35-6a

OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: U. S. NUCLEAR REGULATORY COMMISSION

Title: INTERVIEW OF: DAVID VINEYARD

Docket No.

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ADDENDUM TO INTERVIEW OF David Vineyard
(Print Identity of Interviewee)

Page	Line	Correction and Reason for Correction
3	7	"buck" should read "vaccum"
10	16	word "purpose" should be purple
11	18	"setting ahead" should be "setting of the head".
13	21	"NCW" should be "NSCW"
18	4	"TR's" should read "TH's"
27	16	"bands" should be "dams"
38	6	"service" should be "surface"
4	24	
5	6, 7, 13, 17	"enunciater" should be "abouncinter"

Page 1 Date 3-29-9[illegible] Signature David D Vineyard

U. S. NUCLEAR REGULATORY COMMISSION

INTERVIEW OF:

DAVID VINEYARD

Site Manager's Conference Room
Administration Building
Vogtle Electric Generating Plant
Waynesboro, Georgia

Tuesday, March 27, 1990

The interview commenced at 1:05 p.m.

APPEARANCES:

On behalf of the Nuclear Regulatory Commission:

GARMON WEST, JR.
WARREN LYON

PROCEEDINGS

MR. WEST: This is the NRC IIT of the event that occurred at Vogtle on March 20, 1990. It's currently 1:05 p.m. on March 27, 1990.

Whereupon,

DAVID VINEYARD

appeared as a witness herein, and was examined and testified as follows:

EXAMINATION

BY MR. WEST:

Q What we would like to do at this point is to have the interview introduce himself and state what your position is here at Vogtle and proceed from there to talk a little bit initially about what you were doing at the time of the event, what role you were playing, and then just tell us in your own words your account of what happened.

A Okay, my name is David Vineyard, I'm a shift supervisor here at Plant Vogtle. I've been here about five years now, had a license about three and a half years, taught for awhile in the Training Department and then have been in the Operations Department now.

The day of the event I was providing outage support, I was in the service building, heard a noise. That noise followed immediately with lights going out in the service building and so I then decided that I would provide some

assistance, if I could, to the control room.

On the way over, I saw personnel going to the back of the turbine building to see what was going on. I went back there with them to see if there was any problem because I was basically concerned with fire. And about that time the announcement come over the page that they were breaking back into the Unit 2 turbine building. So I knew that something more major was going on than just lights going out. So I then proceeded to the control room. I got in the control room, went in the Unit 2 control room to see if they needed any help. They basically had things stable, there was a couple of personnel in there. I went to the Unit 1 side, they were busy. I asked Bruce Snyder, who was the Unit 1 shift supervisor, if he needed any assistance. He did not -- he said come on in and at that point I basically was concerned primarily about temperature because it was obvious that they had no power. . observed that there was no power on the bus.

To the best of my recollection, as I walked in, I think either the diesel just had tripped or it tripped right after I come in for the first time and I then asked about thermocouples and they had it up on the computer screen and I started -- I told Bruce I was going to start watching his thermocouples for him and I started watching and making a five minute time interval of thermocouple temperatures.

I did that primarily the rest of the time and assisted the reactor operator as he needed, and I basically looked over Bruce's shoulder, made sure he was using the AOP's and he was, and so basically I watched thermocouples for him after that.

I made one plant announcement when we downgraded from the site area to the alert and then after we got the diesel back and things were stable, temperatures were stable and then decreasing, we started the RHR pump and I was sent to the Unit 2 side to assist in stabilizing that unit and trying to get things back on line over there.

Q Any particular reason that you went to Unit 2 first?

A Well other than they were operating and usually it requires more of direct assistance for an operating plant than necessarily for a shutdown plant -- generally speaking. So I decided to see if they were in a stable condition or needed any assistance.

And also usually on Unit 1 there's always one or two extra persons in Unit 1 anyway because they're always testing something or doing something else.

Q Any -- I don't know exactly where you were positioned at the time that you were in Unit 1 when the diesel tripped, but it's my understanding that there's an enunciator panel for the Unit 1 diesel generator?

A Yes, sir, one for each diesel.

Q Is that in the main area of the control room?

A Yes, sir, sure is.

Q Do you recall which -- does it have a first out capability?

A No, it doesn't have a per se first out light for reactor trip, it doesn't, it just has various enunciators.

Q I see. Any recollection of which enunciator may have come in?

A I can't say that I remember which one it was, but I do remember that they said it was low jacket water pressure that tripped. I can't say that I recollect it. I do recollect on the second -- let's see, on the third start when we emergency started it, we received an enunciator that I hadn't really seen come in before and it was low lube oil sensor malfunction, and that one subsequently cleared after the diesel was running for a few minutes. That was the only specific enunciator I remember on the diesel.

Q How much time did you actually spend in Unit 1?

A Probably -- I would say 20-25 minutes, it could have been more or less five or ten minutes, but that's what it seemed like.

Q What was your general impression, whether you were in Unit 1 or Unit 2 during the event, with respect to whether the control room was too crowded, about right or whatever it might have been?

A On the way in, I was thinking about it. Having spent so much time teaching in the simulator environment, very honestly I was impressed for two reasons. One, I thought that -- first off, I'll use the word "zone defense" I thought was exceptional. You had the crew was performing, myself and a couple of other shift supervisors had come in from other jobs to assist them so they had immediate on the floor support. The OS was up on what we call the podium making his -- getting into the E-plan, emergency plan, making notifications. Had a couple of other OS's assisting him and then management behind him.

So I thought, first off, the arrangement was very applicable. I didn't think it was too many or too less and I also thought communications were at the time very applicable. First off, I'll qualify communications. The air in the room was not of disarray, it was of very directed response. I thought people pretty much knew what they were doing and what they needed to do. The RO was, you know, observing his panel and staying at the panel. The BOP and the other people assisting were trying to get the diesels back. I tried to focus just on thermocouples and not get over in that, make sure we had the procedure out. Other people were doing the E-plan, so I thought that the people's direction and the air was directed. And then I thought communications, because of the level of urgency to get that

diesel back, I didn't think it lost focus because of excessive communications. We talked earlier, you know, about when I was monitoring thermocouples -- Friday, when I was monitoring thermocouples, about when I would make interjected comments to them. At the time I thought mostly all communications, particularly for the crew on the floor, was very specific. And based on what they were seeing. In other words, I thought the people at the diesel was going at a very controlled but urgent rate. In other words -- I wasn't giving them any specific input from thermocouples because they were going at a real good rate of doing it.

Q What was the chain of communication as it related to you? Specifically who were you communicating with?

A I reported primarily to the RO and Bruce Snyder, the shift supervisor. That's who I was trying to provide that input to so that they were aware -- and I also occasionally gave the Emergency Director, who was John Hopkins -- and at the time -- I can't remember, one time Bill Burmeister was on the phone with the NRC, on the red phone, and then later on Jeff Gasser was on the phones and they were continually wanting to know thermocouple temperatures, so I was providing information to them as well. So it was primarily the RO, the SS and the emergency response team.

Q You're talking about in-core or ex-core thermocouples?

A In-core thermocouples.

Q What was the nature of the exchange that you were having with various individuals? I'm just trying to picture it a little better. Did you -- you were watching the thermocouples on the CRT?

A On our Proteus computer. Specifically what I did was, as soon as I got down there, they informed me they had started about 90 degrees because I come down there and said are we watching thermocouples and they said yes, it was 90 degrees. I can't remember exactly but it was 100, low hundreds when I first got in there. And I said I'll start plotting them and I started a five minute time line written down on what -- we had two thermocouples hooked up and I was monitoring and plotting -- I shouldn't say really plotting, just writing down what the trend was so that we all had an idea of what our rate of increase of heat up rate was.

Q I see. Is there something you had to -- you just on your own would report occasionally or did you -- were you called upon to --

A Usually what I did, I did five minute intervals and at five minutes I would update the RO and the SS and then when the emergency people, people talking to NRC, I would give them that new rate -- heat up rate, and a couple of times the NRC would come back and ask again as they were making notifications, they would ask what number are we at

now or what was the last number the last time you logged it, those kinds of things.

Q Did you have any communication with any of the other areas related to the event, the diesel generator room --

A No, I did not. And again, there was a reason. One reason why I didn't even feel it necessary to do that was because I didn't feel there was any need to burden them with that information specifically, (1) because they were working at a urgent rate and I didn't see any need for them to know what thermocouples were but I did the RO and the SS, so he was cognizant of what was going on and so he could make his decision of whether or not he would want to go on with the AOP's which would have gotten us into gravity drain and so on and so forth. But specifically to the people over at the diesel panel and out at the diesel, no, I was not in communications with them.

Q The safety parameter display system, are you familiar with that?

A Uh-huh.

Q SPDS. Was that available?

A I looked at it and the information on it was purple, which indicated it was bad. I called it up, it was bad, I went over to the --

Q Was everything bad or just some of it was -- most of it or whatever was bad?

A From my recollection, I would say most of it was bad. I called up the screen of thermocouples and trends and it was bad and about that time the RO said Dave, I've got thermocouples on Proteus, so I went straight to Proteus and started watching them on Proteus at the time, which is our other plant computer that monitors all kinds of other parameters, safety and non-safety related. And that's what I monitored on.

Q Just in passing, previous to the event itself, what has been your view or experience with the SPDS?

A At power or shutdown?

Q Both.

A At power, I consider it a very reliable piece of equipment. And usually a large majority of them work, depending on what maintenance is going on and what tests. A lot of those end up being purpose status when we do A-COTS and channel calibrations and stuff.

When we're shutdown, we are doing all kinds of maintenance on it, so most of the time shutdown SPDS is not due to -- is purple, which usually either means it's bad or it's questionable because of the range.

And there again, I think that's where it comes to a point where I had -- my primary function during the outage is fuel handling supervisor so I was not on a day-to-day update basis of SPDS, but based on -- but on that statement

is SPDS reliability would have to be determined on a day-to-day basis by the operators who have been working with it, particularly in the outage environment where things are changing minute-by-minute.

Q As an SRO you're certainly close to what's available there in the control room in terms of instrumentation displays and so forth, controls. Could you give us your view of how -- of whether (1) the instrumentation and controls you need are available and (2) whether they are suitable in terms of dealing with the kind of event that took place?

A Well (1), I think just because of the way we are at mid-loop, we are in mid-loop, we are limited and generally we have multiple indications when we're looking at a parameter, whether it be at pressure or temperature or flow at power. When we're at mid-loop, we're very limited. I thought particularly because we had installed thermocouples early in the setting ahead, that it was -- we couldn't have asked for better, and I think most of that came out of the training and stuff we've had on the Diablo Canyon event and necessarily -- particularly when you're installing nozzles in advance of having thermocouples and we just went ahead and installed them. And specifically for this event, I think -- I don't think I could have asked for any more parameters to watch the core in than the thermocouples. I

don't know of anything else that would have really helped us in that respect at mid-loop with no recirculation capability.

Q Vessel level --

A Uh-huh.

Q -- what did you have available there in the control room?

A We had the two accumulator level instruments that have been rewired during mid-loop operations that is into a temporary pressure transmitter that's tapped into the system and that was working properly.

Q Does this have a range to it, wide range, narrow range?

A What -- we have one instrument that's set up for wide range and one for narrow range and there's a posted operator aid up on the control board that tells us what this specific transmitter is, it's 960 -- I don't remember the other number -- 960 might not be right, but it tells us specifically which level transmitter is the narrow, which one is wide range and at the time, because of talking to the crew during the event, they were raising level, so they also had a guy at the tygon tube observing level come up as well. So I guess those are -- I didn't really think about levels, but those are indications that are good, I thought were very good. And later on if we had had to went to gravity drain,

would have been of great usefulness in determining what our level was.

MR. LYON: But you were not directly reading level, you were just concentrating on temperature?

THE WITNESS: Myself, that is correct. I looked up like one time and looked at level and I saw we had fine level and because of -- we had communications with the guy on the tygon tube, so you know, if level had been coming down, we made sure HP was with him, so if we had a problem there, you know there was health physics coverage and based on temperature, I didn't expect for level to be decreasing, I didn't expect to have a reduction problem in mass.

MR. LYON: Do you know if anyone else was periodically checking level in the same way that you were checking temperatures?

THE WITNESS: I would have to say yes based on the assumption that the RO was being very cognizant of his board. What was going on behind him on the electric panel was not -- it was not diverting his attention to that, he was staying primarily with the two panels, the reactor panel and panel A which is RHR, NCW and those things, because we had even discussed once about what level was and where it was going and he was the one that told me we had a tygon tube watch and that level was fine. So in that I would assume the answer is yes, Perry Vannier was, because that's

his normal responsibility and he was staying in the realm of his area, particularly in the incident, he was staying very close to that.

MR. LYON: You said you were recording thermocouple readings at five minute intervals.

THE WITNESS: Right.

MR. LYON: This is a written record that you were preparing at the time?

THE WITNESS: I wrote it down and gave it to -- I can't remember if it was the ED at the time or John Hopkins, I gave it to one of that zone group that I was talking about earlier to put with the log that they were keeping down there. They were keeping a log, a time line of events and when things happened, and I gave that thing -- it was on a yellow pad of paper -- and I gave that time log to them.

MR. LYON: And who was the ED at the time?

THE WITNESS: I'm pretty sure it was George Bockhold. Now he may have -- I don't remember if -- it doesn't seem like it was George Bockhold that I gave it to now that we put a name on it. So I really can't say exactly who I gave it to. I gave it to one of the supervisors on the podium who had the time line, the log that they were keeping.

MR. LYON: Okay.

THE WITNESS: There was like four -- three or four

log entries that I had made of what time was -- or temperature was and time.

MR. LYON: In other words, there was four numbers?

THE WITNESS: Well it was actually eight numbers, it was four times and I had logged both thermocouple temperatures all the way up till we started the pump and I wrote in what the pump start was and then after the pump started and it come down I wrote one more because temperatures were at 131 and 136 degrees Fahrenheit when we started the pump and then of course there was some time delay while we started flushing the water through the core once we started the pump and then they dropped off real rapidly and stabilized at about 105, 109, in that area.

MR. LYON: I'm confused. You indicated you were recording these at five minute intervals.

THE WITNESS: Uh-huh.

MR. LYON: And you had a total of eight numbers. In other words, you had four times --

THE WITNESS: Four times with eight temperatures, right, two temperatures per time.

MR. LYON: So -- and how long were we without AC power? I guess the next question is when did you start recording, was it significantly into the event?

THE WITNESS: The -- I can't remember what the first temperature was, but it seems like it was into the teens.

Like I said it may have been three -- may have been three time intervals, I can't remember if it was three or four.

MR. LYON: Okay, that's close enough to get a feel for --

THE WITNESS: Right, right.

MR. LYON: -- how many we have there. So these were tabulated. There is not a plot?

THE WITNESS: That's correct, not a plot, just a time and it was an odd time, it was like on the one minute and then the six minute time frame because when I started logging it, that's what it was and I didn't see any need of waiting. So I wrote that down, wrote the two temperatures down and every five minutes thereafter I wrote those two temperatures down.

MR. LYON: Were you recording time as you went along?

THE WITNESS: Yeah, I wrote down -- just for the thermocouples, I wrote down that it was nine and whatever it was, 01 and then wrote those temperatures down. And then five minutes later, wrote the time and those two temperatures down. So you could actually look across it and determine what time it was and what the two thermocouple temperatures were so that I had -- and I was doing that for a couple of reasons, (1) so I didn't have to rely on my memory and more importantly, (2) so I could get a feel for

what the heat up rate truly was and was those instruments reading reliable because if they both trended together I could believe both instruments were reading a more reliable value. They always maintain anywhere from a three to five degrees difference. At the end it was 131 and 136 and that's about the difference they started at, so in my opinion it was a reliable -- both instruments were very reliable.

MR. LYON: Do you feel that is a calibration thing or it's real, this temperature difference?

THE WITNESS: Well I feel like it could be a number of things. I feel like it could be calibration, I feel like it could be just position in the core, position where it was at in the head, in the upper internals.

MR. LYON: Did you have anything to do with positioning those as to which ones were selected to provide information?

THE WITNESS: Myself, no, I did not.

MR. LYON: Do you know who did that?

THE WITNESS: No, I do not.

MR. LYON: Okay. There's a number of other RCS temperature measurements that are displayed in the control room, yet you concentrated on the thermocouples. Could you kind of walk us through the other temperature indications, tell us whether you looked at them or not and why and if you

did, give us an indication what they were doing?

THE WITNESS: The answer to that is yes, I did look at them and those other instruments were wide range TC's and TR's. Now I didn't put a lot of weight on those because (1) they're way out in the loops and because loops are not filled I expect no type of recirculation through the loops. If anything, it would only be internal of the vessel, water falling in the cold spot and rising in the hot spot, which would be minimal. But I did look at those, and they were relatively the same as what thermocouples were, and the I never did go back and see if they were trending to any specific value. I looked at it again later on after we started the pumps and they were about the same as thermocouples but I didn't put a lot of weight in those temperature elements simply because of their location to the core.

MR. LYON: Okay, so let me make sure I understand. When you first started looking at temperatures, you took a quick glance at your wide range, both cold leg and hot leg.

THE WITNESS: That's correct.

MR. LYON: And when you saw that those were indicating about the same thing, you did not go back to those, knowing their characteristics.

THE WITNESS: Knowing where they were in the loops, that's correct. I was more concerned about in the core than

out in the loops because the loops were going to have obviously some large lag time because there's no circulation at all.

MR. LYON: What about your narrow range?

THE WITNESS: Narrow range, I didn't even bother looking at because narrow ranges don't work unless we have flow through the bypass manifold.

MR. LYON: Then there is another temperature indication in the RHR system.

THE WITNESS: That's correct. I only looked at that to see what it was before we started because that would not work unless we had forced flow, RHR pump was running. I basically looked at that to see where temperature was when we started and it was about 90 degrees and he said thermocouples read 90 degrees, about 90 degrees. I didn't see a change and I didn't expect to see a change until we started the pumps and then we watched that very closely, the one for the warm up of the RHR's, so we started flow back slowly and then -- to see temperature come up and then come back down to a stable point and watch -- we watched the RHR temperature with thermocouples and of course there was some lag time and then after everything had stabilized out and we had a constant flow, within a minute or two, those temperatures then were about the same, thermocouples and RHR pump discharge temperature -- or inlet temperature, excuse

me.

MR. LYON: What I'm hearing here then is pretty much your specific function was to watch those thermocouples. That wouldn't occupy you full time, I wouldn't think, were you doing other things at the same time?

THE WITNESS: I was trying to provide Bruce backup in that I asked him what AOP was he in, did he have it out, he said he was in the loss of 1-E and the loss of RHR and I basically -- basically was just trying to provide him backup and if he needed anything, you know, while he was down there. That was really to ensure that we were using the procedure because he was probably spending more time ensuring that he got power back than he was proportional to the RHR directly because they are a direct relationship, not to imply at all that he was ignoring thermocouples because I was providing him that input. But I was trying to assist him by relieving him of some of that heavy burden of just watching thermocouples to ensure that work was going to get power back. And I did that primarily by ensuring he had AOP's out and that he knew where he was going and that I was right there if he needed any assistance.

MR. LYON: Would you say that both of these procedures were in use simultaneously?

THE WITNESS: Yes, I would say that. I would say multiple procedures were, but primarily those two.

MR. LYON: Okay. The procedure covering the loss of electrical power, was that effective under these circumstances? Are you in a place to judge that?

THE WITNESS: Effective is a very general word. I would say that they provided the adequate guidelines to send you the procedures that were the most effective in this area, which primarily if you didn't have power, the RNO sent you to all of these other procedures which then sent you to the loss of RHR procedure, if for some reason you didn't have a cognizance of mind to go straight to the loss of RHR procedure. So in itself, the word sends you to the right procedure, in my mind the two primary procedures were 1-E, loss of 1-E bus and the loss of RHR because loss of RHR provides you all the guidance for bottling up the containment if temperatures rise above 200 degrees, go ahead and start your gravity fill and while 1-E is to tell you to get power back. So the loss of 1-E in itself exclusively doesn't cover the job, but I don't think it was ever intended to. It sent you to all the procedures that were necessary at the same time to provide coverage.

MR. LYON: Now the RHR procedure clearly was written for a non-power operation situation.

THE WITNESS: That's correct.

MR. LYON: The -- was that also true of that loss of AC power procedure?

THE WITNESS: No, but the way it's written it will cover both areas very good. And to qualify what you're saying, for loss of RHR procedures basically is set up into two areas, Modes 4 and 5 and into Mode 6 with the head off. And then that one closes itself up real good because the first step asks you if the water level is above the flange level, if it's not then you go to Modes 4 and 5, even though technically we were in Mode 6, they hadn't bolted the head down. And that provided all that necessary guidance.

Now the 1-E procedure written -- really the way I read it, and I went back and looked at it, I really don't see that it is really tainted either way to a power procedure or not because it sends you -- when you lose 1-E obviously you lose most of all your large systems, cooling systems primarily and support cooling systems. It sends you to all those applicable AOP's which then as necessary are divided into subsets. In that case one of the one is CCW and then CCW says if you don't have it, go to loss of RHR and loss of RHR is divided into those necessary applicable statements, so to me personally, I think the procedure was adequate in speaking academically only, to lead you in the right direction. I think from a trained operator understanding what's going on, he could have just as easily have went straight to the loss of RHR procedure without needing the paper path to get there.

MR. LYON: Now a number of people have told me that the RHR procedure is pretty heavily front loaded on the presumption that one train of RHR was lost, that the other train is available and it concentrates on getting that other train into operation. Is that true in your perception and if so, is that a problem because you didn't have that situation?

THE WITNESS: Well let me answer that in two parts. One is yes, it is more heavily weighted to have that other power back. But most of the RNO, response not obtained, columns do have all the contingencies there in case you don't have that train. Some of them are written so that basically the kick-outs to them are not until you get to a 200 degree frame, which I think most people, you know, if you're going to 200 degrees, you don't necessarily wait till 200 degrees to go ahead and use that response not obtained column and generally we are trained to do that. But I think the second part of that answer is is I think yes, there is plenty of guidance, not necessarily that it could be made better or that it's bad, but there is plenty of guidance there to what we really need to do and from lessons learned that we've been trained on from other places, specifically to isolate containment, to start gravity fill. It tells you which procedure to go to for gravity fill, which system operating procedures specifically tells you to go to do that

and whether or not you have manways off or not, can you run other pumps.

So I think that two-part question is (1) it is heavily loaded up front for the assumption which we always assume we have power and then (2) in case we don't have that power, there is adequate guidance there to get you where you need to get, which is provide water to the core.

MR. LYON: Okay. In the process of sort of looking at these and providing I guess for want of a better word, a consulting capacity, were you thinking ahead of what actions might need to be taken, what advice you might be needing to provide if they did not get electric power back and what those actions would be?

THE WITNESS: The answer to that is absolutely yes, and that was why I was most concerned about trends and why I was trying to give everyone specifically involved the time frame of the heat up rate. I wasn't trying to load them down and I tried not to provide them with more information than they needed, just enough to understand where they're at. I wasn't real concerned about making the technical change of mode, you know, once we crossed 140 degrees, as much as I was later down the line of boiling in containment. And I wasn't providing any extra information to those individuals at the time other than what heat up rate was. In other words, I wasn't trying to get -- to raise their

urgency because again I thought they were going at appropriate value and we were far enough from 200 degrees or 212 -- 200 is when the procedure has us start doing other things and I think that's when most of us consider us needing to be doing things. And looking at what -- what I was thinking at the time was is that at the time we finally got power back, we had about a 60 degree an hour heat up rate and based on that heat up rate, when we hit 150 degrees or so is when I was going to recommend that we start discussing going ahead and starting gravity drain. Do we want to go ahead and line up for it. The areas of isolating in containment had already been initiated, which is one of the response not obtained sections in the procedure. So those actions were already taken.

And I felt and Bruce -- my perception is that Bruce felt at the time that based on that heat up rate and based on the fact that we saw the diesel was starting and that the diesel was not loading under because of the jacket water and we could go to the emergency start, that it wasn't necessary to start gravity filling and possibly get into some other problems, and just going ahead and continue with restoring power. But my personal objective would have been at the 140 to 150 degrees, we would start ensuring that Bruce was considering to start gravity drain to the vessel -- start raising level to add the cool water to the core. But at the

time I did not consider that necessary information, simply because of the actions being taken electrically.

MR. [illegible]: Okay. What do you feel about the preparation that you had received, training, knowledge kinds of things and were you ready for something like this which clearly is not something you usually anticipate running into?

THE WITNESS: Or ever thought you would ever get there. I think the answer to that is as reasonably as you could train someone for such an accident -- and really that's based on -- I say accident, event, whatever you want to call it -- based on looking at really what happened at Diablo Canyon and the discussions that come out of those, and understanding what can happen in the core and understanding that -- and in my opinion, I don't see that we have necessarily a cladding issue, that we're going to damage the clad, because I feel like we can continue to add water to the core, clad-wise.

My primary understanding and direction for protection particularly of the public is really to make sure that we isolate it to containment so that as we slowly boil off this water that we can still add to, that we don't release it, that we keep it inside containment.

And the answer specifically to your question is I think -- I feel like the training is adequate for this kind

of event. Two reasons. One because of implementing recent industry events into our program, training program. And secondly because we generally always get training with respect to where we're at in the plant cycle, specifically speaking we're getting ready to go into the refueling, we know we're going to go to mid-loop so we usually always train on mid-loop before we get there. We do some simulator training, to the best of the simulator ability. We discuss the procedures, we go through the steps and try to understand what they mean and then at the same time we discuss how that relates to what's happened in the industry and what we wouldn't do to cause that or to get ourselves in that case and what we've done basically as a plant in implementing our procedures to ensure we don't do that, ensure the SI pump is operable when we had hot leg nozzle bands installed and so on and so forth. But I think the training is adequate.

MR. LYON: You indicated that your primary concern was to get the containment closed so that you could contain if you were boiling and releasing that to the containment.

THE WITNESS: Uh-huh.

MR. LYON: That energy under that circumstance is essentially being put inside of containment. Do you have a feel for the containment response?

THE WITNESS: Well only that it would be an educated

feel in that eventually containment is going to -- the total energy in containment is going to go up, so it's possible we could compress -- you know, start building pressure in containment. But to me it would seem reasonable that at the same time -- and this is going under the assumption that we do have a vent path out of the RCS so it can get into containment, which we normally always sure we have a vent path in this kind of mode, is that because of the increased surface area and because of what's in the containment when we start is going to provide a large amount of heat sink for this energy we remove from the core. You've got a lot of concrete, you've got a lot of steel, you're got -- the air itself is going to absorb a lot of heat, so to me it doesn't seem like for any short period of time that you would get into a problem with containment pressure. I just don't see that even without any AC.

I base a lot of that on when you talk about -- when you look at the curves in the RHR procedures, we have curves in the back of the RHR procedure that gives us time for core uncovering and time to boiling, our curves stop at 200 hours, which to me implies, you know, where we are and I had to calculate the number of hours, but the number of days we are, that it's going to be a long time, is my gut feeling based on that. And that if we do go to start boiling and it goes into containment, it's even going to be longer because

I have more mass of cooler pieces of equipment to absorb that energy.

MR. LYON: You indicated a mode change at 140 degrees. What is that?

THE WITNESS: Well the Tech Spec says that Mode 6 is 140 degrees with the head untensioned -- detensioned.

MR. LYON: I understand.

THE WITNESS: So if we got to 140 degrees, basically we wouldn't be in Mode 6 any longer even though the head wouldn't be detensioned. It really wouldn't necessarily be in a fully defined mode I guess is really the best way to say that.

MR. LYON: You indicated that you had taught in the Training Department, how long ago was that?

THE WITNESS: Well specifically I've just come back from the Training Department from about four months I spent over there teaching a hot license class primarily in the simulator and walk-through in the plant.

MR. LYON: Were you teaching any of the kinds of things that applied during this event?

THE WITNESS: I would say absolutely. Specifically the loss of RHR to several students on a one-to-one basis as well as an overall basis because again our simulator is limited in the amount we can do at mid-loop. So therefore, if you can't simulate it the next best thing is to talk and

discuss about it and what do the steps in the procedure mean to them.

MR. LYON: Could you describe the limitations of your simulator?

THE WITNESS: The -- at the time and still to my best recollection, we were getting with the new modification, mid-loop capability. But we really haven't been able to simulate mid-loop capability real well. Now that may be different today because I've been gone for awhile and they were working on it when I left. But at the time we were really not able to put the simulator in a mid-loop and really be able to train on that, so all our training that we had to do with loss of RHR and things were done basically with level into the pressurizer, so basically we had loops filled and had that amount of mass left to provide heat sink capability.

MR. LYON: So all this change in the simulator is within the last four months?

THE WITNESS: Oh, you mean to be able to do mid-loop?

MR. LYON: To be able to do mid-loop. Anything they've done to be able to do mid-loop would have been accomplished in the four months since you left.

THE WITNESS: I haven't been gone that long, I've been gone about two and a half months, but within that time

frame. When I left, they were still trying to work the bugs out of mid-loop, to the est of my recollection. At the time, probably the last month or so I was over there, we were not focusing all our attention on mid-loop ops because it was an initial license exam and we were focusing more of our attention on, you know, the normal operations, tube rupture, primary LOCAs, secondary LOCA's, those type things.

MR. LYON: Okay. When you were covering mid-loop behavior and phenomena with some of the students, could you give us a real quick synopsis of the kinds of things that you would cover after you exceeded say 200 degrees Fahrenheit?

THE WITNESS: Basically the way I did it was -- and really did it to ensure that they have the capabiiity of doing the procedures and understanding the procedures was just basically walk through each step of the procedure. If we have this, how does that work and if we don't have that, how do we do the RNO. And does that provide cooling. And just walked through the procedure. Again I am real confident in the way the procedure is written.

MR. LYON: I understand. Did you go into the behavior and what was happening within the reactor coolant system as part of this process, or did you just essentially try to get the people so that they could follow the procedure well?

THE WITNESS: Well it's hard to say specifically when you cover a procedure because I personally don't cover a procedure just black and white words. I think an operator needs to understand what he's doing, what's going on, so only from normally how I teach or work with people in a procedure, I would have to say yes, we did discuss some of the things that were going on, such as water out into the loops is not going to be real indicative of what's going on in the core without being filled because you don't have the ability of real good natural circulation flow, so you're not going to be able to use those instruments. In that respect, I would have to say yes, but to what degree, I could not answer that question because it was always from a relationship from where you were at in the procedure, why you were doing this and those type of -- from that direction.

MR. LYON: Did you cover anything along the line of well I've got gravity fill by numerous paths, I have to have a vent for either steam or water to go out?

THE WITNESS: I can say I covered the gravity fill. I can't say one way or the other if I discussed specifically the need for a vent path or not.

MR. LYON: Okay. In these procedures, as I understand it, there are provisions for providing a vent path.

THE WITNESS: That is correct.

MR. LYON: In covering those, did you discuss the size of the vent path or do the procedures tell you which vents to open?

THE WITNESS: Specifically the procedures tell you which vents to open and also, you know, when you're talking about Modes 4 and 5 and the need for protection from over-pressure protection, you know, the Tech Specs are pretty straight-forward in that and now our procedures tell you which paths to open, whether to use pores or the manways or those type of things.

MR. LYON: Do you feel that the Tech Spec specifications of paths are sufficient to cover the kinds of events that one would have for mid-loop operation?

THE WITNESS: For mid-loop? Good question. Only the portions about where if you don't have the relief valve capabilities, you have to vent and depressurize the RCS through an open path, if you don't have the normal pressure release, only in that respect -- in other words, I think it's pretty obvious that you need an open path in this kind of accident when you're in mid-loop and have no power. You need an open path, not one that you're going to have to go try to open or want to open from the control board. In other words, the manways and that type of thing.

MR. LYON: Do you have a feel of what size opening

you would need so the gravity fill could occur and make up for boiling in the reactor coolant system?

THE WITNESS: No, I don't because that would be a calculation that would have to be performed based on time from shutdown, you know, and you'd have to assume basically a long run and immediately get into that position would be the worst case. I don't have a feel for that, no.

MR. LYON: Would you say the training that you were providing is similar to what other instructors or the same as what other instructors will provide in these areas?

THE WITNESS: I would say similar.

MR. LYON: Is there some training manual that you follow or were you just told hey, you know a lot about this, can you cover these areas?

THE WITNESS: Well it's a two-fold thing, you have lesson plans, you have simulator exercise guides which also direct you to lesson plans and sometimes necessarily, in this case letters like the Diablo Canyon event that discussed those type things that are covered in classroom phase. And then as a simulator instructor, a lot of times that information is just reiterated, not necessarily with the lesson plan in hand but reiterating that information on a day-in, day-out basis. But the information is definitely written down in lesson plans, not necessarily sometimes in that degree because a lot of this is new areas and there's

not a lot of reference material to quote from. So you have to basically extrapolate the knowledge you have somewhere else based on what you see and observe to determine where you're at in that particular instance because I don't think -- I don't think necessarily -- and that's what the whole industry is about -- ensuring we learn from our mistakes. I don't think we can necessarily train someone for every absolute instance that occurs. We can train them for the most common ones and train ourselves and then be able to extrapolate that ability, that knowledge, into maybe an unknown situation is maybe the best way to say it.

MR. LYON: Are you aware of the Westinghouse Owners' Group document that studied a lot of the behavior that goes on in reactor coolant systems at mid-loop?

THE WITNESS: I'm aware of -- with respect to videotape that we got from Westinghouse, that showed vortexing and those types of things. Now I understand -- I'm only aware of it, I have not seen the document -- that some of our curves in our procedure was taken from that, from what I understand, loss of RHR procedure, but that's probably the extent of my awareness of it.

MR. LYON: Do you know if anyone in the training area was aware of that document? That may be an unfair question. If it is, we'll skip it.

THE WITNESS: I don't know.

MR. LYON: Okay. Now let me switch gears just a little bit and try to get a feel of your personal understanding or thoughts about what would happen. Let me take two situations. First, with the configuration that you had, let me take the machine exactly as you had it with an essentially closed up reactor coolant system pressure boundary and a gravity feed capability, if you will. If you had gone into boiling in that situation, what do you feel would have been happening inside the reactor coolant system and -- both with respect to what the steam is doing, where it's going and what kind of heat transfer is taking place?

THE WITNESS: We're talking about a totally intact RCS now?

MR. LYON: That is correct, the configuration that you essentially had achieved.

THE WITNESS: Well we still had three cono-seals open.

MR. LYON: All right.

THE WITNESS: At the time, I thought we still had pressurizer manways off but anyway if it's bottled up --

MR. LYON: Okay, go bottled up.

THE WITNESS: -- the -- first off, we're going to be able to gravity fill for awhile until -- and put cold water in there until we compress the air that's in the system and/or until we start steaming and raise pressure, and

either one of those would start impeding gravity fill as soon as that overcomes the head of the tank.

MR. LYON: Okay.

THE WITNESS: Whatever it would be, 10 or 15 pounds. I'd have to sit down and look at it, I haven't looked at it. But at that time, then the only heat removal from the core would be to continue to raise pressure in the RCS. As we continue to put heat out, that heat would continue to go into the water, which would in turn lower water level as it flashed. But at the same time, we're going to have cold loops, we're going to have some -- it would be limited, some heat transfer maybe in the steam generators if we could get water in there. So some of that steam that's going to go in other places that are cool now, the pressurizer, other parts of the loop, is going to condense and give up its energy to the piping. So you're going to get some cooling from that alone. To have a feel for how much that would be, I don't know. I would -- as long as those loops -- the loops and other pieces of material were cool enough to give that energy up, we would be giving energy up to those materials.

MR. LYON: Okay, you indicated if you had enough water in the primary, you might be able to get some heat transferred over into the steam generators.

THE WITNESS: That's right, that -- and I'm basing that on how much gas we would compress in the tubes. In

other words, if we're at mid-loop and then we started steaming or if we were able to fill up, how far we would be able to get water level up into the tubes, and then how far steam would be able to get up into the tubes, because if you have gas up there, the gas is going to basically blanket a lot of the tubes, so the service area is going to be greatly reduced.

MR. LYON: I'm a little confused. If I'm getting water up into the tubes or if I'm getting steam up into the tubes --

THE WITNESS: Okay.

THE WITNESS: If I get either one of those up into -- let's look at it first of all, if I gravity fill before pressure rises and I'm able to get water up into the tubes, that's going to give me more cool water that can just recirculate around in the loops and fall back down into the vessel.

MR. LYON: Okay, you're thinking of circulating up over the top of the U-tubes and coming down?

THE WITNESS: That would be if I fill, and I doubt I would fill because I'm going to compress gas in there. I would not expect to fill. I would expect all the upper portions of the tube to either be -- to be air-bound. So somewhere down here I would have water or steam, depending on how much water I was able to get in the vessel before

pressure built up.

MR. LYON: Fine.

THE WITNESS: And that would be based on when I compressed this air bubble or when I boil and build steam pressure up.

MR. LYON: Let's go with just steam.

THE WITNESS: Okay, if I built -- and again, it's going to depend on how far the air is up and how much mixing I'm going to get, of how much transfer I'm going to get. I would expect to get some, how much -- I don't think I have a feel for how much I'm going to get.

MR. LYON: Okay, that's fine.

Let me just cover one more thing because we're pretty much chewing up our time slot here. The cono-seal openings.

THE WITNESS: Uh-huh.

MR. LYON: How many of those are there?

THE WITNESS: There's -- the number off the top of my head is 28 but that's too many, that's too many -- let's see, four, 12 -- there was three open.

MR. LYON: There were three open. Are those big openings?

THE WITNESS: About a three-inch opening.

MR. LYON: About a three inch diameter. Is that a free flow passage between the reactor coolant system and

containment that is three inches in diameter?

THE WITNESS: Specifically free flow, no, it would have to go through the upper internals, around a drive shaft -- I call them the little top hats that hold the drive shafts, around flow nozzles and those kinds of things. But with the exception of those installed orifices, you know, it would be straight out to containment. There would be nothing to block that other than it would have to go through other places.

MR. LYON: But those other places are pretty much non-restrictions?

THE WITNESS: Exactly right, they're flow nozzles that provide upper head cooling in the upper internals.

MR. LYON: Those are little guys.

THE WITNESS: Yeah.

MR. LYON: But that's only between the upper annulus and the head.

THE WITNESS: Correct.

MR. LYON: And more accurate, communicating between the upper plenum and the upper head -- do I have a fair amount of opening there?

THE WITNESS: Well I would say let's qualify that in that if we're talking about a large rate of steam production, then it might be -- you might would want to consider it a large restriction, but we're talking about a

small -- in my opinion in seeing what was going on -- a slow process. Once we start steaming, our heat rate should go down because we're able to remove a lot more energy as a bubble of water -- or as a molecule turned into steam, and I don't think that rate would be so great that it would provide back-pressure to the RCS. I think that would be able to vent out those cono-seals.

MR. LYON: Okay. I have no further questions.

MR. WEST: I have one last question. You mentioned certainly a lot of thoughts about the two primary procedures that were being used, the loss of electrical power, loss of RHR. Were there any negatives or any inadequacies at all with regard to those procedures? I know generally speaking you commented on the procedures.

THE WITNESS: Hmm --

MR. WEST: If there are none, fine. If you have some in mind --

THE WITNESS: I -- there's none that are on the top of my head that seem to be a detriment either to this event or any other event in that mode.

MR. WEST: Okay, fine.

(Wnereupon, the interview was concluded at 2:06 p.m.)

C E R T I F I C A T E

This is to certify that the attached proceedings before the U. S. Nuclear Regulatory Commission in the matter of:

Name: Interview of DAVID VINEYARD

Docket Number:

Place: Vogtle Nuclear Generating Plant, Waynesboro, GA

Date: March 27, 1990

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

PEGGY J. WARREN
Official Reporter

Ann Riley & Associates