

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

1 In the Matter of:

2 IE TMI INVESTIGATION INTERVIEW

3 of James C. Higgins, U. S. Nuclear
4 Regulatory Commission
5 Reactor Inspector, Region I
6
7
8

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

13 May 1, 1979

14 (Date of Interview)

15 June 21, 1979

16 (Date Transcript Typed)

17 #88

18 (Tape Number(s))
19
20
21

22 NRC PERSONNEL:
23 Bob Marsh, Region III
24 Tim Martin, Region I
25 Dorvin Hunter, Region III

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1 MARSH: The date is May 1, 1979, the time is 5:09 p.m. This is Bob
2 Marsh I am an inspector with Region III of the Nuclear Regulatory
3 Commission and we are together at Three Mile Island today to conduct
4 an interview of James C. Higgins of the U. S. Nuclear Regulatory
5 Commission. Prior to starting I like each member present in the room
6 to identify himself, to spell his last name and identify his position
7 with the NRC. Dan if you would start. Okay, Tim Martin NRC inspector
8 with the Performance Appraisal Branch. Dorwin Hunter, I am a Inspector
9 Specialist with the Performance Appraisal Branch, Region III. J. Higgins
10 Reactor Inspector Region I in the Reactor Operation Nuclear Support
11 Branch.

12
13 Okay Jim you are the individual we wish to speak to this afternoon and
14 as you are aware we are conducting an investigation regarding the
15 incident here March 28. Both Tim and Dorwin have some questions that
16 we would like to present to you and at this time I would like to turn
17 it over Tim I would ask a couple of things I would like to keep the
18 pace of questioning down to speak slowly if any acronyms are abbreviations
19 or jargons is used I would like to have it defined just for the people
20 who would have to transcribe this. At the end of the tape and we
21 begin to run out of tape I would give everyone a sign indicating that
22 we are running toward the end and finally a time when we are down
23 within a few second of the tape running out at which time I would like
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1 to put the time on the tape and like to put the time on the tape and
2 footage and turn it over so if you see me making certain hand signs
3 that's indicating how much time left on the tape. With that Tim I'll
4 put it in your hands, you can begin.

5
6 MARTIN: Okay, Tim Martin speaking. Jim its our understanding that
7 you were one of the first NRC inspectors to arrive on site. I would
8 like a confirmation of that and I would also like to find out how you
9 got from you arrived on site how you to Unit 2 control room; what
10 conditions you found when you arrived there and then try to brief us
11 of what occurred what you saw in the control room during that first
12 day, okay?

13
14 HIGGINS: Okay I'd like to preface this just to say that what I'm
15 giving you is my best recollection and hopefully the facts won't be
16 too clouded by the passage of time. I left in the emergency vehicle
17 from Region I about 8:45 in the morning and there were five inspectors
18 in the vehicle coming to the plant: Gallina, Plumlee, Nimitz, Neely
19 and myself and we left the Region as I said about 8:45 and proceeded
20 directly to the plant. We arrived around approximately 10:05 at the
21 north gate. When we arrived at the north gate there was considerable
22 confusion at the north gate. There was a lot of people milling around
23 there was already press there. We heard reports on the radio on c.
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1 trip up that Route 441 in front of the plant was closed and barricaded
2 by the state police. We didn't find that to be the case when arrived.
3 We didn't know what to find except when we did arrive but what we
4 found was that there were several guards out by the front gate. There
5 were also appeared to be some plant people around there what we did
6 was we went up to the guard shack and Carl Plumlee and I myself both
7 have had at that time picture badges on the site and we went to the
8 guard shack and asked the guard for our picture badges and told them
9 we were the NRC team that had arrived to look into the matter that was
10 going on in the site, the guards at that point called into the plant
11 and gave us our badges processed us quite expeditiously at the front
12 gate, then unlocked the gate, the gate was chained at this point, the
13 north gate unchained it and let us in. Once on the site we drove to
14 the parking lot by the processing center on Unit 1 and went in there.
15 There were very few people on the Island at this point as we can see
16 as compared with the normal status that you would expect at an operating
17 plant. In the processing center there were only a few people, there
18 were no guards in the processing center which is normally manned by
19 the guards force. At that point, they still had that badges there at
20 the processing center where you pick up your second badge for the
21 protected area. Karl Plumlee and I did pick up our badges there. We
22 did not get any dosimetry of any type. There are any place else that
23 day from the licensee. All of us were using our own NRC film badges.
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1 Those of us, well, I can't speak for the other people but I did not
2 have dosimeter. All I had was my NRC film badge. At that point we
3 proceeded directly to the we were given information by someone that
4 Jim Seelinger was in the Unit 1 control room and that we were supposed
5 to go up there and see him and get our initial information from Seelinger.
6 We did at that point all five of us proceeded to the Unit 1 control
7 room and we when we arrived there Seelinger was there in charge I
8 believe and we proceeded to get what information we could from the
9 people there. Some of the health physics inspectors proceeded to talk
10 to personnel about that and the environmental conditions. I tried to
11 talk to the shift supervisor and the operators to determine plant
12 conditions, both in Unit 1 and Unit 2. I spoke with Greg Hitz shift
13 supervisor and Bubba Marshall an operator, reactor operator, and they
14 had both been in Unit 2 earlier that day. I got my first scenario
15 sketchy as it may be at the point as to what happened. I expressed a
16 desire at that point to the personnel in Unit 1 control room that I
17 desired to go the the Unit 2 control room. There was some delay at
18 this point... let me check some thing here.

19
20 MARTIN: Sure go ahead.

21
22 HIGGINS: I guess it was shortly after this cause after we go the
23 first information and we were getting ready to go over to Unit 2
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1 control room that we got the word via the phones from Unit 2 that Unit
2 2 control room was being evacuated because of an airborne radioactivity
3 problem, and therefore, that delayed us getting over to the Unit 2
4 control room. So we tried to gather up some masks in order to take
5 those over with us to Unit 2. Finally we did get the masks. In the
6 meanwhile two other inspectors arrived Ray Smith and Walt Baunack.
7 While the majority of us were still in Unit 1, in the Unit 1 control
8 room, at that point when we finally did get masks together and Don Neely
9 and I proceeded over to the Unit 2 control room together and the other
10 inspectors stayed either in Unit 1 or proceeded out to begin independent
11 surveys around the plant. It was obvious at this point that it was a
12 fairly serious occurrence that had happened there because many of the
13 normal procedures that are followed in the plant were not being followed,
14 that is, in terms of security and and health physics practices, issuance
15 of dosimetry, issuances of masks and training and this type of thing.
16 So anyway Neely and I put on the masks and proceeded over to the
17 Unit 2 control room and we went down through the normal passage way
18 from Unit 1 to Unit 2, that is, down on the first floor on the turbine
19 building around the back around the passage way in the back door and
20 up to the Unit 2 control room. When we arrived there everybody in the
21 control room was in masks and so were we and it made it initially
22 quite difficult to communciate with the people and find out what was
23 going on. The people in the Unit 2 control room were experiencing

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1 some of the same difficulties in communications, that is, both face to
2 face with each other and over the phones with various people.

3
4 MARTIN: Approximately what time was this Jim you got a feel for it?

5
6 HIGGINS: I do have a rough feel. It is a guess, I'd say some time
7 between 11:00 and 11:30 I think that I arrived in the Unit 2 control
8 room with Don Neely. At that point and through the rest of the day
9 Don Neely and I tried to cover the actions in that I followed the
10 system and the plant operation and Don followed the radiological
11 aspects of the accident. Both of us talked on the phone with people,
12 with other NRC people in Region 1 and in headquarters and later on in
13 the day with State personnel also. I don't know what time Walt Baunack
14 arrived but later on in the day Walt did arrive in the control room
15 also and I would guess anywhere from an hour to two after Don Neely
16 and I arrived, maybe several hours I am a little hazy on this but Walt
17 did come back to the control room and Walt helped out considerably in
18 with two operations type people we were much better able to follow the
19 plant situation there than we would have with just one of us particularly
20 with the amount of time that was being required for us to be on the
21 phone talking with the people in the Region and in headquarters,
22 communications were very very poor the first day.
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1 MARTIN: How was the communication established Jim?

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3 HIGGINS: I don't remember exactly; I just don't remember that.

4
5 Communications were broken and established several times and it was on
6 a phone in the shift supervisor office with the Region first and then
7 later we were patched in with Bethesda and there were, it was many
8 times, they did contacted us several times when communications were
9 broken and we ended up calling back and getting in touch with them
10 more than once also. We also at different times during the day, the
11 next day, had AT&T people on that were doing all kinds of special
12 patching in and various other things were going on, on the phone that
13 I had never heard of but they were doing all kinds of things. In
14 order to establish the phone links seem like I was talking to people
15 all over the country trying to establish the communications. Let see
16 anyway at best as I can recall the plant supervision type people that
17 were in the control room were Gary Miller, Station Superintendent and
18 we had Shift Supervisors Joe Chwastyk and Bill Zewe there was Unit 1
19 Operations Superintendent Mike Ross and Unit 2 Superintendent of
20 Technical Support George Kunder.

21
22 MARTIN: Were they in the control room when you first arrived?

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1 HIGGINS: I believe, several of them were not, all of those people
2 were I believe. I don't remember exactly I believe at that point
3 Gary Miller was in the control room who was the station superintendent.
4

5 MARTIN: Who was supervising operations at this point?
6

7 HIGGINS: The there were obviously several levels of supervision all
8 in the control room which you normally don't have. We had the station
9 superintendent, operations superintendent, shift supervisors and
10 operators and so on there were very many people and basically what was
11 done and the way it was done through the most of the afternoon was
12 that people, the supervisor types, upper level supervision, gathered
13 into the shift supervisor's office and discussed the plant conditions,
14 the situation of the various systems and what courses of action they
15 wanted to take. It was many many meetings of this type of which
16 Gary Miller was generally in charge and making the decisions based on
17 recommendations of the various people that were there as the recommendation
18 of the shift supervisor input from operators from health physics
19 people that is from the Unit 2 and also from the emergency control
20 center which was being run from Unit 1 control room. Also there was
21 input from B&W people and there was a Lee Rogers have you talked to
22 Lee of B&W?
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1 MARTIN: I don't know.

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3 HUNTER: He is scheduled for an interview.

4
5 HIGGINS: Okay he was the B&W man and he had a considerable input
6 throughout the first day with recommendations from B&W as far as
7 actions to be taken and plant conditions that sort of thing. There
8 was also phone communications with different people later on in the
9 day B&W had established communications with their people in there home
10 I believe in Lynchburg later on in the day towards the later afternoon
11 communications were established between Jack Herbein over in observation
12 center and the people at that point Jack seem to be making more the
13 decisions than the in plant people as they had through most of the day
14 and in general I would say that the plant personnel the plant management
15 and the operators were all acting in basically a calm manner and
16 fairly professionally I believe. However there was some certainly
17 some uncertainty among the plant people as to where to go. The plant
18 was in a very unique situation. They didn't know how to get out of it
19 they tried everything throughout the day to recover the pressurizer
20 level to get rid of the bubbles that they knew they had in the loops
21 steam bubbles at this point they felt and perhaps some noncondensibles
22 so they really didn't know and they tried various thing trying to
23 recover and return the plant to a normal situation and most of which
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1 through out the day proved unsuccessful. Everything they tried and
2 they were very frustrated trying to recover the plant and return it to
3 a normal situation. Later on in the day when Jack Herbein started to
4 essentially take control of things from the observation center things
5 appeared to get more organized and I think it was probably the result
6 of having someone that was slightly removed from the entire problem
7 able to sit down and logically sort through the information make good
8 decisions as to which direction the plant should be taken and what
9 things should be done and it appeared at the time that the plant
10 started to make real progress towards returning the plant to a final
11 stable situation.

12
13 MARTIN: Jim when you first arrived in the control room how many
14 people were there?

15
16 HIGGINS: I really can't picture the control room at that time there
17 were it was quite crowded it was fairly crowded especially since they
18 had evacuated out of the control room even at the point it was people
19 quite a few people in the control room and just... go ahead.

20
21 MARTIN: Would you characteristic most of these people as operator
22 type?

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1 HIGGINS: Yes.

2
3 MARTIN: Or supervision?

4
5 HIGGINS: About half and half.

6
7 MARTIN: Bout half and half?

8
9 MARTIN: Were the panel obstructed could the operators actually manipulating
10 the controls see all there alarms see all there panels?

11
12 HIGGINS: Yes.

13
14 MARTIN: What kind of evolutions going on when you arrived?

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16 HIGGINS: I really can't at this point make a picture in my mind at
17 all of the control room as it was at the moment that I arrived what I
18 have to describe to you is what I can remember happening throughout
19 the day and there were operations associated with steaming or not
20 steaming the steam generators feeding the steam generators manipulation
21 on the lot of manipulation with adjusting makeup flow manipulations
22 with the pressurizer heaters and with the block valve in the eletromatic
23 and the pressurizer vent valve going on through out the day. Certainly

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1 a lot of alarms that the plant had regular annunciator alarms and also
2 radiation monitoring panel alarms that probably constituted the majority
3 of the actual operations on the control boards, those types of things.
4

5 MARTIN: What kinds of decisions were made in the Shift Supervisor's
6 office and later acted on by the operators? Do you remember some of
7 them, give us a sequence of these events?
8

9 HIGGINS: Well, I could do that by going through my notes. Use that
10 type of thing? Some of these may be out of order.
11

12 HUNTER: Let me ask one question. You commented before, then we'll go
13 on. You commented before that you obtained or attempted to obtain a
14 plant status when you first came onsite.
15

16 HIGGINS: Yes.
17

18 HUNTER: What was the plant status, describe what the plant status
19 that you found, at that time, your understanding of the status even if
20 it is different today.
21

22 Higgins: I'll give you this right out of my notes from the first day.
23 When I first arrived on the plant, the first sequence of events that I
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1 got was from, and now my notes were again kind of sketchy but I'll
2 give you what I have from there and what I believe it to be. I believe
3 this was from Greg Hitzright after our arrival in the Unit 1 control
4 room which would have been sometime around 10:30 and at that point he
5 said that initially what they had was a problem with the polisher and
6 the condensate system causing a condensate pump, booster pump and feed
7 pump trip. As a result of this they as a final end result of the
8 sequence, they had SFAS, which is a actuation of the engineer safety
9 features, or I believe a safety features actuation system and they, at
10 that point I was told that the reactor tripped on low pressure and the
11 SFAS occurred on low low pressure. Okay? And that they also had a
12 tube rupture in the B steam generator and that the auxiliary building
13 was isolated. That was Unit 2 and that was very brief because he was
14 involved with operations at this point in Unit 1. I found out that
15 Unit 1 was in hot shutdown 532 degrees 2155 psig. Shortly, thereafter,
16 I talked with, in more detail, with Bubba Marshall, who is an operator
17 and he told me that he had, about an hour before that, been in the
18 Unit 2 control room, he gave me the conditions in Unit 2 as of what he
19 knew as of 9:30. He told me that as of 9:30 the plant was at 1500
20 psi, about 550 degrees, that the B steam generator was isolated, the A
21 steam generator was being used for cooldown. He said that the incident
22 had been initiated by a loss of feed which resulted in a turbine trip
23 and initial run back of the reactor for about 8 seconds and then a
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1 reactor trip on high pressure. At that point the electromatic relief
2 lifted to the reactor coolant drain tank, the rupture disc on reactor
3 coolant drain tank blew and that resulted in a buildup in pressure in
4 containment. He told me that containment isolation was not received
5 with the initial accident but was gotten later. At that time containment
6 pressure was about 2.8 pounds, he told me. Those, that set of conditions
7 was what I called into the Region the first chance I had, which I
8 don't remember what time it was, but that description there was the
9 first description that I called into the Region. Okay. Anything else
10 on that?

11
12 HUNTER: No. Then apparently your're going into the control room and
13 you'll pick up some of your activities?

14
15 HIGGINS: Right.

16
17 HUNTER: On decision making process.

18
19 HIGGINS: Right, and through out that, okay. Fine. Let me go into
20 that... Okay, there were a lot of discussions at this point later on
21 in the day. I'll pick up around 11:00-12:00. There was a lot of
22 discussion with B&W personnel and plant personnel and with myself and
23 also with Walt Baunack when he arrived later as to running the reactor
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1 coolant pumps. At this point they were reluctant to run the reactor
2 coolant pumps because they felt they would blow the seals on the
3 reactor coolant pumps as they said, and that would create a very large
4 loss of coolant, and, therefore, they didn't want to attempt that.
5 They had attempted it earlier in the day and they said that when they
6 did attempt it they had run essentially unloaded when they looked at
7 the amperage that they were not pumping any water, either noncondensables
8 or steam and that was certainly backed up by looking at some of the
9 temperature parameters they had. So that, that type of thing was
10 discussed.

11
12 HUNTER: You indicated, Hunter speaking; you indicated that they made
13 the decisions at that time not to (run) the pump again.

14
15 HIGGINS: That's correct.

16
17 HUNTER: At that time, okay.

18
19 HIGGINS: Yes.

20
21 And, what they were trying to do, there, they knew that they had very
22 high temperatures in both hot legs and low temperatures in both cold
23 legs, so they felt that there were steam bubbles or noncondensable
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1 bubbles in the hot legs. They felt that somehow that they, and they
2 also had pressurizer level out of site on the high end, the pressurizer
3 indicated full and they believed that indication. What they were
4 trying to do was somehow recover pressurizer level, get rid of the
5 bubbles in the hot legs and reinitiate flow in the loops. Okay? They
6 were, throughout it, they were concerned about maintaining the core
7 cover and maintaining adequate core cooling. That came up in discussion
8 a lot in the control room. There were more than one time when they
9 went through and they made a decision on what course of action to
10 take, they said, does anybody here feel that the core is uncovered, is
11 there any concern among anybody that we're not taking the right action
12 as far as maintaining core coverage?

13
14 HUNTER: And that question, Hunter speaking, and that question came
15 from Gary Miller or did it come from everybody?

16
17 Higgins: Gary Miller made that statement at least once, I can recall
18 that. Yes. Later in the afternoon is when I specifically remember him
19 making that statement. There was a lot of discussion as of what
20 course of action to take in order to recover the loops and get the
21 bubble back in the pressurizer. They were having difficulty with
22 letdown so there was a lot of discussion about how to get more letdown
23 flow at various times during the day. B&W, they ended up, it was, as
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1 I said before, a lot, through a lot of this period, a lot of people
2 were in masks and communications were somewhat difficult. People did
3 take off mask periodically in order to improve communications when the
4 frustration built up to such a point that and they had important
5 things they had to discuss in the shift supervisor's office, took the
6 masks off and held them right there. Both face to face communications
7 and communications over the phone and I did the same thing sometime
8 when I was trying to communicate back to the Region and I was just
9 unable to make myself understood or understand back what they were
10 trying to tell me over the phone. As I said earlier, also, the communications
11 were bad and not only had we lost communication at time, but there
12 were quite a few times when I was trying to tell the Region what was
13 going on in the plant, types of management decisions that were being
14 made and the people that I was talking to either didn't understand
15 because they had shifted off four times and they weren't, the people
16 that were picking the phones back up weren't getting briefed as to
17 what happened before. There was a lot of problem with that and also
18 with background noise in the Region and Headquarters, people trying to
19 talk to the person while they were trying to talk to me in the control
20 room. That was happening continually even while I was pulling my mask
21 off in a contaminated area, trying to talk to people on the phones,
22 very frustrating. Getting back to some of the other management type
23 decisions, the, a lot of the decision as to how best to recover and

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1 get rid of the bubble in the leg, a lot of the input for this type of
2 decision was made by the B&W people and it was difficult at times to
3 completely follow what actions they were taking.

4
5 MARTIN: Was this B&W Lynchburg or B&W representative who was on site?

6
7 HIGGINS: The representative on site, but he was getting input from
8 Lynchburg and I don't know how much input he was getting from Lynchburg.
9 I have the impression that most of it was coming from directly from
10 the personnel on site and I'm not sure that they were getting that
11 much from Lynchburg, but they may have been.

12
13 MARTIN: How soon after you arrived did the B&W man have contact with
14 Lynchburg?

15
16 HIGGINS: I don't know what time the link was established. They were
17 talking to Lynchburg back around, I believe behind the back panel with
18 the phone back there so I don't know what time that was established.
19 I believe that they had that when I arrived, I'm not sure. There were
20 two B&W reps there, I only know the name of one, Lee Rogers.

21
22 This is Jim Cresswell speaking. Was the other one John Flint?

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1 HIGGINS: I don't know his name. Okay. The other types of decisions
2 that were discussed and made were, was controlling primary pressure
3 and whether or not to take primary pressure high and try and control
4 it high on the electromatic relief or the pressurizer vent or to take
5 pressure low and try to get on the decay heat removal system. There
6 was a lot of discussion about getting the plant low enough to go on
7 the heat removal system at one time that day; they did try to take
8 pressure down in order to initiate decay heat removal system.

9
10 MARTIN: Who made that decision to go that route?

11
12 HIGGINS: Well, all decisions were made sort of as a, with the input
13 of all people that were present and the final decision was made by
14 Gary Miller. He was in charge and he was making the decision but he
15 was getting input from all people present as I discussed, that is, the
16 Shift Supervisors and the B&W people and Operations Superintendent,
17 and so forth.

18
19 MARTIN: Were there ever phone contacts made before the decisions were
20 finalized?

21
22 HIGGINS: Later on, as I can best recall, the phone contacts did not
23 start to really come into play as far as decision making until late in
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1 the afternoon when Jack Herbein started to do that and at that point
2 when that began that, it appeared that the process became much more
3 orderly. Lets see... There was a lot of, there was discussion upon
4 reducing pressure in order to get down when they could get on the
5 decay heat system, there was a lot of discussion about the core flood
6 tanks in order to, they want to lower pressure and they felt that when
7 they got down around 600 pounds where the core flood tanks could
8 inject they wanted to go ahead and let them inject and that would,
9 provide an addition source of makeup water for core cooling and insuring
10 that the core was covered and they thought that would also give them
11 positive indication that the core was covered and when the core flood
12 tanks, when the pressure drops 600 pounds and the core flood tank
13 levels dropped very slightly and didn't inject any more they felt that
14 at that point that the core was covered. There was continued discussion
15 also about the mode of cooldown whether to draw vaccum into the condensor
16 whether to use the atmospheric relief valves, this type of thing.
17 There was concern in when the pressure was being maintained high and
18 the plant was cycling the block valve to the, the electromatic relief
19 valve in order to control pressure. There was a lot of concern about
20 the block valve failing because of continued cycling and that, at
21 that, shortly after that the decision was made not to cycle that
22 anymore but to leave it closed and to use the pressurizer vent valve
23 for pressure control and then also, this to reduce pressure, that was
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1 part of the consideration in reducing pressure so they didn't have to
2 do that. There were a lot of periperial things happening throughout
3 this, away from the main problem in recovering the loops in the pressurizer
4 and so forth, and there were, as I said, Shift Supervisors and Operations
5 Superintendents in this type of thing and they were attacking a lot of
6 these periperial problems throughout the day. Just one example comes
7 to mind is that there was loss of power to various instrumentation at
8 one point, they lost the entire area radiation monitoring panels would
9 be energized and they lost various powers and that was regaining after
10 a half hour or so. There were a lot of peripheral problems like this
11 coming and going which added to the overall level of confusion... I'm
12 just looking through here to see if I, some more of the examples of
13 the type of things you're asking about. When the decision was made to
14 forgo the effort to reduce pressure and get on the decay heat removal
15 system, partially it was because they weren't able to reduce pressure
16 low enough, but they also at that point...

17
18 MARTIN: What did they attribute that to? What, when they were unable
19 to get below, I think it was 450 pounds,

20
21 HIGGINS: They attributed that to being at saturation conditions and
22 they had to, they felt, they had to cool down and reduce pressure
23 together at that point in order to get any lower and. The, sometime,

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1 okay, this was around 5:00, around 6:00, 5:45, 6:00 they decided,
2 after discussions with Herbein on the phone, Herbein felt that there
3 was some concern that, whether the core was covered or not and the
4 plant people were not sure why he had this concern. They did not have
5 the concern, but he did over the phone, and he wanted them to take
6 pressure back up to around 2000 plus pounds and by filling the pressurizer
7 solid and what he wanted to do was take the pressure back up, insure
8 positively by increasing pressure that any steam bubbles that existed
9 in the system in the core were collapsed and the plant people initially
10 did not agree with that but he wanted them to do that. At this point
11 decisions were being made by him, by Herbein, via the phone.

12
13 MARTIN: This was around 4:00, 5:00?

14
15 HIGGINS: This was around 6:00, 5:45, 6:00. 5:45-6:00 was when they
16 finally decided to increase pressure back up after discussions on the
17 phone with him for some time. So they did that at this point they
18 were also drawing the vacuum in the condensor and trying to steam the
19 A steam generator for cooldown. Okay. I guess those are the only
20 examples I can find now for the type of things you're asking, the
21 types of decisions that were made by the people and who they were made
22 by.

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1 Hunter speaking. When you came on, into the plant cooler, the Unit 2
2 were already in respirators and did you get an indication from the
3 people, Gary Miller, or any of the management in the control room of
4 the radiation problem and where it was coming from?

5
6 HIGGINS: All the people at that point felt that it was coming from
7 the auxiliary building from the water that had been pumped out of the
8 reactor building sump into the auxiliary building and it had overflowed
9 the sumps in the auxiliary building and then was being transmitted
10 through the ventilation systems somehow causing activity levels everywhere
11 to go up because after I arrived in the Unit 2 control room I heard
12 that Unit 1 control room had to get a mask also. So therefore, they
13 felt that it was just going throughout the plant and they believed the
14 source to be from the auxiliary building, Unit 2.

15
16 Hunter speaking again. At any time during the daytime did, during the
17 morning, did you get involved in any discussions concerning containment
18 isolation?

19
20 HIGGINS: Yes, I did.

21
22 At the point it was isolated and any changes that occurred at that
23 time?

24
25 894 074

1 HIGGINS: The discussions that I had, I found out that containment was
2 not isolated additionally when the event occurred and that is why the
3 auxiliary building sump pumps pumped to the auxiliary building. I was
4 told that containment was isolated later on but was not able to obtain
5 any definitive information as to exactly when that occurred. I did
6 monitor the pressure containment throughout the late morning and early
7 afternoon to see what the pressure was and how it was dropping.

8
9 Did, Hunter speaking, did you note the pressure spike on the reactor
10 building pressure?

11
12 HIGGINS: No, I didn't. No. But the information I can give you on
13 that is I was not aware of that at all, I guess, it is probably pretty
14 indicative about the type, the level of activity that was going on in
15 the control room. There was so much going on, so many various different
16 things that any given thing could easily have been missed by me or the
17 other people, and actually, to give a further example, the first time
18 that I realized that the spike had been there was on Friday. And, on
19 Friday, people, I guess, were going over the charts and were looking
20 at that and I started, picked it up and started to discuss it with
21 plant management and came out and talked to Gary Miller about it and
22 at that point he said that, in discussing at that point, he realized
23 that he had heard it and that he had recognized it on Wednesday but
24
25

894 075

1 that was the first time he had thought of it since then, that he had
2 completely forgotten about it in the whole rush of events that occurred,
3 and he stated at that point he remembered, clearly saying to the
4 operators what was that, and looking over and the operators securing
5 the building spray pumps and it was at that point on Friday that I
6 believe, that plant management really realized that they had that
7 pressure spike.

8
9 HUNTER: Okay. Another area of interest is that during the decision
10 making process, did you hear or were you aware of discussions concerning
11 the boron, the BWST being pumped into the containment and the water
12 level decreasing and they were reducing their inventory?

13
14 HIGGINS: Yes, there were discussions as far as that and there was
15 some concern about it. It appeared that there was, I was not involved
16 with too much from the plant as far as discussions on BWST, I did a
17 lot of headquarters, NRC had a lot of questions about BWST levels, and
18 I fed a lot of information on BWST levels versus time over the phones
19 to the NRC people in Washington and the Region.

20
21 HUNTER: Okay. Were you involved or did, were you privy to any discussions
22 concerning high pressure injection flow?
23
24
25

894 076

1 HIGGINS: Yes.

2
3 Throttling the flow?

4
5 HIGGINS: Yes.

6
7 HUNTER: And the, in your stay in the control room?

8
9 HIGGINS: In general, the plant was, flow was being varied considerably
10 throughout the time that I was there and flow rates, I did pass makeup
11 pump flow rates to the, again over the phone, to Washington at various
12 times during the day, looks like the first time I have anything in my
13 notes on that is around noon, where two pumps, one pump, two pumps
14 being run, one was 200 gpm, the second was 125 gpm and later on in the
15 day, I believe I have something in here as far as the calculation by
16 B&W, which determined for the core coming from Lynchburg, given the
17 amount of core decay heat that they had if makeup was the only source
18 of heat removal that they needed, 400 gpm I believe makeup flow they
19 had calculated.

20
21 HUNTER: Okay, lets take a break. We're coming to the end of the
22 tape.

23 894 077
24
25

1 MARSH: Okay. Time is 5:53. I'd like break at this point and turn
2 the tape. I'm reading 697 on the meter.

3
4 MARSH: The time is 5:54. I'm reading 698 on the meter. Dorwin, I
5 think you were asking a question at the time we were interrupted.

6
7 HUNTER: Okay. I had just, we had just talked about discussion of
8 high pressure injection flow and you had indicated that at one point
9 B&W had calculated that if the injection flow that they had was all
10 the coolant that was being fed to the reactor, that it wasn't adequate
11 to remove decay heat.

12
13 HIGGINS: I don't remember if that's exactly the case. I believe that
14 they calculated a number that they felt that they, if they could
15 supply that much makeup then that would be adequate. I can't find
16 that right now.

17
18 HUNTER: Okay. In your particular location, you said you were watching
19 reactor building for a substantial amount of time.

20
21 HIGGINS: Off and on throughout the day.
22
23
24
25

894 078

1 HUNTER: Did that put you in the area of the injection flow indicators?
2

3 HIGGINS: Yes.
4

5 HUNTER: Did you look at those more frequently than just calling them
6 in? Did you watch them throughout the day?
7

8 HIGGINS: I looked at them periodically throughout the day at times
9 when I wasn't calling them in. Other than what I have in my notes for
10 flow rates I don't recall numbers, I have, sometime between 4:30 and
11 6:00, was when B&W made that calculation that they felt they needed
12 about, excuse me, 400 gallons per minute letdown which would be correspondingly
13 matched with 400 gpm makeup in order to match the heat from decay
14 heat.
15

16 Okay. Hunter speaking. And 400 gallon per minute letdown, they're
17 referring to taking the water out of the reactor coolant system through
18 heat exchangers and then feeding back high pressure injection at 50
19 degrees, at whatever the temperature is.
20

21 HIGGINS: That's correct.
22
23
24
25

894 079

1 HUNTER: Did you, were you privy to discussion about that particular
2 number, whether they could establish any letdown flow?

3
4 HIGGINS: They were having difficulty, they did not establish that
5 much letdown flow. They were having difficulty throughout the day
6 with blockages in their letdown lines, in establishing adequate letdown.

7
8 HUNTER: Could you amplify that particular item with difficulties with
9 letdown flow-if you were involved in any of those discussions? Or
10 actually involved in any of the letdown, the numbers that they were
11 obtaining in the letdown?

12
13 HUNTER: Do you follow me?

14
15 HIGGINS: I have a figure at 2:30 with letdown flow being 100 gpm at
16 2:30. See if I have any other ones. 12:15 letdown flow was 70 gpm.
17 They did find that as they reduced pressure from the higher values
18 down to the lower ones that they lost some of their ability to let
19 down. And, they were trying, they spent efforts throughout the day
20 trying to bypass various filters, and demineralizers, and so forth, in
21 the letdown system. A little more discussion on this, I hope this is
22 from the first day since this isn't from my notes, its from my memory,
23 it is possible that it could be from a couple days later on, but I
24
25

894 080

1 believe that it was the first day. Here's another letdown No. (at)
2 310 it was 120 gpm letdown. There were discussions about, in the
3 auxiliary building where they had to go to bypass the various filters
4 there, there were very high rad areas being measured up in the range
5 of greater than 100 R per hour and there was discussion about what the
6 NRC would consider, would consider a deliberate overexposure to personnel
7 in order to go in and operate those particular valves and Don Neely
8 was working with that, so he might, he can give you some more information
9 on that I'm sure. As far as sending personnel in to get deliberate
10 overexposures to establish the additional letdown that they felt they
11 needed. That was part of the problem in recovering pressurizer level
12 in that they could not get adequate letdown in order to, well, there
13 were two problems really, in that they had lost some of their heaters,
14 lost power to some of their heaters and they also weren't able to
15 establish adequate letdown in order to redraw the bubble in the pressurizer.

16
17 HUNTER: This is the feeling you got from the management of the plant,
18 the reason they couldn't reestablish the bubble?

19
20 HIGGINS: Yes.

21
22 HUNTER: Is this what they told you?

23 894 081
24
25

1 HIGGINS: Most, they were not talking directly to myself or Walt
2 Saunack throughout most of the day, but we sat in and participated the
3 meetings that they had. The personnel were extremely throughout the
4 day. All personnel involved, they were actively involved in decisions
5 in the plants situation throughout the day, and it was, we tried to
6 impact as little as possible on plant management with extraneous
7 questions and this type of thing, if we felt we had a legitimate point
8 to interject, a legitimate point we certainly made it right there but
9 as far as making them go through additional explanation and what they
10 were doing for our benefit, we didn't do that because that would have
11 impacted directly on their ability to function in the situation they
12 were in.

13
14 HUNTER: I understand. And during the discussions of letdown and
15 makeup did you, do you recall them discussing makeup and letdown
16 balance, maintaining makeup more than letdown at all times, or matching
17 makeup and letdown at all times?

18
19 HIGGINS: No, I don't.

20
21 HUNTER: Anything along that line?

22
23 894 082
24
25

1 HIGGINS: No, I don't.

2
3 Okay.

4
5 HIGGINS: And there was, there was certainly, there was a lot of
6 difficulty in reading exactly what makeup and letdown were, because
7 of problems with both the makeup and letdown instrumentation. I don't
8 remember specifically which instruments, but there were problem,
9 problems in several of the instruments there and getting good readings
10 off of those.

11
12 MARTIN: Jim, at any time did you, did the impression that the, there
13 were too many people in the control room and that they were interfering
14 with operations?

15
16 HIGGINS: Not the first day. I'd have to say that the number of
17 people did not interfere, it was more the situation that existed that
18 causing the problems rather than the number of people causing the
19 problem the first day. Later on, several days down, that was a problem
20 in the number of people in the control room, starting about Friday,
21 that became a problem.

22
23 894 083
24
25

1 MARTIN: Who was giving orders to the operators to take action? Was
2 it still the Shift Supervisor or did Gary Miller assume that authority,
3 or someone else?
4

5 HIGGINS: It wasn't clear cut in that one person was giving direction
6 to the operators as I recall, it may have been in one case. Mike
7 Ross, in another case, Gary Miller in another case, Shift Supervisor.
8 It was not a clear cut distinction that this is the person that gives
9 the direct order to the operator to manipulate a particular valve and
10 only this person, that didn't exist.
11

12 MARTIN: In the control room were people assigned to specific panels
13 to watch certain parameters or was it just if it got past a parameter
14 and felt it was out of line you then talked about it?
15

16 HIGGINS: That was second, was probably closer to the actual situation
17 than the first.
18

19 MARTIN: How many people were actively involved in operation, manipulation
20 of controls?
21

22 HIGGINS: Afraid I can't do any better than several.
23
24
25

894 084

1 MARTIN: Were they getting information from the back panels, Jim?

2
3 HIGGINS: Yes.

4
5 MARTIN: Who was getting that information?

6
7 HIGGINS: I believe there were at times operators going back there
8 also some B&W people were back operating the, getting direct readouts
9 off some of the, some thermocouple bridges, RTD bridges and passing
10 that information up front. Although, throughout the day there was
11 confusion among the operators and also earlier on the, among some of
12 the supervision as to the indications that they were seeing on the
13 temperatures, the reactor T hot and T cold, that type of thing. The T
14 average.

15
16 MARTIN: What, we've heard several references now to problems with the
17 T average indication when it appeared to hang up at 570 degrees, was
18 that ever resolved in their minds why it was hanging up there?

19
20 I didn't hear any discussion on that, and I think that it was probably
21 too minor of a problem for people to concern themselves with at that
22 time. It was it was a type of thing that, there were bigger system
23 type problems to worry about than that in general, the type of thing
24
25

894 085

1 also where it would have been nice to have done, is to have a nice,
2 someone to take over in the corner and look at the charts analyze what
3 was going on, and come up with some good information as to perhaps
4 what they had in there. That just wasn't done to my knowledge because
5 it was, there was too much else going on.

6
7 MARTIN: Who made the decision to jog the pump in the A loop at, I
8 guess it was around 8:00 that night?

9
10 HIGGINS: I left at 7:30. I left the control room at 7:30. Just when
11 they were getting ready to start the pump in the A loop and I left the
12 control room at 7:30 and went to the Unit 1 control room, picked up
13 with Neely, I picked up Gallina, we went over to the observation
14 center, at that point we had been requested to go to the Capitol to
15 talk to the lieutenant governor about the situation and before we went
16 there Jack Herbein wanted to talk to us and give us the latest updated
17 status as he knew of and so we went to the observation center. When
18 we arrived at the observation center, sometime getting on to 8:00, we
19 were told that the reactor coolant pump in the A loop was running, by
20 Herbein.

21
22 MARTIN: When you arrived in the observation center, who was helping
23 Herbein out there?
24
25

894 086

1 HIGGINS: I'm not sure. There were about half a dozen people in the
2 back room and there's, if you're familiar with the observation center
3 the room all the way in the back where Jack Herbein was, he was in
4 there by himself with prints and this type of thing, in the next
5 larger room there were half a dozen people or so, in the main room it
6 was jammed packed with people and there's a lot of confusion in the
7 main room in the observation center. There was some frisking being
8 done there, and when we left the plant that was the first time we were
9 frisked, was out in the observation center at that point. Don Neely
10 found that his pants were contaminated. At that point we, I believe
11 George Kunder was there, but I'm not sure, Unit 2 Superintendent
12 Technical Support, I'm not sure about that, however. Anyway, we
13 discussed with Jack, the plant, the latest plant status and then
14 Gallina and I left with a state trooper to go to the Capitol.

15
16 Hunter speaking again. Excuse me Jim, you left the control room at
17 7:30?

18
19 HIGGINS: Yes.

20
21 Were you relieved by another NRC IE inspector?
22
23
24
25

894 087

1 HIGGINS: Walt Baunack stayed in the control room. He had been there
2 since early in the afternoon with me. As I said earlier, I don't
3 recall exactly when Walt arrived, but it, I believe, shortly in the
4 afternoon, after 12:00 and he was there all day. When I left, he
5 remained.

6
7 HUNTER: Okay. And would you, who asked to you to leave or how did
8 the word come for you to leave?

9
10 HIGGINS: Well, in the control room late in the afternoon, we had two
11 calls from the Lieutenant Governor's office, one from a Mark _____
12 and also another one from Nate _____. Our discussions with them
13 were that, the discussion earlier about 5:35 with Nate _____ I
14 don't recall exactly what we said but later in the second one with
15 Mark _____ was around 7:15 p.m., and he expressed concern, he said
16 that he was calling for the Lt. Governor and he wanted to know basically
17 what the situation in the plant was, stated that they were having very
18 much difficulty getting good information finding out what was happening,
19 what was going on, he did not ask for any technical details, he was
20 not a technical person, but he did want to know what was going on
21 onsite with the people and if we felt, he wanted our evaluation if the
22 people were adequately handling the situation. We told him that we
23 felt they were, that the people were acting professionally and they
24
25

894 088

1 were beginning to get the situation under control. The request, as I
2 recall, came from them for us to go to the Capitol and brief the Lt.
3 Governor on the situation in the plant. At that point the decision
4 was made and I can't remember who it was made by for the three of us
5 to go; Gallina, Neely, and myself.

6
7 MARTIN: When you went out to see Mr. Herbein at the observation
8 center, did you have any other discussions other than the reactor
9 coolant pump had started and it was now running in the A loop?

10
11 HIGGINS: As I recall that was the only change, we asked him if there
12 were any other changes and if he wanted to tell us anything else
13 before we went and he said that was the only change from when we had
14 left the control room and that was all we discussed. He was continually,
15 while we were there in his office, discussing over the phone plant
16 status with the control room as he had been, while we were in the
17 control room. All these discussions took place on speaker phones and,
18 as I said, we were there in the Shift Supervisor's office when they
19 took place, so we were privy to both ends of the conversation.

20
21 MARTIN: Okay. Did you see anyone during your stay in the control
22 room pull out some steam tables and check to see if saturation conditions
23 existed anyplace in the plant using the temperatures, at least were
24 displayed to them?

25
894 089

1 HIGGINS: No, I didn't. I looked for them a couple of times and
2 couldn't find any but that was a quick check and it was not exhaustive
3 and they may have very well been there.

4
5 MARTIN: What do you think was the basis for their belief that the
6 core was still covered up until a time that Mr. Herbein urged them to
7 increase pressure and refill the primary system? I recognize I'm
8 asking for your opinion.

9
10 HIGGINS: Let me think about that for a minute and see if I can reconstruct
11 it. Around 12:30, they went to the core flood tanks when the pressure
12 dropped around 600 pounds in the core flood tanks came on. Okay.
13 They, the pressure was around 600 pounds and the core flood tanks
14 injected slightly but they did not go in any more than that. They
15 felt that that was telling them that there was not a bubble in the
16 core, that it was solid water in there and that they, there were
17 discussions about temperature versus pressure relationships. But I
18 never did see any steam tables in use myself, although, it appeared
19 that people were using them from the discussions I had heard. There
20 was a lot of problem, a lot of difficulties as far as doing that type
21 of thing because of the unreliability of all the temperature instrumentation,
22 people really didn't know what the temperature was where with the TC's
23 very, very low, the TH's very, very high and not knowing exactly what
24
25

894 090

1 was in the core, because early on they did try and get thermocouple
2 printouts but were unsuccessful, they were what they considered at
3 that time, failed indications on the RTD's.

4
5 Excuse me, Hunter speaking. They got indications, failed indications
6 on the thermacouples, were they getting them off the process computer?

7
8 HIGGINS: Yes.

9
10 HUNTER: And, do you recall what kind of indication they got, they got
11 question marks, or did they get bad data, or

12
13 HIGGINS: I didn't see the indications, I only heard, perpherally
14 short discussions on it...

15
16 HUNTER: That they got bad data?

17
18 HIGGINS: That's right. People said that, I heard statements that the
19 core thermocouples had failed and I didn't pursue it any further.

20
21 MARTIN: Okay. Did anyone raise the question that the core flood
22 tanks are very similar to the pressurizer in that, they both indicated
23 relatively full although they had already admitted that there were
24 bubbles in the loops?

25
894 091

1 HIGGINS: There was no comparison of the core flood tanks with the
2 pressurizer to my recollection.

3
4 Okay. Hunter speaking. I have no further questions at this time.

5
6 MARTIN: Jim, let me ask you one further thing. You may have heard
7 some discussion once you got there of earlier events. Do you remember
8 any of that and any justification for actions that they took?

9
10 HIGGINS: What do you mean by earlier?

11
12 MARTIN: Events that occurred before you arrived in Unit 2 control
13 room?

14
15 HIGGINS: Okay. Yes, there was discussion of earlier events.

16
17 MARTIN: Could you relate some of that to us?

18
19 HIGGINS: Well, there was discussion about the attempted start of the
20 reactor coolant pump earlier, which I discussed already.

21
22 Hunter speaking. That was when they started the pump and ran it and
23 they had no current indicating that the pump was not pumping any
24 liquid.

25
894 092

1 HIGGINS: A very low current.

2
3 HUNTER: A low current?

4
5 HIGGINS: And there was also, there were at times some discussions of
6 the original event in order to, and things that happened shortly after
7 that, in order to interpret what was going on in the plant, for example,
8 the rupture, the rupture disc blown on the reactor coolant drain tank
9 and where the water or the steam was going when they were venting out
10 of the pressurizer vent, the pressurizer electromatic relief, that
11 type of thing.

12
13 HUNTER: Any discussions on nuclear instrumentation that you recall?

14
15 HIGGINS: I heard no discussions on nuclear instrumentation that I can
16 recall. I do have, I have an entry in my notes on source range counts.
17 2:00 p.m., NI 1, 400 counts; NI 2, 60 counts. That was one I took
18 myself, but I heard no discussion among plant supervision on nuclear
19 instrumentation.

20
21 Cresswell speaking. Was there any discussion about the difference in
22 those count rates?

23 894 093
24
25

1 HIGGINS: No. I did not hear any.

2
3 Jim at this time, this is Tim Martin, they already knew they had
4 airborne activity in the auxiliary building and you indicated that
5 they believed that it came from the water that was pumped from the
6 reactor building. But how did it get out of the tanks in the auxiliary
7 building to the atmosphere? Was there any discussion of that aspect?

8
9 HIGGINS: I did not hear any discussion of that aspect and that was
10 one of the types of thing we were trying to find out as best we could
11 in addition to all of the other things that were going on and never
12 did find out that first day.

13
14 MARTIN: Jim, were there any discussions about the problems they were
15 having with the pressurizer heaters?

16
17 HIGGINS: There were some discussions in that, that was one of the
18 peripheral things that wasn't, that was apparently handled by other
19 people outside of the main discussions and early on I had an indication
20 that they had no pressurizer heaters available and later on they had
21 got some of those back and I was not privy to any of the discussion
22 that went on with that.

23 894 094
24
25

1 MARTIN: J m, can you think of anything that we haven't asked you
2 about, maybe would help our investigation that you would like to
3 relate to us at this time?

4
5 HIGGINS: Let me just make one quick run through here and maybe there'd
6 be something that could. Let's see. On pressurizer heaters, they did
7 state early on, around 11:30, that they had no heaters available, the
8 pressurizer was full, they could not heat it up and draw a bubble
9 because the pressurizer heaters were apparently grounded. The people
10 believed that B steam generator was very, what I'll do here is run
11 through my notes and if there's topics we haven't discussed, I'll
12 mention them and see if you want any elaboration, you can give them to
13 me or do you think that wouldn't be worthwhile?

14
15 MARTIN: No, please.

16
17 HIGGINS: Okay. People felt that the B steam generator was highly
18 contaminated although, I was never able to establish from talking with
19 people why they held that belief and they did feel that there was a
20 tube leak however, throughout the day there were 300 pounds maintained
21 in the B steam generator even when 2000 pounds were in the primary,
22 there was no indication at all of any increasing level or pressure in
23 the B steam generator throughout the day. Throughout the early morning
24
25

894 095

1 people believed that they did have some natural circulation flow even
2 though the TH's were pegged high, and the TC's were down around 210
3 degrees.

4
5 MARTIN: Were they able to justify that, Jim, on steam generator
6 pressures?

7
8 HIGGINS: No. It was just, it was a feeling that they did have natural
9 circulation flow albeit it small.

10
11 MARTIN: Was the only indication they were using for the TH and TC the
12 chart recorders or were they using back panel indications for that?

13
14 HIGGINS: My impression was that early they were using the chart
15 recorders but that later on in the day they started to get readouts
16 from the back panels. There was discussions throughout the day of
17 what the boron concentration was but never did get a good answer to
18 that question. I'll skip over some of numbers that we haven't discussed
19 because I'm sure you have that on charts and graphs, that type of
20 thing. Early on, the plant in the early, very early afternoon, 12:00,
21 12:45 to 1:00 they were still using the atmospheric release on the
22 steam gen, the A steam generator for their mode of cooldown. They
23 were getting very little flow and very little cooldown from the atmospheric
24
25

894 096

1 release. There was continued discussion certainly among the people in
2 the control room and coming from the Emergency Control Center and
3 phone calls coming in from state personnel about the continued releases
4 from the plant to offsite and efforts to reduce those. I did some
5 looking into their mode of cooldown in these atmospheric reliefs and
6 in discussion with the operators I found that the, they were feeding
7 the A steam generator with the condensate pump. I asked George Kunder
8 and Gary Miller why they continued to feed the A steam generator from,
9 with the condensate pump, from the condensor when, if the B steam
10 generator was highly contaminated and certainly the condensor would
11 also be contaminated. At that point, they didn't, hadn't realized
12 that the plant had shifted from a, from feeding the generators with
13 the emergency feed pumps as they had earlier which was a pure supply
14 of water to feeding from the condensor and when I informed that to
15 them they went out and checked that with the operators and verified
16 that indeed they were feeding them with the condensate pump. Shortly
17 after that there was another call from the state. The state was
18 getting very militant about securing all venting from the plant, all
19 releases. Then there was a discussion with Mike Ross as to what
20 benefit the plant was getting from the cooldown from the atmospheric
21 reliefs. Mike Ross felt that because of the lack of natural circulation
22 or the small amount of natural circulation in the low pressure in the,
23 the very low pressure in the A steam generator, that is 50 pounds or
24
25

894 097

1 less, that they were not getting much cooldown from that and therefore,
2 Gary Miller said, well, we'll secure, at this point, they were controlling
3 the atmospheric relief manually. So they decided to secure that, that
4 mode of cooldown using the atmospheric relief on the 'A' steam generator
5 and to my knowledge, they never did initiate it after that. That
6 would have been around 1:15 when they secured that... They did attempt...
7 they were using in order to collapse the bubbles in the hot legs, they
8 were using a method where, I was not able to get the exact lineup, but
9 they were charging in with the charging pumps and trying to flush that
10 water through the hot leg the colder water through the hot leg and
11 somehow up the spray line and into the pressurizer in order to reduce
12 temperatures in the hot legs and get rid of the bubble. That did work
13 once in the A loop as indicated by dropping in the TH; however, not
14 too long after that the bubble reformed in the A loop, and finally
15 later on in the day they were able to finally recover it and get rid
16 of the bubble in there and finally start the reactor coolant pump...
17 We didn't discuss drawing the vacuum in the condensor at all, that
18 occurred around 2:45-3:00 by my notes. They commenced to lineup to
19 start _____ to do their lineup to draw a vacuum into the condensor
20 about 3:00. They had also at that point tried to sample the A steam
21 generator in order to determine whether or not they could cool down to
22 the condensor by steaming the A steam generator. They noted that the,
23 after they did collapse the bubble in the A loop that the pressure in
24
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1 the steam, in the A steam generator started to increase; therefore,
2 they felt they had indication of additional heat transfer and additional
3 matched circulation in the A loop.

4
5 MARTIN: Approximately what time was that, Jim?

6 HIGGINS: Around 3:00... Let's see. I have very little in my notes
7 about offsite radiation doses and that type of thing, but I do have
8 one entry around 4:00 p.m. when they had the reading of 70 mr/hr at
9 the north gate. That's the north gate or the weather station and 100
10 mr/hr at the service, the exterior service building. This is, all the
11 information the plant was getting on this was very confusing because
12 originally there were very low levels being reported offsite then we
13 got these tremendously high values and then shortly after other readings
14 came and said those values were bad, and then we got other reports
15 back, no those were good but they have the decreased down to less than
16 1 mr/hr. There was a lot of confusion associated with that. Don
17 Neely did most of the following on those. 4:15 still working to get
18 condensor don't have it yet even though they had started back around,
19 3:15. Most of the other things we discussed already. Part of the
20 reason, throughout the afternoon they had tried for a long time to try
21 and establish a pressurizer level, they finally had coming on 5:00 or
22 so, 5:30, in at that point Herbein started discussing taking the
23 pressurizer solid again and increasing pressure and that was part of
24
25

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1 the plants reluctance to do that. But they did base on his recommendation.
2 At this time, I do have throughout here some BWST levels but I think
3 you got that.

4
5 HUNTER: Do you recall how they recovered pressurizer level? Hunter
6 speaking. Were they using letdown?

7
8 HIGGINS: They were using letdown and they did get more heaters later
9 on in the day, that was the way that they did that.

10
11 Okay.

12
13 HIGGINS: And, I guess that's about all that I have.

14
15 CRESSWELLS: You mentioned that you had, this is Jim Cresswell speaking,
16 you mentioned that you had made some recommendations to operators.

17
18 HIGGINS: We had some discussions throughout the afternoon as far as
19 when we felt that we had some input as far as what they were doing if
20 we had any ideas throughout this, we didn't make our statements known
21 to, to Gary Miller or the people involved in the discussions. Those
22 were either made in the meetings or separately to them on the side.
23 There were not, certainly I cannot recall any momentous recommendations
24
25

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1 that we made but it was more on the order of comments or discussions
2 or questions where we felt that we had some input. I can remember
3 Walt Baunack certainly making a strong recommendation and that they
4 think very hard about putting the decay heat removal system on when
5 they were trying to do that.

6
7 HUNTER: One quick one. Before you met with the state people and you
8 had your meeting with Mr. Herbein in the visitors center, did he give
9 you any advice?

10
11 HIGGINS: No.

12
13 HUNTER: That's all.

14
15 HIGGINS: Okay.

16
17 MARTIN: Jim, I think that's all the questions. We certainly appreciate
18 your time. Thank you very much.

19
20 Before we terminate, this is Marsh speaking, Jim, I notice you've been
21 making reference notes through the whole which you have in a spiral
22 bound note book. I'm sure you're aware of it but I would recommend to
23 safeguard those notes and because of the Freedom of Information Act
24 and being not sure how far this investigation will proceed.

1 HIGGINS: You do have a copy of these already.

2
3 Fine. Greg, do you have anything? Okay. At this time being 6:31 p.m.,
4 we have a reading of 275 on the meter which, I believe, indicates 1275
5 feet. End of the second side of the first cassette, we will terminate
6 this interview ending at this time.

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