35-4a

OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: U.S. NUCLEAR REGULATORY COMMISSION

Title: INTERVIEW OF: FRAY THOMPSON
AND
ROBERT MOYE

Docket No.

LOCATION: WAYNESBORO, GEORGIA

DATE: TUESDAY, MARCH 27, 1990 PAGES: 1-83

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ADDENDUM

TO INTERVIEW WITH FRAY THOMPSON

Page	Line	Correction and Reason for Correction
2	26	the A/E firm of the Southern (Reason clarification)
3	27	Electric System. We preform engineering services for Georgia Power (Reason clarification)
3	1	Company and the SONOPCO Project.
4	3	that a diesel did not start on the Unit. (Reason clarification)
4	4	(delete this line clarification)
4	6	the question was, why did Unit 2 trip because of a problem in the (Reason clarification)
4	17	the 1200 AMP feeders that we had to the service building and (Reason clarification)
4	23	wouldn't trip out due to the differential relays in the (Reason clarification)
5	3	and with which breakers and how the breakers would be aligned. (Reason clarification)
5	11	and during this period, we contacted our associate A/E the (Reason clarification)
5	12	Bechtel Corporation in Gaithersburg, Maryland (Reason clarification)
5	19	information we were asked to review the (Reason clarification)
5	20	information from a protective relay function application (Reason clarification)
6	8	were that the switchyard relaying had done its job and had (Reason clarification)
6	9	operated correctly and that Unit 2 had one of two (Reason clarification)
~~6~~	~~10~~	~~(spelling of diff~~ FT 3/28/90.
6	11	zone or the relay misoperated. We developed (Reason clarification) action plans for trouble shooting and design review.

Page 1 Date 3-28-90 Signature Fray Thompson

ADDENDUM

TO INTERVIEW WITH FRAY THOMPSON

A-11

Page	Line	Correction and Reason for Correction
6	12	(delete this line for clarity)
6	13	(delete this line for clarity)
6	14	(delete this line for clarity)
6	17	methodologies the utility uses to test (Lines 17, 18 & 19 clarification)
6	18	the transformers to assure the
6	19	insulation is adequate and the
7	8	~~basically~~ the elementary, schematics and (Reason clarity)
7	12	the 20th, Late in the afternoon of Wednesday, the 21st, (Reason clarity)
7	13	our review revealed a discrepancy. We found that the Unit 2 (Reason clarity)
7	14	high side CTs for the primary differential relay (587-U1) (Reason clarity)
7	16	~~the ratio~~ the ratio is 600 to 1 not 601 reason: 601 is not correct (reason accuracy)
13	13	1300 AMPS NOT 13000 AMPS (reason accuracy)
14	2 through 11	The lighting strike was on the line between Wilson and Waynesboro. (reason correct line name)
15	8	A/E not AD (reason term)
14	12	Yes was not the question I answered (reason lost conversation)
16	5 through 11	To the best of my knowledge. (reason basis of statement)
18	19 and 20	I was told by K.S. Burr (reason basis of statement)
19	16	I do not know the term fingered* (reason understanding)
~~19~~ 22	22	1 RHR, 2 NSCW, 1 CCW and 100 KVA of misc load (technical accuracy)

Part this point I am not correcting the paper for clarity is reading the work.

Page 2 Date 3-29-89 Signature Fray Thompson

* in the contexts of the answer.

ADDENDUM TO INTERVIEW OF FRAY THOMPSON
(Print Identity of Interviewee)

Page	Line	Correction and Reason for Correction
21	10	delete "man" (reason accuracy)
29	13	Breaker failure relays not release
29	21	"ADN" is ABN
43	21	The name is Fray not Fray.
46	18+19	The circuit switches (typical) as shown on drawing 1X3D-BH-B55B, the tripping is via lock-out relays and are to protect the transformer and clear only the switches not the off site source (both RATs) a fault on the high side of the RAT would also be cleared by the off site source 230 KV circuit breaker and hence both RAT's powered from that off site source would be lost.
49	12	not a war hunt, I went to the war room
5	1-8	I was looking at power from Unit 2 turbine building to Unit 1 via the service building. We reviewed voltage drop, loading, interlocks and protective relays. "Charging" current in terms of inrush or magnetizing magnetizing current in no rectrain. Steady state losses in the transformer was not considered to be a significant load (this concern will be reviewed late)

Page 3 Date 3-20-9 Signature Fray Thompson

ADDENDUM TO INTERVIEW OF FRAY THOMPSON
(Print Identity of Interviewee)

Page	Line	Correction and Reason for Correction
56	2	"A" diesel not "B"
60 ~~56~~ 73 3-14-90	2	The answer was for a feed from Unit 2 to Unit 1 or it may have been Unit 1 to Unit 1, it is all the same interlock.
64	8	Steve Kantutes not Kochevar
67	7-9	The fossil plants have start-up transformers, some have generator breakers, and some tieing.
81	11	relay number is 587-U1 (Unit 2 relay)
81	21	through the service build.
81	21-23	The charging current issue is being reviewed. Inrush currents to the transformer have been reviewed and found to be of no impact. Steady state currents to the RAT ~~and~~ 4 3-14-90 is under review but do not appear to be a ~~significat~~ 73 3-14-90 significant load.
1 through 82		I have read the interview transcript and found it to be of basic technical accuracy, the intent of the interview is fairly well documented Some details and discussion are not 100% complete

Page 4 Date 3-28-90 Signature Fray Thompson

(LAST PAGE FOR FRAY THOMPSON)

ADDENDUM TO INTERVIEW OF: Robert Meye
(Print Identity of Interviewee)

Page	Line	Correction and Reason for Correction
2	18	PLANT ENGINEERING SUPERVISOR
8	21	the UNIT 2 critique
~~11~~	~~15~~	Terminates. First, Ran
~~11~~	~~Ran~~	
17	11	operating currents were
17	19	getting into this
18	3	order, it would have failed.
25	15	whats ON the
30	4	to do it somewhere
33	10	dobled
33	16	which - had been
36	20	2R1 (not "TR-1")
41	14	times I AM GETTING FOR YOU. When it was
41	15	taken out of service, the substation
43	11	cutting IN that
44	19	SOMEONE MANNING the
46	14	Answered by Fray Thompson
	16	Ditto
47	21	did not operate.
48	1	, after this mechanical latch was reset,
53	16	NAØ2
63	19	are around them

Page 1 Date 3/29/84 Signature Robert A Meye

ADDENDUM TO INTERVIEW OF Robert Moye
(Print Identity of Interviewee)

Page	Line	Correction and Reason for Correction
71	22	IN Modes five
71	23	"~~Reservation Disconnection~~
76	7	IN the planning process
	10	KNOW. the operations

Page 2 Date 3/20/92 Signature Robert Moye

U. S. NUCLEAR REGULATORY COMMISSION

INTERVIEW OF:)
)
FRAY THOMPSON)
AND)
ROBERT MOYE)

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

Tuesday, March 27, 1990

The interview commenced at 10:21 a.m.

APPEARANCES:

On behalf of the U. S. Nuclear Regulatory Commission:

RICK KENDALL
GARMON WEST

On behalf of Carolina Power & Light:

WILLIAM JONES

On behalf of EPRI:

HARVEY WYCKOFF

PROCEEDINGS

MR. KENDALL: Okay, this is the investigation team at Vogtle Unit 1, an interview with Robert Moye and Fray Thompson.

Whereupon,

ROBERT MOYE
and
FRAY THOMPSON

appeared as witnesses here and was examined and testified as follows:

EXAMINATION

BY MR. KENDALL:

Q We will start by having them introduce themselves and their positions at the plant, and how long they have been here.

A (Mr. Moye) My name is Robert Moye, I work for Georgia Power. I am Plant Engineer and Supervisor in the Engineering Support Department. I have been at Plant Vogtle since 1978 and probably four of those years in the Construction Department and the rest in the Operations Department through start up and operations.

A (Mr. Thompson) My name is Fray Thompson. I am an Engineering Group Supervisor with the Vogtle Project at Southern Company Services and Southern Company Services is the A/E firm for the service company called the Southern Electric System for engineering services for Georgia Power

Company and SONOPCO Project.

I have been employed with the Southern Electric System since 1968. I have been involved with the Vogtle project for a time in around 1978 and then again beginning in 1985 through the present and I am the Group Supervisor for the Electrical Group in Birmingham, Alabama.

Q Okay. We should mention that it is Tuesday, March 27 and it is about 10:24, and we will get started. The first thing we wanted to go into was the cause of the Unit 2 trip on the fault in Unit 1 Vogtle power switch yard, primarily because it looks like an item we can get out of the way first, and we would like to start by just having you tell us about it.

Perhaps starting with the generation of the fault and then what happened on the fault on the Unit 1 side and then your understanding as to why Unit 2 tripped.

A (Mr. Thompson) Okay, on the morning of March 20, I was in Birmingham, Alabama performing my normal engineering function. We had received an indication through some of the engineers that Unit 2 had tripped.

A little while later, I was summonsed to the conference room and asked for us to go investigate supplying power to Unit 1 from Unit 2. That was my first charge. My first involvement in the incident.

We were given some facts related to basically what

happened, did we know that a truck had hit a substation structure, that power was lost to the class 1E buses and that diesel did not start on the unit, the 180s did not start on the Unit 1.

We were also told that Unit 2 tripped. Of course, the question was, why did Unit 2 trip, the problem being the substation.

My first task was to mobilize my people to go find the source in Unit 2 to feed Unit 1. We recommended looking at a circuit from the turbine building in Unit 2, back to the service building and back to the Unit 1 turbine building switching gear and that way we could make it tie back into the low side RAT buses and then back to the class 1E buses.

We mobilized. I had some engineers looking at the capability capacities, especially of the circuits to make sure we had adequate voltage, we had adequate capacity in the 1200 M feeders that we had to the service building and also the feeders back, to make sure that that circuit would/ could carry the minimum amount of load required.

We reviewed the interlock scheme as far as the electrical interlocks and the service building switch gear. We reviewed the protective relay scheme to ensure that we wouldn't trip out due to a differential of some relay in the circuit.

We got with our systems people to verify our

assumptions, our minimum loading requirements and basically developed a step by step switching procedure, what switching and with which breakers and where it would have to be aligned.

We basically reported that from our cursory review it seemed highly possible to feed from the Unit 2 turbine building, through service building switch back into the Unit 1 turbine building and then into the low side of the RATs to feed the class 1E buses, if necessary.

The site area emergency was down graded to an alert and during this period, we contacted our associate A/E, our other A/E in Bechtel Corporation in Gaithersburg, Maryland and basically informed him of what had happened at the plant site to get them involved in the problem solving.

During this period of time, the reserve auxiliary transformers were placed back into service, was the report that we got, and we received additional information concerning the targets that were observed and from that information, we were asked basically to review that information from protected relay function application basically to determine what happened, why did Unit 2 trip for a problem in Unit 1.

It is the philosophy of the Southern Electric System as it is throughout the industry that we do not drop generation because a trouble incident in the switch yard

structure. That is bad business practice. We are out to, of course, protect the safety and welfare of the community and also in business to supply power to Susie's toaster down the road, and to make money for our stockholders, that is our function, and so that is not a good thing to have happen and so we basically reviewed the targets and reviewed what happened, the sequence of events, and our first impressions were the switch yard relay had done its job and it had operated correctly and, too, that Unit 2 had one of two problems. Either there was a fault within the differential zone or the relay misoperated, and so we have basically developed actions and involved with the action plan basically and recommended -- for recommendations into the trouble shooting aspects.

The trouble shooting aspects were basically involved with the plant site and the normal trouble shooting methodologies the utility uses it to go out and run testing on the transformer basically to make sure that the insulation is within the transformer and that the general electrical features are indeed intact and to prove to ourselves we did not have a fault within--verify that we didn't have a fault within the differential zone of Unit 2.

On the design end, we set off to review the application of the relay and to review the design documentation, to assure ourselves that our relays were

hooked up correctly, all the deltas were hooked up correctly, that the relay ratios and CT ratios were indeed correct and we did not have any non-intentional grounds in the design, a CT having a ground that we forgot to remove, but that is just a detailed review of the first-level documentation which, of course, is basically the single lines, some relay data sheets, and secondary drawings, basically the yellow elementary schematics and then down into the wiring diagrams, down into the actual white wire ties to the TB1-2 type of review.

These activities started basically the afternoon of the 20th. The late afternoon of Wednesday, the 21st, in our review, we found a discrepancy. We found that in Unit 2 that the high site CTs for the primary differential relay were shown on the design documentation as being tapped at a ratio of 601 or 3000 and 5.

Reviewing the application of the relay, we determined with that tapped CT that we were actually operating on the ragged edge of the trip point, under normal loading conditions and that the close-in fault would have driven the trip into the operating range of the relay and the relay would have indeed operated--

MR. WYCKOFF: I have a question here.

BY MR. WYCKOFF:

Q Had the initial determination of the tap been

incorrect or was it just a clerical error along the way?

A (Mr. Thompson) We reviewed the documentation from the initial issue of the engineering, of the design documentation, the implementation documentation and it had always been tapped at 3000 and 5.

The base documentation, the detailed calculations in our relay setting sheet as performed by Georgia Power Company systems protection group, a gentleman by the name of Tony Ayoub, he is the responsible party there.

The relay data sheet indicated a ratio of 2000 and 5 should be utilized and that information of the engineering documentation, the relay information as far as the CT connection was not translated into the implementation documentation, did not get on to the engineering design documentation, either the one lines, the elementary schematics nor into the wiring diagrams.

We discovered the problem in the documentation. We contacted the plant personnel and I believe we talked to Chris Eckert.

MR. MOYE: Unit 2 in particular, he was heading number 2.

MR. THOMPSON: And we also called the substation switch house, Extension 4310, I believe the gentleman's name was Bob Tollison, if I am not mistaken.

We asked the switch yard, the gentleman out in the

switch yard to go to the cabinets for the 500 kv breakers on Unit 2 and verify the wiring, the connection where we had tapped.

He fed back to us the information that the CT was tapped 3000 and 5.

We contacted--we were in contact with Chris Eckert, informed him of the situation and also contacted Mr. Jack Born, who is the Substation Supervisor, and informed him of the situation and at that point in time, we telecopied our analysis, our review to the plant site and from that point in time, to the best of my knowledge, a document was generated and those changes were made in the substation to bring the configuration of the taps in the CT in conformance with the relay data sheet.

BY MR. WYCKOFF:

Q This was done in all three phases?

A (Mr. Thompson) Yes, it was.

Q And these are bushing curves, are they?

A (Mr. Thompson) Yes, bushing type CTs.

BY MR. WEST:

Q And the appropriate tap should have been 6000 and 5, was that correct?

A (Mr. Thompson) No, the appropriate tap should have been a ratio of 400 to 1, or on a 5 amp basis of 2000 to 5.

MR. WEST: Two thousand to five. Thank you.

MR. THOMPSON: At that point in time, I left the office and flew to Augusta, Georgia. The next afternoon I met with Rick and Robert and reviewed the documentation, and, again, finished up our review on this Friday morning and then I returned to Birmingham Friday afternoon and then, from that point in time, Saturday, I went into the office and was involved with the -- influence, if we had an explosion, we got into that, and then Saturday afternoon and Saturday night, I was involved with a review of the diesel generator test procedure and Sunday morning, I came in and reviewed the review comments with the client on our test procedure that we had reviewed earlier.

Yesterday, I was in the office again involved with all of this and was told to come to the site here today.

BY MR. WYCKOFF:

Q Maybe we can take them up, one subject at a time, this kind of, I would think close to--I just want to ask you something to learn, that's all. School is in session.

Somebody prepared this thing (indicating).

A (Mr. Thompson) Don Smaha.

Q Yeah, I just wanted to ask you something.

A (Mr. Thompson) Yes, sir.

Q He talked about, it was set at -- the differential curve was .4 and the pick up was .99 of the rated, it is a 5 amp relay, right?

A (Mr. Moye) Yes, well, the rated current and everything is on a 5 amp basis.

Q So this point, the 2 amp differential would be this, and the .99 would be here (indicating), but he had the curve over there.

A (Mr. Thompson) Okay, this point out here is the -- is under--

Q I didn't see the one that he describes in the calculation. It doesn't matter.

A (Mr. Thompson) Okay. This is, we went back and looked at the--

Q That is the wrong one.

A (Mr. Thompson) Okay, this is the maximum, this scenario is the maximum phase to ground fault current.

Q Oh.

A (Mr. Thompson) Okay.

Q Is that what is on that curve then?

A (Mr. Thompson) Yes.

Q Ah, yes.

A (Mr. Thompson) This is the maximum phase to ground current with the 3000 and 5, or that is with the 2000 and 5 amp, okay?

Q Uh-huh.

A (Mr. Thompson) This takes it to the assumption, we basically simplified the circuit.

Q Yes, I know. You dropped a little.

A (Mr. Thompson) Basically, that is what we did.

Q Uh-huh.

A (Mr. Thompson) We dropped a little and based upon this maximum phase to ground fault outside of the zone basically we -- it demonstrates through the calculation that for external fault, this is where the trip point would go, okay?

Q Yes, uh-huh.

A (Mr. Moye) The normal loading with the 3000 and 5, the 3000 and 5--

Q Would have been in that area (indicating)?

A (Mr. Thompson) Would have been right--

Q Right there (indicating)?

A (Mr. Moye) Yes, right there.

Q That is what I was looking for.

A (Mr. Thompson) Okay, and then with the 3000 and 5 taps, the trip point would have moved up.

Q Where -- the 2000 and 5 would have been with normal load.

A (Mr. Thompson) Right in this area here (indicating).

Q Uh-huh. You were kind of tippy toeing along here all the time, weren't you?

A (Mr. Thompson) Yes, we was basically sitting on the

ragged edge. We have had other faults in substations in the transmission system here at Vogtle. We have not experienced one as close in electrically to what we are here.

Q How many times on your system right here is fault current times load current?

A (Mr. Thompson) I am not sure--I can find that out--this is out of our, we call it PSA program. Power Systems Analysis for a certain program, and we would be able to find that.

Q It isn't germane to this. I just was curious. Twenty? A number like twenty?

A (Mr. Thompson) This was 20,000 amps here and the load current was about 13,000 amps and so--

Q Ah.

A (Mr. Thompson) That is twenty divided by one point three.

Q Uh-huh.

A (Mr. Thompson) That is about 15.

Q It is about 15 with a great big load phase here.

A (Mr. Thompson) Yes, sir.

And we also went to--we did this calculation here based on the demonstration that was done with the correct taps, where we did have adequate margin, we had some security margin.

Q So the tap cut was set wrong, it has happened before

and it will happen again.

A (Mr. Thompson) We, here at Vogtle, I am aware of two or three probably, where we have had similar type incidents, on Unit 1 when we were starting, we had another differential CT and we had a ground in one of the transformers that was basically the vendor's CT ground short, you know, when we short out the CT, we ship, we send the ground back, the ground was not removed and we experienced a lightening stroke on a line between Wilson and Lynchburg and the lightening stroke caused Unit 1 to trip the differential.

Q Yes.

A (Mr. Thompson) Again, we found the problem being that on Unit 2 where we had a CT circuit--

A (Mr. Moye) That was rolled.

A (Mr. Thompson) --That was rolled.

A (Mr. Moye) And it was in vendor wiring.

MR. WYCKOFF: I am ready to drop this crash course.

BY MR. WEST:

Q Let me ask before we move on, could you just summarize how it is first established what the tap should be and not to get into a lengthy further discussion on this, but then how it comes to be that the tap is set wrong?

A (Mr. Thompson) The engineering, the calculations for the whole scheme, the CT ratios and the taps, are

generated by Georgia Power Company's System Protection Group. Their responsibility is documented in our design criteria.

If I am not mistaken, it is Design Manual DC-1823 and in that Design Manual, they show that is the responsibility of Georgia Power Company.

That information from that organization is sent to the AE to be tied into the implementation documentation, so then their design phase, that is the basis for the design, the actual setting in the control of the set points from that point in time goes between--within Georgia Power Company System Protection Group and eventually down here to the plant site and that is where the testing and verification of the as-built configuration is done.

The problem that we ran into, potentially we could have ran into is that this documentation indicated 3000 and 5 and if somebody went out to check the CT ratio and used this documentation, they would have said yes, it matches this documentation.

Q But the design criteria indicated 2000 and 5?

A (Mr. Thompson) Yes. That is the fundamental problem.

BY MR. WYCKOFF:

Q Do you think a draftsman picked it up wrong or--

A (Mr. Thompson) I really don't know. Again, we went

back to --

A (Mr. Moye) That is going to be part of our root cause analysis as to how it got picked up or why it didn't get picked up. Chris Eckert is still working on that.

A (Mr. Thompson) As far as the jurisdiction and the testing, the CTs that were mistapped were out in the substation. This work falls within the jurisdiction of the Augusta Division of Georgia Power Company and anything inside the protected area falls within the jurisdiction of the plants, basically, the project, and so there is an interface.

A (Mr. Moye) In interviews with the start-up people that were involved, you know, in the check out of that circuit, what we did was we went to the switch house where the circuit terminates, you know, first in from the plant, and they tested it there and then the substation people test out and, of course, when they tested it, of course, that was the right thing installed to when they looked at it on the drawings and so, you know, that is where our interface point is, is in that switch house, and we have jurisdiction up to our side of the termination cabinets in that switch house.

BY MR. KENDALL:

Q You are saying that during testing that the CT as it was installed with the wrong tap being used was tested?

A (Mr. Moye) It was verified that it was the correct

CT ratio.

Q And it did match the drawings?

A (Mr. Moye) Uh-huh, it was verified.

Q Were there any--are there any functional tests or anything performed on these that would allow you to determine that there could be something wrong based on test results?

A (Mr. Moye) They have gone in, and I have learned this through the interviewing process too, is that during start up, they tried to probe all the relays to find out where the actual operating curves were through the CTs and they were able to do a large number of those during various times, during plant start up on both units, but this particular relay was not probed.

And there is still an open work order on this, and the reason it wasn't probed was the operators when the work order was taken to them, you know, we have to identify potential plant trips, we say, you know, well, we will be getting this cabinet, this relay does give a trip to the turbines and, you know, this probing operation is in an area that is, you know, potentially a trip hazard.

And the normal, I guess, feel for anything that has a plant trip associated with it is that you use kid gloves, and, in this case, the operator chose not to let the maintenance department do that.

And if we had gone in and probed that relay, executed that work order, that would have been failed.

Q Okay, so--

A (Mr. Moye) There is potential plant trip items, the operators have the final say on that, and we tell them that this is an area, then they make that call, we give them the benefit and, of course, the first thing they say is well, you know, I had a trip, I am operating now, and, you know, it is hard to tell them, well, you know, it is going to trip you, because you don't know, you know, how it is operating, you don't know that there is a problem.

Q These tests, would they be something that are done during pre-operational testing?

A (Mr. Moye) They are normally done during pre-operational testing. In fact, they probed this relay during testing and the currents were too small. Okay, the generator was not on line at that time and they probed it then.

A (Mr. Thompson) It was probed in a back configuration.

A (Mr. Moye) In a back configuration and they said the current was too low for them to make any accurate determination of the correct wiring.

(Brief interruption and discussion off the record.)

[Mr. Kendall left the conference room.]

BY MR. JONES:

Q My main thrust is that I am a Systems Engineer, but what I am really trying to understand is were there other activities that could have gone on that could have helped this plant if power had not been restored in the way it had been and when you mentioned that you had been asked to come up with -- you were asked to come up with some alternate switching schemes that might supply power to Unit 1 and Unit 2, did you have adequate information in Birmingham to do that?

A (Mr. Thompson) We had the design calculations. We had the loadings for the buses. We have a technical staff in Birmingham that is capable of generating those calculations if we have data as far as the lengths of the cables, the type of cables, the capabilities of the switching gear, all of the diagrams that I fingered here as far as the interlocking system, and so we set off to basically verify the maximum current from the Unit 2 turbine building all the way to the service building and then back to the Unit 1 turbine building, we would have ample voltage to supply adequate current to supply the loads to the 1RHR pump, 2 MSCW cooling tower, 2 MSCW pumps and 1 CCW pump and a 100 kva -- and that was our planned attack to verify and we did indeed have that capability.

MR. WYCKOFF: We are going to go into that in great

depth.

MR. JONES: Oh, you are?

MR. WYCKOFF: Oh, yes, but it will be later.

MR. JONES: I will shut up.

MR. WYCKOFF: It happens to be on the end of what we have.

MR. JONES: Okay.

BY MR. WEST:

Q I have one follow up question on the CT tap, I think at least at some general level it comes across that it should be been one thing by design and it actually was something else by implementation.

Could you -- your testimony before in terms of perhaps it was a drafting error or not--but what I am trying to get at is that what would be available here at Vogtle if someone wanted to check what the tap was, would they have--apparently these are one sets of drawings that reflects--

A (Mr. Thompson) These drawings?

Q --Not necessarily the case of what it should be, but if someone here at Vogtle wanted to check the tap, what would they have available to them?

A (Mr. Thompson) They would have a relay data sheet that shows the CT ratio.

Q With the information they would have available, would it reflect the correct tap or not? That is really

what I am trying to establish.

A (Mr. Thompson) They would have two pieces of information. One piece would be demonstrated on a relay data sheet that is generated by Tony Ayoub and the Systems Protection Group out of Atlanta. That document indicates the number 400 slash, and the square root of 3, which indicates a ratio of 400 to 1, but connected in a delta configuration.

Okay, that translated to a tap of 2000 to 5 on a 5 man basis and also have access to the switch yard drawings showing those CTs and that drawing shows a tap of 3000, and so it is a matter of taking those two pieces of information and saying--

Q So you have the data sheet and you have 2000 and 5 and the other document was what?

A (Mr. Thompson) Three thousand and five.

Q But the other document that would show that was what?

A (Mr. Moye) Here is the switch yard drawings which shows those CTs, I think is what he said.

Q Now, would you expect a person to, if one wanted to pursue that, to verify it, for whatever the reason, would you expect the person to have both pieces of documents to pursue it, to pursue answering the question of whether the tap is correct or not with both pieces of information?

A (Mr. Thompson) Yes.

Q So from that point of view, they would become aware of the discrepancy and then try to go about resolving which one is the correct one.

A (Mr. Thompson) We found the discrepancy when we put our mind to doing a full review, wire by wire, ratio by ratio, back to the base documentation. That is where we found it.

Here is this particular CT. I am looking at Drawing AX3DAAL50T. This drawing shows connections that leave this drawing and go to Unit 2, main transformer differential relay 587-U1. The CTs on this drawing is shown as 3000/3000/5, noted as 3 CTs and a wire connection, 3 CT-- well, it was 3 CT wire on the set of, on the breaker out there.

The underlined 3000 is the tapped of the CT.

Q Since the switch yard drawing in this instance is incorrect, is either of you familiar with what procedure they have here for insuring that the switch yard drawings are in fact consistent with what the design is calling for or not?

A (Mr. Moye) I would defer that answer. I am not sure.

A (Mr. Thompson) To answer that question, there are two methods in which the switch yard drawings are changed.

One is via the documentation being demonstrated on a Vogtle as-built notice and being sent through for incorporation by my organization on an as-built notice.

A (Mr. Moye) That is as-found, right?

A (Mr. Thompson) Yes, that is as found, as found information. The other demonstration is by a set of field mark prints that are controlled by the Augusta Division of Georgia Power Company and those field mark prints are sent to my organization, the A/E, through Georgia Power Company's process and it comes in the process under direction from Georgia Power Company to incorporate those documents into final mylars.

Q Now the tap that is specified in the switch yard drawings, is that something that was initially there or is it something that came by way of a change that was made at some point? I am not crystal clear on that.

A (Mr. Thompson) The review that our engineers in Birmingham made of the initial drawing up through, we are to Rev. 2, this print indicates that the tap has always been demonstrated as 3000 to 5.

Q The methods that you mentioned in terms of how something would be changed on a drawing, is that outlined in some procedure?

A (Mr. Moye) The ABN procedure is a Vogtle document, okay? We do not red line. The plant does not red line and

send drawings in. The Augusta Division does that.

Our procedure is more formal than that. We ABN, or we do document changes through our design change packages. If there is something that needs to be changed that is wrong, we do DCPs.

Okay, if we find something that is not in agreement with the drawing, we ABN it, okay, to make the drawing agree with what is in the field.

Q The drawing is up to Rev. 2, the bottom line has what the CT tap is specified in the drawing, has that always been there or was it at some point a change? I am not clear on that?

A (Mr. Thompson) The report that I received from the review that our engineers made in Birmingham was from Rev.0, the initial documentation, up to this point in time, the tap has always been shown as 3000 to 5.

On the one line documentation on the schematic documentation and the tabs as shown on the wiring diagrams where the actual copper is--

Q Well, from the point of view of how something is initially put there then, what would be in place to check that, whether it is what it should be versus what it is not?

A (Mr. Thompson) What it should be, the correct taps for those CTs should have been transmitted from Georgia Power Company to the A/E, to the architect-engineer.

Q As you mentioned earlier in the process of how this comes to be.

A (Mr. Thompson) That would be shown on the one lines, the one lines would be translated into the three lines or the schematics and at that point in time would be translated into the--

Q But my question is, when that process happens, the information is conveyed to the A/E, then it eventually reveals itself in a drawing, is there anything in place at Plant Vogtle to insure that what was conveyed is the same as what was actually, what actually appeared in the drawing, is there any process for unfolding, verifying, or--

A (Mr. Moye) We verified the plants configuration, but I don't think that is what you are asking, you are asking how the design process insures that what's--the calculation sheet is transmitted to the drawing properly, is that what you are asking?

Q That is, yes.

A (Mr. Thompson) The initial design, up to this point, the design documentation shown here was performed under our FSAR 17.1 program, which is basically the new construction phase, construction start up, during that phase.

To the best of my knowledge, that was handled probably either through a letter or through a meeting where

these documents were sent back and forth. The A/E of record at that point in time was the Bechtel Corporation located in Norwalk, California and Bechtel was responsible for the executing the unit single line and Southern Company Services of Birmingham acted as a subcontractor for Bechtel to produce the one lines for the substation and there had to be an interface between Georgia Power Company System Protection Group through the Vogtle project to Norwalk to generate the single lines for your project and then back through the project to the Southern Company Services to demonstrate this on the substation drawings during that process, the 17.1 program.

[Mr. Jones left the conference room.]

In the 17.2 program, we basically have design, we go through a design change request process and we have basically a check list and in our check list we make notations of what relay is involved and that check list is a documentation to the System Engineers to coordinate back to their System Protection people as far as the base line relay data sheets, we coordinate with them as far as the relay changes.

Now the CT itself is a multi-ratio CT. The 3000 to 5 is the maximum capability of the CT. It is tapped in increments and so making the change from a 2000 to 5 to 3000 to 5 is basically rolling some wires, changing some wires.

Q Just to bring closer to my questions and I appreciate your patience, all of you. Would you have any insights on how would we get a definitive on what is the controlling mechanism, if you will, from going to what the design is calling for on the CT tap and what was actually portrayed on the switch yard? How would we follow up on that, to get a definitive answer on that. I understand the process. I don't have the exact information that I would want to use to pursue this.

A (Mr. Thompson) As far as following this particular chronology, historical chronology, we would go back and review the correspondence on the Vogtle project in this area from Georgia Power Company and to the Vogtle project itself and through Norwalk back to Southern and review the correspondence and see exactly what transpired.

Q That's--and I can understand that thought from a historical point of view. I will ask the question differently too, from a current point of view, what does Vogtle have in place that would speak to the design calls, for one thing, how would you insure that the drawings match the design?

A (Mr. Thompson) Under the current program, we have what is known as a Design Change Request program, DCR process, that program, basically, the client sends to our organization a specific design change request, specifying

some design. We would engineer that change.

Q If I wanted to look at this on paper, could you tell me what the reference point would be, if you know it?

A (Mr. Moye) Do you mean the reference document for making changes?

Q Yes.

A (Mr. Moye) It is our Admin. Procedure 400.

Q This is the Design Change Request?

A (Mr. Moye) This is the design change process, yes.

Q I am sorry, repeat that again.

A (Mr. Moye) It is our Admin. Procedure 400, and then there are some sub-tier documents under that that are referenced.

Q All right, fine. Now, from the historical point of view, is this something that someone is looking into as far as the root cause?

A (Mr. Moye) Yes, Chris Eckert is doing the critique on Unit 2.

Q Who?

A (Mr. Moye) Chris Eckert.

Q How do you spell his last name?

A (Mr. Moye) (Spelling) E-c-k-e-r-t.

Q Okay, fine.

A (Mr. Moye) And Chris is trying to run that down, but, you know, maybe I shouldn't say this, but the interface

right now, as far as design changes go, we get it to the switch house and then the substation is sort of a gray area, okay, and I don't handle design changes in the substation and those are all handled by the operating district which is the Augusta District, and any changes that go on out there would be documented by them and verified by them and our design change process does not really cover what they are working on out there. Even though, you know, there is probably some debate over whether we should or not, right now that is how it is all through Georgia Power. This is not unique to Vogtle.

A (Mr. Thompson) No, we recently had a change where we changed out the breaker failure release in the substation. We have basic stability criterias that we have got to clear faults in the substation in a certain amount of time or we will lose stability on the units. We process that change totally, including substation changes, through the DCP progress, because it did affect off-site sources, it did affect the commitment in the FSAR as far as our stability levels. That was all documented through the DCP process, ADN back through, and that was basically a judgment call. This was germane to the commitments, it was basically a design change related to those items.

Changes as far as the protected relay system is such that it is in the substation.

A (Mr. Moye) Historically, Georgia Power proprietary and, you know, that is the transition region where it goes into the Georgia Power system. This shouldn't be unique, but you have got to get used to seeing it.

BY MR. WYCKOFF:

Q If it is all right with you, we probably ought to-- because this really, the charter called came to this, but this is not pertaining directly to safety matters, so the unit tripped, and it is not desirable, but--

A (Mr. Thompson) Right, it is not desirable.

A (Mr. Moye) That is for sure.

A (Mr. Thompson) We are selling power and we are really not--

Q Well, more than that. You don't want to get into tripping because then you get two tripping at one time and it's bad.

I would like to, there has been some confusion, so let me go on.

A (Mr. Moye) Are the other guys not coming back? Are we going to finish this by ourselves?

Q They will make it in time, but we will go ahead for the record--there is not way to, they said keep going.

A (Mr. Moye) Okay.

Q I would like to open the subject of the repair of the transformer B, and the nature of this subject is whether

this was an expedited effort or considered a very relaxed effort?

Let me ask you, let me just discuss a series of questions and then we will just go into them one at the time.

What we had in mind were things like this, when was it taken out? When was it put back in service? What was the nature of what you were doing to it, but, more important, considering what was going on in the reactor, did folks try to get this out and back quite fast, or was this a fill-in job? We will put crews out there when there are not other things to do. Things along that line.

A (Mr. Moye) It wasn't expedited.

Q It was not?

A (Mr. Moye) Huh-uh.

Q That is kind of--when did it go out, I guess, when was it taken out of service, what date?

A (Mr. Moye) I am not sure and I can get that for you. Okay?

What we--really the only way to tell when it was taken out is to look at the clearance, when the clearances were applied. Okay. The work orders may not accurately reflect when it was actually taken out of service. The clearances would and that would be an operations question.

Q Okay.

A (Mr. Moye) If you want to, I can pursue that for you or--

Q Oh, if you could get it and later on--

A (Mr. Thompson) If I am not mistaken, to the best of my knowledge, that was a scheduled activity, and th overall schedule--

A (Mr. Moye) Yeah, the problem is, it is a window though, Fray.

A (Mr. Thompson) It is a window.

A (Mr. Moye) And it won't show the date and they did not expedite. I know the transformer had been available for maybe several days before the incident, you know, to go back into service, I think a day or two, and it was available prior to this.

Q It was available several days before the event?

A (Mr. Moye) Uh-huh.

Q Except there was a few little things to do yet, like the oil I guess had to be put in.

A (Mr. Moye) As far as I know, everything was ready to return to service. The check out of the transformer, all the substation work was complete. They do all our transformer maintenance. They had turned it back to us and the maintenance activities associated with that, I believe, were completed. The restoration process may not have been complete as far as maintenance. you know, there may have

been some connections though they had to finish.

Q To turn back though, it was not placed in service?

A (Mr. Moye) Right, the reason it was taken out, okay, that reason it was gone and the physical activity to put it back in service had not occurred which was maybe the maintenance activities associated with the clearance and then the clearance itself.

Q Roughly, what did you do to it?

A (Mr. Moye) They changed the oil and I am not sure if they doubled the insulation or not.

Q Did what?

A (Mr. Moye) The insulation, I am not sure if they did or not.

Q Oh, doubled, yeah, uh-huh.

A (Mr. Moye) They did what we consider standard maintenance for large transformers of this type, which they had been in operation continuously for 18 months.

Q We used a GIS filter, to get the moisture out, very ineffective. They do now. So you will try to find out and maybe you will let us know how that--but, of course, the back drop to this is, you know, your preparation and at the same time, this makes it -- and the generator was out of service, and so it would indicate it was judged that it wasn't a very dangerous affair.

[Mr. Kendall returned to the conference room.]

Let me bring you up to date on what's happened, we started into --

MR. KENDALL: Excuse me, you don't have to record him bringing me up to date.

MR. WYCKOFF: You can shut it off.

(Discussion off the record.)

(Short recess.)

MR. KENDALL: Okay. My understanding of the testing of the current transformer that was mistapped is that the test was conducted during an abnormal system line up where the currents were so small that the test measurements were basically--

MR. MOYE: During the pre-op phase, they tested and during the backfeed, what we call the backfeed, and the currents were to low to tell at that time, you know, that they agreed with the design documents.

Okay, they did check it out, okay, but they had to make the decision that they would have to be reprobed again when the currents were higher.

BY MR. KENDALL:

Q Was it, that decision was made then at that time?

A (Mr. Moye) Well, there was a Work Order written that carried that incomplete item, okay, which was the Work Order that was open since '89. I talked with the supervisor who was responsible for that. He is, in fact, on site today

and he is in my corporate office now, he told me that they did check those circuits out and that one they could not verify the currents because the currents were too low.

Q And because of that the Work Order was prepared to test it later?

A (Mr. Moye) That's right.

Q Okay, who is that?

A (Mr. Moye) Ken Burr.

Q Ken?

A (Mr. Moye) Ken Burr.

K. S. Burr, that is (spelling) B-u-r-r.

Q But that was outstanding since '89?

A (Mr. Moye) Right.

Q That Work Order--

A (Mr. Moye) The problem with that relay was outstanding since '89.

Q Was '89, when it was tested in '89, that was during pre-operational testing?

A (Mr. Moye) I haven't looked at the dates to see how that coincides and that is probably right around start up time.

Q Okay.

A (Mr. Moye) Of that switch yard.

Q I understand what you told me about the operators having the last say on whether a test that had potential to

trip the unit should be done or not.

A (Mr. Moye) That's right.

Q Was it just a timing thing? If this had come up at another time to do the test, where it wasn't so critical, the tripping of the plant, do you think the operators would have okayed it?

A (Mr. Moye) It was my understanding that this Work Order was scheduled to be performed right before the Unit 2 outage. This Work Order was scheduled the day before the Unit 2 outage, okay, so that if there was, you know, say, a slip of the wrist that it was, you know, at a scheduled time when we were prepared to just go ahead and stay down and go into the outage, but it was going to be done on the way down, Unit 2. I don't remember where I heard that information, but, in the last several days in my conversations with people that are involved in this, that is my understanding that it was scheduled to be done.

Q Okay, I am not sure I understand. They wanted to wait and get Unit 2 down?

A (Mr. Moye) Well, you see, TR-1 is scheduled for this summer, or in September, and they were planning to probe the relay at that time, right before the outage.

Q Oh, I see. I see what you are saying.

A (Mr. Moye) So a trip would have had, you know, no impact on the plant except it would be an automatic trip,

but it still, it would not have been in the middle of the summer or during the Unit 1 outage or something like that.

Q Okay, you are telling us now when the opening maintenance Work Order was intended to finally be closed?

A (Mr. Moye) That's right, now they gave that Work Order to the control room before and I don't how many times it has been offered to the control room to be worked, but it has been turned away several times--I know at least once, maybe several times.

Q Is that something Ken Burr could tell us?

A (Mr. Moye) Ken might be able to tell you that. We may have to go to the work planning people to find out a little bit more about what happened, you know, as far as scheduling that Work Order. There is a schedule history that we can look at and see how many times it went active, which means it would have gone to the control room for opening.

MR. KENDALL: Okay. Do you have anymore questions along that line?

MR. WYCKOFF: No, I had one on the--what were we talking about? On the B RAT and then I am ready to go into the heavy stuff.

MR. WYCKOFF: Okay.

BY MR. WYCKOFF:

Q My only other one on the B RAT was, I think this is

right, confirm it, that when they went to mid loop right after they took the unit down, they were careful to have both auxiliary transformers in service, am I right on that?

A (Mr. Moye) I am not sure. It would have coincided with our backfeed and I don't know the schedule. I can look at it and see. If you would like me to follow up on that for you?

Q I guess the underlying question is, when you first came down out of the outage, the KE is very high and did that play a role in thinking not to take down the reserve auxiliary transformer?

A (Mr. Moye) I don't know.

Q Who would know?

A (Mr. Moye) You probably would need to talk to someone in the outage area to find out, you know, why they scheduled the outage for the RATs when they did. I am sure there is a reason for that at that time.

Q Do you know who that is?

A (Mr. Moye) Joe D'Amico, I think, is your contact there.

Q Judy?

A (Mr. Moye) Joe D'Amico.

(Spelling) D-a, let me write it down, D-A-m-i-c-o.

Q He is in Outage Planning?

A (Mr. Moye) That is right. I believe he is

identified as a contact for the outage side.

MR. WYCKOFF: Do you have questions for them on this?

MR. WEST: No. Fine.

MR. KENDALL: I have a question on, I guess, for you, Harvey, on the maintenance that was done on the reserve auxiliary transformer, did you get the name of a contact who knows about the maintenance and who could tell us about times for--well, a two-part question, do we have a contact on maintenance or do you have a good enough feeling for how long it takes and whether--

MR. WYCKOFF: They didn't rush it, they just drifted along.

MR. MOYE: Well, now, wait, the substation people, they worked through weekends, I mean they worked hard on that to get it back, okay. Now, there is a--

MR. WYCKOFF: Are you talking about before the event or after the event?

MR. MOYE: This would be before the event.

MR. WYCKOFF: But you said then it was turned over to the station and they didn't put it in service?

MR. MOYE: That's right and he was, I think Rick was asking about the maintenance activity that accrued on it, was it the normal activity to have something like this down or the activity we were doing, I guess.

MR. KENDALL: Let me--okay, I think I know what I want to ask now. I appreciate this discussion. What I would like to ask is, and if parts of this have already been answered, just let me know because I missed a little bit of this earlier, tell us what you know about the maintenance that is done on the transformer and what is involved following completion of the maintenance and to return the transformer to service?

MR. MOYE: We talked about the maintenance activities, do you feel comfortable with those?

MR. WYCKOFF: Yeah, you changed it out and probably did a double test.

MR. MOYE: Right.

MR. WEST: Before you get started, are we talking about the Unit 1 A RAT or the--

MR. MOYE: Either RAT.

MR. KENDALL: Either RAT, in general, yes.

MR. THOMPSON: The B RAT was the one that was--

MR. MOYE: The B RAT was the one that was down at the time of this.

MR. WYCKOFF: Why did they change the oil and didn't--the standard is you change the oil and check the insulation level.

MR. MOYE: Uh-huh.

BY MR. KENDALL:

Q Do you know when that was completed?

A (Mr. Moye) I am getting those times for you now. They were requested and I am getting those together for you now.

Q Okay, good.

A (Mr. Moye) I will have those after this.

Q And that will include the time between when maintenance was completed and when the--

A (Mr. Moye) When the substation department was finished and turned it back to us to re-energize.

Q And at the point when the transformer was returned to service?

A (Mr. Moye) Yes, I will give you that. There is three times when it was taken out of service, when it was-- the substation group finished with it, and when we returned it to service.

Q Can you provide us with a description of what actions are necessary to return the transformer to service, or maybe a better way to phrase it is to, and I don't know if I am using the correct terminology, but can you be a little bit clearer?

A (Mr. Moye) There is a restoration Work Order.

Q Okay.

A (Mr. Moye) And there is a clearance that probably is referenced on the Work Order that would probably describe

everything, all of the clearances that they had attached. That might be a good document for you and you could have that in your hand.

Q Okay.

A (Mr. Moye) Instead of us trying to vocalize it. We can get that document.

Q And then that will tell us what is required to put the transformer back in service once maintenance has completed it?

A (Mr. Moye) Once the substation is finished, the substation testing people have finished, it will tell you what we do afterward.

Q Okay, that sounds good.

A (Mr. Moye) What we normally do is we have an installation Work Order that installs, you know, whatever physical gaps we have to have and then the clearances are associated with the installation of the removal of whatever and then there is a restoration Work Order and that would have associated removal of clearances.

Q Okay.

A (Mr. Moye) And I will give you that.

Q The term "clearance" means that -- clearance means that a piece of equipment has been cleared to work on it?

A (Mr. Moye) Yes, a clearance--

Q Removal of the clearance means that you take that

clearance away and you can no longer work on it.

A (Mr. Moye) Okay, a maintenance person would have his name on the clearance and a clearance is a way to electrically isolate a piece of equipment and the maintenance person, once he has finished working it, would take his name off the clearance, and the only person left or the only activity left would be the operations personnel, either closing something or removing the lock and closing something back in.

Q Okay.

A (Mr. Moye) The physical activity of cutting that piece of equipment.

Q Okay.

A (Mr. Moye) And that's the clearance, and the clearance is normally an air gap.

Q Okay.

A (Mr. Moye) And it can be an open breaker or a removable disconnect or a breaker racked out, in the floor, you know, where someone could visibly see that there is no electrical connection to it.

Q Okay, one other question, Robert or Tray, whoever, it was understanding that during the procedure of restoring the B RAT that some problems were encountered with a switcher, would you discuss that a little bit?

A (Mr. Moye) That is one that we went out to look at.

There is a mechanical interlock out there.

A (Mr. Thompson) From what Steve Kochery has described that happened, there is a mechanical interlock in the switch to keep from energizing two coils at the same time basically. There was binding, it was bound, it wouldn't operate.

Steve reported to us that one of the substation personnel was familiar with the switch and basically fingered the mechanical linkage, and allowed the switch to operate.

A (Mr. Moye) Fingered the switch.

MR. WYCKOFF: What is a switcher?

MR. THOMPSON: It is basically a disconnect switch with a mechanical operator on it.

BY MR. KENDALL:

Q The switch yard people or substation people that helped fix the problem with the switcher, were they normally on site?

A (Mr. Moye) We always have someone named in the control room for the switch yard, it is a 24-hour operation and they assist the plant.

Q Were the people that did the maintenance on the transformer gone at the time of the event?

A (Mr. Moye) I believe so, you know, the people that--we have people that come in from off site, but the

people that are on site did participate in that activity because they do open switches for -- they do a lot of activities, you know, the maintenance activities that are going on in that switching room.

Q Okay, so in a hurry to restore the transformer and the problem that occurred with the switcher, there will always be someone available that can come and figure out this type of thing?

A (Mr. Moye) There is always someone out in the switch yard that you can call upon if you had a problem with the switch. Okay, and their job is those types of switches, you know, that is what they are used to seeing.

A (Mr. Thompson) That is a good description.

The document that we are looking at is 1X33AP15-3-2. It is an instruction, actually it is an Instruction Manual for this sort of switching.

The device that he fingered was down in the control mechanism.

MR. WYCKOFF: Yeah.

BY MR. KENDALL:

Q Are you aware of any problems in general with switcher operations? How would you describe this, as a one of a kind type thing or something that gave you problems in the past?

A (Mr. Thompson) I am not personally aware of any

generic problems. We have supposedly used them on the system a good bit, the substation people are familiar with that, with the operation.

A (Mr. Moye) Talking about engineering or any problems that we have.

A (Mr. Thompson) They were basically selected from the utilization inservice, the dismantling. We have two offsite sources coming into the plant site, offsite source U-1 feeds Unit 1 A RAT and Unit 2 B RAT and service provide isolation from offsite source number one for the A RAT and the other one for the B RAT.

Q Okay, so these devices are primarily intended to open the circuit signals on a day to day offering?

A (Mr. Moye) Yeah, they do trip on a low level fault.

Q And they perform low-level fault interruption?

A (Mr. Moye) Right. Low-level, right.

Q Low-level fault interruptions.

A (Mr. Thompson) And that low-level fault interruption is cleared by operation of the 230 kv.

Q Okay, so this is a device that is meant to quickly break the circuit under certain conditions, but on a condition when it has been opened for maintenance and you do a maintenance activity and it takes some time and then you want to restore it to service, the condition that the switch was being operated under the other day was abnormal in the

sense that it was a rush activity to try to close the switcher?

A (Mr. Moye) I don't know if you would call it abnormal or not.

A (Mr. Thompson) I wouldn't, I wouldn't call it abnormal. I was not here, but this reminds me, my knowledge of the kit, Southern Electric Systems patched in this equipment, we do our switching in a methodical order, a methodical process, we don't switch 230 kv haphazardly.

A (Mr. Moye) There is a remote switch where they tried to close in this breaker, I believe the switch is located in the control room, Fray?

A (Mr. Thompson) Right.

A (Mr. Moye) Is that right, and they tried to operate it from the control room, which is the normal way to close it back in and it did not operate and so they went out to the switch.

Q Okay.

A (Mr. Moye) It was not cranked in out there. Okay. It should have operated from the control room via a hand switch and the hand switch did not open.

Q So they never attempted to operate, it wouldn't open, in this event?

A (Mr. Moye) It is my understanding it was closed in. Okay, it was closed in. They closed it from the control

room, over this mechanical interact, they close it in from the control room.

Q Okay, when they attempted to close it from the control room, it didn't close.

A (Mr. Moye) It didn't close.

Q They then went down and fingered the interlock.

A (Mr. Moye) Open the box, where it was contained, saw the interlock, fingered it, closed it back, told the control room to operate it, and it worked.

Q And it worked, okay, fingering the interlock means jiggling, is it a mechanical interlock?

A (Mr. Moye) It was something in there stuck or binding and they moved it, you know, and allowed it to operate.

Q Okay, and what is this piece? Is it a mechanical--

A (Mr. Moye) Well, we went out and looked at it.

A (Mr. Thompson) It is a mechanical interlock between the opening contactor and the closing contactor. We have two contactors there.

Q So it is a mechanical linkage type thing?

A (Mr. Thompson) A mechanical linkage.

I am looking at drawing 1X3DDHB55B.

A (Mr. Moye) When we first went out there, we were looking at the contacts, we thought we had a relay problem with maybe a contact or a coil and that is when we found the

mechanical interlocks was keeping the relay from working and that was discovered by the substation people. They were assisting in closing that.

Q Okay, anything else on the RAT maintenance?

(No response.)

Okay. Let's move on to alternate methods for restoration of power to the safety buses. You discussed a little bit previously in your description of what occurred during the event, correct?

A (Mr. Thompson) Right, when we were--when I was in Birmingham, I was summonsed to what we affectionately called a war hunt, and was asked to bring my electrical drawings and I brought my electrical drawings.

A (Mr. Moye) Have you got the drawings that I sent to you last night, is that what you are looking for?

Q I don't know what I am looking for. I tell you what-

A (Mr. Moye) Yeah, that is what you are looking for.

A (Mr. Thompson) But in the discussions with my management, C. R. Myer, W. C. Ramsey and with Cliff Miller, C. C. Miller, I was asked to come up with a way of feeding power from Unit 2 to Unit 1. The indications were that the plant staff here was looking into means of feeding power from the turbine building switch gear on Unit 1 since we had back feeder status back to the class 1 buses. The scenario

that was given me was we are hanging on to one diesel now and if that diesel trips out, we have got to get power from somewhere, so the third place would have been off the turbine building switch, get it to number one when it comes to backfeed. If we had lost that, what would be the next place, and the next logical place to go look was Unit 2 and so that was my task was to go look at that.

Q So you were looking at how to get power from Unit 2 over to the safety buses on Unit 1 and people here at the site were looking at how to get power from the non-safety buses at Unit 1 to the safety buses at Unit 1?

A (Mr. Thompson) Right.

A (Mr. Moye) You also were involved in that too, right, Fray?

A (Mr. Thompson) As far as the turbine building?

A (Mr. Moye) Yeah, coming from the Unit 1 turbine building to the safety buses, weren't you working the interlocks? Were you doing that?

A (Mr. Thompson) We, indirectly what we were doing there was because you feed from Unit 2, demands were coming up from Unit 2 to Unit 1, basically went through turbine building switch gear to turbine building switch gear and then from there to the class 1E buses and so basically the same interlocking system as far as my group, to my personal knowledge, I was not looking, I was not tasked with looking

at, looking at--I was strictly from the Unit 1 turbine building through the main power transformer from Unit 1 into the turbine building and bused down through safety buses. I was tasked with that and I had not cognizantly went out and said this is my task and assigned people to go look at the protective relay and the capacitors and the interlocks and that type thing. I had not, I was not going to go do that as my task for this scenario.

Q Robert, do you know who was doing that? Was that someone else in Birmingham or somebody here?

A (Mr. Moye) Well the person in the TSC is probably who we need to talk to. Aufdenkampe.

A (Mr. Thompson) I was told it was Aufdenkampe.

A (Mr. Moye) John Aufdenkempe.

MR. WYCKOFF: Altenkampe?

MR. MOYE: Aufdenkampe. (Spelling) A-u-f-d-e-n-k-a-m-p-e.

MR. WYCKOFF: T-e-n?

MR. MOYE: A-u-f-d-e-n-k-a-m-p-e. Did I spell that twice the same way?

MR. KENDALL: I didn't write it twice the same way, I know that. Okay, so he was in the Test Support Center and he would have knowledge about the effort to get power from Unit 1?

MR. MOYE: Yes, he was directing the activities, you

know, from the TSC, and he was telling Birmingham what he wanted them to work on and he was also directing the staff in TSC as to what method of approach he wanted to take.

BY MR. KENDALL:

Q Was John your contact, Fray?

A (Mr. Thompson) My contact was C.R. Myer, who was my manager indirectly back through C. C. Miller, Myer (spelling) M-y-e-r.

Q So you talked to Miller, you talked to Myer and you talked to Aufdenkampe?

A (Mr. Thompson) We may have been on the squawk box or could, may have come over to our area and talked to him in a group in the war room.

A (Mr. Moye) I believe John was talking to Cliff Miller, okay, if you want to establish the contact that to bring it in, I believe John Aufdenkampe was talking to C. C. Miller.

A (Mr. Thompson) To my knowledge, I did not speak directly to John Aufdenkempe.

MR. KENDALL: Okay.

BY MR. WYCKOFF:

Q So what did you cook up?

A (Mr. Thompson) Basically, what we cooked up is I am looking at design calculation that was prepared by the people in Birmingham, it is calculation number 90110GP, this

was the version of what we came up with, what we looked at was a feed from -- through the Unit 2 system, okay, basically, Unit 2 was tied back through RAT 2A, into turbine building bus 2NA01, which is located in the turbine building, feeding from there into the service building.

Q Where is that on here?

MR. MOYE: It was off that drawing.

MR. WYCKOFF: It is not on here?

MR. KENDALL: No.

MR. MOYE: Have you got Unit 1 or Unit 2?

MR. THOMPSON: Well, it doesn't matter.

MR. KENDALL: Here is the service building, right here.

MR. THOMPSON: Let's see, here is the service building. Okay, this one goes into--

MR. MOYE: To NA area 2.

MR. THOMPSON: Yes, it comes in here, okay, here (indicating) in this bus and then from here, there is another feed into here (indicating) which goes into Unit 2. Okay?

MR. WYCKOFF: Well, get the drawing.

MR. THOMPSON: This is Unit 1, let's get the Unit 2.

MR. MOYE: This green line is going to go up to a bus just like this on Unit 2.

MR. WYCKOFF: I realize on this one. Where is it

going to go now?

MR. THOMPSON: Okay, the scheme here was that we would come back through, we would open up this breaker, we would close in this breaker here (indicating) which would allow us to power either to this bus (indicating) or we would bring the power into this bus (indicating). Okay?

Of course, we would remove--take this breaker out of service and we would come up here and assure that we had this transformer basically isolated on the high side and then come here (indicating) and isolate here (indicating) and we would also -- I would have to refresh my memory, whether we were going to remove the grounds or not here (indicating), but if I am not mistaken, we were going to drop the grounds on the--

BY MR. WYCKOFF:

Q I have a big question, my first big question. That is a 60 MVA transformer, did you convince yourself that this would handle the charging current in that transformer?

A (Mr. Thompson) We--I am not sure, I would have to go back through those calculations and see what we did. We looked at the differential relaying and I am not sure the charging current, if we ever looked at the charging current.

Q And the reason I ask that, I ask you the question, there is a way to get from the -- there is just as easy a way to get from the Unit 1A unit auxiliary transformers down

to the safety bus if you can handle the charging current, so that would have been an effortless route you had to defeat in interlock, which is no big deal, and so I thought the reason they didn't just go ahead and defeat the interlock was because they felt they couldn't--here, I can show you the route and I think you come from here (indicating), down to here (indicating), across to there (indicating), there, and there, and the only bad thing about it is where you have got an interlock to defeat, but you have to energize that transformer, so if you can do what you were going to do, you can do this.

Tell me where I am wrong. I am not trying to be a smart aleck.

A (Mr. Thompson) Okay, granted we were backfit from here (indicating).

Q Right.

A (Mr. Thompson) Okay, and come down through here.

Q Right.

A (Mr. Thompson) And in through here (indicating) and here, through here.

Q Uh-huh.

A (Mr. Thompson) And then there (indicating), this is what I was told Mr. Aufdenkampe was planning.

A (Mr. Moye) This is when we talked to John, because actually another route was going before.

A (Mr. Thompson) That was the primary source. What the scenario I had was is we would lose -- the B diesel would go away, we would lose this transformer and this went away, and we didn't have the backfeed, and we didn't have this RAT available (indicating), or this RAT available.

Now, you don't have backfeed capability, you don't have this RAT or this RAT, or this diesel or this diesel.

Q Yes, your assumption is arbitrary. It is fine, but if you lost this, you are probably going to lose it on the other unit too, because they both come off at the same approximate rate and so--

A (Mr. Thompson) Right, in that configuration, we are basically, on two units, we are then left with one RAT available, one RAT and two diesels.

Q What is involved in removing the interlock?

A (Mr. Thompson) Which interlock?

Q Here (indicating).

A (Mr. Moye) This would keep us from closing two breakers in.

Q The one from here (indicating) and the one from there. These are interlocks. That is the interlocks that has to be broken. What, I presume you just pull a relay out,, don't you?

A (Mr. Thompson) Basically, you have to remove the interlock from the trip and closed circuits to be sure that

you don't kick each other back. The scheme is actually you would never close these two breakers at the same time.

Q But physically, is that much work?

A (Mr. Thompson) It is some work.

Q What do you physically do?

A (Mr. Moye) We would add some jumpers to bypass the contact to kick this one out, the closed circuit, and then we would open up the contact that would kick the other one out.

Q A couple of minutes job?

A (Mr. Thompson) No, I wouldn't say it was a couple of minutes job. It is probably an hour's job to find the drawings and put all of that together.

Q That can be done, and so the big unknown in all of this, and you didn't do it either, is could you handle the charging current, or are you going to do something over here and kick out the breaker, just trying to pick it up or hold it?

A (Mr. Thompson) Yeah, there is probably some charging--yeah, there is charging current in there.

Q Oh, wow, 60 megawatts, big stuff, and there is a little ol' relay setting along the way here. I don't reverse our relays on these breakers?

A (Mr. Thompson) No. There is bus differential or transformer differential, this transformer (indicating) to

wrap to here and wrap down to the buses.

Q I presume the differential, the charging current would be differential, but I presume that is not enough to pick it up, that wouldn't have done anything.

Well, now, I have another question. These differentials here (indicating), do they also go down and take out that breaker, or are they only open on the high side on the belief there is no backfeed?

A (Mr. Thompson) No, they take out this breaker here, yes.

Q These differentials reach down?

A (Mr. Thompson) Yes. Let me see.

(Brief pause.)

This is a similar drawing on Unit 2. I don't have the Unit 1 drawing.

(Brief pause.)

MR. KENDALL: The reason you are trying to--

MR. THOMPSON: I was going to show that there is -- that does take out the feeder breaker.

MR. KENDALL: Yeah, I think, do we need to go through the drawing to show that, Fray? I think we ought to continue on with our interview, unless you need--

MR. WYCKOFF: I guess you are right.

MR. THOMPSON: I was going to pull these drawings and look at this, but here is the differential relay here

(indicating) 487 RA and the one set of currents that come into it is from the high side of the transformer, the other side, the other inputs to the relay are from the 13-8 bus, the 4 kv bus, 4 kv bus, the 4 kv bus and the 4 kv bus.

MR. WYCKOFF: Okay, off the bushing currents, okay.

MR. THOMPSON: Yes, the differential would wrap.

BY MR. WYCKOFF:

Q So, the conclusion of this, at least as I see it, is that these are schemes in about one hour you might have, perhaps could have bypassed the interlocks, but we still don't know about the charging current. You didn't--

A (Mr. Thompson) I don't believe we looked at the charging current.

MR. KENDALL: You would have had to have developed a procedure that discussed where to install jumpers and where to lift these to peak your interlocks, you would have had to back stack the plant and they would have used it to peak the interlocks?

MR. THOMPSON: Yes, sir.

BY MR. KENDALL:

Q Now, the interlocks we are talking about here are ones to get power from the Unit 1 non-safety buses, to the Unit 1 safety buses, which you were not directly involved in, are the interlocks on the breakers and in the service building very similar in terms of defeating the interlocks

and procedures?

A (Mr. Thompson) Yes.

Q Okay, and you come over from Unit 2 via the Service Building bus, are the only interlocks that have to be defeated the interlocks on the feeder breakers to the Service Building bus, or are there other interlocks that must be defeated also? Do you recall?

A (Mr. Thompson) Let's see. I don't recall. I don't have those notes with me here, but I believe that those are the only points in the switch gear, because this would come through here, in the Service Building bus, would come through here, this would be open, we would wrap this breaker out, we would close this into here, administratively we would move this breaker to here.

Q Okay. This may be an unfair question since you had one specific task you were looking at. They have some combustion turbines not far from this site here, would running a cable from that location to the plant be a feasible alternative?

A (Mr. Thompson) We have looked at that in conjunction with a station black out, as sort of an option in a station black out, it is feasible to run something from Wilson over here, I mean Plant Wilson over here.

Q Plant Wilson is the combustion turbine location?

A (Mr. Thompson) Yes.

BY MR. WYCKOFF:

Q Has that been--I know that was done during construction, I believe?

A (Mr. Moye) There is a loop around the plant that was a construction loop that comes out of Wilson and it is still up. It is still around the plant.

BY MR. WEST:

Q Has that been done since the construction period? I was just curious.

A (Mr. Moye) Has what been done?

Q Running power over from the Wilson Plant, over to this plant.

A (Mr. Moye) The same wire has always, it is still there.

A (Mr. Thompson) The output of Wilson is tied into the grid here, into the substation and that is one of the sources of power that feeds offsite source 1 and offsite source 2. As far as the construction loop, in Birmingham, we did not chase the construction loop.

BY MR. WYCKOFF:

Q Where does Wilson come in here?

A (Mr. Thompson) Wilson ties--

A (Mr. Moye) It is out, it is up here (indicating).

Q A pretty good, high voltage.

A (Mr. Thompson) Yes. Here is offsite source number

one, here is Plant Wilson. I am looking at drawing AX3DAAL50A, here is the tie to Plant Wilson here. Here is offsite source number one.

BY MR. KENDALL:

Q We have heard some discussion that perhaps power could be brought into a safety box on Unit 1 from Wilson combustion turbines. That is the way it was phrased. Would that mean taking the cable to some point out here or to go up the hill to Wilson Station?

A (Mr. Thompson) The closest way of doing it, the closest point would be to come out here, but it is tapped down to 230, or to run the cable on the ground.

Q Is either one of those, or are both of those methods or either one of those methods physically feasible?

A (Mr. Thompson) Within what time constraint?

Within 8 hours, I would say no.

Q So you don't believe any one of those can be available in 8 hours?

A (Mr. Thompson) I would say that that would--

Q That would be pushing it?

A (Mr. Thompson) I would say that, yes.

Q We are somewhat interested in the situation where the generator disconnect links might not have been removed. In this case, they were removed. If they had not been removed, then there would have been no power to the Unit 1

non-safety buses so that the option of cross connecting with safety bus or non-safety bus would not have existed.

A (Mr. Thompson) Other than going to some extraordinary means such as going back through the service building.

Q Okay, over to Unit 2.

A (Mr. Thompson) Yes.

Q Okay. If the situation had occurred earlier while you were not backfeeding, how long would it take to remove the disconnect links?

A (Mr. Moye) I think they could remove those in a shift pretty easily.

Q That would be 8 hours, so you think they could do it in 8 hours?

A (Mr. Moye) Uh-huh.

Q Could you discuss a little bit what is involved in doing that?

A (Mr. Moye) It is my understanding there is a shroud there, we have three phases and the shrouds are in them. The shroud is located around the connection. Of course, that is a forced air connection--I mean a forced air shroud and we are going into the shroud to get to the connections, the voltage connections there, and I am not sure how many voltage connections are in that, in that jumper that goes between the generator and the bus, okay, but, of course, it

is a concentric, there is enough connections to make that whole concentric loop there in the whole three phases and as far as the bolting operation, I am not sure how many bolts would have to be removed there.

MR. WYCKOFF: Most people it takes about eight hours.

MR. MOYE: I think 8 hours is what we need.

MR. THOMPSON: I could talk with Steve Kochery and see -- of course, you have got some scaffolding.

MR. KENDALL: Yes, you have to put up some scaffold in order to reach the point at which you would be physically able to unbolt--

MR. MOYE: Basically I am going on the fact that the scaffolding is there and the clearance is installed-- talking about the physical.

MR. KENDALL: Yes, the physical activity. If the clearance is not installed and the scaffold is not there, then we are adding how much time?

MR. MOYE: It would take several days.

MR. KENDALL: It would take several days?

MR. THOMPSON: There is also some temporary relay that has to be put in to have a grounding source to that, and also to load down the potential transformers.

MR. WYCKOFF: Oh, you do add grounding?

MP. THOMPSON: Ground relays, yes.

MR. WYCKOFF: Because the ground is over on the generator.

MR. THOMPSON: Yes, the ground is on the generator.

MR. KENDALL: Because when you remove the links, you isolate the grounding and so you have to install a ground relay.

BY MR. KENDALL:

Q The impression that we have is cross tieing between the safety buses and non-safety buses at Plant Vogtle is something that is not easy to do and it is not a normal means of operation.

A (Mr. Thompson) That is absolutely true.

Q And it was intentionally meant to not have the cross ties between non-safety and safety buses, is that true?

MR. WYCKOFF: Are you aware that many plants do have?

Many plants, the safety bus can either be on the unit's only transformer or the start-up transformer.

MR. KENDALL: I am not saying it is good or bad. I am just trying to understand the design.

MR. THOMPSON: I am aware that there are varying commitments of establishing station service utilization throughout the Southern Electric System. We do have stations where you see a varied myriad of doing that. The philosophy of the Vogtle project is--

MR. WYCKOFF: Can you tell us why this philosophy? That is leading to the question I was leading up to. It is not a tricky question. You will see whether it is or not, but maybe, first, I would ask you why did they do it this way?

MR. THOMPSON: Vogtle was under design for approximately 16 years. A lot of those decisions are captured in the files and I have not read all of the files or interviewed all of the people that you have talked with about it.

MR. WYCKOFF: So you don't know why it is the way it is?

MR. THOMPSON: I know that it meets our design criteria, the basis of our design criteria, how we came up with this particular configuration, that is something else, but it is like another plant.

MR. WYCKOFF: Yeah, the fun question was--

MR. MOYE: Maybe the model plant, you know--

MR. WYCKOFF: I could tell you what the fun question was, but I don't think it is going to mean anything to you. But the fun question was going to be, did the NRC have a lot to do in influencing you to go to this kind of arrangement versus one with an inter-tie, and you are not going to know. In the licensing, when they were having design review, you don't know?

MR. THOMPSON: I would not think so. This was done on prudent design practice and the standard practices that affect the corporation of Southern Company.

MR. WYCKOFF: I have nothing further. I was going to ask about your fossil plants, but it is a meaningless question.

MR. THOMPSON: The fossil plants basically have starter potential, we have got generators, we do not have--we basically do some cross tieing.

MR. WYCKOFF: You do cross tie them. You can go either way.

MR. THOMPSON: Basically, yes. A lot of generator stations. A lot of fossil plants have generator breakers. Can basically establish backfeed with a flip of a switch.

MR. KENDALL: I want to get back to the disconnect links. I guess it goes without--well, I want to ask a question concerning motorized disconnect links. Let's not grapple with this either.

MR. THOMPSON: Motorized disconnect links with this size of equipment we are talking about, we are talking about in the range of 30,000 amp range motorized disconnect, it is largely based on stripped down reliability.

It is the same question with generator breakers, smaller units, that was our standard practice, we put generator breakers, and basically I have got access to all

site confirmation through the step up vein and of course with the prudency and standard practices, the equipment was available in the market place to do that. In today's market, generator breaker isolation which generally is something especially designed units, but--

MR. WYCKOFF: Fairly huge now.

MR. KENDALL: And there is reliability and availability.

MR. THOMPSON: Our general policy is we do not desire to buy a series number one even. It is proven in the industry and by Southern's track record it has to be especially designed , so we put it in our products, we sell electricity.

MR. KENDALL: To put in Susie's toaster?

MR. THOMPSON: Yes. It is tremendously time consuming and requires a lot of consideration.

BY MR. KENDALL:

Q With the disconnect links removed, then the only two sources of power are the two reserve auxiliary transformers to the plant, to a given unit, assuming no cross connects the other unit?

A (Mr. Moye) Assuming that feed right there?

A (Mr. Thompson) Could you ask your question again?

Q Oh, okay, assuming the disconnect links were not removed and therefore you were not backfeeding, then the

only sources of power from offsite to a unit is--

A (Mr. Thompson) Is two RATs.

A (Mr. Moye) Is two RATS and two diesels.

Q Okay and when you are in modes 5 and 6, you are allowed to supply both safety bus from a single RAT which is not the normal configuration.

A (Mr. Moye) Right, the tech specs basically allows us to operate with one RAT, and one diesel, one train--

Q And that allows you to take one RAT out of service to perform maintenance.

A (Mr. Thompson) It also allows you to take the diesel out of service, take one bus and switch gear out of maintenance too, and clean the bus.

Q You can essentially take an entire train then of equipment out of service to do maintenance.

A (Mr. Thompson) You must from time to time though maintain this equipment. That is your electrical distribution system. You have got to take that out of service. You are mandated some remote operations to take one train out of service.

A (Mr. Moye) We have got numerous bulletins, you know, that tell us that loose connections, you know, because of high resistance, and cleaning, the tool manufacturer, you know, they are pretty much making us take this equipment down from a reliability standpoint and also from the events

in the industries, we have those connections over time, where we have to go and retorque them, clean the buses, and check all the components that we have bulletins on.

MR. WEST: Did you just--I am sorry--did you just say that you could take one diesel out of service, you could take one RAT out of service and you can take one safety bus out of service simultaneously?

MR. KENDALL: As long as they are all in the same train.

I assume that all of this maintenance that had to be done, that out of these maintenances, that maintenance on reserve auxiliary transformers probably the one that's longest and in terms of having only one offsite power source available?

MR. MOYE: Actually the maintenance on the diesel is longer than the maintenance on the RAT. I think our diesel was down longer than the RAT was out, but that was the question, right, Rick?

MR. KENDALL: Yeah.

MR. MOYE: Which source was available more?

MR. KENDALL: Yeah, what I am trying to understand is the vulnerability of the system to take any equipment out of service and then the lengths of time that this is vulnerable and I realize those vulnerabilities of necessity is given the maintenance statute to insure the system

operates as it should during times of plant operation.

Do maintenance on the RAT last for four or five days?

MR. MOYE: Probably, and you will have that time before you leave.

MR. KENDALL: Okay.

MR. MOYE: And the diesel maintenance, we can get that from Kenny, okay, and on a switch gear when it is down for cleaning, it is only down about a shift or less, 8 hours.

MR. WYCKOFF: The RAT, how many days?

MR. MOYE: Four or five days. I will give that to you today. I can freely publish that. I can get it to you this afternoon.

MR. KENDALL: Okay.

I understand there was a tech spec change to allow both safety buses to be fed upon a RAT simultaneously in those five to six--

MR. MOYE: The FSAR.

MR. KENDALL: --FSAR changes.

MR. MOYE: Yes, the tech spec says you can have one train down in those five or six and then fueling, but FSAR describes disconnection where you have two buses connected to one off-site source.

MR. KENDALL: Harvey, do you want to get into human

factors or questions regarding vulnerabilities of source?

MR. WYCKOFF: Yeah, the RAT itself, the Unit 1A RAT, is that typical in terms of its design to RATs that you find in other plants?

Specifically what I am speaking of, you have the concrete part at the base, you have the metal clock shaped hole that goes up and then stretching across that, you have the bus bar and you have the, I believe, a wire, is that--

MR. THOMPSON: That is fairly typical design structure.

MR. WYCKOFF: I was curious, is there anything else that may be typical out there of a design type that might lend itself to not being so problematic if in fact something does come in contact with it, for example, a truck?

MR. THOMPSON: There are structure after structure in the switch yard and as far as I know, the truck--taking it to be sure it is not outside the design, it is not tornado proof. We are basically designed in accordance with the National Electric Safety Code.

It is a Georgia Power Company standard switch, it is a 100-year switch. After Vogtle is decommissioned, it is out intention that it will still be a switching substation that will be in operation.

BY MR. WEST:

Q Since we are on this subject of what could occur in the switch yard, could you comment on the implications of the truck backing into the pole that has this 230 kv lead wire and the potential there of the various flammables that are on the truck?

A (Mr. Thompson) Okay, I participated in the review process last Saturday. I did not do a complete review of the whole final product and like I said, I am not cognizant of everything that was done in the process. Basically my involvement was we needed to get our fire safety engineer and our nuclear safety engineer to work together to actually look at the combustibles and monitor them and basically make an equivocation of that back to tons of TNT and then the damage that it would be and the range of influence that would be affected by the equivalent to TNT. If I am not mistaken, this was the type we looked at realistic scenarios like 9 gallons of gasoline and a big volume when there is an explosion and we equivocated that out to about 135 mills of TNT which gave us a radius of influence of about 130, if I am not mistaken, somewhere in that ball park.

We based our assumptions on that an explosion would basically create shock waves and missiles and would damage insulators in that area and that would result in a likely ground fault to alter insulation and based upon that, where

the accident occurred, that 133 foot radius, we would only take out off-site sources, we would probably take out the backfeed, the generator, and the worst case location is on the west side of the trench that is located--well, it is in the center line of the two units, were the truck in that location, we would have explosion, we would have potential for fault, all facets, which is the same explosion we had with the tornado, or an earthquake.

MR. WYCKOFF: Do you shut down in advance of a tornado? I am talking to the site.

MR. MOYE: There is a procedure for that.

BY MR. WEST:

Q You mentioned that the RAT itself is typical of design in perhaps other plants, what about the finding that you have a vehicle with flammables on it that is in a switch yard, is that typical?

A (Mr. Thompson) I was speaking out of my area of knowledge, but I am cognizant I think and I would say we have some switches over the Southern Electric System where we have construction activities that go on and I am sure that those activities require diesel or gasoline driven air compressors and welders and I would think you would have trucks going in and out here that do carry combustibles.

Q And I believe what you are also saying in passing, and may have said it clearly that even the welders

themselves would in fact be in switch yards.

A (Mr. Thompson) I would venture to say, yes, that would probably be the practice. Again, this is not my direct area of expertise.

MR. WEST: Thank you.

MR. KENDALL: I have got a question I would like to ask. If you were in a refueling outage and you had one of the RATS out of service for maintenance and so the plant was clearly more vulnerable with respect to losses of power because you only have a single line from outside, assuming again that you are not backfeeding, do the activities that occur during the refueling outage, those additional activities, not just the trucks in the switch yard and welding going on, but there is, I assume, a lot of things going on inside, probably heavy pieces of equipment and cranes moving stuff around and fork lifts running through the plant and what not, is the potential therefore for losses of faults, losses, blackouts of power, significantly higher during this mode in which you are more vulnerable to loss of power?

MR. THOMPSON: From what I know of Vogtle's specific procedures and methodologies, I believe it is the intent in the procedures and the methodology and the controllers working here that those risks are minimized. You have got a refueling outage, you have got more people on site, you

have more activity and you are inherently going to have more of an opportunity to have an incident, to have some problems.

MR. KENDALL: It seems like you have more opportunities during that time than you do during power operating when you have multiple sources available.

MR. MOYE: One thing they do in the training process is they involve operations real early in the planning process and I think that is, I guess, maybe an answer to, you know, the operations people, you know, those with license and those who are dealing with the plant people may not have a license, are involved in the planning process.

MR. WYCKOFF: You always take the, I think in every refueling, do you take the links out so you have the unit auxiliary transfer available?

MR. MOYE: We have done it in the last two outages.

MR. WYCKOFF: But there was one where you didn't?

MR. MOYE: We have only had two outages.

MR. KENDALL: I want to ask a question that I think we have already answered, but I want to make sure.

Getting back again since you were involved in getting power to Unit 2 or means for getting power to Unit 2 over to the Unit 1 safety bus from the time at which you were asked to look into this and to go through your review process of what you have to do to remove interlocks and what

you have to do as far as voltage shock calculations, loads you have to strip and what you have to do in preparing the procedure and FAXing it up here to the plant, and then have the plant actually physically do it, what do you think would be a reasonable time that that could be--the whole process could be accomplished in?

If they lost power at, I forget the time, 9:20, or whatever it was, could three hours after that power have been restored from Unit 2?

MR. THOMPSON: I have not sat down and gone through everything that would key in to that time frame. The methodology for doing that would be brainstorming everything that had to be done basically, group those into groups of activities, put those in as they fall with logic, and come up with a logic, with a manpower budget, and durations with that to come out with the end product. The situation we were in was what is it going to take to do this and go find the answer, okay, and I did not sit down and do planning, I did not sit down--I gather my team together and to the best of my knowledge, these were professional engineers and I assigned work to this group and to this group and this group and we go look at the basic concerns.

Are we going to have enough capacity in case of an outage of Unit 1? Are we going to have sufficient voltage, the minimum points to start the motors, to run the motors?

Is there anything dealing with relays that is going to take us out? What are the interlocks, and that is the questioning process that I went through.

MR. KENDALL: And you basically got the answers to all of that, did you not?

MR. THOMPSON: We were getting the answers when the alert was called and basically told to log off this and we could continue at a later date.

MR. KENDALL: About how long after you had started were you called off?

MR. THOMPSON: It was late afternoon.

MR. KENDALL: So you had been working on this for several hours then?

MR. THOMPSON: Yes.

MR. KENDALL: And to get the information back up here to the site and have them inspect it would have been some more time?

MR. THOMPSON: Yes, mobilize and transfer that knowledge, that information from the designing organization to the station engineers into the work planning process, mobilize the electricians, physically go and do the interlocks, give the switching orders, yes, that is time consuming. Procedurally, you know, every procedure is met along the line, every "i" dotted and every "t" crossed.

MR. KENDALL: If things got critical and you didn't

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MR. KENDALL: If things got critical and you didn't

dot "i's" and cross "t's", it probably could have been done sooner, is that a fair statement?

MR. THOMPSON: I would say yes.

MR. KENDALL: But at a somewhat greater uncomfort factor?

MR. THOMPSON: Yes, yes.

MR. MOYE: And, you know, in an emergency situation, the work planning process that normally occurs prior to an activity occurring is done after the fact. We have emergency procedures, they will obviously go out and do work under upper management direction and document that work later after the fact.

MR. KENDALL: Under any--if [illegible]ded to an emergency situation, I suspect, well [illegible] know what the process is, is all of that kind of stuff waived?

MR. MOYE: I don't know, but that is a management decision I guess they would have to make.

MR. THOMPSON: In my group, we have to come up with the answers.

MR. KENDALL: I understand. One last thought. If this had occurred in the evening or sometime when the Birmingham office had gone home and you were eating dinner, I assume that that would have added another--

MR. THOMPSON: You would have added some time but we do have an emergency call-out system, the supervisors and

managers carry beepers. They are virtually on call 24 hours a day and we have a call out list and mobilize people to come into the office and it would have been, particularly on a weekend, there would have been an effort to get everybody together, or particularly in the middle of the night, or something like that. We do not necessarily have all of our engineering team stay in town every weekend, that is physically remain, but we do also have our comrades with the electrical, we do communicate with that organization, they have access to basically the same information that we do and work as a team to solve problems and utilize power.

Like I said, we mobilized our people to go and attack this problem, but what if it is a scenario where you have a Christmas weekend, a New Year's weekend, people are gone and there could be a problem with calling people out.

MR. KENDALL: Sure.

MR. THOMPSON: But we do have management services, we do have beepers, telephone numbers, managers on call. We have a communications network set up for events like this.

So far as I know, I have not been involved where we have actually gone in where they were in mode 5 or 6 and had a 4 PB switch gear bus out, you know, the train bus out, and a situation where a truck hit the line.

MR. WEST: We started the interview with at least two questions and I recognize we have covered a lot of

ground, but one question was what tripped Unit 2 and the second question was could you supply power to Unit 1 from Unit 2, could you briefly summarize what the bottom line answers were on those two questions?

MR. THOMPSON: The bottom line answers are--give me the question again.

MR. WEST: Our question one was, what tripped Unit 2 and the second question was, could you supply power to Unit 1 from Unit 2?

MR. THOMPSON: What tripped Unit 2 was the operation of a main differential relay, relay number 587 Unit 1. I have a sequence of events here through the switch yard that gives the detail operation of individual relays that operate in the basic sequence of events for the incident, for the off-site source number one clearing, the Unit 2 clearing faults as far as feeding power from Unit 2 to Unit 1, up until the question of charges came up, we were comfortable that we could have had ample capacity to feed our, to 1 RHR pump, 2 NSCW pumps, 1 CCW pump and 100 kw, or 100 kva worth of miscellaneous load from Unit 2 to Unit 1 safety related buses through to the service. The question on the charges, as far as I know, we are not going to look at that, but that is what we did as far as the short view to the end.

That answer is not the format that it needs to be transmitted to the clients but it is in our file waiting on

a formal request to process and I understand that is coming.

MR. KENDALL: Is there any other questions?

(No response.)

I guess that ought to do it. Thank you very much. We really appreciate it.

REPORTER'S CERTIFICATE

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the interview in the above-entitled matter before the NUCLEAR REGULATORY COMMISSION.

Rose Arnold, CVR, GCCR No. A-8
Official Reporter