UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:

IE TMI INVESTIGATION INTERVIEW

of Mr. Thomas Wright, Instrument Man, Nuclear

Trailer #203
NRC Investigation Site
TMI Nuclear Power Plant
Middletown, Pennsylvania

June 15, 1979
(Date of Interview)

July 7, 1979
(Date Transcript Typed)

#310
(Tape Number(s))

NRC PERSONNEL:

Mr. Anthony Fasano
Mr. James S. Creswell
Mr. Owen C. Shackleton

T

SHACKLETON: The time is now 2:32 p.m., Eastern Daylight Time, and my name is Owen C. Shackleton, and we are present conducting an interview of Mr. Thomas, first name is the usual spelling, T as in Tom, HOMAS, middle initial J as in Jim, the last name is Wright. It's spelled W as in William, RIGHT. Mr. Wright is an instrument man, first class, nuclear, with the Metropolitan Edison Company assigned to the Three Mile Island Nuclear Power Station. This interview is taking place in Trailer #203, which is parked just outside the south security gate at the Three Mile Island facility. Present to conduct this interview from the U.S. Nuclear Regulatory Commission is Mr. Anthony, first name usual spelling, ANTHONY, middle initial N as in Nancy, Fasano. Last name is spelled F as in Frank, ASANO. Mr. Fasano is an Inspection Specialist, Performance Appraisal Branch, Inspection and Enforcement, Reactor Construction Inspection presently assigned to Region I. Also present from the U.S. Nuclear Regulatory Commission is Mr. James S. Creswell. The first name is the usual spelling; James, middle initial S as in Sam. The last name Creswell, C as in Charlie, RESWELL. Mr. Creswell is a Reactor Inspector assigned to Region III. My name is Owen C. Shackleton. First name is O as in Oboe, WEN. Middle initial C as in Charlie, last name Shackleton, spelled S as in Sam, HACKLETON. I'm an investigator assigned to Region V. Just prior to beginning this interview on tape, I presented to Mr. Wright a two paged document from the U.S. Nuclear Regulatory Commission, which explains the authority of the U.S. Nuclear Regulatory Commission to conduct this interview and the scope and purpose of the interview. It also identifies Mr.

Wright's right to refuse to be interviewed and the right to refuse to submit any form of a signed statement. It also advised Mr. Wright of his right to have a person of his choice present for this interview. On the second page of this document are three questions and I'm going to ask Mr. Wright at this time, to respond to them orally for the purpose of the record. Mr. Wright, did you understand the two paged document that I'm referring to?

WRIGHT: Yes.

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

WRIGHT: Yes.

SHACKLETON: And on the third question, in which we ask you if you want a copy of the tape, you responded "no." Is that correct?

WRIGHT: Yes, that is correct.

SHACKLETON: Alright. Thank you. Mr. Wright, now for the purposes of the record and for those persons who will be interested in your testimony, would you briefly give us your education and work experience in the nuclear field.

WRIGHT: Education would be... I'm a graduate of Lebonan Valley College, a B.S. I was a physics major. As far as work, past work experience before I was hired by Metropolitan Edison, I worked as a TV repairman for 7 years. In the course of that I've met an instrument foreman by the name of Don Barry and he got me, he got me interested in applying for the job since I have the electronics background that was needed. And I applied and I was hired as an instrument man, Second Class. I worked as an instrument man, Second Class, for about a year and a half to..., yeah, about a year and a half. And then I was promoted to instrument man, First Class.

SHACKLETON: Thank you. This interview is taking place on June 15, 1979. I'll now turn the questioning over to Mr. Creswell.

CRESWELL: Jim Creswell speaking. Jim, I'd like for you to go back to the day of March 28th, 1979, and tell us when you came on duty and what the conditions were whenever you came onsite.

WRIGHT: I got into the gate out by the Unit 2 Search Trailer there, we can still come in through that way. We got to the gate approximately 10 minutes to 5 minutes of 7 and the guard had just informed us as he locked the gate behind us that we better get up to the control room; they just declared a general emergency. So, I wasn't sure what was going on, so we, my partner and I were riding together at the time. So, we both walked up to the control room and when I walked into the

control room I saw quite a few people standing around. I looked over at the control room panel and I saw the radiation monitor lights that were lit up and I saw my one foreman standing at one corner right at the door, and his name Doug Weaver. I saw him and I said, "This isn't a drill, is it?" and he said, "No. Its the real thing." So, that's were I started at about 5 minutes of 7.

CRESWELL: Jim, you mentioned that the guard said there had been a general emergency. Was it a general emergency or a site emergency?

WRIGHT: He said, just as we got inside the gate, you know, when he locked the gate behind us, he said that they'd just declared a general emergency.

CRESWELL: A general emergency. Okay. So, you went on up in the control room, you mentioned somebody was with you. Who was that?

WRIGHT: Yes. That's my partner who was on shift at the time with me. His name is Willie Wrignt.

CRESWELL: Willie Wright?

WRIGHT: Yes. Same last name but the first name is Willie.

CRESWELL: Now you entered the control room, you mentioned that there were quite a few people in the control room.

WRIGHT: Yes.

CRESWELL: Were there a number of people back behind or in front of the panels whenever you got there?

WRIGHT: What do you mean by in front of the panels?

CRESWELL: There's a line that is drawn across...

WRIGHT: No, everybody was pretty well standing back letting the operators do their job. They were just, they were concerned onlookers that's what it seemed... But, I don't know exactly who all was there because everyone was mulling around in the back, you know, trying to watch what was happening and see what was going on.

CRESWELL: Okay.

WRIGHT: And we were told that the maintenance people that were there were all mustering over into the one office that was what was called the startup office. It's now Sample Board Meter's office. It's a little room to the left of the control room. We were mustering there to standby until the time that we were needed.

CRESWELL: Is that where you saw Doug Weaver?

WRIGHT: Doug was standing right inside the door of the control room and that's, he's one of the first people I saw as I entered into the control room.

CRESWELL: Could you give me an estimate at to how many people were at the control panels themselves?

WRIGHT: I honestly don't know how many were at the panels. There is just, you know, there's about 30 or so people standing in the back corner there by the door, you know, trying to say back out of the way.

CRESWELL: You couldn't give me an estimate as how many were actually at the panels?

WRIGHT: No, because I really didn't see. I looked up at the monitors and I saw that they were lit up and then Doug just said, you know, go back and stand by and we all tried to stand back and wait to be called.

CRESWELL: What's the next thing that happens?

WRIGHT: The next thing that happened for me? We were told by Doug that Ivan would want us to hook up some things. They were talking,... Let me just try to comprehend... Yeah, we were standing by waiting to

be called, that's how it was, and Doug came in and said, "Ivan's gonna want some things hooked up. Go and get a fluke ready and go with Ivan." And, now this wasn't right away, its about maybe half an hour to 15 minutes, somewhere in that area after we got there...

CRESWELL: Is that what ___ from...

WRIGHT: So that's since about quarter after to 7:30, somewhere in that area.

CRESWELL: Okay...

WRIGHT: I really don't know. So, we were told by Ivan that he wanted to take some temperature readings on the incore thermocouples that the computer had, the computer was reading offscale, so it was just reading question marks. So, what he wanted to do was go down and take the thermocouple readings down at where the thermocouples came into the computer cabiret. So, we got a, we hunted around for a digital thermocouple reader that would take type K thermocouple and when we found it then we went down, and he said, "Just take some random data. Take the ones that are easy to get to, or, you know, just take some data whichevers, you know, whichevers the best, and, you know, take about 5 or so and then let me know what you get." So, we proceeded to take off the thermocouples from the computer cabinet and hook them up to the thermocouple reader. We took just a spattering list of the ones that were easy to

get to since we didn't have any set ones that we were told to measure. And we may have put those on the thermocouple reader and marked those, jotted those down on just a scrap of paper that we had handy so that we could transmit the data time. After we got about the 5 or so, Ivan had come down at that same time. He was down there right as we were just finishing up taking the first couple sets of data; the first 5 or so. And he, we showed him the numbers that we got and a couple of numbers were fairly low; you know, like one in particular was a reading, I guess, around 200 some degrees. We had most of them reading somewhere around 400 to 600, I believe, and we had one at least that was around 2,100, 2,200, somewheres slightly over 2,000 degrees. And Ivan said he didn't know that looked good. You know, he was in the process of getting quite a few other things, too. But he said that the data didn't look good. He wanted us to try another means of measuring the data. So, we went up and we were trying to find another thermocouple reader, but then it was suggested to use a millivolt meter and simply measure the millivolts...

CRESWELL: Who did suggest it?

WRIGHT: It was made by, I believe, Skip Bennett. I'm not sure because Ivan might have said it also. But we decided to measure the actual millivolt output and see, you know, then we could correlate that temperature over into degrees. So, we took a fluke down, this was maybe 10, 15 minutes later. Again, I'm not sure of my times because

we did quite a few things very fast. We took a millivolt reader down there and then measured every input with the millivolt reader and took the data down for that as well. And in the process there, we ran into some high, again, like we had, of 2,000 degrees. A couple which read quite a bit more than that. Now, I'm correlating the degrees because I know what its been since. But the average millivoltage was very close to what we knew from, you know, from the first points, what we read. We had the millivoltage varied, but some millivolts were like down around 10 millivolts and we had one or two that was somewhere even up around 75 millivolts, which correlating, is ran somewhere around 4,000 degrees. But we had almost no way of knowing if it was a good point, if it could have been damaged that we were reading two in series, that kind of thing. So, we, you know, we didn't know what we were reading at the time. We, you know, if it was good or bad or where its core location was, or anything. We just took the data as it came in millivolts and read that the whole way up and down.

CRESWELL: Did Mr. Bennett have a Leeds and Northrup conversion chart from millivolts to _____...?

WRIGHT: He looked it up, he found either an L&N or whatever other type of conversion chart that we have. We found our charts, and then we were able to correlate how many millivolts would be approximately how many degrees. But considering the temperatures, they didn't bother correcting, I don't believe, for the cold junction of the

temperature and things like that. We were just trying to get a ballpark area of what the temperature really was. We didn't really care to pin it down to the exact degrees.

CRESWELL: So, what happened. You're in the cable room at this period...

WRIGHT: Yes. This is down under, beneath the control room in the cable room.

CRESWELL: Okay. So, you've taken some, a few at random, Ivan says they don't look too good, look at them on another instrument, you use a millivolt meter, you take several more, some of them are high...

WRIGHT: Yes.

CRESWELL: Up about 2,000...

WRIGHT: Some were high, some were low. Yeah...

CRESWELL: Some were low...

WRIGHT: Its, we had a, there was enough low readings that I, myself, figured, well, we either had some fail or some were being shorted out, or there was a definite failure of the elements themselves, from the indication of the temperatures.

CRESWELL: Okay. As an instrument technician, what did that mean to you?

WRIGHT: By seeing this spattering of data, or? Well, in general, I could assume that the ones that were in the middle were probably still good, as far as they were probably reading somewhat close to what the true ones were. Like any statistical average, the highs you throw out and the lows you throw out and you know, you can assume that the rest of the readings are fairly good. It could have been that all of them were good. It could have been that, you know, some of them are shorted, some of them were open. All I can say is its not my duty or job to analyze the data. But, from what I could tell, I assumed that most of them were reading properly.

CRESWELL: And the ones that were reading properly, what would have been the maximum value?

WRIGHT: The ones that were reading properly, I'd say, 2,000 degrees was, I was tending to accept the 2,000 degrees as being a good input.

CRESWELL: What would 2,000 degrees on a thermocouple reading mean to you? Inside the core.

WRIGHT: As far as 2,000 degrees; normal operating range, from what I've understood is somewhere around 500 to 600 degrees. Seeing 2,000

degrees would either indicate possibly that the detector had been exposed, which meant a steam bubble would have exposed the core, and/or that that particular fuel assembly would have become very hot, you know, somehow it would possibly be grounding out. What I say, if I was assuming it to be good, which I, looking at the data, I figured that it probably was, I assumed that some fuel damage had occurred and that that was a very hot spot from the core.

CRESWELL: Would it be, could I make the assumption that you say that whenever a void had occurred that the core had actually been uncovered?

WRIGHT: I assumed from when I say what I know of, you know, the design of the reactor and things like that, I assumed that the core at least been for a little bit and was probably covered again, you know. But, yeah, because the temperatures were, we watched them for a while. They were showing a very, very slow decrease. They were coming down in temperatures. We watched them for about a 5 minute period of time and they did decrease in general. Some of them went up and down a little bit, some of them stayed about the same. But most of them, in general, were decreasing. And, you know, it was slowly, of course. So, from what I could tell from within about 15 minutes looking at data and things, I could probably assume that the core had been uncovered to where it suffered damage. But that it probably had been covered again and that it was in effect cooling.

CRESWELL: Okay. Did you or did anybody with you make a statement that they thought that the core had been uncovered?

WRIGHT: My partner who works primarily in Unit 1; we have four people per shift, usually, and two people in the Unit 1 and two people in Unit 2. My counterpart, I suppose, the First Class on the team that Unit 1 was also along as my helper in the relay room, his name is Bill Yeager. He had made the remark that the core's uncovered, "look at that. The core's uncovered." Now, again, people say things, but that's, he did come up and say that.

CRESWELL: Okay. Was Mr. Porter there whenever he said that?

WRIGHT: Ivan came down, like I said, when we were almost done taking the first five readings and by looking at the one that was 2,000 degrees, he, you know, he turned around and said to Ivan, "Look, you know, it's uncovered. You got 2,000 degrees down there." But, of course, you know, you can't really make that type of decision, but that's what he did say.

CRESWELL: You would be careful about making a decision based on one reading, is that what you're saying?

WRIGHT: I, myself...

CRESWELL: You personally...

WRIGHT: I, myself don't stick my foot in my mouth, to speak. I've learned enough to step back and look at things a little bit more before I jump to conclusions, and...

CRESWELL: After the second set of figures, where a second set of measurements were made. Do you feel that a statement like that could be made...

WRIGHT: I feel...

CRESWELL: More rationally...

WRIGHT: I feel then that there was a definite sign then that the core had definitely been uncovered to the point where it suffered damage. But it, I still say that, you know, I'm there to take the data. I'm not there to analyze it. So, I gave them my personal opinion as in the, yeah, I do believe we did suffer some damage there.

CRESWELL: That's the time...

WRIGHT: Which, by that time Ivan already knew that anyhow because he had said, "Yeah, it doesn't look good," or something similar to that. Like I said, we were doing quite a few things and quite hectic.

CRESWELL: Now after the second set of measurements are done, do you go back upstairs to the control room?

WRIGHT: Yes. We went back up and we stood by, you know, waiting for them to call us if we were needed for anything else.

CRESWELL: Would you say, what time would you say that you got back up in the control room?

WRIGHT: After the second set of data? I get so confused because we were down and up so many times and I was on other jobs that I get confused when I even sit and think about it, myself. I hooked up an RTD bridge in between jobs and I also went out on a, to assist the electricians with some reactor coolant pump interlocks that they were working on. And, I'm not sure where it fits in as far as time. The first thermocouples were measured, I'd say, at least by 8:00, the first thermocouples were probably measured. The complete set of thermocouple data, I'd say, probably at quarter of 9, somewhere in that area. That seems to strike about that area, 8:30 to quarter of 9 to 9:00, somewhere in that area.

CRESWELL: Okay. Can you fix in any time to when you first started hooking up the digital volt meter to the resistance temperature devices on the hot legs, ____?

WRIGHT: I believe it was after I took the readings for the first time. They took the five readings down there and while Bill, I'm not sure if it's Bill. Somebody else is trying to find another type of digital thermocouple reader. They said to me that they needed the fluke hooked up across the hot leg because the hot leg was also pegged high and they wanted to see what the actual temperature indication was there. So, I got the fluke digial volt meter and I had some leads made up previously for testing RTD's and I grabbed those and went out to Cabinet A of the RPS cabinets and since I had known which wires to do before, that's probably why they got me to do it. But, I lifted the four leads coming in from the RTD, coming from the hot leg, and, I put those onto the digital volt meter. And the digital volt meter will read out directly in ohms, because it has it's own constant current source. You can use it as an RTD bridge. When I hooked it up across there, we, one of the other bosses, I don't know if it was Skip or if it was Doug, they also dug out our calibration data on the RC 4 or RC 5, whichever the instrument number for the RTD was. They dug out the correlation as resistance versus temperature. And they brought that out for us, too. And when I correlated the resistance reading that I got to the temperature that it was indicating, it was indicating 720 degrees.

SHACKELTON: Excuse me. May I just interject. For the record, Jim, could you identify what RTD stands for?

WRIGHT: RTD is Resistance Thermal Device. It is a, as the resistance goes up the, I'm sorry, as the temperature increases, the resistance of this element will also increase. And by using an electronic circuit, known as a bridge circuit, they can precisely measure a small change in resistance and be able to determine and correlate what the temperature is at that element.

SHACKLETON: Thank you.

CRESWELL: Did you report this 720 degrees to anyone?

WRIGHT: Yes. My boss wanted to know what it was, and I told him what it was. That was Doug.

CRESWELL: Doug Weaver?

WRIGHT: Also Ivan Porter wanted to know also.

CRESWELL: So you reported to both of them?

WRIGHT: Yes, I did report the data and we left at hookup so that the operators would be, and we left the conversion chart plate on top of the meter so that if the operators wanted to know what the hot leg temperature was, all they had to do is come back, read the meter, and then correlate it from the _____.

CRESWELL: More than likely, if you took these RTD readings between the first set of thermocouple data and the last, it would have been in a time period of, what 8 to 8:15?

WRIGHT: Between the first, I think it in points at more around 8:30, probably 8:15 to 8:30, probably would be better one. I, like I say, I'm very vague on times, alright?

CRESWELL: Okay. After you take the second set of thermocouple data, you go back upstairs to the control room. Do you report this information to Ivan Porter or...?

WRIGHT: Yeah. He wanted us to take down what all the readings were with all the point numbers and we had, again, we just had like a scrap of paper with us that we marked this stuff down on. And we took all the readings, you know, as in .1 through .20, I'm not sure how many points there are, but we took them all down with the corresponding millivoltage readings next to them and we turned them in to Ivan. I'm not sure if it was directly to Ivan or if we gave them to, say, Doug or Skip or whoever. But, eventually we were supposed to get to Ivan, I'm not sure. I'm very sure he saw them, you know, but I don't know if he saw the converted figures as far as what the temperatures were. He, you know, we had them in millivolts then.

CRESWELL: Did you get any indication of what his impression was in the second set of readings?

WRIGHT: I didn't talk to him about the second set. Let's see. I know that we said that we got it. He said there's some there that are, that looked too high, that looked like we came, you know, that looked like they'd been damaged. Now, as far as anything more, I couldn't really recollect _____.

CRESWELL: Okay, so we're in the time period of about 8:45, when you get back up to the control room, 8:45 to 9:00. What's the next thing that happens?

WRIGHT: I was also confronted with helping the electricians. The electricians that were on the emergency repair party were also over there and they were told by either someone in Operations or, again, an engineer, or something. I don't know who wanted them to, but they wanted to start one of the reactor coolant pumps and I, for what reason, I really don't know. But, they wanted to start it, however, the interlocks that are built into the reactor coolant pump did not let them start the pump. So, they wanted the electricians to go down and jumper out these interlocks so that they could start the pump and see what would happen. Since I had done quite a bit of work on the reactor coolant pumps in the past, I told them when I found out that the electricians were gonna run down there, I told them I had a sheet

of paper that would tell them what contacts or what as far as, you know, we didn't have to bother looking prints and going through the trouble, you know, I knew where to go. So, they sent me with the electricians to go down and work on the, to go into the switchgear cubicle and jumper out the interlocks strain so that would allow them to start the pump.

CRESWELL: Do you recall who the electricians were that you went down with?

WRIGHT: One of the electricians was Bill, now let me think. Bill Con...? I always get these two mixed up. Bill Condran, CONDRAN. He's an Electrician Chief, and I don't know who he had as a helper at the present. I don't know who else was down there, but I know he was one for sure.

CRESWELL: Okay.

WRIGHT: Okay. We went down and we found the appropriate switchgear, you know, for the pump that they wanted to start. And, we then jumpered out the relay strain, the interlock strain which prevents some starting it. But, we jumpered that out so that the control room could start the pump. We informed the control room that this had been done and they said, "Okay. They'll give it a try."

CRESWELL: How did you do that?

WRIGHT: We went over to a page phone that was around the corner from the switchgear cubicle and called up the Unit 2 control room. And whoever was there, I don't know who answered, but it was one of the CRO's and we said that we got the jumper installed; go ahead and try to start the pump. So, they informed us to stand by, that they were gonna give it a try. I don't know if they didn't start it right away or what, but in the process we were told just standby and wait. Ivan Porter then came down again, down to see how we were doing.

CRESWELL: Excuse me. You said again?

WRIGHT: Well, he came down, like I say, he works in and out with us. He's on various other jobs and then he stops by to see if we got whatever he wanted done and to take whatever readings he wanted to take. But he stopped, you know, that's the next time that I saw Ivan. He came down to the switchgear cubicle. And, I believe at that time they tried starting the reactor coolant pump, and by watching the amperes, that the motor pulls, and there's a amper meter on the front of the switchgear cabinet. By watching the amps and by seeing, like say, for starting current should go up and then stablize, the current went up as a starting current but then fell back to almost nothing, which Ivan and I both knew, at least I can make the assumption that he knew what was going on. When a motor doesn't pull its normal amount

of current, but pulls less, it's not really pumping. It doesn't have any resistance. So, we could make the assumption, but again, it was just a, rather fast assumption that the pump was pumping nothing but steam. So, they shut the pump down again after just a matter, a couple of seconds they had it running and then they shut it back down again. But, within that amount of time we could take the readings that we wanted to see as far as normal operating currents. The current looked lower than what it normally runs at.

CRESWELL: Okay. Have you been down with Ivan to that area before you went down with the electricians?

WRIGHT: No, no.

CRESWELL: Okay. So, this was the only time you were down with Ivan ...

WRIGHT: Yeah. We were down with the electricians and we were told to stand by a little bit and they didn't know if they wanted us to put the jumper in right away and then they got back to us on the page and then we called back and forth. And, after about maybe 5 to 10 minutes worth of standing by they said go ahead and put the jumper in. And we put the jumper in, called them back up and said it's ready, and they told us to standby again, and then, within that time, Ivan came down to where we were at.

CRESWELL: During this period of time, did Mr. Porter try to jar in the relays on the panel?

WRIGHT: As far as when I was there, I didn't really take note to him trying to do anything, because the electricians and I were all there, you know. I don't think Ivan tried to do anything at that time.

CRESWELL: Okay. He just observed.

WRIGHT: Yes.

CRESWELL: Okay. So we're to the point where they started the pump, the current went up to startup current, and then dropped back to practically nothing, and, the pump was eventually in a few second step back off.

WRIGHT: Right.

CRESWELL: What is the next thing that happens?

WRIGHT: After that I was told to, you know, I asked if we were done because I wanted to go up to the control room again. I believe the electricians still stood by in case they'd have to remove their jumper. But, I went back up to the control room and I stood by up there.

CRESWELL: What's the next thing they have you do... How long would you estimate you're down at the...

WRIGHT: I was down at the switchgear for, it's hard to say. Probably about a half an hour, altogether.

CRESWELL: Okay.

WRIGHT: And this puts us somewhere around maybe 9:30. I don't really know.

CRESWELL: Okay.

WRIGHT: And when we came back up again, they informed us that they had a thermocouple reader that we had again, we wanted to go down and hook a couple off permanently to the thermocouple reader. So, I believe it was Bill and I again, went down with this...

CRESWELL: Bill Yeager?

WRIGHT: Bill Yeager, yes, I'm sorry. We went down to the relay room again, which is the cable room, and pulled off, I'm not sure if he told us which ones to pull off or he just had us pick some random again. But, we hooked up at least 5 to the thermocouple reader all at one time. It has a switching circuit that you can hook 5 inputs up to

it and then just push a button and select one input at a time. We then hooked about 5 thermocouples up, and I believe he, I believe we hooked on purpose one of the ones that was reading like around 2,000 degrees. We wanted to watch that one as well.

CRESWELL: Had that one decreased any of those at least since you had measured before?

WRIGHT: It had decreased but only a small amount. Something like maybe a half a degree to a degrees, you know. You couldn't really say that it decreased because they were, you know, they were fluctuating up and down. But, from what I remember, I'm pretty sure it had decreased by about a degree.

CRESWELL: You only picked one that was high?

WRIGHT: We picked, I'm not sure if it was the first 5 that we picked and we just hooked those up again or if we took random or if we were told to hook certain ones up, I'm not sure. But, we picked them up and I distinctly remember that we had at least one of the ones that was fairly high. We put that on the thermocouple reader. I don't know if we hooked one, I don't know if we hooked it up at that time or not, but we might have hooked the one that was reading, you know, like 4,000 degrees up to. I know we had it on there for a little bit, but I think that might have been just to take the data, to see what they were reading.

CRESWELL: Did anyone take any of this data down as...?

WRIGHT: We took the data down initially, like I said, on like scrap paper, you know, whatever paper was available at the time because it was, you know, such a rushed job. We took the paper, the data down on like the back of a computer printout. But, as to my recollection what happened to it, I couldn't honestly tell you. It might have just gotten thrown out with all the rest of the paper that was floating around at that time. But, we did take the data, we did jot the numbers down.

CRESWELL: Who had the data last that you recall?

WRIGHT: I couldn't even tell you. I don't know.

CRESWELL: Who was writing the data down?

WRIGHT: Well, Bill took most of the numbers down. I, Bill Yeager...

CRESWELL: Yeager...

WRIGHT: Took most of the numbers down as far as wrote them down. I usually don't have a pen so, he had a pen with him. He took most of the numbers down on the paper while I read with the volt meter. He held the meter and wrote the numbers while I switched from input to

input. And, as far as when the meter was permanently hooked up so that we'd be able to monitor them, I don't think we took that data down.

CRESWELL: I have before me some data that was copied down into a computer type listing of the points to the computer. There are handwritten notes here of millivolt readings for some computer points. Are you aware, Jim, of any other data that exists besides what I'm showing you here?

WRIGHT: The other data that would exist would have probably been the data that that came from. Like I say, it would have been our rough copy that we took the numbers down. Then once they were found out which numbers in as far as computer points, they correlated to, they were copied on to that sheet. The looks like, I'm pretty sure that's either what Skip or Bill did. I have a feeling that Skip has it, Skip Bennett, our one foreman. I have a feeling that that is what he did. He wrote it down into the computer book. I'm not sure who wrote it, but I think it was him.

CRESWELL: Okay. Let's see. I believe the last point in time was that we talked about was around 9:30. You hooked up these five thermocouples permanently. How long did it take you to do that?

WRIGHT: I don't know. Maybe 10, 15 minutes. It's really rough to say. We had to get a ladder to prop the thermocouple reader on since we didn't have any resistant, the proper length, lead, and everything. All we had was a very short lead of the wires and the tip. So, we had to get some things around. I'd say at least 15 minutes. It's very rough to tell.

CRESWELL: Okay. So, what do you do after you perform this operation?

WRIGHT: As far as I know, I came back up to the control room again and we then stood by for anything else that they would want. They had us then hook up, I believe it was after I came back up again. Like I say, I'm very confused. They had us then take a regular fluke which is our regular digital volt meter that we use for calibrations. It's a hand held model. They had me go over and go over to Cabinet C of the RPS cabinets, which would have been, I believe, I hooked up to the cold leg on one of those. And, they had me do the same as what I did to the hot leg in the ARPS cabinet. They wanted to rejust the resistance across the RTD. Now, you have to worry about correlating your lead length as far as the resistance due to your leads and they decided that, I measured the lead length first and I found that to be approximately 20 ohms. So, for a ballpark figure they could subtract approximately 20 ohms or 40 ohms from the value of ohmage and they'd be able to correlate that into temperature as well. So, I hooked that other, I hooked a regular multimeter up to the CRPS cabinet. And, I believe,

that's when I hit it after I came up from hooking up the thermocouples up there.

CRESWELL: Okay. Now, the V hot leg RTD would have been in what cabinet?

WRIGHT: I don't know which group it was in. I, you know, as far as A loop or B loop, it was in the CRPS cabinet that they had to go to, which was. They had to go to the CRPS cabinet and pull the lead coming in from there.

CRESWELL: What sort of temperature was indicated by this other hot leg?

WRIGHT: That one I honestly don't know have no recollection of that temperature whatsoever.

CRESWELL: Okay. At this time we'll turn it back over to Owen.

SHACKLETON: We'll change the tape at this time. The time is now 3:13 p.m., Eastern Daylight Time.

SHACKLETON: This is the continuation of the interview of Mr. Thomas J. Wright. The time is now 3:14 p.m., June 15, 1979. Please continue.

CRESWELL: Okay. After you hooked up the multimeters to these other two channels, do you report back what you're finding on the temperatures?

WRIGHT: I told my foreman that I had it in, I had the meter installed and as far as, you know, they said, well, what's it reading? And I knew the number then. I told them approximately how many ohms the meter was reading. And, they offhand correlated the temperature which, I'd say right now I have no recollection anywhere close to what the temperature would be.

CRESWELL: Would you report it to Doug Weaver?

WRIGHT: I did report to one of the foreman. I'm not sure that it was Doug or Skip, but I have a feeling it was Doug that I talked to.

CRESWELL: Did you talk to Ivan again in this period of time?

WRIGHT: I passed Ivan back and forth quite a few time. I don't know if I told him or not. I have a feeling of a firm recollection.

CRESWELL: What's the next thing that you recall that happened?

WRIGHT: To be totally honest, I'm almost totally blank. I don't know, really, what happened. I do think that at that time they were trying to get all non-essential personnel, well, even before that time

they tried to get all non-essential personnel off of the Island except for the emergency repair crew, which, of course, by me being onshift designated me as a member of the emergency repair crew. They tried to get most of the people off either to the muster area, which at first was the North Auditorium and then I was told that they moved them entirely over to the Observation Center. Much more than that, I really don't know what all was going on. I pretty much of a blank except for the first hour or two I knew what was going on because I was busy and I was taking numbers. But, after that, I'm shaky.

CRESWELL: When you do leave the Island, what sort of process did you go through?

WRIGHT: We were told to get into our car and report to the 500 KV substation for monitoring. So, we got into our car and, yeah, well, I'm very sure we left by means of the North Gate. Went to the North Gate, went out, drove down to the substation across, you know, on the main land here, the 500 KV substation, and we then pulled up, had our cars frisked as far as to check for any radiation. We were also personally frisked. And, at that time we were told to go up to the Observation Center and muster. And we reported then to in back of the Observation Center and I don't know if at that time, I don't know if they brought sandwiches in or if they told us just to go home. It was around 1:00, 1:30, somewhere around there. I'd say between 1:00 to 2:00, somewhere. They told us go ahead home but stay by your phone;

we might need you. And Doug, I believe, was the one who sent us home early and he said just go get something to eat since, you know, you lost your lunch and everything. So, we went, I'm very sure it was that day, we went and got a Sub on the way home and then we went home.

CRESWELL: Okay. Were you contaminated any at all when you...?

WRIGHT: No, I was not. The activity level was a slight bit more as far as my person, but you could tell it was just primarily gas because it was, I stood out in the air and I wasn't, my activity level was not to a point where it set off an alarm. You know, it was like, it was less than what was considered an alarm state. But, by standing out in the air and everything, we noticed the background fluctuated greatly and, you know, they considered us safe; so, that's all I cared about.

CRESWELL: Okay. Was anybody with you contaminated?

WRIGHT: With me, no. Not at that time.

CRESWELL: Did you wear a mask, a respirator, anytime during the day?

WRIGHT: I'm very hazy on this because I get the first and the second day very confused. I'm very sure the second day we did wear respirators. But, I don't think that at any time during the first day we had a respirator on. I don't believe we did.

CRESWELL: Okay. Tony, do you have any questions?

FASANO: I have a few just to go back over. Fasano speaking. You said that you were mustered into the startup office...

WRIGHT: Yes.

FASANO: Now with the remaining... And your part of the emergency repair party.

WRIGHT: Yes.

FASANO: Do you know who was in charge of the emergency repair part at that time?

WRIGHT: The emergency repair party were told by previous arrangements. Should an accident occur or should they have a drill, or anything like this, the emergency repair party will muster at the ECS, which stands for the Emergency Control Station. And, the foreman who we worked for is designated as the Shift Maintenance Foreman that's on duty at the time. Now, since it was during daylight hours and my particular instrument foreman was on duty, we, he took charge of the instrument men as far as the instrument men of the emergency repair party. He then took personal charge of leading us. And, at the time, I believe it would have been Barry Kalenevitch, would have been our normally scheduled Shift Maintenance Foreman.

CRESWELL: Could spell Kale...

WRIGHT: That's gonna be a good question. KALENEVICH. I'm fairly sure that's the correct spelling. He is, he was my foreman at that time, for that, to be on duty. And, he would have been the foreman responsible for directing us. But, like I say, since Doug, who is our lead foreman, so to speak, he is, he took direct charge of the instrument men, and I think they had electrician, they had a regular electrician foreman. And, if the normal foreman that's there, on daylight is there, they take over. But, if they're not there the Shift Maintenance Foreman is who heads the party. So, you know, we worked then for Doug since he was there.

FASANO: Okay. On the, when you went back to remeasure the thermocouples, did you pick some of the same points that you had measured the first..

WRIGHT: What do you mean by when we went back to remeasure. When we used the millivolt meter the second time?

FASANO: Correct.

WRIGHT: We measured all points then. The first time when we measured the points we had to disconnect the wires from the computer cabinet, hook them up individually to the thermocouple reader; read one point at a time and then when we were done reading that point, we reconnected

the wires to the computer cabinet again. The second time we strictly took a millivolt reading across the wires while they were still hooked up to the computer cabinet. We didn't have to disconnect the wires to take the readings for millivoltage.

FASANO: For correlation purposes then, you knew which ones you had done the first time.

WRIGHT: We knew which ones we did the first time; but we took all the data no matter what, you know, we took all the data the second time and measured the millivoltage.

CRESWELL: It's my, exuse me. Jim Creswell speaking. It's my understand that the thermocouple reader indicates the temperature here directly...

WRIGHT: Yes, yes.

CRESWELL: And with the millivolt reader you have to make a conversion...

WRIGHT: Yes.

CRESWELL: How did, for the ones that you measured both ways, how did they compare?

WRIGHT: They compared within a close enough degree of tolerance that we assumed that the thermocouple reader was correct. The millivolt readings, there's always a slight error in converting and things like that. But, the millivolt, yeah. The thermocouple reader, which reads directly out in temperature, is calibrated for the particular type thermocouple that you're using. And, it did correlate in so many millivolts, did correlate to so many degrees. You know, it is a, were a correct reading.

FASANO: Have you ever done thermocouple calibrations, say in a laboratory? You did study some of this.

WRIGHT: Thermocouple calibrations, I don't exactly, you know, the term is a little misleading. Do you mean...?

FASANO: Actually put them in a bath...

WRIGHT: Yes.

FASANO: And actually get a fixed formula...

WRIGHT: And take a curve from them, yes. I have done that in the past In fact, when we calibrated or do a complete loop as part of our job of temperature calibration, we take a temperature curve first to make sure that the curve, that the element is still agreeing with

the curve. We put it at one temperature and measure the..., we put it in a bath at one temperature, take the reading, put it in the bath, then another temperature, and correlate those temperatures to a given scale. Most thermocouples use a common table. Type K will be so many millivolts equals so many degrees. Type J is a different millivolt reading. But, we check that initially and for the precision RTD's, anything that's amount precision, we usually use the RTD's, but, which is the Resistance Thermal Devices. They operate differently and that they go by resistance versus a notable reading. So, for special applications we have a curve that's taken every .1 degrees or every small increment of degrees.

FASANO: So, the RTD is a more accurate thing?

WRIGHT: Yes. It's much more accurate. The precision can be much closer with an RTD than what a thermocouple is. But, a thermocouple has an advantage that it can measure a lot hotter the temperatures and...

FASANO: Higher temperatures?

WRIGHT: It, a thermocouple can usually measure much higher temperatures than what a resistance element can...

FASANO: How about response time?

WRIGHT: As far as response time, you're getting into engineering questions and things like that...

FASANO: Okay.

WRIGHT: I couldn't tell you.

FASANO: The, it, okay, then. I was just wondering if you had a high temperature reading or a low temperature reading on, say, thermocouples, if it is lower than you'd expect, you were mentioning that you used a statistical, you'd throw the low ones out...

WRIGHT: Yeah.

FASANO: And the high ones out. But...

WRIGHT: Yeah. That's my own, I'm used to taking data like that because of doing experiments and things like that in school. But, I usually throw out the low, throw out the low and then take the statistical average of what's left. If I wanted to take an average to add it up.

FASANO: Okay. You did say that you did work on the reactor coolant pump.

WRIGHT: Yes.

FASANO: You also had mentioned that by the second series of measurements on the thermocouples and you had in between this time, you had measured also T_h.

WRIGHT: Yes. Well...

FASANO: Well, T_h seemed to be high.

WRIGHT: T_h, let's see. I did the first readings. I hooked up the ohms and I went back... Like I say, I get very confused. But, when I hooked up the digital volt meter to T hot, my readings before I looked at T hot that the scale on the bridge that is in the RPS cabinet goes from 520 to 620 degrees. That's its normal operating range. The scale was pegged high when I got to the cabinet. I took the thermocouple, yeah, thermocouple, I'm sorry. I took the resistance leads coming in off of the cabinet, hooked them up to the volt meter, and correlated how many ohms I had as far as how many ohms the device was reading. And by converting with the precision table that we have that comes with the RTD, by converting I, the only reason the numbers sticks with me is it was exactly 100% hotter than high scale, which it was 720 degrees, is what it correlated to.

FASANO: Now you had another indication that the hot side was being indicated. A hot temperature above what you'd expect. The, that was in between, right? You had gone downstairs...

WRIGHT: I went down, came up, hooked it up and then I went back down again for readings...

FASANO: Okay.

WRIGHT: And when I nooked it up is when I...

FASANO: So, now you had three of these three different sets of data points in your head.

WRIGHT: Yeah.

FASANO: And you did also work on the reactor coolant pump.

WRIGHT: Yes.

FASANO: At this time did you start to believe that maybe the high temperatures were correct?

WRIGHT: I had it in my mind, you know. I never rule anything out to begin with. But, I had it in my mind that they might all have been

correct. And the idea that we really did suffer some bad damage. But, you know, its, again, its the idea that all kinds of thoughts go floating through you mind.

FASANO: You also been on the reactor coolant pump when you noted that the amperage was low.

WRIGHT: Yeah.

FASANO: This then, you mentioned that the thought of steam being pumped went though your head.

WRIGHT: Yeah. I then thought when I saw the current drop off to almost nothing, I looked at that and we both had, you know, as far as Ivan, in particular. But, we looked around at each other and we could both tell, we knew what we were thinking. And that, that's just not pumping anything.

FASANO: So, this now gave you another data point of...

WRIGHT: Yeah.

FASANO: A possible conclusion.

WRIGHT: I was drawing conclusions all along. But, like I say, it wasn't a formal conclusion.

FASANO: I'd like to turn it over...

WRIGHT: Go ahead.

SHACKLETON: Mr. Wright, we thank you very much. The time is now 3:30 p.m. and Mr. Wright has to leave due to another assignment. We will terminate this interview at this time. Would it be possible Mr. Wright if we need to talk to you, we could call you again?

WRIGHT: Yeah.

SHACKLETON: To help us clarify some of these points.

WRIGHT: Yes.

SHACKLETON: And may I ask you, were you at any time, prior to this interview, ever coaxed or instructed on how to answer any question?

WRIGHT: No.

SHACKLETON: By the Nuclear Regulatory Commission?

WRIGHT: No.

SHACKLETON: Have you been interviewed by any other investigative bodies?

WRIGHT: No.

SHACKLETON: Alright. We will close now. 3:31 p.m., Eastern Daylight Time. June 15, 1979.