NUCLEAR REGULATORY COMMISSION

Docket No. 50-424/425-OLA-3 EXHIBIT NO. II - 178

In the matter of Georgia Power Co. et al., Vogtle Units 1 & 2

☐ Staff ☑ Applicant ☐ Intervenor ☐ Other

☐ Identified ☑ Received ☐ Rejected Reporter SD

Date 9/7/95 Witness George Bockhold

CR-200-E-5

GPC EXHIBIT II-178
BOCKHOLD EX. W

DOCKETED
USNRC

OFFICIAL TRANSCRIPT OF PROCEEDINGS

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Agency: Nuclear Regulatory Commission

Title: Telephone Conference: IIT, Licensee, Region II (CLOSED)

Docket No.

LOCATION: Bethesda, Maryland

DATE: Thursday, April 5, 1990 **PAGES:** 1 - 37

ANN RILEY & ASSOCIATES, LTD.
1612 K St. N.W., Suite 300
Washington, D.C. 20006
(202) 293-3950

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the Matter of: :

INVESTIGATIVE INTERVIEW :

Telephone Conference: IIT, :

Licensee, Region II :

(CLOSED) :

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Nuclear Regulatory Commission

Operations Center

7735 Old Georgetown Road

Bethesda, Maryland

Thursday, April 5, 1990

The above-entitled matter commenced at 10:03 o'clock a.m., when were present:

Alfred Chaffee, IIT Leader

Ken Brochman, NRC Region II

Rick Kendall, NRC

Nuclear Regulatory Commission

Ken Burr, Vogtle

Mike Horton, Vogtle

John Auftenkampe, Vogtle

Paul Kochery, Vogtle

Alan Mosba

PROCEEDINGS

[10:03 a.m.]

MR. CHAFFEE: Mr. Sheibani.

MR. SHEIBANI: My name is Mehdi, M-E-H-D-I, Sheibani, S-H-E-I-B-A-N-I.

MR. CHAFFEE: Mr. Sheibani, just a couple minutes here before we go into the diesel thing. This morning we sat down in our group there -- Region II, did you just get on the line?

MR. BROCHMAN: This is Ken Brochman.

MR. CHAFFEE: This is Al Chaffee. We have a number of people from the licensee. Why don't the licensee people, why don't you run through again who all is there so that Ken can hear that.

MR. AUFTENKAMPE: This is John Auftenkampe. There may be some other people that come in as we go on with this.

MR. CHAFFEE: Before we start talking about the diesels, I had an administrative thing which is really for Mehdi Sheibani. That is, we went through this morning a listing of the documents we have asked for and where we think we are in terms of getting them. We are going to look at it a little more closely so that tomorrow in the 10:00 o'clock call we can also help focus on those documents that we haven't yet received that we have the highest priority on.

What we did this morning, one of the documents that we are eager to get our hands on is the printout, the traces from the ERF database where you were going to provide us with plots as a function of time for key parameters. Last week, I believe it was on Thursday, we had provided you a list that had been highlighted in red -- I think red dots -- I don't know what it was -- a dozen parameters that we wanted to get the plots on. On Thursday you guys were going to try to get them to us on Friday.

It is my understanding and we may be wrong, but we haven't yet received those. I just want to reemphasize that we are eager to get our hands on those. If you could talk to the people involved, and assuming that you have not yet sent them to us, escalate that to a highest priority in terms of getting that to us. We would appreciate that.

MR. HORTON: We do understand that you need those, and that has taken an incredible amount of effort to generate. We have had to dedicate a number of engineers and computer time to get those things printed out. They are very slow to print out.

MR. CHAFFEE: I didn't realize that. I thank you for telling me. We sometimes don't understand the impact these requests make, and I appreciate your bearing with us. We try not to be too pushy on them.

MR. HORTON: We generate those a sheet at a time,

and we also underestimated the volume of data here. There are probably several hundred sheets involved here.

MR. CHAFFEE: Right now what we are interested in, I think it's only -- I want to say a dozen different parameters, the ones that we would like to get the first wave. Are you telling me that there's a large number of sheets for just one parameter? Wait a second. Is this a deal -- let's take for example a breaker that trips open or trips shut; do you get a separate sheet for each stage of the breaker?

MR. HORTON: I don't know.

MR. CHAFFEE: What I am saying is, I understand what you are saying that it's a big effort. What we were trying to do is, say that we think it is important for us to get it. We are also trying to say that narrowing it down to a small subset of all the parameters that are in that database in the hope of being able to allow at least that portion of it to be done on a more quick time basis.

MR. HORTON: We are about one-half way done, and we will send you what we have.

MR. CHAFFEE: Okay. Tomorrow, after having gone through the list here and what we have received, we will try to focus you guys in on those documents that in terms of time marches on that are of key interest to us, so we can help prioritize the effort where that is possible.

Why don't we shift then to the diesel generator work. To the best of my knowledge -- let me just ask you guys. Where do you stand in terms of preparing for the test that you are working on?

MR. HORTON: Assuming you are talking about the 1-A temperature monitoring test; is that correct?

MR. CHAFFEE: That's correct.

MR. HORTON: The test was set up last night. As you are all probably aware, the first few hours involves standby mode, simply monitoring --

MR. CHAFFEE: We haven't seen the procedure yet.

MR. HORTON: -- the heater.

MR. CHAFFEE: We haven't gotten the procedure yet.

MR. HORTON: Okay. At your request yesterday, we added a current monitoring on the jacket water heater, and we are monitoring that and one of the thermal wells that the high temperature sensor sits in. So, you have two parameters there. That was initiated this morning at approximately 7:00 o'clock Easterr time. It has been running for basically three hours.

MR. CHAFFEE: Mehdi Sheibani, are you guys in the processing of faxing us the test procedure for this? I assume you must have it.

MR. SHEIBANI: It was faxed to you about five minutes ago.

MR. CHAFFEE: Okay.

MR. HORTON: If you would like, Al, I could tell you the results of the first three hours.

MR. CHAFFEE: Great.

MR. HORTON: The first three hours show a steady state temperature of 163, and a frequency on the jacket water heater of approximately one hour and one-half with it being on for most of that duration and only being off for between five and eight minutes each hour and one-half. That's all we know so far.

MR. CHAFFEE: Basically, you haven't seen any fluctuation in temperature? That 163 degrees is basically constant?

MR. HORTON: Right.

MR. CHAFFEE: No variation at all?

MR. HORTON: Correct.

MR. CHAFFEE: That's interesting.

MR. KENDALL: The heater is only off for about eight minutes for every one and one-half hour span?

MR. HORTON: Correct.

MR. CHAFFEE: With it in that configuration you have the standard jacket warming pump operating; is that right?

MR. SHEIBANI: Correct.

MR. CHAFFEE: Do you happen to know what the flow

rate of that pump is and what the volume of the jacket water temperature system is -- the jacket water cooling system is?

MR. HORTON: The flow is a little under 100 gpm, 60 to 90 somewhere, and we don't have the total volume handy. A rough estimate might be something like 1,500 for the total. We think it may be like 600 and the rest of the system volume might bring that up to a rough total of 1,500. That is just rough.

MR. CHAFFEE: That may mean that you are getting turnaround of the system -- what would that be, once every six to ten minutes type of thing?

MR. BURR: Once every 15 minutes.

MR. CHAFFEE: Okay Is the piping from the tank to the pump and stuff, is that six inch piping?

MR. SHEIBANI: Which pump?

MR. CHAFFEE: The standpipe. The pump takes the suction on the standpipe, the piping of the standpipe to the pump. What size piping is that roughly?

MR. SHEIBANI: One and one-half inches.

MR. CHAFFEE: Just one and one-half inches. That gives me a picture then. I take one and one-half inch pipe --

MR. SHEIBANI: One and one-half suction and one and one-quarter inch.

MR. KENDALL: That is just for the keep warm pump,

right?

MR. CHAFFEE: I see. The regular pump for the jacket water temperature system, what is the suction pipe size in that?

MR. SHEIBANI: Ten inch suction and eight inch.

MR. CHAFFEE: That makes more sense to me. Do we have a drawing that shows the jacket water?

MR. KENDALL: We have an eight and one-half by 11 one that is kind of difficult to read. We requested a big one yesterday and they are going to get it and send it out.

MR. CHAFFEE: It is a one line diagram, or do we have one that shows a picture -- a pictorial picture.

MR. KENDALL: It's a P&ID. It shows the flow diagram.

MR. CHAFFEE: It shows the different type pipes?

MR. KENDALL: It shows it but it is very difficult to read. We are going to get one in that's more readable.

MR. CHAFFEE: You guys don't have an equivalent to an isometric for the jacket water system, do you?

MR. BURR: No, we do not.

MR. KENDALL: I want to make sure that I understand all the points that are being monitored. You are just monitoring jacket water -- I guess we will call it header temperature up --

MR. HORTON: You guys are cutting in and out.

MR. CHAFFEE: Just a second. Can you hear me?

MR. HORTON: It sounds like an amplifier problem on the bridge.

MR. KENDALL: Is this any better?

MR. HORTON: You are still fading in and out on a cyclic basis. It's the bridge.

MR. CHAFFEE: Can you hear me?

MR. HORTON: I can hear you.

MR. KENDALL: I just wanted to make sure that I understood all the points that are being monitored for this. There is only two; there's the jacket --

MR. BURR: You are still fading in and out on us.

MR. KENDALL: I will try it again. I want to make sure that I understand the points that are being monitored. As I understand it, there's only two. One is the jacket water temperature at the top of the diesel where the two lines meet for the return where the three temperature switches are mounted.

MR. SHEIBANI: That's right.

MR. KENDALL: The other thing that is being monitored is heater current, so you know when the heater cuts on and cuts off.

MR. SHEIBANI: Correct.

MR. KENDALL: There is no actual monitoring of temperature in the tank.

MR. CHAFFEE: I thought they said they were measuring the current for the heater and they put a thermal couple and measured the temperature at a high point just above the heater.

MR. BURR: No. We removed one of the temperature switches and have a thermal couple in there, RTD, I should say.

MR. CHAFFEE: Okay, I understand. Basically we have a --

MR. KENDALL: Did you go back and calibrate the heater, or do you know if the heater is actually cutting on and cutting off, what those temperatures are? I guess the heater is always on.

MR. BURR: It's always on, except for about five or eight minutes it's off. So, we are drawing a straight line.

MR. CHAFFEE: It sounds like that heater is made basically just to be able to keep up with the ambient losses.

MR. BURR: It looks like that.

MR. CHAFFEE: I guess basically it sounds like the flow you got is just enough to keep things -- I am going to get this mental picture that the flows that exist in the warmup system is intended to be sufficient to keep the water fairly evenly mixed and fairly evenly distributed in

temperature throughout the jacket water system.

MR. BURR: It appears that way.

MR. CHAFFEE: What that tends to suggest then is, when the diesel gets called upon to start up, unless somehow this warmup system is leaving some cold pockets someplace --

MR. BURR: I believe we have one hot pocket in the heat exchanger. We are measuring a higher temperature there.

MR. CHAFFEE: How did you discover that? Did you put some different sensors --

MR. BURR: Surface thermometers, and we also have some local sensor gages. We are reading about 170 degrees at that water heating tank.

MR. CHAFFEE: In addition to these sensors that we just talked about, you are basically using whatever sensors you can find to get whatever measurements you can on this system over this 24 hour period?

MR. BURR: It's a survey, we just went out and looked.

MR. CHAFFEE: Good move. We have 170 degrees in the lube oil cooler area.

MR. KENDALL: Ken.

MR. BURR: Yes.

MR. KENDALL: Did you check all the other places too, in the jacket water system?

MR. BURR: The lube oil jacket was the highest temperature we could find.

MR. KENDALL: What was the lowest temperature that you could find?

MR. CHAFFEE: Would you guys please state your name before you speak. Let me ask a question.

MR. KENDALL: Where is the lowest temperature that you found?

MR. BURR: I believe the lowest temperature we found was the one where the sensors are at.

MR. CHAFFEE: Who just said that?

MR. BURR: Burr.

MR. KENDALL: The lowest temperature you are seeing is up at the high point there, and that was 163?

MR. BURR: We are using surface thermometers, so those are not that accurate.

MR. KENDALL: Understand.

MR. CHAFFEE: Do you have an explanation for why the temperature is higher, the lube oil cooler?

MR. BURR: We are probably not getting as much flow through the lube oil heat exchanger. Of course, we also have to heat the oil.

MR. CHAFFEE: That's what I was leading to. You do have a warmup system for the oil. Do you happen to know whether or not that warmup system for the oil tries to keep

the oil at a temperature different than what the jacket water system heater is trying to do?

MR. BURR: It doesn't appear to be right now.

MR. CHAFFEE: You must have a heater also, right. Does the heater trip set points; does it go off at the same value that the jacket water goes off, or is it a different value?

MR. BURR: I have not made that survey, so I do not know.

MR. CHAFFEE: That's interesting though, that the water in the lube oil is higher. That may be the hot pocket. If the lube oil system actually shoots for an even higher temperature, that might where the hot water slug is coming from. You guys probably ought to take a look at that and see what the lube oil warmup system is trying to do. Maybe it is creating the hot pocket. Maybe the thing that is creating this hot pocket is not this jacket water heater but the lube oil system that is creating the hot pocket, which then is induced in the jacket water system.

MR. BOCKHOLD: This is George Bockhold. I had to come in late because of some discussions I had to have with corporate, some information that Region II wanted. Let me give you another piece of information.

MR. CHAFFEE: Okay.

MR. BOCKHOLD: Last night I had my I&C folks take

a brand new switch out of the warehouse, jacket water temperature switch.

MR. CHAFFEE: Okay.

MR. BOCKHOLD: I did a little experiment. We took it as it was calibrated from Calcon, and really didn't do anything with its calibration. We put it in a temperature bath and we basically found out where it tripped. What we used was, we used one degree per minute temperature rise and it first tripped at 196.8. We did a two degree per minute temperature rise, and it tripped at 195.4. Then we did a three degree per minute temperature rise. It tripped at 195.6. Then we did a four degree a minute temperature rise, and it tripped at 195.3.

Basically that test -- that was the fastest that we could do in a controlled fashion.

MR. CHAFFEE: That test suggests that the rate of temperature change has no impact on the switch.

MR. BOCKHOLD: On the switch. Then we took the switch and we put it in a 160 degree bath. After that got stable, we quickly picked it up to a 200 degree bath. It took the switch three minutes and 54 seconds to trip.

MR. CHAFFEE: You put it at what temperature bath?

MR. BOCKHOLD: Can't tell, because we don't have the ability to homogeneously change the mixture.

MR. CHAFFEE: I just didn't hear part of what you

said. You said you took it out and you did a step change in temperature to it. What was the step change from to?

MR. BOCKHOLD: One-sixty to 200 degrees.

MR. CHAFFEE: One-sixty to 200 degrees, and it took it three minutes and 54 seconds to trip?

MR. BOCKHOLD: Three minutes and 54 seconds. We tried to keep the temperature bath at approximately 200 degrees.

MR. CHAFFEE: And it took three minutes and 54 seconds to trip?

MR. BOCKHOLD: That information tends to say that the tests were running on a diesel will not show anything, but we are going to go ahead with it.

MR. CHAFFEE: Why would it take so long for it to trip? I guess the reason it took the three minutes and 54 seconds to trip is because --

MR. BOCKHOLD: The thermal well was at 160 degrees, and we took the thermal well and the switch and moved it to the next. The last test, of course, was not a controlled experiment. The temperature rise was about four degrees a minute under a controlled type test.

MR. CHAFFEE: Then you took it from 160 degrees and put it in a bath of 200 degrees, and it took three minutes and 54 seconds for it to trip from the time you put it in the bath of 200 degrees?

MR. BOCKHOLD: That's right. The thing that we were trying to verify was, we were trying to find out if the set point went down significantly as we increased the rate of rise of temperature.

MR. CHAFFEE: Right, I understand that.

MR. BOCKHOLD: We were just trying to prove or disprove what the Calcon man said about that. The last test was let's try to get a step change in temperature, and see if the set point changed. You know, the last test was gee, let's try something else because the fastest that we could go in a controlled fashion was four degrees a minute.

MR. MOSBA: This is Alan Mosba. What that last test tells me is, we couldn't come up with a specific temperature at which the switch tripped. That tells me that because of the long time that it took to trip, that it tripped a temperature fairly close to the 200 degree point. If there had been a significant downward set point shift due to a rapid increase in temperature, it would have tripped a whole lot sooner.

We were coming up on the equilibrium temperature of the new fluid that you immersed it in, and it took three minutes and so many seconds to reach that. It means that there was not a significant set point shift, even under a very rapid rate of change of temperature.

MR. CHAFFEE: Right. What's true is that -- I

would assume that they built the RTD well and sensor such that time constant for it coming up to temperature should be fairly quick.

MR. MOSBA: I would agree.

MR. CHAFFEE: I agree with you. When you put it in the 200 degree bath, was the temperature of it being monitored? Did you see any change in it? Did it stay basically at the 200 degrees?

MR. MOSBA: George will have to answer that.

MR. BOCKHOLD: The people who did that were on night shift, so we would have to kind of talk to them about it. But I believe they were trying to maintain it relatively constant at 200 degrees. We will check and see how big the bath was and what the thermal inertia of the bath was that it didn't get drug down any.

MR. CHAFFEE: I would like to know that. From what you have told us, it sounds like the rate of temperature change really has very minor impact on the set point.

MR. BOCKHOLD: I think that's what those tests show.

MR. CHAFFEE: If that's the case and if that goes away -- also what we have been told just before you walked in George, is that at least the temperature out by the sensors seems to remain very steady and constant at 163

degrees for the first three hours of your test. The other thing that we were told was that the high point in temperature seems to be adjacent to the lube oil cooler which was, I guess, at 170 degrees.

We were just pursuing a line of discussion saying, well, why is it hotter there. Is it by chance a situation where a differential temperature that the sensor sees is more becoming a function of what the lube oil warmup system is doing. We were just getting into that kind of discussion.

MR. MOSBA: I think what we are seeing, given the temperature information that we have around the lube and the flow rates that we and the cycle, the turnover time is, we have a fairly homogeneous distribution of temperatures. The coolest point is the point coming out of the diesel where we have incurred the ambient losses. The hottest point is the temperature where we have another source, the heat source, the lube oil.

But the total range of temperatures we have given you is only seven degrees. Maybe around the lube the various fluid pockets and so forth have different temperatures, but that is probably all within 10 degrees.

MR. CHAFFEE: I guess the one thought that is running through my mind is that -- everything that you said makes sense to me. The thing I think you might want to

think about considering is whether or not the lube oil cooler system could cause the temperature of the jacket water that is adjacent to the lube oil -- in the lube oil cooler, would the maximum temperature expected be this 670 degrees or does it have any kind of cyclic nature.

If it turns out that the 170 degrees is the maximum temperature that exists in the jacket water system, then you have just bounded it. In other words, that is the max temperature and the minimum is 163, and it all fits together. On the other hand, if there is any cycling of temperature in that lube oil cooler you would want to know about that.

MR. BOCKHOLD: Okay. I don't think there's an issue there, but we will check and see what the on and off set points and reset points are on the lube oil heater, and see what the span of operation is there and see if that could have any effect. My inclination now given the data that I have is probably that is not a big -- it is still bounded by this 10 degree variation. But, we will check that.

MR. CHAFFEE: We have it. I assume that when you are out doing your survey of all these temperatures around the system, you guys are keeping some sort of record of that just for your own records?

MR. BOCKHOLD: I think that information will be in

the test log or we will include it in the test log.

MR. CHAFFEE: Okay, great. What we would like to do is once that stuff is recorded, we would like to get a copy of it. We would like to have that.

MR. BOCKHOLD: Okay.

MR. KENDALL: Are the surface temperatures that you went around and checked, is that just a one time shot or are you going to do that again sometime within this 24 hour period.

MR. BOCKHOLD: I think that if, after a couple of more hours of observation of this, that all we are seeing is steady state. We have no more data to collect, and nothing is changing again. We may not go the full 24 hours. There may be no purpose in that if everything is totally stable.

MR. CHAFFEE: Right, from the standpoint -- I understand what you are saying. I don't disagree with that. The concept being that if you find that the temperature distribution in the jacket water system stays basically constant as a function of time, there is no sense in continuing to draw data.

MR. BOCKHOLD: We have observed maybe an hour and one-half periodicity on the cycling of the jacket water heater, and once we observed that for a couple of more cycles and if we have no other issues like any other heaters or whatever and see no impact from any of those, we will be

inclined to terminate the test and think that we have all the data that can be obtained.

MR. CHAFFEE: I understand. I guess the only thing I would throw out again is this thing with the oil heating portion.

MR. BOCKHOLD: We will investigate that and resolve whether that has any impact.

MR. CHAFFEE: The reason we are going for all this is what we are assuming is that the heat balance that exists in the system is made up of the cycling of these two heaters, the heater for the jacket water tank and the heater for the oil warmup system. Once you understand their cycling periodicity and the cycling of the pumps that are distributing the water, once you look at the periodicity relationship of those and assure yourselves that you have captured what can happen as those things go through the periodic approach, I guess at that point you would have a full picture of what is going on in terms of any transient natures of hot spots associated with the diesel jacket water system as well as the lube oil system.

It sounds like you already have good data, that the jacket water itself near the sensors is fixed as a function of time, because you have had no variations. I guess once you look at what the lube oil -- the only other thing that contacts this thing that can transmit heat I

guess is the lube oil system. Once you understand the phenomena of that, then from that you will be able to conclude whether or not you have taken enough data or not.

MR. BOCKHOLD: Right.

MR. KENDALL: Did the surface temperatures taken include different parts on the tank?

MR. BOCKHOLD: We agree. Anything else?

MR. CHAFFEE: What Rick just asked was, in taking your temperature readings on different things did you take any temperature readings near the top of the tank, the hot water going up type of thing making sure that there's not an accumulation of hot water jacket water that is in the top of the tank that maybe is -- later on again, when the thing starts, could provide a slug; did you look at that?

MR. BOCKHOLD: I don't think we have taken any data. Let my folks explain the piping configuration where the return water enters the tank and where we take the suction to the pump. I think that configuration may well dispel any stratification ideas in the tank. Who can speak to that?

MR. BURR: The water after it leaves the area around the sensors that we have on top -- the trip sensors -- it goes into the standby. The suction of the pump comes out the side of the heater.

MR. CHAFFEE: The concept that you are giving us

is that you have relatively cold, 163 degree water is passed by the sensors and goes into the top of the standpipe, and then that water goes down. Is the heater near the bottom of the standpipe?

MR. BURR: About the middle.

MR. CHAFFEE: About the middle. And then, the pump that takes the suction off that standpipe that is, the warmup pump, it is located about the middle of the tank?

MR. BURR: The suction actually comes out of the side of the heater.

MR. KENDALL: My point for asking the question was is that it seems to me that you guys --

MR. BURR: We can't hear you.

MR. KENDALL: The reason I asked the question was, it seems to me that you guys want to make sure that you know that this temperature thing from different temperatures in the system is or could definitely said is not a cause. From what you have told us, I don't think that we can conclude that you have done that.

MR. BURR: We will find out whether it is the cause or not when we run the test. If we don't see a temperature rise, all this is immaterial.

MR. KENDALL: You are saying that there is no point in taking surface temperatures at different points within the system?

MR. BURR: If we run the test and we find out that there's no temperature rise, it don't make any difference.

MR. CHAFFEE: But in fact you are taking some measurements. You have already said you have gone down to the survey.

MR. KENDALL: My point for asking the question was, I just hope we are not in a situation later on where we say something like did you take a temperature here, and we can't explain whether that would or would not have been a contributor or not.

MR. BURR: If, after the test we find that we have a problem, we will have to investigate and find out where that problem is.

MR. BOCKHOLD: Let me just summarize here. We got the standpipe -- I understand that issue that you are bringing up of any potential stratification in the standpipe. But the configuration is that the coolant water returning from the diesel enters toward the top of the standpipe and it flows down toward the heater, and the suction to the pump is in the vicinity of the heater.

That configuration should basically preclude stratification. Ken's point is that if there is any stratification when we run the final test, any slug of water will show up in our temperature measurements. That is the whole bottom line of the testing that we are doing. We

think that should show any affect.

MR. CHAFFEE: Okay, I understand. Again, I guess we all agreed to the extent that you can as you have been doing when you do your survey, you are trying to -- in fact, it was good that you did that because that led you to this thing about the lube oil cooler having -- apparently at this point it seems to be the hot spot. That is good, because that will now lead you into trying to characterize what that means in terms of is the 170 degrees is the hottest it could be or is perhaps the lube oil system cycles, could it be a little hotter than that.

Again, what Rick is pointing out -- it sounds like you agree -- to the extent that you take surveys, you want to make sure your survey is comprehensive enough that you capture any other potential hot spots that exist so that you can evaluate their significance and their possible variation as a function of time. I think we are all on the same wavelength. I am glad to hear that you found this one with the lube oil cooler.

Again, when people are out there taking measurements, as long as they keep in their mind where those potential hot spots are and go out and take those readings and look for those, I think they will be able to qualitatively at least figure out what the worse case conditions might be. We agree that once you do the test,

hopefully that will bear out whether or not it is a real problem or not in terms of the diesel starting.

MR. MOSBA: We will find out with the test, but right now the piece of information that George Bockhold gave you that we are not seeing substantial shifts of the temperature probe with rates of change in temperature and then it's tripping in the 190 type temperature range, and our observations that the system is barely homogeneous and that the hot spots are in the 170 degree range, we think those are sufficiently far apart that right now it doesn't look like the slug of water theory is what is causing any tripping.

Our tests will verify that, and that's where we are.

MR. CHAFFEE: Who just talked?

MR. MOSBA: Alan Mosba again.

MR. CHAFFEE: Let's pause a second here. Let's assume that what we are going to find when this is all done that the max temperature that those temperatures see on a start is -- I don't know -- would we guess maybe 165 degrees or something like that?

MR. MOSBA: Probably no more than 170.

MR. CHAFFEE: Let's assume 170 then. Let's assume that the max you will see is 170. The next question we have is, let's assume that at the vent that's the maximum

temperature we saw was 170. The next question would be why did the trip occur? Let me ask another question.

At this point, my understanding is that your best projection in terms of what caused the trip was the trip on high jacket water temperature sensors, and that is because you were able to reproduce the annunciation that existed at the time of the second trip by simulating a high jacket water temperature trip condition; is that right?

MR. BOCKHOLD: Yes. This is George again.

MR. CHAFFEE: George, we were just trying to work through the thinking process. Let's assume that when all is done here it turns out that the max temperature that these sensors are going to see in the start and one of the fellows proposes to use 170 degrees because that's the max temperature that they seen in the lube oil cooler. The next discussion was, let's go back and figure out that if that's what it turns out to be, if it's only 170 degrees -- we said the second trip at this point, the belief is that the second trip of the diesel during the event was caused by high jacket water temperature trip.

That is because you were able to reproduce the annunciations that occurred on that second trip by simulating a trip on high jacket water temperature. I guess what is true at this point is -- I am not sure if everybody wants to say that the fact caused it, but it's the most

likely cause of the trip?

MR. BOCKHOLD: We said it is the most probable cause.

MR. CHAFFEE: The next thing we say is, if the highest temperature that those sensors should have seen in the event was 170 degrees but they actually caused the trip. The next question is, how do we account for that. What could have caused them to trip if they only saw a temperature of 170 degrees?

I guess what is true in theory, they were set for something about 200 degrees and we need to come up with a rationale for this 30 degree difference between the set point and the actual temperature. The question is, how do we account for that, what could have happened? If it turns out that the rate of temperature change is not an explanation for that difference, then what is there left that can be pursued in terms of trying to understand why these sensors caused the diesel to trip.

MR. BOCKHOLD: What we have to do is, we have to test the probes which are currently under quarantine. What I was going to say associated with this conversation and really with some of our other conversations that we have had is, what we would propose is go get an independent lab -- I think we are looking at Wiley, but I don't think we decided on that independent lab.

We collected all the quarantine pressure switches, we would get appropriate team of people, and if the NRC wanted to be part of that team it would be fine, or if you just want to look at the procedures that would be fine.

MR. CHAFFEE: Okay.

MR. BOCKHOLD: Let's take the quarantine switches and establish very detailed test programs and go and test the switches and see if we could get the answer to your question. Basically, that's where we are at. In fact, Louis Ward in our Birmingham Corporate Office has been assigned the lead on that. Basically, we plan to move this offsite to have Birmingham take the lead on determining or working with you all on these temperature switches.

MR. CHAFFEE: Sounds good. Do you have a phone number for him?

MR. BOCKHOLD: It's 205-877-7802, Louis Ward.

MR. CHAFFEE: Did I get that number correct; 205-877-7802?

MR. BOCKHOLD: That is correct.

MR. CHAFFEE: Did you get any feeling from them in terms of what kind of timeframe this would all occur under?

MR. BOCKHOLD: No, I didn't get any feeling. I believe that Louis got that assignment this morning, so he's off to work on his new assignment.

MR. CHAFFEE: We should just contact him directly?

MR. BOCKHOLD: Contact him directly. Ken Burr has been one of our lead engineers. He is the senior project engineer, and he is working with our diesel testing. He normally lives in Birmingham, so he will be getting back there shortly and be working with Louis on this.

MR. CHAFFEE: Okay. Just a second. We have to caucus here on this. Just a second, George.

[Short pause.]

MR. CHAFFEE: George, this is Al. Can you hear me?

MR. BOCKHOLD: Yes, go on, Al.

MR. CHAFFEE: Rick just brought up a good point. I think that you are probably aware of this. Catawba had some problems with the pressure sensor switches on their pressure valve diesel, and it was because of moisture problems. I understand from our discussions that it is probably not the case here.

I believe that some of the quarantined switches include some pressure switches. Tha thought that we had was that it would probably be a good idea if in this test program that they are doing if they took a look at the pressure switches at least to the point to verify that you don't have that kind of problem that they had at Catawba.

MR. BOCKHOLD: I spoke to a person at Catawba and, yes, I understand they had problems with pressure switches.

Further, I understand that they had a clearance problem is what I thought the gentleman told me on their pressure switch and they changed to a difference clearance and actually a different model number and then they did not have any pressure switch problem.

We did not get pressure switch problem indication.

MR. CHAFFEE: I thought you got a low jacket water pressure annunciator the same time that you got the high jacket water temperature.

MR. BOCKHOLD: That was a turbo charger lube oil pressure annunciator. That was not -- they got main bearing engine low lube oil pressure.

MR. BURR: They had a problem with the old model pressure switches. We have new models, the same as they have now.

MR. KENDALL: The model pressure switches installed on the diesels during the time at your plant were not the same models that they had problems with at Catawba.

MR. BOCKHOLD: We have, and we have checked the new models.

MR. CHAFFEE: When you say new models, is that a new Calcon model or the new model is the Calcon switch versus a previously older versus another manufacturer's switch that was previously used?

MR. BOCKHOLD: Calcon is what I believe.

MR. BURR: The number was -- I am just guessing now -- I think it was 4400 was the old number and the new one has a B on the end of it, 4400 B. We have the B model.

MR. CHAFFEE: Both made by Calcon?

MR. BOCKHOLD: That is correct.

MR. CHAFFEE: I didn't know that either. They actually changed their models. That model change is just for the pressure switches and not for the temperature sensors?

MR. BOCKHOLD: Correct. That is our knowledge.

MR. CHAFFEE: Where are we at. There's going to be a test program to try to figure out what is wrong with these high jacket water temperature sensor switches. Is that program going to only look at the jacket water temperature sensor, or is it also going to get into and address the other sensors that are currently quarantined?

MR. BOCKHOLD: My plan was to basically give them all the switches and let Louis Ward and those folks and the laboratory work out the details of that. I am not quite prepared to answer that, and I think it would be appropriate for you to contact Louis or we could have Louis contact you.

MR. CHAFFEE: Okay. Sounds good to me. Our first cut would be, we would like to see them do the testing on all the quarantined switches so they can figure what went wrong with all the switches that are quarantined for which

there is something -- that there is believed to be something wrong with them.

Some of the quarantined switches I think perhaps are switches that were taken off and nothing was wrong with them, but they were just taken off as --

MR. BOCKHOLD: That were leaking a little bit but would have normally been acceptable, but we were very conservative and wanted to get the best switches we could out there.

MR. CHAFFEE: I understand. There needs to be another dialogue to talk about what switches are going to be tested and so on and so forth. We will conduct that dialogue with Louis Ward. That's going to go on to look into the sensors. This is ongoing now, in terms of looking into the impact of temperature variations in the system. Is there any other rocks that haven't been looked into in terms of the diesel's operation during the event? I guess not.

Region II, do you have any questions or comments?

MR. BROCHMAN: No. We are fully onboard and have been talking with them with respect to diesel generator operability issues.

MR. CHAFFEE: I guess that's all we have. Thank you very much, George. The transcriber needs to get the names of the people that were talking.

MR. BOCKHOLD: Before we hang up here Al, I went

and checked with Herb. He has probably a ream of ERF pictures and I am going to have him Federal Express that up to you tonight.

MR. CHAFFEE: Okay, great.

MR. BOCKHOLD: We will also send it in the package --this will either be the originals or copies, I don't know which. You will get another submittal of them too. If they are originals don't lose them, because the copies are not going to be very good.

MR. CHAFFEE: Okay, understand. Is there anything else that anybody has?

[No response.]

MR. CHAFFEE: Thank you very much. We will talk to you again tomorrow at 10:00. Wait a second, one question. If everything goes well, the procedure -- we haven't seen it but we understand that you guys faxed it up and we will take a look at it. We will get comments back to you as soon as we can. When are you planning on doing the test? What is the timeframe for that?

MR. BOCKHOLD: About two hours from now.

MR. CHAFFEE: You are planning on doing it at 1:00 o'clock?

MR. BOCKHOLD: Between 12:00 and 1:00.

MR. CHAFFEE: Between 12:00 and 1:00, so an hour from now?

MR. BOCKHOLD: That's right.

MR. CHAFFEE: We would appreciate it if we could have gotten the procedure a little more than one hour just before you planning on doing the test. We will take a look at it right now if we have it. If we haven't got it, we will give you a call back. Again, we would ask you to wait and give us a chance to look at it before you start it up.

MR. BOCKHOLD: Okay. Herb faxed it up to you before this phone call ever started. In fact, I thought he faxed it up at 9:00.

MR. CHAFFEE: Our understanding was that there was nothing here and we were told that you guys were in the process of faxing it as we got on the call.

MR. BOCKHOLD: I think he verified it's there, but I will check on that.

MR. CHAFFEE: We will check. Sometimes these things get shuffled. Again, we checked this morning when we came in and were told nothing was here. When we called down to verify it we talked to somebody down there and they said they were just in the process of faxing it as we started the call. We will go find it, and if we can find it we will take a look at it and give you a call back with our comments. If we can't find it, we will call back and we should talk to Mehdi Sheibani?

Let me ask you a question. In case we can't find

it, what Mehdi Sheibani's phone number?

MR. BOCKHOLD: He's on extension 3209.

MR. CHAFFEE: Okay. We will give him a call here as soon as we are able to determine whether or not there's a problem with us getting it or not.

MR. BOCKHOLD: Okay.

MR. CHAFFEE: Thank you. Before you decide you are all done, you are going to go back and assess the impact of the lube oil system and make sure that you have enough data to cover any variations in that, right?

MR. BOCKHOLD: Yes. We will do that from the data and we will also look at the test points.

MR. CHAFFEE: You understand what I am saying. It would be unfortunate to decide just to do it for four hours and then find out after you have gone and run the test that you really didn't have it all understood what sort of temperature changes are going on in that lube oil system.

MR. BOCKHOLD: We agree. We agree that it is important to look at that.

MR. CHAFFEE: Okay. Thank you.

[Whereupon, at 10:56 a.m., the telephone conference concluded.]

REPORTER'S CERTIFICATE

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

in the matter of:

NAME OF PROCEEDING: Operations Interview

DOCKET NUMBER:

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

JON HUNDLEY
Official Reporter
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