UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:

IE TMI INVESTIGATION INTERVIEW

of Ivan D. Porter, Jr.
Instrumentation and Control Engineer

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

May 21, 1979
(Date of Interview)

July 3, 1979
(Date Transcript Typed)

237
(Tape Number(s))

7908890083

NRC PERSONNEL:

James S. Creswell
Anthony Fasano
William H. Foster

FOSTER: The following interview is being conducted of Mr. Ivan D. Porter, Jr. Mr. Porter is the Instrumentation and Control Engineer at TMI 2. The present time is 1:44 p.m. The date is May 21, 1979. The place of the interview is Trailer 203, located immediately outside of the south gate at the TMI site. Individuals present for the interview are interviewers, James S. Creswell, Reactor Inspector, Region III, Anthony Fasano, Inspection Specialist with Office of Inspection Enforcement, Performance Appraisal Branch. My name is William H. Foster, and I'm a Senior Inspector Auditor with Office of Inspector and Auditor, NRC, and I'll be monitoring the interview. Prior to the interview being recorded, Mr. Porter was provided with a documents explaining his rights concerning information being obtained regarding the incident at Three Mile Island. In addition, Mr. Porter was apprised of the purpose of the investigation, and scope and the authority by which Congress has authorized the NRC to conduct the investigation. On the second page of the advisement document, Mr. Porter has answered three questions. Questions and Mr. Porter's answers will now be recorded as part of the interview. Mr. Porter do you understand the document?

PORTER: Yes, sir.

FOSTER: Do we have you permission to tape the interview?

PORTER: Yes, sir.

FOSTER: Would you like a copy of the tape?

PORTER: Yes, sir.

FOSTER: At of this time, would you provide us with a brief summary of your academic background and your employment history as it relates to the nuclear field?

PORTER: Well, I graduated in 1965, Penn State University, with a degree in electrical engineering. I spent one year with Philadelphia Electric on a training program in the operations department. I went from Philadelphia Electric to General Dynamics Electric Boat Division in Groton, Connecticut. And I worked there for six and a half years in the R&D department, instrumentation section as a recording equipment engineer, basically, working power range startups and sea trials and special tests of a sort. 1973, I came to Three Mile Island as a shift test engineer for General Public Utilities. Worked the Unit 1 startup as a shift test engineer. 1974, I went to Unit 2, GPU startup as lead I&C electrical engineer. And worked the Unit 2 startup until June of last year, when I took a position with Met Ed in their engineering department.

FOSTER: Thank you very much, Ivan. O.K. At this point, I am going to turn the interview over to the interviewers.

FASANO: Ivan, what we'd like to do, is get your chronological, if possible, information of the March 28, 1979 events. And, you can start with when you were called?

PORTER: I received a call just about 6 o'clock on the button. I had just awakened and was sitting on the edge of the bed when the phone rang. The message was the we had had a trip with complications, and I was to come to work at once. Which I did.

FASANO: Do you know who called you?

PORTER: I don't recall for sure, no.

FASANO: When did you arrive at the site?

PORTER: I got to the Control Room about 6:30. The time 6:25, sticks in my mind, but I'm not sure if that was when I came through at the gate processing center or when I arrived at the Control Room. But that would be about right, for the travel time from my house, and stopping any place along the way and so forth.

FASANO: Who did you report to when you got here?

PORTER: I went straight to the Control Room and saw George Kunder.

FASANO: How did the control room appear to you at that time? Did it appear normal, or unusual?

PORTER: I would say fairly normal, after I say that period of time after a trip. It was ... I guess some of the people you'd expect to find there after a trip, but other than that, not particularly abnormal.

CRESWELL: What did the control panel look like to you when you walked into the Control Room?

PORTER: I didn't go to the control panel. I came in the Control Room and George said something to the effect that the plant conditions were strange or abnormal. And he described that he had T_h off scale. And low pressure, I believe he said, 700 pounds at the time. And I asked him were the pumps running. And he said no. And at that point, I immediately ... cause having just arrived, I hadn't been looking at the indications prior to that. But I immediately tried to verify his high temperatures and the incongruity just between the temperatures and pressure.

CRESWELL: What did you find?

PORTER: My assessment was that the indications were what the plant conditions were. And I went to the various RPS cabinets, looked at the computer and stuff and I found enough redundant instrumentation to tell me the same thing. To lead me to believe that's what it was.

CRESWELL: So you believed the instruments?

PORTER: Yes.

CRESWELL: What about the radiation monitors. Did you notice anything unusual about them when you came into the Control Room?

PORTER: I didn't. But I did not look at that time.

FASANO: Could you tell us which variables you did look at?

PORTER: I went around to the RPS cabinets, looked in it, you know the T_h instruments and ... of course it's only wide range pressure, but I was just looking at them to see if it ... if they agreed. And they all told me the same thing. That the pressure was indeed off scale low, and the temperature was off scale high.

CRESWELL: Do they have meters in those cabinets?

PORTER: Yeah.

CRESWELL: And the meters agreed with charts out front?

PORTER: I didn't go to the console to try to compare ... looked in the cabinets.

CRESWELL: And you verified it. It was on the basis on the information that George Kunder had given you. That pressure was, say 700 pounds, and you went around

PORTER: I believe that's the number anyway. The plant pressure did not agree with what the temperature indications are.

CRESWELL: Well, there were different transmitters supplying the control board from was what was supplying the information, and the RPS cabinets.

PORTER: Well, in some cases, there the same, but the ones we do every one the transmitters for the RPS channels. That's why I went around to all them. To get as quick a selection as I could of the different transmitters.

CRESWELL: Did you tell anybody that you had verified these numbers?

PORTER: I came back and told George that I could see no reason not to believe them. Although I'm sure the fellows that had been in the Control Room continuously, were ... look at them also.

FASANO: Do you know how this information was used, now that you had given a validation that what the instruments said went back to. Were you included in any decision, based on the information you brought back?

PORTER: I don't recall.

CRESWELL: You went back to George and told him that they looked reasonable to you.

PORTER: Yeah. I was just a short period of time after that, that we had to call the site emergency, so I don't recall exactly what I did, in whatever few minutes there might have been in between.

CRESWELL: Who called the site emergency?

PORTER: I would have thought George Kunder did. But I do believe there was a brief discussion between him and Bill Zewe. Dick Dubeil called up with the information on what they found taking the sample. And then of course it was immediately, almost immediately thereafter, that the site emergency was declared.

CRESWELL: What sample was that?

PORTER: I didn't know at the time. But looking over what we see, I'm convinced it was the information that they had high readings in the area of the sample sink while they were recircing to take that sample.

CRESWELL: O.K. So the site emergency is declared. What did people do, after the site emergency is declared?

PORTER: Well, it was announced on the page. And we got out the emergency procedures. And started setting up patrol stations. Worked on getting set up and making the phone calls, and so forth. Getting communications set up.

FASANO: What assignment were you given?

PORTER: I got out the emergency book, emergency plan book, and we went, myself and two other fellows went back in the shift supervisor's office. The other two fellows started making the phone calls.

FASANO: So you weren't involved in a further investigation of the instrumentation ... I mean, you were now put into a new role?

PORTER: More or less. I ... sometime during this whole period of time, I'm not quite sure when it was, I also had a DVM set up on the T_h RTD. And once again, it's not clear in my mind, but I wanted to read the resistance. Since all the instrumentation was off scale.

CRESWELL: For the benefit of those who might listen to this tape, DVM is a digital volt meter.

PORTER: Yeah.

CRESWELL: And an RTD is a resistence temperatures device.

PORTER: Yeah, right. It was on the A loop T_h RTD. It feeds the red channel RPS cabinet.

CRESWELL: O.K. RPS is reactor protection system.

PORTER: Right,

CRESWELL: O.K. So, you set up this digital volt meter on that T hot, Resistance Temperature Detector. And what sort of reading did you get out? How did you go about setting up the DVM on there to begin with?

PORTER: Well, we have a ... the particular instrument is a Fluke digital volt meter which has a four wired circuit, specifically designed for resistance measurements, using a constant current in measuring the voltage.

FASANO: That's a bridge type of circuit?

PORTER: Well, it's not really a bridge. It uses, I believe, a 1 mil constant current, down two wires and reads the voltage on the other ... the other pair. We use it routinely for this type of measurement. I had it set up on the ARPS channel, so I could get the resistance, and therefore determine what the actual temperature was.

FASANO: Where did you get the resistance? You said for comparison you got the resistance. Was this off a chart?

PORTER: It was displayed on the digital volt meter. And then we have the Rosemont curves for the RTDs, the resistance versus temperature curves.

FASANO: So, what kind of resistance tipped your devices? Who makes them?

PORTER: Rosemont.

FASANO: And where did you find the curves?

PORTER: There in the refueling calibration procedures that's in the Control Room. And they're also in the shop, in the, we have a book with all the Rosemont curves in it.

FASANO: So, you read the resistance of the Digital Volt Meter, and then you used that resistance to determine what the corresponding temperature was from the chart on the procedure?

PORTER: Not exactly, because it was beyond the calibration information provided by Rosemont. Their information goes to 700 degrees, which was slightly over 240 ohms. And I was reading about 243 ohms.

FASANO: So from that, you probably concluded, or did you conclude that it was over 700 degrees F?

PORTER: Yeah. I believe somewhat erroneous report at 725, doing a quick extrapulation. Looking back, I believe that there was one in the neighborhood of 715 to 720.

FASANO: Did you report this information then to Kunder or to the other group that you were assigned to?

PORTER: Yes.

FASANO: It was specifically?

PORTER: I'm not sure.

FASANO: O.K. It could have very well been say

PORTER: It was whoever was out, and I won't say it was George. Who was ever out directing the operations at that time.

CRESWELL: Do you recall who was in charge at that time?

PORTER: I believe Mike Ross was directly at the console.

FASANO: What, about what time? Can you remember about what time this was?

PORTER: No. I won't try to say. I'm just not sure.

FASANO: Morning?

PORTER: Oh, it was morning. It was sometime in the period I believe between 7 and 8 o'clock. Because it was shortly thereafter that we tried to verify the incore thermocouple readings down at the computer.

FASANO: So, you reported this to somebody. Do you remember any type of action was taken, or any comments that were made on this?

PORTER: Not directly. No. We had some discussions to how believable it was. And I admit that I found it hard to believe ... at the pressure we were at.

FASANO: Did you tell them though, that you thought it was an accurate temperature?

PORTER: I believe my evaluation was, I couldn't disbelieve it, but it was equally difficult to believe it also.

CRESWELL: What did it mean to you. As far as the reactor coolant system was concerned?

PORTER: I'm not sure at that point. I know later at least, the only way I could believe it was, if you were looking all the way back into the vessel itself from the hot leg RTD. I don't know that that was my evaluation at 7:45, or whatever time it was I hooked up the DVM.

FASANO: They were having current problems with the reactor coolant pumps. And later on, I guess they were down when you got there?

PORTER: Yes, all four pumps were off at that time.

FASANO: And apparently they tried to start them later. Were you consulted at all on the restart?

PORTER: Yes, I made several trips to the breakers, down in the Turbine Building, checking out ... the K3 relay is the one that must be picked up by all the various service systems to the pump, the interlocks. And tried to verify if the relay was picked up or not.

CRESWELL: O.K. I'd like to go back to the point in time when you finished making the resistance measurement on the RTD. What's the next thing that happens after that. You reported to somebody and then what do you do?

PORTER: I don't recall the details of each action that clearly. I'm ... sometime after that, and this would have been after Gary Miller got there, I believe shortly after 7, he asked me about the readings on the incore temperature detectors, and I punched out several of them and got ...

CRESWELL: Ivan, when you say, "punched out" of this computer

PORTER: From the computer. I went to the computer and requested the information from the computer?

CRESWELL: Did you request a complete listing of the - which one were you interested in?

PORTER: No. I just started looking back at the input book, to find where they were, and the series of numbers and punched out quite a few of them and got quite a few out of scale readings.

CRESWELL: How did you select the ones that you

PORTER: Completely at random. I just started someplace and just started punching sequential numbers.

CRESWELL: O.K. And the results that you got back, what did that mean to you?

PORTER: Well, to me it confirmed that what I was seeing on the RTD. That we had temperatures greater than 700 degrees in the plant, since 700 degrees was full scale on the computer, and I was reading greater than 700 on the hot leg RTD.

FASANO: What does the computer print out whenever its reading over 700 degrees?

PORTER: Well, you get question marks from points that are out of the range of the calibrated span.

FASANO: Now you apparently were confirmed in your own mind, confirmed to yourself that you could believe these high temperatures. You had looked at the pressure, and the pressure indications on the reactor coolant system. Do you have any feel now for this, you know, the comparison? The temperature, pressure?

PORTER: They didn't match up. I know that.

CRESWELL: It was a confusing situation for you, Ivan?

PORTER: Yes.

FASANO: O.K.

CRESWELL: Did you report what you found about the incore RTDs to Gary Miller then?

PORTER: The incore thermocouples - yes.

CRESWELL: I meant to say thermocouples.

PORTER: And he subsequently asked if there was any other way we could read them down at the computer or whatever. And I told him, I thought we could. And we went and got a digital thermocouple read out instrument, and some of the necessary paper work to locate the wires and went down to the computer and read some out down there.

CRESWELL: Where is that computer located, Ivan, physically?

PORTER: The input cabinets in the cable room which is directly below the Control Room.

FASANO: Cable Spreading Room?

PORTER: No, it don't believe ... I believe the Cable Spreading Room you will find, is the one directly underneath the Cable Room. Anyway, it's in the room directly below, where most of the instrumentation is located.

FASANO: Instruments, various panels down there?

PORTER: Yes.

CRESWELL: So you went down there with this computerized thermocouple reading device, and then what did you do? Did you take anybody with you, or are you working by yourself?

PORTER: No. I had some instrument foremen and some instrument techs. Actually, we wound the paper work and we went down. I believe I went back to the cable or back to the Control Room. And came back down a few minutes later to see what the results were. And that time they had four thermocouples. I'm not sure which ones hooked up to the device.

CRESWELL: What what did you find in those four devices?

PORTER: They had ... two of them were reading somewhat over 2300 degrees F. And another one was reading 200 and some degrees F.

FASANO: About what time was this, do you recall?

PORTER: I would say shortly after 8 o'clock.

FASANO: Was the foreman with you? Mr. Weaver? Do you recall?

PORTER: I'm not sure if Doug was still there or not. I believe Skip Bennett was there for the duration of taking the readings down there that morning.

FASANO: Did you report back to Mr. Miller on this temperature?

PORTER: Yes.

CRESWELL: After you got the reading out, is that the next thing that happened? That you went back up and talked to Gary Miller?

PORTER: Yes, yes.

CRESWELL: O.K. What does he comment when you tell him about this?

PORTER: I don't recall a specific comment. He asked when I told him what the thermocouples were reading, he asked me what I thought it meant. And I told him ... what did I say ... I'm not sure if what I said at that specific time.

FASANO: You did tell him the temperature?

PORTER: Yeah, my personal evaluation was that they had been destroyed.

FASANO: Did you have any way of checking the resistance of those?

PORTER: We haven't, but I don't believe we did it at that time.

CRESWELL: Ivan, by saying that you felt they had been destroyed, does that mean that you didn't believe the values that you were ... that were being indicated?

PORTER: I didn't consider them necessarily reliable based on the fact that we had readings that I was sure were too low to be the valid readings inside the plant at that time, inside the reactor.

FASANO: That is the 200° reading?

PORTER: Yeah.

FASANO: But the 2300, you had, reason to believe that this was analogous.

PORTER: I didn't know. I guess I was afraid it was real.

CRESWELL: What types of physical processes, Ivan, would have caused you to get these readings? Did you think about that at that time? What could be causing these types of readings? By that I mean the physical mechanisms that could be involved in the thermocouples themselves that would give these readings?

PORTER: I think I was once again concerned that the T_h RTD was reflecting conditions straight back into the reactor vessel. But I didn't ... you know 2300 was pretty high. I was a little concerned over or not whether that could be real or not.

CRESWELL: What I'm asking you Ivan, is ... most instrumentation you can consider like it shorts out, that you'll get certain indications ... this

is the type of question that I'm asking you. Did you consider a failure in mechanism for the thermocouples themselves, that would give you the indication?

PORTER: I did. But I'm not sure I did it at 8 o'clock or nine o'clock on the morning of the 28th. I considered the possibility that the low readings were open.

CRESWELL: O.K. Would you get any indication at all if the leads were open?

PORTER: You might. You're talking only a few millivolts, you could very well pick up that much reading ... you know that many millivolts if you had an open circuit, around 450 foot of cable or so.

FASANO: The high temperature was more believable if indeed from a failure. You just don't get

PORTER: Once again, I had no real reason not to believe the high reading once it was fairly obvious to me that the low ones weren't accurate. But once again, I wasn't sure just how accurate the high ones might be either.

FASANO: Were you consulted at all on the alarm printer when it failed? One of the things we find that jammed or something happened?

PORTER: No. I believe the technicians were there working on it then, and they're really in much better shape to handle that than I would be.

PORTER: No, I think I was more concerned about getting ... verifying that we had water in the hot legs, so we could successfully start a pump. That was what I was ... was really on my mind.

FASANO: O.K. At this point after you've read the thermocouples ... thermocouple readings ... had anyone in NRC asked what those readings are? Or asked for them?

PORTER: At that point in time, they were not here ... at that point in time.

FASANO: Did one ask over the telephone, to you knowledge, for that information?

PORTER: B&W may have. I'm not sure. I reported that information back to the shift supervisor's office. But I'm not sure what ... just what information might have been requested of them.

FASANO: O.K. When you say B&W, would that be through Lee Rogers.

PORTER: Yes.

FASANO: O.K. Did you have a reactor engineer in this group in the Control Room?

PORTER: A reactor engineer?

FASANO: Of nuclear type - physicist.

PORTER: Not that I recall.

FASANO: Did you at any time during that morning have a nuclear engineer? One that was familiar with the nuclear physics of the core to discuss any of this information with?

PORTER: Not that I recall. No. There may have been.

FASANO: You mentioned that you hooked up another DVM to the other reactor coolant loop ... hot leg. What sort of temperature reading did you get out of it?

PORTER: It was about the same. The instrument we hooked up over there was such that it also read the lead resistance. So it read like 248 ohms, instead of 243, so to me that disconfirmed what I was seeing on the other side.

FASANO: They had actually been a little hotter?

PORTER: No, no, it meant was it was reading, what it meant to me was I was reading 5 ohms of lead resistance or so, as well as the RTD resistance.

FASANO: O.K. Ivan, I've a copy of a page out of the FSAR, and it talks about a vented valve thermocouple nozzle, do you know if there is a thermocouple in this location in the upper section of the vessel?

PORTER: I believe we don't have those hocked up.

FASANO: Were they available?

PORTER: I don't think we use those on Unit 2.

FASANO: They don't exist?

PORTER: I believe not.

FASANO: O.K. So you were engaged in ... after 8 o'clock or so, mainly in monitoring the Digital Volt Meters that you set up. When was the first time that NRC requested any information on the thermocouples?

PORTER: I'm not sure, but it was later in the day sometime.

FASANO: Was it an inspector asking you for it personally?

PORTER: We went through kind of a process of asking me, and collecting data themselves. Mostly the discussions with me, I believe, after a point in time, was to try to evaluate how believable they were.

FASANO: And what was you position regarding how believable the thermocouples were?

PORTER: I believe what I said, over and over. Was I just didn't know what to believe with them. Since some were indicating high and some were indicating lower than what was realistic.

FASANO: So you had a certain lack of confidence in what the instrumentation was indicating?

PORTER: I would say that's true, yeah.

FASANO: What was NRC's position? By NRC, I mean the representatives that you were talking to?

PORTER: We went over those thermocouples so much for several days, I can't begin to sort out what specific conversation occurred, at any particular time with regard to them. I'd like to, but I just can't. We went through over the next period of a couple of days of how well we could believe them,

and taking measurements. I measured the ground, which only substantiated my belief that we had junctions different than the ones we started out with. I eventually talked to an engineer at Leeds and Northrupp, I believe that was on Friday or Saturday, to discuss whether or not, if you got multiple junctions or junctions with different types of material, other than the chromel-aluimel that you started out with. Could we get higher readings. And he said yes we could. Depending on the conditions of thermocouples and what junctions we had. And it was about that point in time, I recommended that they get somebody who knew more about thermocouples and answer the question. I just run out of things to say, anymore.

FASANO: But this more like

PORTER: But that was more like the 30th or 31st, not the 28th.

CRESWELL: Who was "they"? You recommend that "they" found somebody else?

PORTER: Well, this is really directed both to B&W and the NRC, and I actually gave him the names of a couple of people that had been recommended they might talk to, that had been involved in research and chromel-aluimel thermocouples and stuff.

FASANO: Now you indicated that you made some measurements on the resistance to ground?

PORTER: That was ... the only date I have recorded was the 29th. And I believe that was the first day, or the first time I did that.

FASANO: About what time did you do that?

PORTER: I don't have the data sheets here ... during the day shift, sometime.

FASANO: Now did you get lower resistance readings or higher resistance readings than you would anticipate?

PORTER: Well, I didn't know what to anticipate specifically, but what I did get was different ratios between the chromel-aluimel lead from one thermocouple to another one, which indicated to me that we had shorter passed aground on some of them, than we did on others, or longer passed, if anything.

FASANO: Of course in some cases, you would have a longer lead when you are taking a ratio just between the two and the one given

PORTER: Yeah. The chromel I believe was run around 300 ohms to ground and ... I may have this reversed. One is around 300 ohms and the other one is nearer to 900. And what I did was divide 200, approximately 250 or 300 into the 900, and I got different ratios. felt, regardless of the distance of the leads and stuff, that the ratio should come out constant.

And they didn't. And that was only on, oh, I think five or so of the hottest ones were the greatest concern at the time. Plus, a couple or three more, that were reading approximately what T_{ave} was at the time.

FASANO: Did you check continuity on that?

PORTER: Well, if you have a reading to ground, you have continuity. They were grounded junction thermocouples, and we still were getting readings to ground, yes. But, what we didn't know was where the ground was ... was actually at.

CRESWELL: At any time during the morning, did anybody come to you and question the pressurizer level indication?

PORTER: I heard questions raised about it. I don't know that it was addressed to me specifically. As far as I can recall, the instruments themselves were in agreement with each other, which led you really to no great choice but to believe them.

CRESWELL: Do you remember who made those comments?

PORTER: No.

FASANO: Were you requested to make any checks to validate this in any way?

PORTER: Not that I recall, no.

FASANO: During the event, apparently there was some problem with the pressurizer breakers. They were going out. Do you have any knowledge of this? Were you involved in evaluating this or had you been?

PORTER: I did not go down to the breakers myself, no. We did have electricians go down, and selectively try to figure out which specific breakers were a problem. In order to try to reenergize more of the groups.

FASANO: Where are these breakers located?

PORTER: There in what we call the M-20 area, down adjacent to the basement of the Turbine Building. What had to be done was selectively turn off groups and try to reenergize the main breakers to figure out which ones were causing the problem to recover what we could of the heaters.

FASANO: The T_{ave} data, apparently it sort of once it got to a certain to which got T_h off scale, it appeared that T_{ave} was coming out of fixed value. Were you knowledgeable of this?

PORTER: I guess not specifically at the time, but I believe with your T_c off scale low and your T_h off scale high, you'll get mid scale.

FASANO: Did the operators realize this?

PORTER: Well, I'm sure they did. I don't believe they addressed it to me specifically. But I would think they would.

CRESWELL: Do you set up the instrumentation on the T-cold and RTDs?

PORTER: No. We have wide range on T-cold. We have indications on T-cold.

FASANO: On the electromatic relief valve you were involved with, I guess modifications of this particular electronic, an electrical part of the valve.

PORTER: Yes.

FASANO: Do you recall when this was completed? And what was the final results?

PORTER: When, I don't recall - no. What was done was the bistable signal that comes out of the NRI system was changed such that a loss or power to the analog instrumentation would not cause the valve to open. The contact would not fail in a closed position to give a signal to the electromatic to open. And an additional light was added which was operated off the voltage to the electromatic's solenoid itself.

FASANO: The first time that you had a problem where it actually opened was somewhere in March of 1978 or April?

PORTER: That could be.

FASANO: So the modification was done somewhere the early part of 78? Do you recall? Or later on?

PORTER: I don't recall specifically. I'm sorry, I just don't.

CRESWELL: Ivan, do you recollect there ever being any further discussion on providing operator positive indication on the electromatic relief valve opening and closing?

PORTER: No. No I don't recall that there was any discussion.

FASANO: When a modification like this is performed, do the training people get copies of what was done so the that if the operator would know what was done?

PORTER: Yes.

FASANO: As to what really was done and what they're really seeing?

PORTER: Yes.

FASANO: So they knew that it meant that they were getting a current through the solenoid, not that they a positive indication of the valve was opened or closed.

PORTER: I would feel they should, yes.

CRESWELL: Ivan, you mentioned that you had been monitoring the T-hot values for quite some time that morning. When did they first come back down on scale?

PORTER: I guess I don't recall well enough. Because I thought it was later than the graphs that turned out to show that it was. I thought it was later in the afternoon, but the graphs are showing it more like one o'clock or something.

FASANO: When did you think it happened?

PORTER: I had my mind more like three. O.K.

FASANO: O.K. What do you feel was the cause for the T-hot going back down on the scale? As far as reactor coolant system or condition was concerned?

PORTER: I just felt that through the different changing of plant conditions and so forth, we'd managed to get water up in the hot leg.

FASANO: Did you have any indication of what the operators were doing to get that water up into the pump?

PORTER: I did. But I don't recall that sequence well enough now.

FASANO: But in a broad sense. What do you feel was responsible for getting the water back up there? High pressure injection or starting the pump?

PORTER: I don't know. I just ... I'm sorry it's been too long now to try to recall stuff in that detail.

FASANO: Getting to about 2 o'clock, or thereabouts, they had a pressure spike in the Reactor Building pressure indicator ... pressure. Were you called to look at this spike? Were you consulted at all?

PORTER: I was. But somewhow I have a feeling, I didn't really look at those charts until the next day. I'm not specifically sure that I was aware of it that day. I know that I very specifically remember a discussion where we looked at the chart, was asked if it could possibly be real, and I also looked at the wide range pressure chart and saw that showed up as a decrease in pressure on the wide range reactor coolant system pressure, but I sincerely believe that that was the next day that I looked through that stuff.

FOSTER: Let's take a break and change the tape. The time is 2:25 p.m.

FOSTER: We're continuing with the interview of Mr. Porter. The time is still 2:25 p.m.

FASANO: I think we just talked about the pressure spike about 2 o'clock or so. Did you happen to hear any noise at that time? Unusal?

PORTER: I can't say that I did. No.

FASANO: Did you observe anybody congregating around the chart, or any activity in the Control Room regarding that happening?

PORTER: I don't know, or didn't ... sorry. But once again I wouldn't swear that I was right there or that I was even in the Control Room. I may have been back in the instrument shop or someplace else.

FASANO: You did mention that you don't recall if you looked at the wide range reactor coolant pump ... the reactor coolant pressure at the same time during the 28th. This is what I believe you said, that you saw a negative pressure.

PORTER: I'm pretty well convinced that was the 29th, that I looked at it ... those charts.

CRESWELL: Ivan, after you had looked down ... looked at that pulse ... pressure spike, could you explain through any form of instrument malfunction or is there an instrument malfunction that would produce that type of response?

PORTER: I would think not. It did look like a real spike to me. That was when I was specifically asked if it could real. That's the reason I went and looked at the wide range pressure, just to see if I could find it in two places. And I did.

FASANO: Wide range pressure then is a direct readout to the environment of the reactor?

PORTER: No. What I was referring to there is that the reactor coolant system wide range pressure unit was referenced against building atmosphere. So I went to look for a 30 pound decrease in the wide range pressure indication and it was in fact a blip on that chart also.

FASANO: Were you in the Control Room when ... I guess you were... when you had to don masks?

PORTER: Yes.

FASANO: Do you know why you were told or told you to put breathing masks on?

PORTER: I believe Dick Dubeil told us. I hoped they would ... because I, not that I wanted it ... but because high particulate activity wasn't something I was hoping for ... but

FASANO: Did you feel more comfortable?

PORTER: Yeah.

FASANO: Do you know of any problems with the coare flood level indication? Were there any that you know of?

PORTER: Not that I was aware of. No.

FASANO: Had there been problems with the core flood indications on this plant?

PORTER: I don't believe so, no.

FASANO: Were you there when they were trying to discharge coare flood tanks.

PORTER: Yes.

FASANO: Were there any discussions of fluctuating levels in the core flood tank level indication?

PORTER: I don't recall any. No.

FASANO: Were you around the instrumentation whenever they were performing this manipulation?

PORTER: I was around the Control Room. I was not specifically watching the core flood instrumentation. No.

FASANO: Did it appear that the maneuver was successful to inject core flood tank water into the reactor coolant system?

PORTER: As I recall it, it was to a small extent, but of course the pressure being what it was, you couldn't get it down any lower, why it was only marginally successful.

FASANO: Just prior to the trip event, and I know you weren't in the Control Room at that time, but do you on the condensate and condensate booster lineup, I've been told that the operators do not use it in the auto mode on the auto-manual switch. Do you know

PORTER: I believe that's true. But I'd not try to be the one to explain all the ramifications of why that's true.

FASANO: So to the best of your knowledge, they usually kept it in a manual mode?

PORTER: That's my understanding, yes.

FASANO: O.K. So the logic then would be that you could have one condensate pump trip and you will not have it's pair trip off, is that correct?

PORTER: Yes, I believe so.

FASANO: Were you involved in any way or have any knowledge of the relationship to the condensate polisher and air supply and the logic for the valves to close if the water gets in the monitor ... gets in the air line to the valves?

PORTER: I had not been directly involved in that. No, I guess. We had had some difficulty with various problems with ... with the instrument air versus water. They had trouble before I guess, flushing of the resins and so forth, and instrument air.

FASANO: You normally wouldn't be involved in this?

PORTER: Normally or abnormally, I don't know. I just wasn't, I guess.

FASANO: When the two main feed pumps tripped, this plant is designed on the ICS to try to run back or will you always get a reactor trip on two main feed pumps go off?

PORTER: I'm not sure if that's a direct contact trip or not.

FASANO: When you get one feed pump, you do get a run back. Right?

PORTER: Yes, you should. It should run back to the point of 60% power on that. It normally comes down to 55 and then we operate between 55 and 60, or so.

FASANO: Were you consulted at all on the makeup pump ... operation makeup pump that particular makeup pump 1A, during the this event?

PORTER: Not as I recall, no.

CRESWELL: Well, Ivan ... go ahead

FASANO: I have one more here. On the logic for the ... getting back to makeup pumps ... apparently there's a logic where you see an A pump are off two different buses and the your B pump is swinging ... if ... does the operator have to do anything to make sure the electrical lineup is correct when he goes to start another, is there an automatic setup so that he doesn't get interference on using the same bus?

PORTER: There are interlocks to prevent starting two makeup pumps on one. I'd like to look at the drawing on that to be sure. I know you can't start two on a diesel. I'd have to check on the drawing to make sure. I know you can't run two on the one bus with a diesel.

CRESWELL: Ivan, at this point, we'd like to ask your for you comments, any comments that you have about the event and ways to improve things, NRC, anything that you'd like to say to take the problems out.

PORTER: I don't know if there's a great deal I'd like to say, although, it's obvious that there's ... we need a great deal of work on what happens an hour after the emergencies are declared. Who talks to who, and who has responsibility and communication links? And I'm sure there's nothing unique in what I have to say there. It's obvious to everybody, I believe.

CRESWELL: Then, what's you point?

PORTER: A lot of the interfaces got extremely difficult and cumbersome, I think with all parties. It made it almost impossible to just do things in what might be considered a reasonable length of time, unless you just did them.

CRESWELL: Are you saying the time it took to anwer all these questions distracted from the operations role?

PORTER: Well, it depends on what time frame your in. Fortunately there weren't much operations ... to much operation required after the first evening we got the pump running. I believe that we were extremely fortunate, at least in the primary plant. The Auxiliary Building systems were of course another problem trying to control the liquid and gaseous waste out

of there. I believe that's a too good assessment. Yeah. I had myself encountered several different people over the fact that I didn't feel that routine engineering information had to be transpired through the Control Room, where people were busy taking care of the situation at hand.

CRESWELL: Ivan, you did mention that you were on both Unit 1 and Unit 2 in the startup phase?

PORTER: Yes.

CRESWELL: Could you give an appraisal as to the way Unit 2 startup in the ascension to power program went in comparison with Unit 1?

PORTER: I think it's obvious that Unit 2 didn't go as well.

FASANO: Obvious? What do you mean, because of this or was there something

PORTER: Just compare starting and end dates, it obvious it didn't go as well.

FASANO: Well, what do you think that's due to?

PORTER: These two being my only points of reference, it's a little difficult, as near as I can tell from looking what I know of the industry, Unit 1 went exceptionally well. I guess I don't think that Unit 1 had an abnormal

number of problems from what I do know of some other plants. But, that's possible, if it did. I don't know for sure on that.

CRESWELL: If you were to make changes in the design of the plant, what sort of changes would you recommend?

PORTER: Well, my views are kind of narrow, I guess. I wouldn't put all the instruments in the basement. I wouldn't put the instruments on racks. And I think the secondary plant needs work.

CRESWELL: Would you provide the operator with any more instruments?

PORTER: Probably, yeah, now. We'd give them a better computer, I'm sure. Something where the alarms weren't coming in as late as they were. Be more careful about things like the T_h being such a limited scale and so forth. I don't really feel that as far as display instrumentation and stuff, that the plant is short of indication. I do believe that some of the ranges are probably could be reworked. The computer certainly, but than we were planning to ... because it's a significant - computer change.

CRESWELL: The operators indicate that they were using the vibration loose parts monitor channel for ... one of the channels for indication of auxiliary feedwater flow. They had a speaker

PORTER: There's an installed speaker, that's part of the system.

CRESWELL: Yes, but that's a permanent mounting type of speaker. As I recollect there was another speaker, a temporarily mounted speaker sitting on top of the control panel. Are you familiar with that at all?

PORTER: Unless there's been a change made. That speaker inicate, it was really to indicate when the main steam relief valve were open and shut. Although you can hear the steam driven pump when it starts up on that. But I don't know if that's a good indication of actual injection of feedwater. You do hear the pumps start up on that speaker.

CRESWELL: Oh you can hear that.

PORTER: It was my understanding that the noise from the emergency feed was from the installed loose parts monitoring system. But I could be mistaken there.

CRESWELL: O.K. Why would you mount a speaker in there to listen to the main steam safety relief valves?

PORTER: Well, last spring we had a full set of them that didn't reseat properly. And they since have been changed and we haven't had that difficulty, but the speaker is still there.

FASANO: This is the Lonigan valves?

PORTER: The Lonigan valves. Yes.

FASANO: I have a question on the decay heat interlock. Apparently you have a greater than 300 psi interlock, at least at the ... down at the relay room ... just below the Control Room.

PORTER: Uh, uh.

FASANO: And it ... does an operator or an auxiliary operator have to go there and watch the reset ... make a reset on that if you're going into the decay heat mode ... and this is for the decay heat valve 1 and decay heat valve 2, I believe.

PORTER: I believe so, but I'm not sure.

CRESWELL: The reason, we're asking, Ivan, is that we have indications that an operator was sent down into that Cable Room, that you were talking about earlier, to the S-fast cabinets, and was to reset the bistable when it was attempted to lower pressure, and not to let the core flood tanks discharge. Can you with your knowledge, of the S-fast system see any need to do that?

PORTER: Reset the bistable to repressurize the core flood?

CRESWELL: That's the bistable that trips at 320 pounds in pressure. To allow you to open up the decay heat valve?

PORTER: I guess, I don't see a reasonable answer.

FASANO: When did you go home? We never did ask you that. I think ... when were you relieved?

PORTER: It was sometime after midnight, I believe.

FASANO: Midnight. So, you were in from about 6 in the morning till midnight the next day.

PORTER: Well, That night, Yes. It was after midnight when I got home anyway, and shaved.

FASANO: Did you pick up your TLD, Ivan, on the way in?

PORTER: Yes, sir.

FASANO: Did you turn it in after the ... that day, when you left?

PORTER: I don't believe I did that day, no. Although I could be mistaken. I'm not sure if they were collecting them that day or not.

FASANO: Were you checked for contamination?

PORTER: Yeah, yeah.

FASANO: What were the results?

PORTER: I was not contaminated. I haven't yet been.

CRESWELL: Where did you check out from? Did you check out at that the Visitors Center?

PORTER: Yeah.

FASANO: What were the conditions that you found over at the Visitors Center?

PORTER: Busy.

FASANO: Did a Health Physicist check you out?

PORTER: No, I believe I did.

FASANO: You checked your own self out?

PORTER: Yes.

FASANO: Did you drive your car up there?

PORTER: Yes.

FASANO: Did anybody frisk your car?

PORTER: I don't believe so.

FASANO: I have no further questions at this time.

FOSTER: O.K. Ivan. Thank you very much for you time. And we're going to conclude this interview at 2:45 p.m.