flush.

10 Then somebody had asked me what I was doing -- was

11 I in a lull because of pressure and so on and so forth. I

12 said, "Yes." And they asked me to assist them in doing the

13 ICS M at 002 which is a vacuum breaker test. Because I

14 guess they evaluated that they cycled an SRV. So I helped

15 them do that.

16 MR. KAUFFMAN: Why are you required to do that

17 test?

18 MR. MOORE: It's to verify that the vacuum

19 breakers will actually cycle and the DP will not be

20 excessive across the floor.

21 MR. JORDAN: You do it just for SRV's? Do you do

22 it if you run RCIC, do you do it for --

23 MR. MOORE: No. It's just SRV's.

24 MR. JORDAN: Just strictly SRV's?

25 MR. MOORE: Yes. As far as I'm aware of.

1 MR. KAUFFMAN: Can you tell us the procedure then,
2 that you were doing or that that is?
3 MR. MOORE: I was pushing the buttons on the
4 panel. The actual procedure number is N2OSPICSM, the little
5 a with the circle around it, it's an AT, 002.
6 And I assisted Jay Lawrence. He had the actual
7 procedure and I stood at the back panels and he told me
8 which button to push for which valves and we verified
9 lights and computer points and so on and so forth.
10 That had to be sometime -- I'm going to have to
11 say, maybe 8:30 or 9:00, maybe later. I can't remember
12 exact time when we were doing that. Then most of the rest
13 of the day I spent putting shutdown cooling in service and
14 that's a long drawn out process of warming up and heating
15 up and unisolating and clearing interlocks.
16 MR. KAUFFMAN: How did that process go? Did it go
17 good?
18 MR. MOORE: Well, it's like any time we put it on
19 it's very, very long to get it on because you're waiting for
20 pressure. You don't want to violate cool-down rates. Once
21 you clear your interlocks you want to make sure that you're
22 down far enough that it doesn't come back. When you start
23 opening isolation valves you want to make sure that you have
24 sufficient inventory so you don't drop level again. And
25 then once you turn the pump switch to start, it becomes

1 rather quick because you're dealing with a few variables;
2 heat exchanger, service water, outlet temperature, cool-down
3 rate in the reactor which is a major concern; flow rate for
4 pump concerns so you're kind of -- really got to think what
5 you're doing on each manipulation and in the first 15
6 minutes it's kind of hectic, but that's the way it is.
7 We've always learned to accept that and we get positive
8 control and within minutes -- what -- because of the
9 increase in flow, both service water and system flow, you're
10 variables change a lot, especially you're cool down. So, we
11 cool down quite a bit in the first 15 minutes and then the
12 next 45 minutes to an hour we almost sit with no cool-down
13 at all.
14 That's about all I can tell you on this, unless
15 you've got some questions.
16 MR. JORDAN: So the rest of the day you were in
17 the shutdown cooling?
18 MR. MOORE: Right, and I didn't get shutdown
19 cooling running until about 3:15. That's from flushing till
20 starting the pump; it was probably when I turned the switch
21 off.
22 MR. JORDAN: After you flush, how long is it good
23 for before you have to flush again?
24 MR. MOORE: Since the system is closed and we're
25 not putting any other water in it, it shouldn't be a

1 problem. The chemistry should remain fairly constant.

2 MR. JORDAN: Why do you flush?

3 MR. MOORE: Well, RHR has five modes of operation,

4 one of them being off the suppression pool. We consider

5 suppression pool not a clean source of water, so to minimize

6 the conductivity increase in the vessel, we flush with

7 condensate transfer water, which is a more clean source of

8 water.

9 MR. JORDAN: Okay. You flush from the condensate

10 -- what's the supply?

11 MR. MOORE: Okay. Condensate transfer taps in on

12 the suction supply on the outboard isolation valves for the

13 containment. We flush that leg of piping down to the

14 suction of the pump.

15 MR. JORDAN: Where's the section of the pump

16 pumping to?

17 MR. MOORE: All right. The reactor, one of the

18 loops, the A loop of recirc, goes to the shutdown cooling

19 loop, so we line up the loop for suction, with the section

20 of the isolation valves, because they're locked out because

21 of your pressure interlock. So you're lining up your entire

22 system to put on your shutdown cooling leg, and then you

23 would open up your condensate transfer to flush out that

24 water. The suction from the suppression pool has been

25 closed prior to this.

1 MR. JORDAN: So it comes from the condensate
2 transfer pump?
3 MR. MOORE: System.
4 MR. JORDAN: System?
5 MR. MOORE: Yes.
6 MR. JORDAN: Okay. You flush the entire RHR
7 system out?
8 MR. MOORE: Right.
9 MR. JORDAN: Where does it flush back to?
10 MR. MOORE: It's flushed to rad waste.
11 MR. JORDAN: To rad waste?
12 MR. MOORE: Right.
13 MR. JORDAN: So you flush it to rad waste. How do
14 you know if you've flushed enough?
15 MR. MOORE: There's a computer point that we
16 monitor for conductivity. Once that computer point clears
17 .2, I think it is -- I'd have to refer to the procedure for
18 the exact micromole number, but once that gets below that
19 point, the sufficient flushing has been done. I usually
20 wait to make sure that it's not just a flood of water going
21 through, that the system is completely flushed prior to
22 securing.
23 MR. JORDAN: Is the transfer from -- what --
24 transfer from the condenser?
25 MR. MOORE: No, it comes from the condensate

1 storage tanks.

2 MR. JORDAN: It comes from the condensate storage

3 tanks.

4 MR. MOORE: Right.

5 I'd flush that. If conductivity gets below I

6 think it's .2, I'd let it sit for at least another minute or

7 two, flushing, to verify that it's not just a slug of water

8 that's passing by the element, that it is completely clean

9 water.

10 MR. JORDAN: The pumps were operating at this

11 time?

12 MR. MOORE: No. The pump is shut down. Actually,

13 the pump is in pull-to-lock.

14 MR. JORDAN: What's the driving force for the

15 water?

16 MR. MOORE: The pressure developed by the

17 condensate transfer pumps.

18 MR. JORDAN: Okay. I think I understand now how

19 that works.

20 MR. MOORE: Okay.

21 MR. JORDAN: You say you started shutdown cooling

22 around 3:15?

23 MR. MOORE: Yes.

24 MR. JORDAN: When did you get relieved?

25 MR. MOORE: I left the control room about quarter

1 to 7.

2 MR. JORDAN: So you were here when they finally

3 got to the point of shutdown.

4 MR. MOORE: Yes, mode 4.

5 MR. JORDAN: Mode 4?

6 MR. MOORE: Yes.

7 MR. JORDAN: Okay.

8 MR. MOORE: I was relieved earlier than that. We

9 went to mode 4, if I remember correctly, about 6:30 that

10 night. That's I guess the best I can remember.

11 MR. JORDAN: You were on shift when that happened?

12 Were you on the shutdown cooling?

13 MR. MOORE: I had turned everything over at about

14 quarter after 6.

15 MR. JORDAN: Okay.

16 MR. MOORE: I usually stick around, collect my

17 belongings, collect my thoughts for the day before I walk

18 about, because I hate walking out and then saying, Oh, I

19 forgot, and then come back -- so I usually take the time to

20 turn over, collect my thoughts, collect my things, go

21 through the control room one more time before I leave, to

22 make sure that I haven't forgotten anything, and then I left

23 at about 6:45.

24 MR. JORDAN: I've got two final questions here,

25 and we'll combine one of the -- One of the question I want

1 to ask is the good news-bad news. The good news is, give me
2 an idea of things that you found as a result of the actions
3 you were assigned to do that you said, Gee, I'm glad I had
4 this in my possession -- whether it be knowledge, training,
5 piece of hardware, procedure -- something that was of great
6 benefit to me to accomplish my tasks. And If there is
7 anything out there that you say, Gee, I wish I would have
8 had this available to me -- instrumentation, indication --
9 you know, Gee, when I'm operating shutdown cooling, I wish
10 this would be available to me -- that you didn't have that
11 would have helped you in accomplishing your tasks? Are
12 there any of those good news, this is great; the bad news
13 is, we got through this, but it would have made my task
14 available easier if I would have had this available to me?
15 MR. MOORE: Right. Probably the best thing I had
16 was the procedure I used. OP-31 was wrote by George Moyer.
17 He's a very knowledgeable individual. Because the procedure
18 was written so well, at no time did I feel uncomfortable
19 prior to doing a step, if there was some kind of a caution -
20 - You know, it's not do the step and then, oh, by the way,
21 pay attention to this. It's always, Before you do this, pay
22 attention to -- because it's coming when you do your next
23 step. So there was never any guess-work involved.
24 MR. KAUFFMAN: Is that different from -- Is that
25 unusual, or are most of the procedures set up like that?

1 MR. MOORE: It varies from procedure to procedure.
2 Again, no procedure can cover everything. There are things
3 that are unique. We proved that on Tuesday, things being
4 unique. But in most cases, our procedures are quite
5 adequate. There are problems here and there.
6 MR. JORDAN: But in this case you found this
7 procedure adequate.
8 MR. MOORE: Very well.
9 MR. JORDAN: Good for you.
10 MR. MOORE: OP-31 is written quite well.
11 The biggest hindrance, I would say, is the initial
12 suction piping flush. The condensate transfer valve is
13 located inside the IV room, which is a no-self-monitor,
14 because you have shutdown cooling, suction, and reactor
15 water cleanup suction piping coming both through the room.
16 It's a high-rad room. In order to get an operator
17 dispatched to open up the condensate transfer valve, you
18 need to get a-hold of rad protection, so on and so forth.
19 MR. JORDAN: What's this valve?
20 MR. MOORE: The valve number is RHS-V-38.
21 MR. JORDAN: And it's located where?
22 MR. MOORE: In the IV room, reactor building 240.
23 MR. JORDAN: IV?
24 MR. MOORE: Isolation valve, 240 elevation.
25 MR. JORDAN: And the problem with the location and

1 access? What's the function of that?

2 MR. MOORE: That's the initial suction piping

3 flush. It's condensate transfer water that is used to flush

4 the suction piping.

5 MR. KAUFFMAN: Do I understand that's normally not

6 a problem, but in this event it was a problem getting a rad

7 tech?

8 MR. MOORE: Well, yes, because --

9 MR. JORDAN: Is it normally a problem, or is it

10 not normally a problem? It was a problem this time?

11 MR. MOORE: Yes, I think because everybody was

12 going different directions to man up, and our normal routine

13 that we normally do was not there. Usually, when we're

14 running cleanup, we're never in that room, because we're

15 above 128 -- it's a situation that we don't normally run

16 into. We're either shut down or the room is open, or we're

17 running and we don't go in there. The only time we have

18 problems is in the transient mode, and, when we're in that

19 mode, we're normally shutting down, and we have an RP tech

20 to go with us.

21 MR. JORDAN: So access to the room requires RP,

22 and that's the problem that you had?

23 MR. MOORE: Yes. There were a lot of people doing

24 a lot of things that were, I guess, more important than what

25 I was working on at the time. Again, shutdown cooling is a

1 long, drawn out process. That's why they started having me
2 do it at about 7 o'clock in the morning.
3 MR. JORDAN: I've got one more question.
4 MR. MOORE: Okay.
5 MR. JORDAN: There was some discussion about a
6 potential water hammer in the RHR system for shutdown
7 cooling. Do you know of any problem in that area?
8 MR. MOORE: Yes. When we were putting shutdown
9 cooling on, doing the initial flush, there is a precaution
10 to close or throttle RHS MOV I think it's 142 -- that's a
11 throttleable valve -- to less than 50 percent open. The
12 stroke on the valve is about 15 seconds, normally. I
13 clocked it out in my head and my wristwatch prior to opening
14 the other IV.
15 MR. JORDAN: Full stroke?
16 MR. MOORE: Yes. I wanted to find out what the
17 stroke was.
18 I then, in turn, opened the valve about three to
19 four seconds to make sure that it was less than 50 percent.
20 When I started doing the flush, I had a report that there
21 was some noise coming from the 215, 196 elevation, which is
22 about the piping goes through to rad waste, and that's how
23 we would flush.
24 MR. JORDAN: That was 215 --?
25 MR. MOORE: 196 elevation. There's a pipe that

1 runs off --

2 MR. JORDAN: Is that 216 to 196, or is it 215

3 elevation and the 196 elevation?

4 MR. MOORE: That's two different elevations.

5 MR. JORDAN: At the 215 and 196 elevations you got

6 reports of --

7 MR. MOORE: Noise or some kind of a hammering

8 sound. I immediately throttled back on RHS-MOV-142 to

9 probably minimum open position. I was then told that there

10 was no further noise. Again the pump was not running. We

11 were just doing initial flushes.

12 MR. JORDAN: You're saying the transfer pump

13 wasn't running or the RHR pump was not running?

14 MR. MOORE: RHR pump and at that point you would

15 not be flushing with condensate transfer.

16 MR. JORDAN: You said your water would not be?

17 MR. MOORE: Would not be.

18 MR. JORDAN: Okay, I'm confused. Opening this

19 valve, does that thing in condensate transfer the water?

20 MR. MOORE: No, that's RHS-MOV-142 is a discharge

21 to rad waste and what you are doing at this point to help

22 you out is you already have, your isolation is cleared. You

23 are using I guess the height of water from the reactor to

24 slowly warm up the system.

25 MR. JORDAN: Are the valves to the reactor open?

1 MR. MOORE: Yes.

2 MR. JORDAN: So you are taking water from the

3 reactor through the RHR pump. Is the RHR pump on it

4 running?

5 MR. MOORE: No. No, all you are doing is warming

6 up the system with the height of water that's in the

7 reactor--

8 MR. JORDAN: To rad waste.

9 MR. MOORE: To rad waste and it is a very slow

10 amount that you are doing it with.

11 MR. JORDAN: Is the only thing that is the valves

12 that are open to the reactor, are they full open?

13 MR. MOORE: 113 -- I'd have to refer to the

14 procedure. I am not sure I think 113 was full open.

15 MR. JORDAN: So the method by which you are

16 controlling the flow through this system is via the 142

17 valve?

18 MR. MOORE: Correct, and that is also an

19 isolation, has an isolation logic built in on it and it will

20 auto-isolate on Level 3, if that is any help.

21 MR. JORDAN: From the reactor to rad waste?

22 MR. MOORE: Right, and what you are doing there is

23 to get the pump to within 100 degrees of coolant

24 temperature.

25 I think -- well, I shouldn't think. I know why

1 the water, why I got a vibration.

2 MR. JORDAN: Is this part of the flushing

3 procedure or is this part of putting the RHR in shutdown

4 cooling?

5 MR. MOORE: That is part of the flush, prior to

6 even getting into shutdown cooling.

7 MR. JORDAN: Within a hundred degrees you say?

8 MR. MOORE: Uh-huh. [Affirmative.]

9 MR. JORDAN: It came from the 100 degrees at what?

10 MR. MOORE: Reactor coolant temperature.

11 MR. JORDAN: Okay. Okay?

12 MR. MOORE: The reason that we got the hammer was

13 because water that was in the line when you open the valve

14 slight to rad waste then you start flushing, it's at 90, 80

15 pounds. You are discharging to an area that is open to

16 atmosphere and thinks it's water but it's not so it turns

17 into steam and I think that's what I had.

18 MR. JORDAN: Reactor coolant was at what pressure?

19 MR. MOORE: Oh, I'd say 80, 90 pounds, something

20 around there.

21 MR. JORDAN: 80, 90 pounds?

22 MR. MOORE: Yes.

23 MR. JORDAN: I am somewhat confused. So you are

24 saying when you did your flushing around eight o'clock in

25 the morning --

1 MR. MOORE: Okay, the initial flush is to get rid
2 of the conductivity --
3 MR. JORDAN: Okay.
4 MR. MOORE: -- on the suction piping.
5 MR. JORDAN: Okay.
6 MR. MOORE: Then there is another point where you
7 flush the discharge. That's where this comes into. The
8 discharge piping --
9 MR. JORDAN: This doesn't pick up the discharge
10 piping?
11 MR. MOORE: No.
12 MR. JORDAN: The flushing that you did in the
13 morning doesn't pick up the discharge piping?
14 MR. MOORE: Right.
15 MR. JORDAN: It picks up which part of the system?
16 MR. MOORE: The suction piping from the reactor,
17 because the suction piping was initially --
18 MR. JORDAN: To the pump?
19 MR. MOORE: Right, drawing through the suppression
20 pool.
21 MR. JORDAN: Was it picked up through the pump?
22 MR. MOORE: Yes.
23 MR. JORDAN: Then discharged from the pump? It
24 doesn't go through -- after it goes through the pump it
25 doesn't pick up -- the morning discharge, the morning flush,

1 it picks up the suction to the pump --

2 MR. MOORE: Right.

3 MR. JORDAN: -- through the pump --

4 MR. MOORE: The discharge piping or part of the

5 discharge piping and then it goes through rad waste.

6 MR. JORDAN: Then it goes to rad waste.

7 MR. MOORE: The afternoon flush is kind of a

8 flush/warmup together.

9 MR. JORDAN: Okay, so then it takes it from the

10 reactor --

11 MR. MOORE: Right.

12 MR. JORDAN: Through the pump?

13 MR. MOORE: Right.

14 MR. JORDAN: Okay, and this is in preparation for

15 shutdown cooling?

16 MR. MOORE: Correct.

17 MR. JORDAN: And reactor pressure is in 80 to 90

18 bounds?

19 MR. MOORE: Yes.

20 MR. JORDAN: And the discharged rad waste is

21 atmospheric?

22 MR. MOORE: Right. That's just whatever -- it

23 goes to one of their tanks, which one I am not sure.

24 MR. JORDAN: And you think you got the water

25 hammer because --

1 MR. JORDAN:

2 MR. MOORE: The water flashed to steam. When I

3 heard the noise I reclosed it.

4 MR. JORDAN: Did you hear the noise?

5 MR. MOORE: No. No, they called me on the radio.

6 They said there is some noise down here, it sounds like a

7 water hammer, what's going on up in the control room?

8 Of course at that time there was a lot of things

9 still going on all through the course of the day and I said

10 where are you? They said 215 or -- and the noise is coming

11 right near 215 and 196.

12 I said, well, it's probably the warmup so I

13 throttled back on 142 and about a minute later I got the

14 call that the noise had stopped. Then I continued on with

15 my warmup and I also asked the person that called me and I

16 can't remember which one that was, to walk around and make

17 sure that there was no leakage or anything was wrong.

18 MR. JORDAN: So they walked down the system?

19 MR. MOORE: I don't know if they completely

20 walked down the system but they walked down the area that

21 they heard the noise. They called back five, ten minutes

22 later. They called five, ten minutes later, said that they

23 didn't see anything. The noise had stopped. Everything

24 appeared to be normal and I continued on.

25 MR. KAUFFMAN: Is this unusual, this happening

1 other times, shutdown cooling's been put into service?
2 MR. MOORE: Honestly, I can't give you an answer
3 on that but nobody is usually out there in this type of
4 situation. Guys are -- once you do the initial flush in the
5 a.m., you don't need operating assistance for the rest of
6 it so unless someone is out actually in the building at that
7 point in time, they may not hear it and until you take the
8 pump switch to start, and by that time you are all warmed
9 up, there is an operator usually locally and then he'll go
10 down and walk in after the pump starts to make sure that
11 everything is running fine.
12 MR. JORDAN: When you are flushing, this is just a
13 natural drain?
14 MR. MOORE: Right.
15 MR. JORDAN: Okay. The pumps aren't running or the
16 RHR pumps running. Is there a flow indication or how do you
17 know if you have water flowing through it?
18 MR. MOORE: The meters start indicating 2000 GPM.
19 You really --
20 MR. JORDAN: During this flush --
21 MR. MOORE: You go by temperature, I guess would
22 be the easiest way of doing that.
23 MR. JORDAN: Is that how you do it? I was just
24 curious how you -- when you cut back on the throttle, how do
25 you know you still have flow through the system?

1 MR. MOORE: Temperature. There is a chart recorder
2 on Panel 601. Outlet temperatures for the heat exchanger
3 inlet, you'll start seeing those increase and there is also
4 a point that measures the temperature for the discharge to
5 rad waste.
6 Initially when I started I had 75 or 80 degrees.
7 I started flushing for the warmup. Temperature was going up.
8 I got the call. I throttled back further. They said it
9 stopped and I still had a temperature increase. It was
10 less excessive, I guess you could say. Then someone had
11 asked me how I was doing on shutdown cooling, getting it
12 started.
13 I said, well, we got some noise, I wanted to slow
14 down. They said fine. I think it was Eric Townsend. He
15 was up in the room asking questions, just kind of seeing how
16 things were going, see if he could help out.
17 Then they said okay, when you feel comfortable if
18 you would like to increase the heatup, you can do so.
19 We wound up increasing the rate and then I had, I
20 can't remember which person I kept calling, because I had
21 three guys working with me. I asked them to check and
22 listen for noise again in the area you heard previous. I
23 increased valve position probably to something less than 50
24 percent.
25 They said there was no further noise. We had a

1 substantial heat up on the pump and then by that time we
2 were with 100 degrees of coolant temperature, and that was
3 about 3:15 when I started the cooling pump, the shut down
4 cooling in service.
5 MR. JORDAN: Does the procedure step you through
6 this use of the recorder for temperature indications?
7 MR. MOORE: Yes, it does. It gives you an
8 actual --
9 MR. JORDAN: -- the rad waste?
10 MR. MOORE: The actual number and it's a 7 --
11 actually it is a multiple point chart recorder but it gives
12 you the points that you're supposed to use and they are
13 labelled right there, which point is what.
14 MR. JORDAN: Anything to watch for as far as
15 temperature increases goes?
16 MR. MOORE: Right.
17 MR. JORDAN: That's in the procedure?
18 MR. MOORE: Yes.
19 MR. JORDAN: Don't we have that procedure
20 anywhere?
21 MR. MOORE: OP-31.
22 MR. JORDAN: OP-31. OP, right?
23 MR. MOORE: Yes. That's in N2-OP-31.
24 MR. JORDAN: Anything else you want to tell us?
25 MR. MOORE: No.

1 MR. JORDAN: Okay, we can go off the record.
2 [Whereupon, at 5:00 p.m., the taking of the
3 interview was concluded.]
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25

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: Int. of BRIAN J. MOORE

DOCKET NUMBER:

PLACE OF PROCEEDING: Scriba, N.Y.

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Ian Rothrock

IAN ROTHROCK
Official Reporter
Ann Riley & Associates, Ltd.

07-102B-91

# OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: Nuclear Regulatory Commission
Incident Investigation Team

Title: Nine Mile Point Nuclear Power Plant
Interview of: BRIAN J. MOORE

Docket No.

LOCATION: Scriba, New York

DATE: Wednesday, August 21, 1991

PAGES: 1 - 27

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9305070264

Exhibit 3-1 (continued)



ADDENDUM TO INTERVIEW OF BRIAN J MOORE NAOE
(Name/Position)

| Page | Line | Correction and Reason for Correction |
|---|---|---|
| 7 | 13 | 1CSM@002 (PROCEDURE NUMBER) |
| 9 | 20 | WHEN WE TURNED SWITCH TO ON. (OTHERS WORKING WITH ME CLINT SMITH ACTUALLY STARTED PUMP WITH SWITCH) |
| 26 | 3 | 3:15 WHEN CLINT SMITH STARTED (WE WERE WORKING TOGETHER) |

Page 1 of 1 Signature Brian Moore Date 8/23/91

1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION
3 INCIDENT INVESTIGATION TEAM
4
5 - - - - - - - - - - - - - - - - - - - -
6 Interview of :
7 BRIAN J. MOORE :
8 (Closed) :
9 - - - - - - - - - - - - - - - - - - - -
10
11 Conference Room B
12 Administration Building
13 Nine Mile Point Nuclear
14 Power Plant, Unit Two
15 Lake Road
16 Scriba, New York 13093
17 Wednesday, August 21, 1991
18
19 The interview commenced, pursuant to notice,
20 at 4:25 p.m.
21
22 PRESENT FOR THE IIT:
23 John Kauffman, NRC
24 Michael Jordan, NRC
25

1 P R O C E E D I N G S

2 [4:25 p.m.]

3

4 MR. JORDAN: It's August the 21st, 1991 at 4:25
5 p.m. We are at the Nine Mile Point, Unit Two in the P
6 Building. We're conducting interviews concerning a
7 transient that occurred on August 13th, 1991.
8 My name is Michael Jordan, I'm with the NRC. I'm
9 out of Region III.
10 MR. KAUFFMAN: I'm John Kauffman, NRC
11 headquarters.
12 MR. MOORE: Brian Moore, reactor operator at Unit
13 Two.
14 MR. JORDAN: Okay, Brian, why don't you give us a
15 background of what your experience is?
16 MR. MOORE: I've been a reactor operator almost
17 three years at Unit Two. Prior to that I was a non-LOT for
18 five years at Unit Two. Prior to that I was in the Navy as
19 a boiler technician -- conventional Navy for four years. I
20 got out as a Petty Officer, Second Class, if that helps.
21 Prior to that I was a machinist in an instrument and control
22 type place. We made thermometers, pressure gauges and
23 before that I was in high school.
24 MR. JORDAN: That's fine. We don't go back to
25 when you were born.

1 MR. MOORE: No.

2 MR. JORDAN: Not that far back, anyway.

3 MR. KAUFFMAN: That's fine. But we could find

4 out.

5 MR. MOORE: Oh yeah, right.

6 [Laughter.]

7 MR. JORDAN: Okay. Why don't you -- let's see,

8 you were on day shift, what shift, mid-shift?

9 MR. MOORE: I was coming in on surveillance shift.

10 MR. JORDAN: Okay, why don't you tell us, as you

11 come through the gate what you saw and what happened?

12 MR. MOORE: At -- I got to work about 6:15 because

13 I wasn't shift-of-record and I didn't have to be in until

14 6:30, so I was early, but --

15 MR. KAUFFMAN: Did you have any problems with the

16 traffic?

17 MR. MOORE: I didn't have any problems at 6:15

18 coming in, however, when I got to security, they wouldn't

19 let me in because they weren't sure what was going on and

20 the initial thing is to prevent anybody from coming inside.

21 I was out in security, I'm going to say tops, 10 minutes.

22 George Moyer, one of the SSS's -- of course, they

23 know him on sight, they said, "You, in." And as he was

24 passing through the gate the first goal is to get through

25 the explosives meters. We had all requested, there was

1 probably six or seven of us, to call back down so that we
2 could get on site.
3 After that, there was a phone call, probably ten
4 minutes later and we were coming in. I then came in and got
5 my hardhat and my keys, flashlight, and headed upstairs.
6 MR. JORDAN: Any lighting problems or anything
7 like that?
8 MR. MOORE: No. Everything was already resolved
9 by then. As far as I was aware of. I didn't have any
10 problems coming in, I even used the elevator.
11 MR. JORDAN: And the elevators had lighting?
12 MR. MOORE: Yeah. The elevators were all lit, the
13 stairways were lit. At least the area I was using. I then
14 got to the control room, but instead of coming in through
15 the back door, because I knew there was a problem, coming
16 through the control room and getting into people's way, I
17 went through the south door of the control room and I waited
18 until I was recognized by the on-shift's CSO. He was busy.
19 Occasionally he would look up and he acknowledged my
20 presence in the control room by a nod or -- you know, he
21 realized, I guess, I was there. A few minutes went on
22 again. He had more than enough hands helping him. So, I
23 guess probably five minutes in the control room I was
24 trying to evaluate what had happened to kind of form my own
25 -- I guess plan of attack to help and wait for some

1 direction to do things.

2 MR. KAUFFMAN: So what do you think happened? Or

3 what did you see?

4 MR. MOORE: Well, most everything was back to

5 normal. When I got there it just looked like we scrammed.

6 We had indications, annunciators, I was like, okay, we took

7 a scram. And then I heard a lot of this and that and what

8 happened and what didn't happen.

9 So, I then -- the CSO came over to me and he says

10 I have enough help,go across the hall and wait in the

11 staging area which is our break area. I'll call you when I

12 need you. And I was in there about 10 minutes, maybe 15

13 minutes and then I was told to come over to the control

14 room.

15 MR. JORDAN: So this is probably what time? Any

16 idea?

17 MR. MOORE: 7:15, maybe. On site maybe.

18 MR. KAUFFMAN: We're really trying to establish

19 time because the alarms and things are gone.

20 MR. MOORE: It's probably around 7:15 by now. He

21 called me to come over to start flushing -- shutdown

22 cooling.

23 [Pause as interviewee peruses notebook.]

24 MR. MOORE: And then -- I've got some things wrote

25 down because I always write what I do. From day-to-day in

1 case something like this ever happens.

2 My first actions were to flush our RHR shutdown

3 cooling and get shutdown cooling in service.

4 MR. JORDAN: What systems were you using?

5 MR. MOORE: RHR and condensate transfer.

6 MR. JORDAN: Which RHR, A, B, C --

7 MR. MOORE: B. It would have been RHR B. And

8 condensate transfer would be used for the flush.

9 MR. KAUFFMAN: What pressure can you shut down

10 cooling and service --

11 MR. MOORE: Huh?

12 MR. KAUFFMAN: What pressure can you put shut down

13 cooling and service interlocks?

14 MR. MOORE: Yes. It's 128 pounds which we were

15 well above prior to that. I was also looking around at what

16 level was and there was some interlocks I still had to

17 clear. The level was -- at that time just short of

18 clearing level three and coming back slowly, at least on

19 the trip units in the back, so that would have been about a

20 level of 150 coming up.

21 I had two aux operators, Dwayne LeMay and Bob

22 Pellegrino assist me in the flush, and they had to do a

23 couple of valve manipulations out in the plant and open the

24 condensate transfer valve which is a manual valve and

25 isolate a discharge valve off of the boost -- jockey booster

1 pump to keep the system full.

2 I'd say that took almost 40 minutes to do the

3 flush, so we're looking, probably around -- by something

4 close to 8:00. Sometime in between there Marty McCormick

5 took over as SED because there was an announcement made in

6 the control room that Mike Conway was no longer the SED,

7 that he was relieved by Marty McCormick. And I kind of

8 remembered that because it was right around that when I was

9 finishing up the flush.

10 Then somebody had asked me what I was doing -- was

11 I in a lull because of pressure and so on and so forth. I

12 said, "Yes." And they asked me to assist them in doing the

13 ICS M at 002 which is a vacuum breaker test. Because I

14 guess they evaluated that they cycled an SRV. So I helped

15 them do that.

16 MR. KAUFFMAN: Why are you required to do that

17 test?

18 MR. MOORE: It's to verify that the vacuum

19 breakers will actually cycle and the DP will not be

20 excessive across the floor.

21 MR. JORDAN: You do it just for SRV's? Do you do

22 it if you run RCIC, do you do it for --

23 MR. MOORE: No. It's just SRV's.

24 MR. JORDAN: Just strictly SRV's?

25 MR. MOORE: Yes. As far as I'm aware of.

1 MR. KAUFFMAN: Can you tell us the procedure then,
2 that you were doing or that that is?
3 MR. MOORE: I was pushing the buttons on the
4 panel. The actual procedure number is N2OSPICSM, the little
5 a with the circle around it, it's an AT, 002.
6 And I assisted Jay Lawrence. He had the actual
7 procedure and I stood at the back panels and he told me
8 which button to push for which valves and we verified
9 lights and computer points and so on and so forth.
10 That had to be sometime -- I'm going to have to
11 say, maybe 8:30 or 9:00, maybe later. I can't remember
12 exact time when we were doing that. Then most of the rest
13 of the day I spent putting shutdown cooling in service and
14 that's a long drawn out process of warming up and heating
15 up and unisolating and clearing interlocks.
16 MR. KAUFFMAN: How did that process go? Did it go
17 good?
18 MR. MOORE: Well, it's like any time we put it on
19 it's very, very long to get it on because you're waiting for
20 pressure. You don't want to violate cool-down rates. Once
21 you clear your interlocks you want to make sure that you're
22 down far enough that it doesn't come back. When you start
23 opening isolation valves you want to make sure that you have
24 sufficient inventory so you don't drop level again. And
25 then once you turn the pump switch to start, it becomes

1 rather quick because you're dealing with a few variables;
2 heat exchanger, service water, outlet temperature, cool-down
3 rate in the reactor which is a major concern; flow rate for
4 pump concerns so you're kind of -- really got to think what
5 you're doing on each manipulation and in the first 15
6 minutes it's kind of hectic, but that's the way it is.
7 We've always learned to accept that and we get positive
8 control and within minutes -- what -- because of the
9 increase in flow, both service water and system flow, you're
10 variables change a lot, especially you're cool down. So, we
11 cool down quite a bit in the first 15 minutes and then the
12 next 45 minutes to an hour we almost sit with no cool-down
13 at all.
14 That's about all I can tell you on this, unless
15 you've got some questions.
16 MR. JORDAN: So the rest of the day you were in
17 the shutdown cooling?
18 MR. MOORE: Right, and I didn't get shutdown
19 cooling running until about 3:15. That's from flushing till
20 starting the pump; it was probably when I turned the switch
21 off.
22 MR. JORDAN: After you flush, how long is it good
23 for before you have to flush again?
24 MR. MOORE: Since the system is closed and we're
25 not putting any other water in it, it shouldn't be a

1 problem. The chemistry should remain fairly constant.

2 MR. JORDAN: Why do you flush?

3 MR. MOORE: Well, RHR has five modes of operation,

4 one of them being off the suppression pool. We consider

5 suppression pool not a clean source of water, so to minimize

6 the conductivity increase in the vessel, we flush with

7 condensate transfer water, which is a more clean source of

8 water.

9 MR. JORDAN: Okay. You flush from the condensate

10 -- what's the supply?

11 MR. MOORE: Okay. Condensate transfer taps in on

12 the suction supply on the outboard isolation valves for the

13 containment. We flush that leg of piping down to the

14 suction of the pump.

15 MR. JORDAN: Where's the section of the pump

16 pumping to?

17 MR. MOORE: All right. The reactor, one of the

18 loops, the A loop of recirc, goes to the shutdown cooling

19 loop, so we line up the loop for suction, with the section

20 of the isolation valves, because they're locked out because

21 of your pressure interlock. So you're lining up your entire

22 system to put on your shutdown cooling leg, and then you

23 would open up your condensate transfer to flush out that

24 water. The suction from the suppression pool has been

25 closed prior to this.

1 MR. JORDAN: So it comes from the condensate
2 transfer pump?
3 MR. MOORE: System.
4 MR. JORDAN: System?
5 MR. MOORE: Yes.
6 MR. JORDAN: Okay. You flush the entire RHR
7 system out?
8 MR. MOORE: Right.
9 MR. JORDAN: Where does it flush back to?
10 MR. MOORE: It's flushed to rad waste.
11 MR. JORDAN: To rad waste?
12 MR. MOORE: Right.
13 MR. JORDAN: So you flush it to rad waste. How do
14 you know if you've flushed enough?
15 MR. MOORE: There's a computer point that we
16 monitor for conductivity. Once that computer point clears
17 .2, I think it is -- I'd have to refer to the procedure for
18 the exact micromole number, but once that gets below that
19 point, the sufficient flushing has been done. I usually
20 wait to make sure that it's not just a flood of water going
21 through, that the system is completely flushed prior to
22 securing.
23 MR. JORDAN: Is the transfer from -- what --
24 transfer from the condenser?
25 MR. MOORE: No, it comes from the condensate

1 storage tanks.

2 MR. JORDAN: It comes from the condensate storage

3 tanks.

4 MR. MOORE: Right.

5 I'd flush that. If conductivity gets below I

6 think it's .2, I'd let it sit for at least another minute or

7 two, flushing, to verify that it's not just a slug of water

8 that's passing by the element, that it is completely clean

9 water.

10 MR. JORDAN: The pumps were operating at this

11 time?

12 MR. MOORE: No. The pump is shut down. Actually,

13 the pump is in pull-to-lock.

14 MR. JORDAN: What's the driving force for the

15 water?

16 MR. MOORE: The pressure developed by the

17 condensate transfer pumps.

18 MR. JORDAN: Okay. I think I understand now how

19 that works.

20 MR. MOORE: Okay.

21 MR. JORDAN: You say you started shutdown cooling

22 around 3:15?

23 MR. MOORE: Yes.

24 MR. JORDAN: When did you get relieved?

25 MR. MOORE: I left the control room about quarter

1 to 7.

2 MR. JORDAN: So you were here when they finally

3 got to the point of shutdown.

4 MR. MOORE: Yes, mode 4.

5 MR. JORDAN: Mode 4?

6 MR. MOORE: Yes.

7 MR. JORDAN: Okay.

8 MR. MOORE: I was relieved earlier than that. We

9 went to mode 4, if I remember correctly, about 6:30 that

10 night. That's I guess the best I can remember.

11 MR. JORDAN: You were on shift when that happened?

12 Were you on the shutdown cooling?

13 MR. MOORE: I had turned everything over at about

14 quarter after 6.

15 MR. JORDAN: Okay.

16 MR. MOORE: I usually stick around, collect my

17 belongings, collect my thoughts for the day before I walk

18 about, because I hate walking out and then saying, Oh, I

19 forgot, and then come back -- so I usually take the time to

20 turn over, collect my thoughts, collect my things, go

21 through the control room one more time before I leave, to

22 make sure that I haven't forgotten anything, and then I left

23 at about 6:45.

24 MR. JORDAN: I've got two final questions here,

25 and we'll combine one of the -- One of the question I want

1 to ask is the good news-bad news. The good news is, give me
2 an idea of things that you found as a result of the actions
3 you were assigned to do that you said, Gee, I'm glad I had
4 this in my possession -- whether it be knowledge, training,
5 piece of hardware, procedure -- something that was of great
6 benefit to me to accomplish my tasks. And If there is
7 anything out there that you say, Gee, I wish I would have
8 had this available to me -- instrumentation, indication --
9 you know, Gee, when I'm operating shutdown cooling, I wish
10 this would be available to me -- that you didn't have that
11 would have helped you in accomplishing your tasks? Are
12 there any of those good news, this is great; the bad news
13 is, we got through this, but it would have made my task
14 available easier if I would have had this available to me?
15 MR. MOORE: Right. Probably the best thing I had
16 was the procedure I used. OP-31 was wrote by George Moyer.
17 He's a very knowledgeable individual. Because the procedure
18 was written so well, at no time did I feel uncomfortable
19 prior to doing a step, if there was some kind of a caution -
20 - You know, it's not do the step and then, oh, by the way,
21 pay attention to this. It's always, Before you do this, pay
22 attention to -- because it's coming when you do your next
23 step. So there was never any guess-work involved.
24 MR. KAUFFMAN: Is that different from -- Is that
25 unusual, or are most of the procedures set up like that?

1 MR. MOORE: It varies from procedure to procedure.
2 Again, no procedure can cover everything. There are things
3 that are unique. We proved that on Tuesday, things being
4 unique. But in most cases, our procedures are quite
5 adequate. There are problems here and there.
6 MR. JORDAN: But in this case you found this
7 procedure adequate.
8 MR. MOORE: Very well.
9 MR. JORDAN: Good for you.
10 MR. MOORE: OP-31 is written quite well.
11 The biggest hindrance, I would say, is the initial
12 suction piping flush. The condensate transfer valve is
13 located inside the IV room, which is a no-self-monitor,
14 because you have shutdown cooling, suction, and reactor
15 water cleanup suction piping coming both through the room.
16 It's a high-rad room. In order to get an operator
17 dispatched to open up the condensate transfer valve, you
18 need to get a-hold of rad protection, so on and so forth.
19 MR. JORDAN: What's this valve?
20 MR. MOORE: The valve number is RHS-V-38.
21 MR. JORDAN: And it's located where?
22 MR. MOORE: In the IV room, reactor building 240.
23 MR. JORDAN: IV?
24 MR. MOORE: Isolation valve, 240 elevation.
25 MR. JORDAN: And the problem with the location and

1 access? What's the function of that?

2 MR. MOORE: That's the initial suction piping

3 flush. It's condensate transfer water that is used to flush

4 the suction piping.

5 MR. KAUFFMAN: Do I understand that's normally not

6 a problem, but in this event it was a problem getting a rad

7 tech?

8 MR. MOORE: Well, yes, because --

9 MR. JORDAN: Is it normally a problem, or is it

10 not normally a problem? It was a problem this time?

11 MR. MOORE: Yes, I think because everybody was

12 going different directions to man up, and our normal routine

13 that we normally do was not there. Usually, when we're

14 running cleanup, we're never in that room, because we're

15 above 128 -- it's a situation that we don't normally run

16 into. We're either shut down or the room is open, or we're

17 running and we don't go in there. The only time we have

18 problems is in the transient mode, and, when we're in that

19 mode, we're normally shutting down, and we have an RP tech

20 to go with us.

21 MR. JORDAN: So access to the room requires RP,

22 and that's the problem that you had?

23 MR. MOORE: Yes. There were a lot of people doing

24 a lot of things that were, I guess, more important than what

25 I was working on at the time. Again, shutdown cooling is a

1 long, drawn out process. That's why they started having me
2 do it at about 7 o'clock in the morning.
3 MR. JORDAN: I've got one more question.
4 MR. MOORE: Okay.
5 MR. JORDAN: There was some discussion about a
6 potential water hammer in the RHR system for shutdown
7 cooling. Do you know of any problem in that area?
8 MR. MOORE: Yes. When we were putting shutdown
9 cooling on, doing the initial flush, there is a precaution
10 to close or throttle RHS MOV I think it's 142 -- that's a
11 throttleable valve -- to less than 50 percent open. The
12 stroke on the valve is about 15 seconds, normally. I
13 clocked it out in my head and my wristwatch prior to opening
14 the other IV.
15 MR. JORDAN: Full stroke?
16 MR. MOORE: Yes. I wanted to find out what the
17 stroke was.
18 I then, in turn, opened the valve about three to
19 four seconds to make sure that it was less than 50 percent.
20 When I started doing the flush, I had a report that there
21 was some noise coming from the 215, 196 elevation, which is
22 about the piping goes through to rad waste, and that's how
23 we would flush.
24 MR. JORDAN: That was 215 --?
25 MR. MOORE: 196 elevation. There's a pipe that

1 runs off --

2 MR. JORDAN: Is that 216 to 196, or is it 215

3 elevation and the 196 elevation?

4 MR. MOORE: That's two different elevations.

5 MR. JORDAN: At the 215 and 196 elevations you got

6 reports of --

7 MR. MOORE: Noise or some kind of a hammering

8 sound. I immediately throttled back on RHS-MOV-142 to

9 probably minimum open position. I was then told that there

10 was no further noise. Again the pump was not running. We

11 were just doing initial flushes.

12 MR. JORDAN: You're saying the transfer pump

13 wasn't running or the RHR pump was not running?

14 MR. MOORE: RHR pump and at that point you would

15 not be flushing with condensate transfer.

16 MR. JORDAN: You said your water would not be?

17 MR. MOORE: Would not be.

18 MR. JORDAN: Okay, I'm confused. Opening this

19 valve, does that thing in condensate transfer the water?

20 MR. MOORE: No, that's RHS-MOV-142 is a discharge

21 to rad waste and what you are doing at this point to help

22 you out is you already have, your isolation is cleared. You

23 are using I guess the height of water from the reactor to

24 slowly warm up the system.

25 MR. JORDAN: Are the valves to the reactor open?

1 MR. MOORE: Yes.

2 MR. JORDAN: So you are taking water from the

3 reactor through the RHR pump. Is the RHR pump on it

4 running?

5 MR. MOORE: No. No, all you are doing is warming

6 up the system with the height of water that's in the

7 reactor--

8 MR. JORDAN: To rad waste.

9 MR. MOORE: To rad waste and it is a very slow

10 amount that you are doing it with.

11 MR. JORDAN: Is the only thing that is the valves

12 that are open to the reactor, are they full open?

13 MR. MOORE: 113 -- I'd have to refer to the

14 procedure. I am not sure I think 113 was full open.

15 MR. JORDAN: So the method by which you are

16 controlling the flow through this system is via the 142

17 valve?

18 MR. MOORE: Correct, and that is also an

19 isolation, has an isolation logic built in on it and it will

20 auto-isolate on Level 3, if that is any help.

21 MR. JORDAN: From the reactor to rad waste?

22 MR. MOORE: Right, and what you are doing there is

23 to get the pump to within 100 degrees of coolant

24 temperature.

25 I think -- well, I shouldn't think. I know why

1 the water, why I got a vibration.

2 MR. JORDAN: Is this part of the flushing

3 procedure or is this part of putting the RHR in shutdown

4 cooling?

5 MR. MOORE: That is part of the flush, prior to

6 even getting into shutdown cooling.

7 MR. JORDAN: Within a hundred degrees you say?

8 MR. MOORE: Uh-huh. [Affirmative.]

9 MR. JORDAN: It came from the 100 degrees at what?

10 MR. MOORE: Reactor coolant temperature.

11 MR. JORDAN: Okay. Okay?

12 MR. MOORE: The reason that we got the hammer was

13 because water that was in the line when you open the valve

14 slight to rad waste then you start flushing, it's at 90, 80

15 pounds. You are discharging to an area that is open to

16 atmosphere and thinks it's water but it's not so it turns

17 into steam and I think that's what I had.

18 MR. JORDAN: Reactor coolant was at what pressure?

19 MR. MOORE: Oh, I'd say 80, 90 pounds, something

20 around there.

21 MR. JORDAN: 80, 90 pounds?

22 MR. MOORE: Yes.

23 MR. JORDAN: I am somewhat confused. So you are

24 saying when you did your flushing around eight o'clock in

25 the morning --

1 MR. MOORE: Okay, the initial flush is to get rid
2 of the conductivity --
3 MR. JORDAN: Okay.
4 MR. MOORE: -- on the suction piping.
5 MR. JORDAN: Okay.
6 MR. MOORE: Then there is another point where you
7 flush the discharge. That's where this comes into. The
8 discharge piping --
9 MR. JORDAN: This doesn't pick up the discharge
10 piping?
11 MR. MOORE: No.
12 MR. JORDAN: The flushing that you did in the
13 morning doesn't pick up the discharge piping?
14 MR. MOORE: Right.
15 MR. JORDAN: It picks up which part of the system?
16 MR. MOORE: The suction piping from the reactor,
17 because the suction piping was initially --
18 MR. JORDAN: To the pump?
19 MR. MOORE: Right, drawing through the suppression
20 pool.
21 MR. JORDAN: Was it picked up through the pump?
22 MR. MOORE: Yes.
23 MR. JORDAN: Then discharged from the pump? It
24 doesn't go through -- after it goes through the pump it
25 doesn't pick up -- the morning discharge, the morning flush,

1 it picks up the suction to the pump --

2 MR. MOORE: Right.

3 MR. JORDAN: -- through the pump --

4 MR. MOORE: The discharge piping or part of the

5 discharge piping and then it goes through rad waste.

6 MR. JORDAN: Then it goes to rad waste.

7 MR. MOORE: The afternoon flush is kind of a

8 flush/warmup together.

9 MR. JORDAN: Okay, so then it takes it from the

10 reactor --

11 MR. MOORE: Right.

12 MR. JORDAN: Through the pump?

13 MR. MOORE: Right.

14 MR. JORDAN: Okay, and this is in preparation for

15 shutdown cooling?

16 MR. MOORE: Correct.

17 MR. JORDAN: And reactor pressure is in 80 to 90

18 bounds?

19 MR. MOORE: Yes.

20 MR. JORDAN: And the discharged rad waste is

21 atmospheric?

22 MR. MOORE: Right. That's just whatever -- it

23 goes to one of their tanks, which one I am not sure.

24 MR. JORDAN: And you think you got the water

25 hammer because --

1 MR. JORDAN:

2 MR. MOORE: The water flashed to steam. When I
3 heard the noise I reclosed it.

4 MR. JORDAN: Did you hear the noise?

5 MR. MOORE: No. No, they called me on the radio.
6 They said there is some noise down here, it sounds like a
7 water hammer, what's going on up in the control room?

8 Of course at that time there was a lot of things
9 still going on all through the course of the day and I said
10 where are you? They said 215 or -- and the noise is coming
11 right near 215 and 196.

12 I said, well, it's probably the warmup so I
13 throttled back on 142 and about a minute later I got the
14 call that the noise had stopped. Then I continued on with
15 my warmup and I also asked the person that called me and I
16 can't remember which one that was, to walk around and make
17 sure that there was no leakage or anything was wrong.

18 MR. JORDAN: So they walked down the system?

19 MR. MOORE: I don't know if they completely
20 walked down the system but they walked down the area that
21 they heard the noise. They called back five, ten minutes
22 later. They called five, ten minutes later, said that they
23 didn't see anything. The noise had stopped. Everything
24 appeared to be normal and I continued on.

25 MR. KAUFFMAN: Is this unusual, this happening

1 other times, shutdown cooling's been put into service?
2 MR. MOORE: Honestly, I can't give you an answer
3 on that but nobody is usually out there in this type of
4 situation. Guys are -- once you do the initial flush in the
5 a.m., you don't need operating assistance for the rest of
6 it so unless someone is out actually in the building at that
7 point in time, they may not hear it and until you take the
8 pump switch to start, and by that time you are all warmed
9 up, there is an operator usually locally and then he'll go
10 down and walk in after the pump starts to make sure that
11 everything is running fine.
12 MR. JORDAN: When you are flushing, this is just a
13 natural drain?
14 MR. MOORE: Right.
15 MR. JORDAN: Okay. The pumps aren't running or the
16 RHR pumps running. Is there a flow indication or how do you
17 know if you have water flowing through it?
18 MR. MOORE: The meters start indicating 2000 GPM.
19 You really --
20 MR. JORDAN: During this flush --
21 MR. MOORE: You go by temperature, I guess would
22 be the easiest way of doing that.
23 MR. JORDAN: Is that how you do it? I was just
24 curious how you -- when you cut back on the throttle, how do
25 you know you still have flow through the system?

1 MR. MOORE: Temperature. There is a chart recorder
2 on Panel 601. Outlet temperatures for the heat exchanger
3 inlet, you'll start seeing those increase and there is also
4 a point that measures the temperature for the discharge to
5 rad waste.
6 Initially when I started I had 75 or 80 degrees.
7 I started flushing for the warmup. Temperature was going up.
8 I got the call. I throttled back further. They said it
9 stopped and I still had a temperature increase. It was
10 less excessive, I guess you could say. Then someone had
11 asked me how I was doing on shutdown cooling, getting it
12 started.
13 I said, well, we got some noise, I wanted to slow
14 down. They said fine. I think it was Eric Townsend. He
15 was up in the room asking questions, just kind of seeing how
16 things were going, see if he could help out.
17 Then they said okay, when you feel comfortable if
18 you would like to increase the heatup, you can do so.
19 We wound up increasing the rate and then I had, I
20 can't remember which person I kept calling, because I had
21 three guys working with me. I asked them to check and
22 listen for noise again in the area you heard previous. I
23 increased valve position probably to something less than 50
24 percent.
25 They said there was no further noise. We had a

1 substantial heat up on the pump and then by that time we
2 were with 100 degrees of coolant temperature, and that was
3 about 3:15 when I started the cooling pump, the shut down
4 cooling in service.
5 MR. JORDAN: Does the procedure step you through
6 this use of the recorder for temperature indications?
7 MR. MOORE: Yes, it does. It gives you an
8 actual --
9 MR. JORDAN: -- the rad waste?
10 MR. MOORE: The actual number and it's a 7 --
11 actually it is a multiple point chart recorder but it gives
12 you the points that you're supposed to use and they are
13 labelled right there, which point is what.
14 MR. JORDAN: Anything to watch for as far as
15 temperature increases goes?
16 MR. MOORE: Right.
17 MR. JORDAN: That's in the procedure?
18 MR. MOORE: Yes.
19 MR. JORDAN: Don't we have that procedure
20 anywhere?
21 MR. MOORE: OP-31.
22 MR. JORDAN: OP-31. OP, right?
23 MR. MOORE: Yes. That's in N2-OP-31.
24 MR. JORDAN: Anything else you want to tell us?
25 MR. MOORE: No.

1 MR. JORDAN: Okay, we can go off the record.
2 [Whereupon, at 5:00 p.m., the taking of the
3 interview was concluded.]
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REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: Int. of BRIAN J. MOORE

DOCKET NUMBER:

PLACE OF PROCEEDING: Scriba, N.Y.

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Ian Rothrock

IAN ROTHROCK
Official Reporter
Ann Riley & Associates, Ltd.