STATE OF MISSOURI

PUBLIC SERVICE COMMISSION

TRANSCRIPT OF PROCEEDINGS

Hearing

July 24, 2007

Jefferson City, Missouri

Volume 1

In the Matter of an Investigation into an Incident in December 2005 at the Taum Sauk Pumped Storage Project Owned and Operated by the Union Electric Company, doing business as AmerenUE	))))))	Case No. ES-2007-0474

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JEFF DAVIS, Chairman,
CONNIE MURRAY,
STEVE GAW,
ROBERT M. CLAYTON III,
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P R O C E E D I N G S

JUDGE DALE: We are here today, July 24, 2007, in the matter of an investigation into an incident in December 2005 at the Taum Sauk Pump Storage Project, owned and operated by Union Electric Company, d/b/a AmerenUE, Case No. ES 2007-0474.

I would like to make a few preliminary remarks about the nature this case. This is an investigative docket, and it is not a contested case. The ex parte rule and other provisions don't apply that would apply to a normal contested case. Any action that must be taken, must be taken in a separate complaint case filed by Staff or another interested party.

Due to the limited opportunity for cross, any testimony here today that will be used in the complaints proceedings shall be offered subject to objections by other parties. In addition, no grant of immunity under Chapter 386, specifically Section 470, is given today; therefore, anyone who has any constitutional rights to invoke should do so.

At this time, I will take entries of appearance.

MR. THOMPSON: Kevin Thompson for the Staff of the Public Service Commission, Post Office Box 360, Jefferson City, Missouri 65102.

MS. BAKER: Christina Baker, Assistant

Public Counsel, Post Office Box 2230, Jefferson City, Missouri 65102, appearing on behalf of the Office of Public Counsel and the rate payers.

MR. BYRNE: Tom Byrne, 1901 Chouteau Avenue, St. Louis, Missouri 63103, appearing on behalf of AmerenUE.

MR. HAAR: Robert Haar, 1010 Market Street, St. Louis, Missouri 63101 appearing on behalf of AmerenUE.

MS. HOUSE: Rebecca House, of Foley and Lardner, 777 East Wisconsin Avenue, Milwaukee, Wisconsin 53211, on behalf of AmerenUE.

MS. PAKE: Lisa Pake, 1010 Market Street, St. Louis, Missouri 63101, on behalf of AmerenUE.

MS. VALENTINE: I'm Kara Valentine, Post Office Box 176, Jefferson City, Missouri 65102. I'm here on behalf of the Missouri Department of Natural Resources.

JUDGE DALE: Thank you.

Are there any preliminary matters?

MR. THOMPSON: None that I am aware of, Your Honor.

Well, we would, I think, like to invoke the rule against witnesses.

JUDGE DALE: Do you wish to make any other

argument other than that request?

MR. THOMPSON: That's simply the request that I would like to make.

JUDGE DALE: Unable to rule on that myself, I will poll the Commissioners.

MR. HAAR: Your Honor, may we briefly respond?

JUDGE DALE: Yes.

MR. HAAR: Robert Haar on behalf of AmerenUE. We would object on the grounds that it's unnecessary, also, it's fairly unusual for Commission proceedings. We're dealing here with people who have been interviewed a half dozen times, many of their interviews are part of the public record. So the kind of concerns that would motivate the rule under false circumstance, we think, are not present here.

Moreover, if the Commission decides to invoke the rule, we would like to have the right, as we would normally in a Circuit Court case, to have one corporate representative present.

JUDGE DALE: The rule excluding witnesses will be invoked. However, the corporate representative will be designated.

MR. HAAR: Mr. Mark Birk.

JUDGE DALE: Were any of those people

present in the courtroom?

MR. HAAR: Yes, they are, Your Honor.

So, those witnesses who have been subpoenaed, in respect to AmerenUE, need to step out, with the exception of Mr. Birk.

JUDGE DALE: Counsel, did you want to make opening statements?

MR. THOMPSON: We'd be happy to, Your Honor.

May it please the Commission. I don't plan to take up much of your time this afternoon listening to me, you have a lot of other people here you would rather listen to.

I will state, simply, that it is all together right and proper that this Commission should, at this time, take up this investigation of the events, that occurred at the Taum Sauk generating facility in December of 2005, for the purpose of understanding those events, and how it is that they were permitted to occur, and to understand what lessons must be drawn with respect to Ameren's operation of its other generating facilities in this state.

The Missouri Supreme Court said, many years ago, that, "This Commission has plenary authority to coerce a public utility into a safe and adequate operation."

That is the focus of this proceeding; a safe and an adequate operation. I think you will agree with me that what happened at Taum Sauk was neither safe nor adequate. I understand, and I know you do as well, that no utility company wants that sort of event to occur. Nonetheless, it did occur. It occurred despite the fact that many very well educated and very experienced professionals, in engineering and other disciplines, were involved in operating and safeguarding that plant.

This Commission has an obligation to the people of the State of Missouri to understand how it was allowed to occur and to understand what lessons must be drawn from that occurrence and applied elsewhere throughout the Ameren system. Thank you.

JUDGE DALE: Before we move on, I want to make an announcement that I was supposed to make earlier, that everyone who has a wireless device is to turn it off. Merely muting it will not suffice. Blackberries, particularly, will cause our recording system to go out.

MS. BAKER: May it please the Commission. The Office of Public Counsel argues on behalf of the rate payers to ensure safe and adequate services provided by their public utilities. Customers demand

and deserve utility service which is reliable, safe and reasonably priced.

Customers have concerns regarding Ameren putting profits before safety. Rate payers also have concerns of Ameren policies of operating to failure and reacting only in crisis mode.

So therefore, Public Counsel is pleased that this Commission is looking into the Ameren Taum Sauk event. On behalf of the rate payers, thank you.

JUDGE DALE: If you want to wait until last, I will let you -- if there are other people who want to make statements?

MR. HAAR: That's fine, Judge.

MS. VALENTINE: Commission Members, my name is Karen Valentine, and I am here today on behalf of the Missouri Department of Natural Resources.

Just very briefly, I understand the Commission wants to here from one of our witnesses, Jim Alexander. Jim is our Chief Inspector for the Dam and Reservoir Safety Program. He's here today with a presentation, a bunch of photographs that he's taken of the dam.

So, we'll make him available. And our role, I believe, is to just answer any questions that you might have. Thank you.

JUDGE DALE: Thank you very much.

Now we're ready for Ameren.

MR. HAAR: Thank you, Judge.

Judge Dale, may it please the Commission. My name is Robert Haar, and I'm here today to represent AmerenUE in conjunction with my colleagues; Tom Byrne, who I know the Commission is very well acquainted with; Rebecca House, who is with the Foley Lardner Firm which was involved in representing AmerenUE in the FERC investigation; and my law partner, Lisa Pake.

I don't normally practice in front of the Public Service Commission. I'm here today because I represent AmerenUE in the suit that was filed by the State Attorney General in Reynolds County, Missouri. And I, in conjunction with my partner; Lisa Pake, represented AmerenUE during the Missouri State Highway Patrol investigation, which I understand is one aspect of what the Commission is looking at here.

The December 14, 2005 breach of the Upper Reservoir of the Taum Sauk Plant is now, certainly, one of the most investigated incidents in Missouri history. And it is an event that Ameren has heatedly expressed regret for and expresses regret today.

By our count, this would be the sixth investigation of the circumstances of the breach

including investigations by the Federal Emergency Regulatory Commission and the Missouri State Highway Patrol.

AmerenUE has fully cooperated with all of the investigations. It has produced tens of thousands of pages of documents and made all of its employees available for interviews and testimony under oath. And I will say that those investigations have been thorough, they have been professional, and they have been fair. The investigation conducted by the Highway Patrol was in the finest tradition of that organization.

I would submit that those investigations answered all the important questions. The investigators uniformly found that the breach on December 14, 2005 was not the product of intentional or reckless misconduct, but the result of actions that were taken in good faith by AmerenUE and its employees with the belief that they were fully consistent with the safe operation of the plant.

The investigations have indicated and shown that mistakes were made. And the Senior Management at AmerenUE has repeatedly taken responsibility for those mistakes, and they do so again today.

Moreover, AmerenUE has taken responsibility for

the effects of the breach in even more tangible ways. To date, it has spent approximately $40 million for the restoration of Johnson's Shut-ins without the benefit of any settlement with the State. It continues to pay taxes to support the schools, even though the plant is not operational and not producing revenue. It has spent $5 million with respect to community projects in the affected area as part of the $15 million settlement it entered into with FERC. It has entered into a settlement with the Toops family, and it has taken the lessons of Taum Sauk and changed those operational procedures that were at fault in an effort to increase the safety of all of its operations.

And as this Commission is aware, the rate payers have not born any of the expense associated with the failure of the reservoir. All the restoration costs, the FERC penalty, the settlements, were removed from Ameren's cost of service in the recent rate case. And in addition, for purposes of the rate case, AmerenUE modeled its operations so that -- as if the Taum Sauk Plant were operating, to give the customers the financial benefit of the plant even though it's out of service.

In light of all the investigations that have been

conducted, in light of the fact that it's now some 19 months after the breach, we frankly do have questions as to why we're conducting -- or this Commission is conducting -- this hearing today.

We have read the Kansas City Star article, and the very disturbing e-mail traffic, indicating an attempt at the highest level of State Government to coerce a law enforcement agency for no reason other than political advantage, and most important to us, at the expense of AmerenUE and its employees. And we've taken note that this e-mail traffic in June occurred during the same time frame that the Commission and its Staff, for the first time, indicated a desire to investigate the reservoir breach, even though it has previously indicated that the breach was outside its jurisdiction. And we submit and maintain that the breach is outside Commission's jurisdiction.

I would be less than candid with you if I did not acknowledge our concern that Members of the Commission, or its Staff, may have been subjected to the same pressure as the Highway Patrol, and that as a result of that pressure, we are here today.

MR. THOMPSON: I'm going to object at this point, Your Honor. This has gone beyond opening statement into insinuations and allegations of

impropriety, which I highly resent, and I have no opportunity to refute.

I do object, sir.

MR. HAAR: Your Honor, if I may respond?

If anyone knows the difficulties of having your integrity questioned by people with little or no information, it's AmerenUE and its employees. And we're not questioning the integrity of the Commission at all.

AmerenUE has always had a good relationship with the Commission, and we hope and believe our concerns are unfounded, but we wanted to get them on the table. We would like to see this hearing be a constructive step forward.

AmerenUE and, we think, the citizens of Reynolds County and the citizens of the State of Missouri, would like to see us move beyond this to the restoration of Johnson's Shut-ins, to rebuilding of the Upper Reservoir, to placing the Taum Sauk Plant back in operation.

And to that end and with a very short notice that we've had, we've done the very best we can to respond to the thirty-odd date of request that you've provided AmerenUE. And although we're not sure of the Commission's agenda today, as has been the case with

all of the investigations, AmerenUE's employees are here today to answer your questions as best they can.

As the Commission has been informed, significant personal issues have prevented two of our employees from attending today; Mr. Voss and Mr. Cooper. We have also been informed by the Staff that three of the subpoenaed Ameren employees need not appear today; Mr. Bolding, Mr. Mentel and Mr. Lee.

Those who are present today for the Commission's information are; Mr. Steve Bluemner, the Consulting Engineer, Ameren Energy Resources; Mr. Thomas Pierie, Consulting Engineer Electrical, Ameren Energy Resources; Mr. David Fitzgerald, Manager, Taum Sauk AmerenUE, Missouri Regulated Operations; Mr. Warren Witt, Manager, Hydro-Operations, AmerenUE, Missouri Regulated Operations; Mr. Mark Birk, our corporate representative, Vice President of Power Operations, AmerenUE, Missouri Regulated Operations; and Steve Schoolcraft, the Generation Coordinator Ameren Energy, Missouri Regulated Operations.

All of these individuals have been interviewed many times, and they've spent countless hours with all these investigative agencies piecing together what happened on December 14, 2005, an event I would -- I know -- deeply affected them as well. Thank you.

JUDGE DALE: Thank you.

MR. THOMPSON: Your Honor, I want an opportunity to respond to the allegations made by Mr. Haar.

JUDGE DALE: If you could do so briefly.

MR. THOMPSON: I deeply resent, on behalf of myself and on behalf of the entire Staff of Missouri Public Service Commission, the insinuations by Mr. Haar, on behalf of Ameren, that this investigation has been undertaken for improper or political reasons.

This investigation is undertaken now, because the primary investigations by the FERC, by Ameren itself, and by the Highway Patrol, have been completed and those reports are in our possession. It would have been a waste of resources, as well as -- frankly -- impossible, to pursue this investigation before those primary investigations were completed.

That explains the scheduling of this investigation. Thank you.

JUDGE DALE: Thank you, Mr. Thompson.

Are there any other preliminary matters I need to address before we call the first witness?

Seeing none then, would you please call Mr. Alexander.

MR. THOMPSON: I believe Mr. Alexander arrived after the rule was invoked.

JUDGE DALE: We will pause while we address a technical difficulty.

(An off the record discussion was held.)

MS. VALENTINE: Have you ever testified in front of the --

COMMISSIONER CLAYTON: Judge, this is under oath today, is it not?

JAMES ALEXANDER,

Of lawful age, being first duly sworn by the Notary Public, testified as follows:

QUESTIONS BY MS. VALENTINE:

Q. Would you please identify yourself for the record?

A. My name is James Alexander. I am Chief Engineer of the Missouri Dam and Reservoir Safety Program which is part of Missouri Department of Natural Resources.

Q. Have you ever testified in front of the Public Service Commission before?

A. No, I have not.

Q. Would you briefly go through your educational qualifications?

A. I have a Bachelor of Science degree in

Civil Engineering from the University of Missouri at Rolla. I have been the Chief Engineer at the Missouri Dam and Safety Program for the last 12 to 15 years -- I'm not sure, they all add up I guess. I've also worked for the Dam and Reservoir Safety Program since 1980.

Q. Do you work out of the Rolla office?

A. Yes, I do.

Q. What are some of the duties, of you, as Chief Engineer?

A. I am responsible for issuing operating permits on dams in the State of Missouri that are 35 feet or more in height that are not regulated by the Federal Power Commission, or by FERC, or Federally owned.

Q. And when you talk about 35 feet in height, are you talking about the Missouri Dam Safety Law?

A. The Missouri Dam Safety Law only covers dams in the State that are 35 feet or more in height.

Q. On the dam we're here to talk about today, on top of Taum Sauk Mountain, is that a State regulated dam?

A. No, it's not a State regulated dam, in that it's regulated under the Federal Power Act.

Q. Now, Jim, are you familiar with the breach

of that dam, or the failure of the reservoir?

A. Yes.

Q. And what was your role in the investigation following that breach?

A. Basically, representing the Department in a technical investigation of the causes of that failure.

Q. And as you testify today, are you prepared with some type of a PowerPoint presentation?

A. Yes. We -- in the process of our investigation -- did collect a great deal of photographs of the site that helps to explain what happened, and some of the questions that we have that we feel have not been properly addressed.

Q. As Chief Inspector for the Department of Natural Resources, did you physically inspect the dam after the failure?

A. Yes, I did.

Q. And as a result of your investigation, do you have some questions that you believe are still unanswered?

A. They are unanswered in my mind. I have not personally seen all of the information that has been provided by Ameren to the Department. I looked at a large amount of it but not all of it. And so, as far as I'm concerned, to my knowledge, these questions

have not been adequately addressed.

Q. I suggest we go through your PowerPoint presentation, and then you can go through those questions that you feel haven't been adequately addressed.

A. I would warn you that it can take as short a period of time as 30 minutes, and I could spend two hours doing this.

JUDGE DALE: Well, hopefully we'll come somewhere in the middle.

MS. VALENTINE: Did the Commission have anymore questions of Mr. Alexander before he starts his presentation?

THE WITNESS: So far, it hasn't loaded so --

COMMISSIONER GAW: I do have some brief questions, Mr. Alexander.

QUESTIONS BY COMMISSIONER GAW:

Q. The presentation you're getting ready to make, who prepared it?

A. It was prepared by the Dam and Reservoir Safety Staff.

Q. And how many people are there, four or five, how many?

A. There are three Registered Professional

Engineers and one EIT.

Q. And who are they, what are there names?

A. In addition to myself, there is Robert A. Clay, who is a Professional Engineer; there is Glen Lloyd, another Registered Professional Engineer; and Paul Simon, who is a recent graduate of UMR, and he is an engineer-in-training.

Q. And what is your role in this presentation as far as its preparation and --

A. I put this together as a visual aid to help display the questions and the -- what we feel happened at the time of the failure, and what the cause and effect was.

Q. And when was it initially put together?

A. This was shortly after the failure as data was collected, it has progressed, as time went on, as more and more information -- we had more information -- we've added to it to help clarify --

Q. I'm sorry, finish your sentence.

A. It's just, as we collected more information on it, that we felt that certain areas need to be clarified. We've added to it over time.

Q. When was the last time it was changed?

A. Probably about a month ago.

Q. And what was changed at that point?

A. We added a cross section of the dam. That's just a rough cross section to show how the dam was -- the makeup of the dam.

COMMISSIONER GAW: That's all I have right now, thank you.

CHAIRMAN DAVIS: Mr. Alexander, can I ask you a couple questions?

THE WITNESS: Sure.

QUESTIONS BY CHAIRMAN DAVIS:

Q. Did any of your supervisors at DNR, or did anyone else in State Government, ever come to you and tell you: I want this in your presentation, or I want you to take this out?

A. No.

Q. So, it's -- this is solely work prepared by you and your fellow colleagues there at DNR's Dam Safety Division?

A. That is correct.

Q. And no one influenced your opinions in any way?

A. Not to my knowledge.

Q. Could someone have done it without your knowledge?

A. No, they could not have done it without my knowledge.

CHAIRMAN DAVIS: Thank you.

(An off-the-record discussion was held.)

JUDGE DALE: Please go ahead in a narrative form. You don't need to do question and answer, you can just go through your presentation. And then, if the Commissioners have questions, they'll ask you.

THE WITNESS: As you can see, in here, basically, is just a picture of the Upper Reservoir prior to the failure. We would like to point out, the failure occurred in this area right in here, in the northwest corner of the reservoir. That's the location of it with regard to St. Louis and Cape Girardeau.

The Upper Reservoir, this is just a topographic map. We put it together showing the layout of the property. You can see here, this is the Upper Reservoir. The Lower Reservoir being down here.

The failure occurred in the northwest corner of the reservoir traveling off a heavily wooded valley towards the East Fork of the Black River where, when it crossed the river, basically it divided into two waves. The first wave, the larger of the two, went in a counter clockwise direction and made its way down through Johnson's Shut-ins State Park. The smaller of the two waves went in a clockwise direction and

followed the first wave down stream.

There's a den wall, or structure gravel trap, located down in here. The power house is located right in this area. Johnson Shut-ins State Park is located in this area. The dam for the Lower Reservoir is located right down here.

As far as the breach data is concerned for the failure, the top was 656 feet, the bottom width 496 feet. The reservoir drained in approximately 12 minutes, creating a maximum outflow of 289,000 cubic feet per second. Peak velocity, where it crossed the East Fork of the Black River, was in the neighborhood of 45 feet per second with a depth of flow of approximately 19 feet.

The reservoir, when full, was a 55-acre reservoir. Maximum storage of 5200 acre feet of water. A reservoir depth of right around 90 feet. An outlet tunnel diameter of 27 feet, which dropped vertically 451 feet. There was additional head on the structure for the hydropower, but it had a 451 vertical drop at the outlet tunnel inlet, and a generating capacity, reported to us, as 450 mega-watts.

There's a cross section of the dam. And you can see -- I'll point out a few things -- this was a random-type rockfill structure sitting on top of a

rock, and then soil in some places. It had a concrete reinforced -- steel reinforced concrete liner on the upstream face, and then over the top of that, it had several different -- it had a high-density polyethylene liner that had been placed in 2004.

There was a parapet wall that sat on top of the dam that was approximately ten feet tall. The vertical segment here, which allowed water to go within a foot of the top of the Upper Reservoir -- which was standard operating procedure -- but it also had a leg that came down on the upstream face tied into the liner, and then had an L that came out on the crest of the dam that was about the width of a sidewalk. And these two segments, here, was to provide stability for the parapet wall.

There again, you have a picture of the reservoir when it was full prior to the failure. The failure occurred down in this area. You can see the power plant down below the dam. It traveled through a tunnel -- concrete lined tunnel -- down to the power plant and through two turbines where power was generated. These turbines could -- after generating electricity -- could be reversed and used as pumps to pump the reservoir back full, and that was usually done during the evening hours.

Just a couple pictures of the turbines. This is a picture of the lower dam, that the water was recycled in this project, so that the water that was released from the Upper Reservoir flowed into the Lower Reservoir. And then, during the middle of the night, that water was then pumped back up into the Upper Reservoir to generate electricity.

This was a peak power facility, as you all know, and it made their profit off of generating electricity on on-peak hours.

Located downstream was Johnson's Shut-ins State Park -- kind of a prized jewel of our State Park system -- known for its pristine hiking trails and the Shut-ins environment, which was very popular for tourists in the summertime to take part in nature's own water slide-type environment.

Here is a picture of the Upper Reservoir when it was empty. There's a couple things I want to point out on this photo. This reservoir suffered problems for many, many years leaking water. It would leak at two-and-a-half feet of water per day, was the reports that I read prior to 2004. When that water was leaking out, it was collected in a series of ditches that ran around the perimeter -- the toe of the structure -- into a pond located in this area. When

that pond would fill up to a certain elevation, a couple pumps would kick on and water would be pumped up into the Upper Reservoir to keep it with as much water in it as possible for hydropower purposes.

This photo, if you look -- it's very subtle in the back -- in the background here, you can see the gauges that controlled the water level. It had two sets of gauges. Basically, one, the normal operating set that's for pressure transducers, that when water got up to a certain elevation, the pump-back features were shut off. And when water lowered to a certain elevation, the drain feature -- or the generating capacity -- was shut off at that point.

It's my understanding that this reservoir was never normal operating procedure, never allowed for the reservoir to completely drain. Because when it would get down to about a third of the total capacity, it would start a vortex operation -- or sequence -- where it would pull air into the tunnel and down through the generators, and that was hard on the turbines.

Here you have just a picture of the tunnel where the water dropped down 451 feet to the turbines. Here's the pond at the toe of the dam where the water was -- the seepage water -- prior to 2004. It was, as

I said, two-and-a-half foot per day leaked out of the reservoir. The reservoir was relined with a high-density polyethylene liner in 2004, and that seepage amount was reduced from two-and-a-half feet a day to about .2 feet a day. So, it was very successful in its ability to cut down on the seepage.

Just a photo of the pump-back facility, the pipe going up into the Upper Reservoir. This was a picture that was taken shortly after the failure. You can see the pressure transducers in the background here. You can see the bow in them. That's indicating that they have come loose from the side of the reservoir and were giving erroneous water surface elevations at that point in time which led directly, we think, to the failure of the structure.

I mentioned, in 2004, there was a high-density polyethylene liner that was placed. Here's some photos of that taking place. High-density polyethylene is, basically, just a very tough plastic liner. It's my understanding that there was two layers of this placed down, and it was actually attached to the top of the structure -- or to the top of the parapet wall -- about a foot below with a metal strip. More photos of that.

A couple things here that are important features

of this liner when it was installed is you had, up here, you had a staff gauge up at the top. I think it's important to note that this staff gauge did not go all the way to the top. It basically stopped there at the base of the wall and made it difficult to, when the reservoir was full, to know exactly what the elevation was in the reservoir so they could compare that to their instrumentation.

The water level of this structure was remotely operated from either St. Louis or the Lake of Ozarks. It is my understanding, this set of pressure transducers give them water level readings at the control points, and that was -- you can see here -- it was fastened to the side of the reservoir wall. And these points, the bottom of these transducers, had to be held in a specific place for it to give accurate readings. It was these buckles that you see that came loose and allowed this structure -- these pipes -- to start flopping around. As they were, the pump-back and the draw-down features were taking place. There were a lot of currents generated in the reservoir and that caused a lot of stress on these pipes.

Here's a photo of that control box where these pressure transducers came into -- up out of the reservoir -- and then were hooked into the

instrumentation to give them -- and translated into readings, as far as water level readings were concerned.

The emergency set of transducers -- or they call them Warrick probes -- were also, if the primary set did not function as intended, the water level got up to the bottom of the Hi probe, it would sound a warning, it was my understanding, and if the system was not shut down prior to the Hi-Hi probe actually being touched by water, then a cold shut down of the whole facility would take place, and this was harmful to the facility as well and not a desired thing to happen. But that was the backup set of probes.

COMMISSIONER GAW: You just described the way these Hi and Hi-Hi probes functioned. I wanted you to clarify whether you're referring to how they function at the time of the breach, or how they were designed to function?

THE WITNESS: That's how they were designed to function. At least that's my understanding.

What you see here is, again, a picture in the days following the failure. You can see the misalignment of the probes. These pressure transducers were actually ran through these pipes and were fastened to the side of the reservoir wall. They had a prescribed

elevation, and that was translated into the accurate elevations they used to operate the facility. When these turnbuckles turned loose, and those things got to flopping around, then the accuracy of them suffered, and instead of being able to get accurate elevations, they could have been off several feet.

I'm going to go through several photos here that depict the failure. You can see the failure, having occurred in the northwest corner up in here, making its way down through a heavily wooded draw into the East Fork of the Black River.

You can see the makeup of the dam here, how clear it is, but you can see, instead of -- there's a high percentage of fines in the dam, greater than what was the original intent for the dam at that point.

The bottom of the reservoir -- this is at the breach -- you can see did not set on solid rock, there was a lot of rock rubble under here. Basically, they tried a multitude of things to get this to be water tight. You can see asphalt that was used, you can see concrete, and then on top of all that is the high-density polyethylene. And then, actually asphalt, it turned out to be one of the more productive things that was used to seal the bottom of the reservoir. More photos of the failure.

COMMISSIONER GAW: When were these photos taken?

THE WITNESS: These photos were taken within the first week or two of the failure, following the failure of the dam. Most of these.

COMMISSIONER GAW: Thank you.

THE WITNESS: What you're seeing -- this photo is -- at the top of the East Fork of the Black River you can see the reservoir, being up in here, made its way down across the East Fork. Here, the Park Superintendent's home was located in this area.

You can see the first wave made its way down that way, which was the greatest majority of the water. The second wave come this way, traveled in a clockwise direction, and then followed the first wave on down stream destroying the Park Ranger's house and depositing him and his family in this field down here. A couple trucks were coming down the highway that morning, they were washed off the road as well.

COMMISSIONER GAW: Can we go back to the previous slide and tell me where the Park Ranger's house was?

THE WITNESS: I believe it's right -- right in here.

COMMISSIONER GAW: You're indicating sort

of in the middle and a little bit down from the center of the slide?

THE WITNESS: Yes. You'll have a better picture in a second. You can see the foundation at this point, right here, of the Park Ranger's house.

Now, the big wave came, and went this way. The smaller of the two came this way and washed the Park Ranger and his family off into this field, destroying the home. And you can see how the timber is laying pushed over. You can see which wave went in which direction if you look closely.

Here's a shot -- you can see if you get your head cocked just right -- you can see a shot of the Shut-ins, and a lot of sediment went down there collecting in the Shut-ins environment. It was a big part of the clean up process.

See how the creek has been clogged at that point with debris, sand, gravel, rock, rebar. A lot of the vegetation was completely stripped in most places creating large log jams that had to be cleaned up.

I'm going to go through all these really quick. You can see the devastation in the State Park. Here was the entrance to the park -- in the vicinity -- where you can see how it was destroyed. If you are familiar with the entrance to the park, that's what

you are looking at there. Here's the Park Superintendent's home. This is how it looked immediately after the failure. Here's one of the trucks that was washed off the road. It was this gentleman -- one of these gentlemen -- they climbed up on top of the truck to escape the water, as it -- the water went back down as quickly as it came up. It went back down because there wasn't a tremendous volume of water. Later, as the water went down, they were able to hear the Park Superintendent's family crying out for help, and they helped aid in the rescue of that family, and are largely responsible for them still surviving this.

Here again is the picture of the park. You see a lot of the debris that was washed out back in the background there. All those trees that were destroyed settled out as soon as the water starting slowing down, and that happened to be in the Shut-ins -- in the park. You can see that stuff having settled out in this area.

You see a lot of -- in the days following the failure -- you could see lots of photos of the -- you'll see lots of photos of the liner that was in the reservoir stuck up in the trees, and you saw that scattered all over the place down there.

Here's the park office. You can see the high water line on the park office. It was not destroyed, but there was a lot of destruction of the trees and log debris that was piled up around it. Huge rocks were carried down off of the mountain and settled out in the valley below, they had to be cleaned up.

And probably one of the worst problems that was out there, as far making it difficult to clean up, was the steel rebar -- which this was, I think, three-quarter inch rebar -- mixed in with the polyethylene liner, and also, still a lot of it had the concrete attached to it. And you can see, with that mixed in with the logs and other debris, created a tremendous headache for Ameren as they proceeded with the clean up. You mixed the logs in with all of it, and the brush in with it, and it really created a nightmare as far as trying to clean it up.

This is the den wall structure, or the gravel trap dam, down here. It was designed to collect water, as it flowed down the East Fork of the Black River, it would carry a certain amount of debris with it. This den was designed to intercept that water, let the debris settle out, and try to keep that from flowing into the Lower Reservoir so that the volume of storage in the Lower Reservoir would not be compromised. You

can see that it served its function and caught a lot of debris, but it overloaded and a lot of it ended up going into the Lower Reservoir.

This is a picture down at the power house -- or at the turbines -- the morning of the failure. You can see the color of the water. This is a picture of the lower dam, it overtopped down here. It was designed to overtop, but it overtopped about six to 12 inches -- was the reports that I read. You can see the color of the water, tepidity that was involved, and once it made its way downstream of the Lower Reservoir, it was pretty much -- as far as flooding was concerned -- it was pretty much a non-event downstream of the Lower Reservoir.

It did -- a lot of turbidity went downstream, and that was a major issue in the clean up. But as far as flooding was concerned, it was not much of a flood wave that went on downstream of the Lower Reservoir.

We spent a lot of time looking at the parapet wall. I'm going to show you some photos -- that's Tom Hollenkamp from Ameren there with us that day in the picture there. You can see the metal strip that the liner was attached to the inside of the wall. And as I indicated before this, it was normal operating procedure to allow water to go up within one foot of

the top of the wall on normal operating basis. Now, over a period of time they've had problems making this wall water tight, and you can see a variety of things there -- sometimes foam was in the gaps -- various ways of trying to make the reservoir more water tight.

We saw a lot of signs of additional overtopping that had occurred and damages that had happened to the embankment. Here's a photo, I want to point out that there's a road that goes right along the toe of the dam in some areas, and you can see here, this used to be wide enough for a truck to drive around the perimeter -- if you were brave enough to drive, it was an interesting drive around it, you could ride around the perimeter of it. You can see hundreds of yards of material that had been washed out.

This is panel 72. Other than the area that failed, this probably suffered the worst -- next to worst damages. What you are looking at is, this is the back side of the inner liner, down here, that was exposed, and if it hadn't failed where it did, this one would not have lasted much longer. It could have occurred here. These are sixty-foot long panels, cast in place, and you can see this one not having much in support there of that to keep it from topping as well.

COMMISSIONER CLAYTON: When you say, "this

side of the wall could have failed," are you talking in an overtopping circumstance or everyday could have failed?

THE WITNESS: This would have been associated with the overtopping event on the morning of December 14th.

COMMISSIONER CLAYTON: So, if the water would have flowed over at this point on the wall --

THE WITNESS: It was flowing over at this point at the time the failure occurred. And all I'm trying to say is, if it hadn't failed over there where it did -- if that would have held up, this one would have failed. It probably wouldn't have taken too much more overtop.

COMMISSIONER GAW: Are you familiar with the height of the various panels?

THE WITNESS: Yes. We surveyed every panel that remained after the failure. We've got both ends of every panel that remained up.

COMMISSIONER GAW: How does the height of this panel compare with the other panels as far as your information is concerned.

THE WITNESS: Our information showed that, other than, obviously, we couldn't survey what had already failed and washed away, but what remained of

the upper parapet wall. This is the lowest spot on the wall at that time.

COMMISSIONER GAW: And do you know what that height was? If you don't know, I don't want you to speculate.

THE WITNESS: I won't speculate then. I could get that for you, we have that exactly. But if I told you, I would be guessing. I can get you within plus and minus four inches.

COMMISSIONER GAW: Well, let's be exact.

COMMISSIONER CLAYTON: On follow up to that question. This is the lowest point in the entire wall, how much variance would there be from lowest to highest point, how much space?

THE WITNESS: Between two and three feet from highest point to lowest point.

COMMISSIONER CLAYTON: Thank you.

THE WITNESS: Here you can see this is immediately downstream, looking down at panel 72, which is what we just looked at. This is looking off the back side. And I point out the fact, where hundreds of yards of material were removed here -- this is very wet of course -- the rock that had been removed and spread out here on the road, there's a green area between the toe of the dam and the road at

this point. Now, when you get on around here, there is no green area there. It is basically right along the toe of the dam. You can see how the rock spread out into the trees here down below the toe of the dam. I want to show you a contrast here in few minutes.

Now, this is over on -- remember, the dam failed on the northwest corner -- this is on the southeast corner, another area that suffered a great deal of overtopping, and you can see a lot of erosion having occurred here. But in this area, the thing that was odd that we discovered -- we did not get to look at this the day of the failure, we were there the next day. So, we were here on the 15th, this is when this photo is taken.

And you can see the grass is standing vertical in this area, and one can see -- one odd thing that really struck us, one of our unanswered questions -- is with the rock that spread out all in the green area of panel 72, with the road right here at the toe of the dam, why was there not any rock on this road? Where did all that material go to? That is one of the questions we continue to ask ourselves as we look at this facility.

Another photo of that area, you can see the road goes right along the toe of the dam, but no rock

actually went out on the road.
QUESTIONS BY COMMISSIONER GAW:
Q. The question that you're asking, in regard to why is there no rock on that road, did you ask that question of Ameren?
A. Yes.
Q. Who did you ask it of?
A. We talked to, primarily, Mark Birk and Warren Witt.
Q. And did you personally participate in that?
A. Yes, I did.
Q. And what were you told?
A. They didn't know.
Q. And this is -- I think you said this but -- this is a picture representing what's below panel 72?
A. This picture is the southeast corner. I'll go to -- that's panel 72, below panel 72 right there.
Q. Is that the same area that you're showing us --
A. No, that's on the south -- that would be the southwest corner. Panel 72 is southwest.
Q. It is southwest. So, what panel is associated with the southeast part?
A. It's about panel 55, I think.
Q. Do you know the height of that panel?

A. It's ten feet, all panels are ten feet tall.

Q. Do you know --

A. I don't know what the elevation at the top of it was. I can get that for you though.

Here's panel 72 again, you can see how -- just to show you how much erosion did occur there and how tenuous its situation was the morning of the failure.

Now, some of the things I really want to point out to you here is that, panel 72 was in this area -- this general area -- but I was showing you -- the question I had about where was the rock on the road -- was located over in this area.

And that concludes my PowerPoint. I went through it very quickly, but I thought your time was very precious.

JUDGE DALE: Can you tell me, is that a spare copy?

THE WITNESS: Yes. I can leave this with you.

JUDGE DALE: Thank you. That will be marked as Exhibit 1 for purposes of this hearing.

(Hearing Exhibit No. 1 was then marked for identification by the Court.)

THE WITNESS: I did have questions -- a

list of questions -- that I have developed, if you're interested in hearing those. Is that okay.

JUDGE DALE: Go right ahead.

COMMISSIONER GAW: Before you get to that, on the subject that you were just discussing, how many different places did you find evidence that there was overtopping in the December 14, 2005 incident?

THE WITNESS: We found there was, I believe -- and I'm having to guess on this to a certain extent -- three or four places that had previously overtopped. Now, how many of those overtopped the morning of December 14th, I would only be confident in saying without a doubt that, where it overtopped and failed, that obviously happened that morning. And panel 72, I feel confident that it overtopped that morning.

The other ones had overtopped. Whether or not that occurred that morning or a previous time, I could not say.

COMMISSIONER GAW: And again, what panels were they?

THE WITNESS: They were panel 55, and there was another one with a small amount of erosion damage associated with it, but I don't remember -- it was more on the northern side of the reservoir.

I do want to point out that the Taum Sauk Reservoir is not regulated by the Department of Natural Resources or by the Dam and Reservoir Safety Program. And I did get to look at a lot of information concerning this dam, but by no means have I seen all of it. So, some of these things that I'm bringing up may have been answered before but not to my knowledge.

My first question that I would have for Ameren would be: At the time of the failure, what was the elevations of the Hi and Hi-Hi probes? It is my understanding that Ameren has made estimates of these elevations, but no documentation has been provided to affirm these estimates, to my knowledge.

My second question has several different others associated with it, and I'll try to go over that as best I can.

How many times were the elevations of the Hi and Hi-Hi probes adjusted? I'd like to know the dates, how was it determined that the probes were malfunctioning and thus needed adjusting? What was the reservoir level gauge reading in the control center each time pump-back was halted by the Hi and Hi-Hi probes? Was the reservoir elevation visually confirmed after any of the premature shut-downs prior

to water being released for generating purposes? What were the settings each time they were adjusted, and what procedure was used to verify that the probes would perform as intended at the adjusted elevations?

Now, my third question is, on the morning of December 14, 2005, at what times were the probes removed?

Number four, who ordered those probes removed?

Number five, what was the rationale for removing the probes?

And six -- and finally -- is, how often was the reservoir elevation compared to the instrument readings at the control center?

And that's all I have.

JUDGE DALE: Staff, you may proceed.

MR. THOMPSON: Thank you, Your Honor.

QUESTIONS BY MR. THOMPSON:

Q. Mr. Alexander, what's your job title?

A. I am the Chief Engineer of the Missouri Dam and Safety Program.

Q. And what qualifications do you have?

A. I am a graduate, Civil Engineer, from University Missouri, Rolla, graduated in 1974 and have been working for the Dam and Reservoir Safety Program since 1980 and Chief Engineer of the Dam and Reservoir

Safety Program since 1993.

Q. Do you consider yourself to be knowledgeable in dam safety?

A. Yes, sir. I do.

Q. Do you recall Mr. Haar's opening statement?

A. No, sir. I'm not sure I was here.

Q. If I told you that he stated that it has been shown that there was no recklessness associated with the event at Taum Sauk, would you have reason to disagree?

MR. HAAR: I will object. I think that calls for a legal conclusion, and I don't think --

MR. THOMPSON: I don't think that's a legal conclusion, to say that is what Mr. Haar said.

JUDGE DALE: Why don't you break your question up into single questions.

MR. THOMPSON: I will attempt to do that.

QUESTIONS BY MR. THOMPSON:

Q. Are you familiar with the report that was produced by an independent consultant, hired by Ameren, and which is available on the website of the Federal Energy Regulatory Commission -- I believe it's referred to as the Rizzo Report?

A. Yes, sir. I am.

Q. Do you recall that the Rizzo Report

indicated, that on the day of the incident, the Hi probe was set at elevation 1597.4 and the Hi-Hi probe at elevation 1597.7?

A. Yes, sir. I do.

Q. The Rizzo Report also states that the lowest point on the parapet wall -- the top of the parapet wall -- was 1597.0; do you recall that?

A. Yes, I do.

Q. Would you consider it imprudent to set probes at a level higher than the lowest point on the parapet wall?

A. Certainly.

Q. Are you aware that the Rizzo Report states that the Upper Reservoir was designed to operate with two feet of free board?

A. No, sir. I did not. I do recall that.

Q. Do you have any reason to disagree if I tell you that's what it says?

A. No. I do know that it was normally operated within one foot of the top of the wall.

Q. Now, you were interviewed by the Missouri Highway Patrol; were you not?

A. Yes, I was.

Q. On February 2nd, 2006?

A. If you say so.

Q. Okay. Have you had an opportunity, I wonder, to look over that?

A. Yes, sir.

Q. Recently?

A. Not recently, no.

MR. THOMPSON: May I approach, Your Honor?

JUDGE DALE: Yes, you may.

QUESTIONS BY MR. THOMPSON:

Q. I'm handing you a copy of your interview with the Missouri Highway Patrol. And attached to that is a memorandum that you produced.

A. Yes, sir.

MR. THOMPSON: I wonder if we might have that marked as Exhibit 2, Your Honor?

JUDGE DALE: Yes, you may.

QUESTIONS BY MR. THOMPSON:

Q. Now Mr. Rizzo -- excuse me.

Mr. Alexander, as you look over that fairly brief interview, do you see any corrections that need to be made, are there any mistakes in it, anything that you believe is inaccurate?

A. No, sir. It looks to be complete to me -- to be correct.

Q. So, today, when you were under oath, you would -- would you not -- agree that you would give

essentially the same answers if you were interviewed at this time?

A. Yes, sir.

Q. And attached, as I said, is a memorandum that, evidently, you produced on January 19, 2006; do you see that?

A. Yes, sir.

Q. Have you had a chance to look at it, sir?

A. Yes, sir.

Q. Do you recognize that as a memorandum that, in fact, you produced?

A. Yes, sir.

Q. The contents of that memorandum -- those contents were true at the time you prepared that to the best of your knowledge and belief; is that correct?

A. Yes, sir.

Q. And you would essentially give the same account today if you were asked questions about that meeting, would you not?

A. Yes, sir.

Q. Do you see on the first page, the second bullet point, it states: The maximum water level allowed in Upper Reservoir was elevation 1596?

A. Uh-huh.

Q. So far as you know, did you understand that to be the normal operating level?

A. Yes, sir.

Q. And that is not two feet from the lowest point, is it?

A. No, sir.

Q. In fact, it's only one foot?

A. Yes.

Q. Now, as an expert in dam safety, sir, would you recommend that a dam, such as the Taum Sauk Upper Reservoir, be operated with only one foot of free board?

A. Only if you were very confident that you knew exactly what the elevation was.

Q. Thank you, sir.

MR. THOMPSON: I would offer Exhibit 2 at this time.

JUDGE DALE: Any objections.

MR. HAAR: No, Your Honor.

JUDGE DALE: Exhibit 2 is admitted into evidence.

(Hearing Exhibit No. 2 was then entered into evidence.)

MR. THOMPSON: I have no more questions for Mr. Alexander at this time. I would like to thank you

for participating today. I don't know if you know this, but you are under subpoena. The General Counsel from the Department of Natural Resources accepted the subpoena on your behalf this afternoon.

And Your Honor, I would suggest that, at the end of his testimony, Mr. Alexander not be excused because this is an on going investigation, and we may need to talk to him again. Thank you.

JUDGE DALE: Miss Baker.

MS. BAKER: Thank you.

MS. VALENTINE: I do understand he does need to leave, but he is willing to come back whenever you need him.

THE WITNESS: I have to be at meeting in Troy, Missouri at eight o'clock.

MR. THOMPSON: I didn't mean retained here today. I meant that he not be excused in a way that we could not recall him at a later time, or even take his deposition, if that's necessary.

MS. VALENTINE: That's fine.

JUDGE DALE: Miss Baker, did you have questions?

MS. BAKER: Yes, thank you.

QUESTIONS BY MS. BAKER:

Q. I have some questions about the prior

incidents where the water had topped over the reservoir. Why were those situations different from the date when it caused the failure?

A. I'm not sure I understand your question.

Q. Why did the failure occur on the day it did when other overtops did not cause a failure?

A. Basically, what happened on December 14th was, the foundation of the parapet wall -- of the sections of the parapet wall where the failure occurred -- got undermined to the point where they were no longer stable, they turn loose -- or they toppled -- releasing the reservoir storage. And that caused failure of the dam and the release of its contents.

Any prior overtopping that may have occurred did not do enough erosion to cause those walls to topple.

Q. So, what you're saying is, on that particular day, there was enough scouring at the bottom of the wall to cause a failure?

A. Yes, ma'am.

Q. The failure that occurred, as you said, was at the bottom of the wall. How much of a play did the fines within the wall play into the fact of causing a large amount of scour?

A. The fine material in the rock embankment

added to its erodibility and caused it to be more unstable during the overtopping event, allowed there to be a lot more erosion in that area which undermined the foundation of the wall and caused it to fail.

Q. Was it within the plans when -- or do you know -- was it within the plans when the reservoir was built that it had that degree of fines within it?

A. I'm not familiar enough with the original design parameters to know that with certainty.

MS. BAKER: Thank you, that's all the questions that I have.

JUDGE DALE: Any other questions from the bench?

COMMISSIONER MURRAY: I just have a couple of questions.

QUESTIONS BY COMMISSIONER MURRAY:

Q. The first one is, how many of the other five investigations have you personally participated in?

A. I'm -- the other five, I'm not sure what you're referring to.

Q. In the opening statements for -- Ameren's opening statements -- five other investigations were mentioned. How many other investigations have you participated in, in this event?

A. I have been at the site a number of times with a variety of different people, but as far as knowing whether or not it was part of an investigation, I wouldn't be able to say for certain.

Q. Have you had your deposition taken?

A. Only by the Highway Patrol, to my knowledge.

Q. Only once?

A. Yes.

Q. And have you filed a PowerPoint presentation -- that you presented here today -- in any other proceeding?

A. I have shown that to a number -- in a number of proceedings. Both in the Department, with the Attorney General's Office, with the U.S. Attorney's Office. So, there have been a number of times that this has been --

Q. And have you told us anything here today that you haven't already told -- regarding this event -- in the past.

A. No.

COMMISSIONER MURRAY: Thank you.

JUDGE DALE: Chairman Davis.

COMMISSIONER DAVIS: Thank you.

QUESTIONS BY CHAIRMAN DAVIS:

Q. Mr. Alexander, after your PowerPoint presentation, you ran through a list of questions that you developed. At what point did you develop those questions?

A. Well, I read a report -- or I guess a press release -- that there was going to be -- this meeting was going to occur on the Taum Sauk investigation. And it indicated that I was going to be asked to share with this Commission any -- let's see -- that any unanswered questions that I had, with regard to this, would need to be brought forward at this point.

And it was at that time I kind of rounded up all the questions that I had and put them into a form so that I could give it to you today.

Q. Can you briefly run through that list again?

A. Yes, sir.

COMMISSIONER CLAYTON: Slowly.

THE WITNESS: All right.

Question number one, at the time of the failure, what was the elevation of the Hi and Hi-Hi probes? It is my understanding that Ameren has made estimates but no documentation has been provided to affirm these estimates, to my knowledge. That's question number one.

Number two, how many times were the elevations of the Hi and Hi-Hi probes adjusted? And under that, I'd like to know the dates they were adjusted. How was it determined that the probes were malfunctioning, and thus needed adjusting? What was the reservoir level gauge reading in the control center -- and this would be at the Lake of the Ozarks -- each time the pump-back was halted by Hi and Hi-Hi probes?

Next was -- in addition to that -- was the reservoir elevation visually confirmed after any of the premature shut-downs prior to water being released for generating purposes? What were the settings each time they were adjusted? What procedure was used to verify that the probes would perform as intended at the adjusted elevations?

Question number three, on the morning of December 14th, 2005, at what time were the probes removed?

Number four, who ordered the probes removed?

Number five, what was the rationale for removing the probes?

And number six, how often was the reservoir elevation compared to the instrument reading in the control center?

And that's all.

QUESTIONS BY CHAIRMAN DAVIS:

Q. Did you ever ask anyone from Ameren to answer any of those questions?

A. We have asked those questions a number of times -- not all of them, but some of those questions, as we've gone along and looked for them in the information that we have reviewed -- and have never been able to come up with answers to those questions.

Q. Do you recall which questions you asked specifically, the people in the Department of Natural Resources Safety Division asked?

A. We have asked -- on the morning of, when the probes were removed -- who ordered the probes removed, and what was the rationale for removing the probes. And then also, at the time of the failure, what were the elevations of the Hi and Hi-Hi probes. Those questions have been asked.

Q. When you read the Highway Patrol's report, did you ever express any of those concerns about the unanswered questions -- any of the unanswered questions -- to the Highway Patrol?

A. I have not read the Highway Patrol's report in its entirety. I know a lot of the information that was in there, but I have never read completely through the Highway Patrol report.

Q. Okay. So, is there -- you have read part of it though?

A. I provided some of that information that's in there.

Q. So, you only read the parts that you provided the information for?

A. Not having seen the report, I don't know just how much of it I was really associated with and how much I wasn't. But I know a lot of it, apparently, contained affidavits and comments that we've made, interviews that we conducted. So I'm obviously familiar with some of it.

Q. Okay.

CHAIRMAN DAVIS: I'll pass for right now, Judge.

COMMISSIONER GAW: I'm going to pass for right now also.

QUESTIONS BY COMMISSIONER CLAYTON:

Q. Mr. Alexander, I want to start off with some questions about these questions.

First of all, you said that you have not read the Highway Patrol report. So is it fair to say that some of these questions could have been answered in the report, you just aren't aware of the questions being answered?

A. That's possible.

Q. Wouldn't it be best to review that report in full before suggesting that additional action be taken to find the answers to these questions?

A. That's, I think, the logical thing to do. I was not given the report, I was just asked what my questions were.

Q. You've never been given a copy of the Highway Patrol report?

A. No.

Q. Have you ever asked for a copy of the Highway Patrol Report?

A. No, sir.

Q. Can you give me an idea what we accomplish if we answer these six questions?

A. I think it shows -- will show -- a great deal about how the reservoir was being operated and whether or not there was negligence involved, or incompetence involved, in the operation of it.

Q. Let me give you an example. In some of these questions you ask for specific information. Like, on the first question, you asked about the elevation of the Hi-Hi probes at the time of the failure. But it's my understanding that Ameren has already suggested that they weren't high enough or

they were at an improper height; would you agree with that statement?

A. That's my understanding.

Q. If Ameren has made such an admission -- I'm not sure if they have, but if they have -- does it really matter what the exact location of those probes are to this Commission -- to the State of Missouri -- does it matter?

A. I think the thing that matters is how many times they were adjusted and why they were adjusted.

Q. And so, the first question isn't really the most important question?

A. Correct.

Q. Let's go to the second question. How many times were the Hi-Hi probes adjusted, I believe is --

A. Yes.

Q. I wrote these down as quickly as I could, so if I mischaracterize your question, please feel free to correct me.

You're interested in knowing how often these Hi-Hi probes were adjusted?

A. Correct.

Q. Is there another term for Hi-Hi? I sound kind of silly saying Hi-Hi.

A. They also have been referred to as the

Warrick probes.

Q. Thank you. Okay. Have you asked the question to anyone from Ameren the details of how many adjustments were made associated with the Warrick probes?

A. No, sir.

Q. You've not even asked Ameren those questions?

A. No, sir. Not myself, personally.

COMMISSIONER DAVIS: Can I just jump in here for a second and ask another follow-up question.

QUESTIONS BY COMMISSIONER DAVIS:

Q. Mr. Alexander, isn't it true that the Warrick probes, that were located at the highest elevation on the dam, that they had to be, in essence, bolted into the side of the dam -- or somehow affixed there -- so any movement would be verifiable from a visible inspection of just looking at the wall, would it not.

A. Yes, sir. They would have been, if they were left in place. They were removed the morning of the failure.

Q. But still the holes would have had to have been there?

A. I do not think you could tell, by where the

holes were, where the probes had been located.

Q. And why is that?

A. Because I think they could be -- could be loosened and pulled up at a point to where you couldn't tell. The bracket would not necessarily be where the probes were located -- what elevation the probes were located.

Q. And so, what if you -- and you wouldn't know if Ameren has already in fact admitted, through operator error or whatever, that the location of the probes might have been so bad that it would have rendered them useless anyway, would you?

A. What's your question?

Q. Would you be aware if Ameren had already admitted --

A. I've read that. Yes, sir.

Q. So, you have read that they have -- might have acknowledged that the location --

A. Yes, sir. I have.

CHAIRMAN DAVIS: I'm sorry, Commissioner Clayton, go ahead.

COMMISSIONER CLAYTON: Quite all right.

QUESTIONS BY COMMISSIONER CLAYTON:

Q. So, we were talking about the number of times the Warrick probes had been adjusted prior to

the breach?

A. Correct.

Q. Do you recall that part of the conversation?

A. Yes, sir.

Q. And I think I asked the question, whether you had asked Ameren any of these questions about prior adjustments?

A. I have not, to my knowledge, asked any of these questions personally.

Q. If it's such an important question, why didn't you ask Ameren?

A. I have raised these questions with our General Counsel and it was up to -- as far as I know -- I mean, basically it's up to them to ask the questions for the Department.

Q. Are you saying you've never asked Ameren any questions?

A. I have taken part in a number of meetings with Ameren where there was a question and answer discussion. But after having gotten to the point to where we were really in-depth investigating this, it all went through our General Counsel.

Q. Let me ask a very basic question. Have you ever asked Ameren any questions about the Taum Sauk

dam breach?

A. Sure.

Q. So, you have asked some questions of Ameren?

A. Immediately following the breach, yes.

Q. Were you stopped from asking questions at a certain point?

A. We were advised that our questions should go through our lawyers.

Q. Okay. Have you ever conveyed -- have you ever made a request to ask these questions to the lawyers -- the attorneys?

A. Yes, sir.

Q. You have. And was that in writing or verbally?

A. Verbally.

Q. And you've not asked any of the different elements of this question, you didn't ask about the dates or why they were adjusted -- why the gauges were adjusted, what the readings were at the time of the adjustment, none of those questions have been asked?

A. I have not asked those questions personally of Ameren, no.

Q. Can you tell me, if we ask those questions, what are we accomplishing by asking those questions?

A. As I said earlier, I think what we're looking at, is whether or not the facility was being operated in a negligent manner, and I think that would reflect directly -- help to reach a proper conclusion.

Q. But once again, as I understand it, Ameren has supposedly taken responsibility, accepted that the gauges were at the wrong level. Does this give us anything else, other than maybe more specific details?

A. I think it just provides more specific details.

Q. Your third questions was, what time were the probes removed; is that correct?

A. Third question was -- okay. Yeah, on the morning of December 14th, what time were the probes removed.

Q. I think -- could be part of that -- you also asked who ordered the removal?

A. Yes, sir.

Q. And why were they removed?

A. Correct.

Q. Now, did you read the part of the Highway Patrol report that suggests some answers to those questions?

A. No, I have not read --

Q. Has anyone ever suggested to you that those

questions are answered?

A. No, sir.

Q. Isn't it true that -- or maybe it's not true, maybe I'm incorrect on this.

Would it surprise you that there's a letter, dated May 23, 2006, in the Highway Patrol report from Ameren, which suggests some answers to the questions that you've raised?

A. I have not seen such a letter. No, sir.

Q. But you haven't reviewed the reports, you just don't know if those answers are in there?

A. That's correct.

Q. Now, in the PowerPoint presentation that you have before us, did you take all the photographs?

A. No, sir. I did not.

Q. Who took those?

A. It's a compilation of several folks.

Q. Would it be the three staff that you referenced?

A. That, plus there was a number of people from the Division of Geology and Land Survey that were present, and it would be some of their photos. Some from the University of Missouri, Rolla. I think some even came from the Department of Conservation.

Q. So, you didn't take any?

A. I took some of the photos. Yes, sir. But not all of them by any means.

Q. Now, how often is a facility such as Taum Sauk inspected, aside from the breach, is it inspected regularly by your staff?

A. It is not inspected by our staff at all. This is not a regulated dam by the State of Missouri. We are always invited by Ameren -- or by FERC -- they offer an invitation, at times, to take part in them if we so desire. But it not being a dam that was regulated by us, we only took part in those sporadically.

Q. How often -- or are you aware -- how often FERC, the Federal Agency, actually does an inspection of Taum Sauk?

A. It's my understanding that they inspect -- a general inspection -- every year, and every fifth year they hire a consultant to do a detailed inspection.

Q. Are you aware when the last inspection of Taum Sauk occurred prior to the breach?

A. No, sir.

Q. Would you agree, disagree, or just don't know, that an inspection was done by FERC in August 2005?

A. Just having read some of the articles in the newspaper that I have read, my understanding is that there was one very shortly prior to the failure having occurred.

Q. So, there was an inspection -- you would agree that an inspection did occur in August 2005?

A. Apparently, yes.

Q. Were you invited to attend that inspection?

A. I don't know, sir. I don't recall. I would not be surprised -- I would be surprised if they hadn't sent us some type of notification that it was taking place.

Q. But you did not attend the inspection, if they did invite you?

A. No.

Q. Would you make it a point of participating in such an inspection, or is it something that is not important for your division?

A. It not being a regulated dam, and us having a fairly small program to begin with, it's not on our high list of priorities.

Q. Taum Sauk is not on a high list of your priorities, is that what you said?

A. That's correct.

Q. Now, how soon --

JUDGE DALE: Before we continue with that, it's -- we've been going for over an hour and forty-five minutes. Let's take a ten-minute break and come back at half past and continue with questions for Mr. Alexander.

(An off-the-record discussion was held.)

JUDGE DALE: We're ready to go back on the record and resume with questions from Commissioner Clayton.

(Wherein, the requested portion of the record was read by the court reporter.)

QUESTIONS BY COMMISSIONER CLAYTON:

Q. I think what we were talking about the last FERC site-inspection that occurred in August 2005. Would you agree with that, that's when the last --

A. If you say so, yes, sir.

Q. And I think you suggested that you did not attend that inspection?

A. That is correct. This is not a regulated dam, and it's not something that is high on our to do list.

Q. I think you said that inspecting Taum Sauk wasn't a priority for your division?

A. Yes, sir.

Q. Now, have you ever done a site inspection of Taum Sauk with FERC?

A. I have been at, at least one, that I can think of. Yes, sir. It's been a number of years ago.

Q. You stated earlier that the Federal Energy Regulatory Commission is the lead organization -- or the lead government agency -- in regulating Taum Sauk?

A. Yes, sir. As far as safety issues are concerned.

Q. Thank you. Are you aware of whether FERC issued a report with regard to their inspection of Taum Sauk following the breach?

A. Say that again, sir.

Q. Did the FERC issue a report -- let me ask this, did the FERC inspect Taum Sauk following the breach?

A. They hired an independent panel -- it's my understanding -- to do that for them. They had people at the site that went around and looked at it along with everybody else, but their inspection is done by -- I believe -- an independent consulting engineering panel.

Q. So, is it your understanding that FERC did not do an inspection of Taum Sauk?

A. Following the failure?

Q. Following the failure.

A. They did make a -- they were there -- they were present. I do not -- I'm not aware of them having inspected the dam.

Q. So, they made a site visit then?

A. Yes, sir.

Q. Some sort of visit to the dam?

A. Yes, sir.

Q. And in association with that, was a report issued by FERC or by their consultant?

A. Their consultant issued a report, sir.

Q. Have you reviewed that report?

A. Briefly, yes.

Q. When you say briefly, what do you mean by that?

A. I'm not sure I've poured over -- and it's been a couple years -- approaching a couple years since that occurred, and I'm not -- I'm sure I looked at it, but I can't remember a lot of detail.

Q. Do you remember how large it is?

A. I don't recall.

Q. Did you read it cover to cover ever?

A. I would suppose I did, but I wouldn't --

Q. You're not for sure?

A. I'm not for sure.

Q. Is it possible that some of the questions that you asked here today could be answered in that FERC report?

A. That's a possibility. You know, a lot of the questions -- I want you to understand -- that a lot of the questions that I've raised here, we have -- it not being a dam that we regulate -- we don't have the right to compel an answer to those questions.

Basically, they are just questions that we have, as engineers out at the site, representing our Department.

But this is part of a civil suit, and as result of that, as that suit continues to go on, these questions will be part of our discovery, I'm sure.

Q. It's my understanding that you haven't even asked many of these questions of Ameren, let alone compelling an answer to Ameren?

A. I have brought these questions to the attention of our Administration.

Q. Who are you referring to?

A. I am referring to the Directors Office.

Q. So, in referring these questions to the Directors Office, did they tell you not to ask Ameren these questions?

A. I have not had the opportunity -- they did

not tell me not to, they just said those type of discussions would take place, you know, through our attorneys, but they were to handle the case.

We were supposed to advise them of the engineering aspects, and they were handling that part of the case.

Q. Well, help me understand the first time that you raised these questions?

A. Is that your question?

Q. It is.

A. These are questions that any engineer -- I think -- familiar with the site is going to ask in trying to understand what took place out at this site.

A set of equipment was operating there that -- for all intents and purposes, from everything I've seen and heard, and heard here today -- when tested after the fact the failure occurred, show that they were fully operational. But for some reason, as they were doing their job over a period of time, they were removed and adjusted assuming that they were malfunctioning.

And I have seen or heard no justification for why anyone thought they were malfunctioning and why they weren't just doing their job.

Q. Maybe you don't understand my question. When did you raise these six questions that you've

identified as being very important in this investigation?

A. This has been a compilation of questions that I've had from day one. Basically, as we've gone through them -- we tried to read through as much as you can -- and finally get to the point to where these are the questions that I have, that I do not and have not read or discovered the answer to.

Q. So, the day after the breach you had these questions?

A. Not necessarily. They developed in the period of time between then and now.

Q. So, over an 18-month period, these questions have come up?

A. Yes, sir.

Q. Do you think they're worth asking now?

A. Yes, sir.

Q. And yet the question hasn't really been posed to Ameren, just asking the question?

A. I do not know what has been posed to Ameren at this point.

Q. Okay. Is it true that you did not visit Taum Sauk for a period of two weeks --

A. Yes, sir.

Q. -- following the breach?

A. For medical reasons.
Q. I'm sorry?
A. I had medical problems with my eyes.
Q. And how many people did, from your division, did visit Taum Sauk?
A. I don't have a division, I have a program. But there's -- that program consists of four engineers, myself being one of them. The other three engineers were there, two of them -- at least one of them the day of the failure. Two of them, I know, the day after the failure, and a number of times between there and when I visited on December 29th.
Q. Okay. Are you aware -- well, let me ask this question. Have you talked to the FERC about the questions that you feel are important here today?
A. These same questions have been discussed with FERC over a period of time.
Q. And can you tell me whether FERC believes these questions need to be answered?
A. They have indicated that they were interesting questions. But to my knowledge -- and they even indicated at one point they were going to be something that was put into their report. But after that discussion occurred, the very next day the report came out, and they were not in it. No, sir.

Q. And that is the agency with the responsibility to regulate Taum Sauk for safety; is that correct?

A. Yes, sir.

Q. Okay. How many reports have you drafted in association with Taum Sauk, or have you drafted any reports or memorandums?

A. I have no -- we have tried to document our -- at least our early on association with everything that we did, some of which you are -- you have access to.

We also wrote up a report, our final conclusions of the Dam Reservoir Safety Program and have shared that with the Directors Office.

Q. So, did you prepare a memorandum dated January 19?

A. Yes, sir.

Q. Does that memorandum list any of these questions that you've raised here today?

A. This was not a question type of document. This was basically a chronological series of events that had taken place between December 14th and, I guess, January 19th.

Q. But this memorandum does not raise any of the questions that you mentioned here today; is that

correct?

A. I don't know that it asked any of those questions. It does elude to a number of those, saying things that we saw that we thought was curious. It helped formulate some of the questions that I have given to you today.

Q. Are there any other reports that you prepared in association with Taum Sauk?

A. Yes, sir. I mentioned one other one.

Q. What is the other?

A. That was just a summary of the findings of the Dam Reservoir Safety Program with regard to the failure.

Q. And what is the date of that document?

A. I do not know, sir.

Q. Could you approximate?

A. It was probably early 2006.

Q. So, about the same time -- about the same time as January 19, 2006?

A. I would say it was probably February and March, that time frame. It followed this report.

Q. And does that report list these questions that you've raised here today?

A. It does mention a number of them. Yes, sir.

Q. Do you know when the FERC report was issued?

A. No, sir.

Q. Do you know when the Highway Patrol report was issued?

A. No, sir.

Q. You stated -- you have stated, as listing out to your questions, that you were concerned about when the Warrick probes were moved following the breach; is that an accurate presentation of your question?

A. Yes, sir.

Q. And there were also suggestions in the press that there was some sort of tampering done; is that accurate?

A. They were -- their adjustments -- they were removed.

Q. How long were those probes to remain in place, in your opinion?

A. In my opinion, those probes should not have been removed until it was well documented as to their exact setting and what the -- everyone had a chance to verify that.

Q. Everyone had a chance to verify what?

A. Where they were set at the time of the

failure.

Q. When you say "everyone," do you mean your agency as well as the FERC?

A. Yes, sir.

Q. So, now Taum Sauk is a priority?

A. At the time it failed, and destroyed Johnson's Shut-ins State Park, it became a very high priority for the Department of Natural Resources.

Q. Are you aware of whether the FERC has ever accused Ameren of improperly tampering with those probes?

A. I'm not aware of that, sir.

Q. If there was improper tampering or improper removal of the probes, is that something that FERC would have raised in their report?

A. I would think that the fact that they had been removed should have been part of that report. Whether it was or not, I don't recall.

Q. You don't know if it's in the report?

A. I don't remember.

Q. You don't remember. At any point, have you written any document, any report, which suggests illegal or improper tampering with the Warrick probes?

A. I know that we have -- I would stop saying illegal. I know that we had pointed out, and have had

as a subject of conversation, as to questioning why those probes would be removed when they were such a key part of the event.

Q. Do you believe that is still an important fact even if Ameren has already admitted that they were improperly set?

A. I think it is. Yes, sir.

Q. Are you aware of who the outside testing company was in association with the FERC?

A. No, sir.

Q. You don't know the name of the firm, or the engineers, or consultants that did the inspection?

A. It was a panel of experts, to my knowledge.

Q. I'm asking.

A. I think it was a panel of experts that represented more than one company. It wasn't just a company, it was a panel that they placed together.

Q. Do you know if that panel or company tested the Warrick probes?

A. I don't know that, sir.

Q. Are you aware of any information that would suggest that the outside testing company thought that the Warrick probes had been tampered with?

A. Well, the fact they had been removed the day of the event is the only tampering that was done

to my knowledge.

Q. You were interviewed by the Highway Patrol?

A. Yes, sir.

Q. Did you ever advise them in your statements that you believe that the Warrick probes had been tampered with?

A. I did advise them that the Warrick probes had been removed the morning of the failure and were later observed on December 29th laying down in the power house.

Q. Do you know the date of that -- is that in a statement somewhere?

A. That --

Q. That you advised the Highway Patrol that someone had tampered with evidence, could you identify that statement for me?

A. I don't have the -- I don't think -- all I have been given here is a copy of a chronological event memo that I wrote on January 19th, and it does not reflect what was discussed with the Highway Patrol when they did their interview.

So, no. I cannot point to where I brought that out, but I would assume that would be part of that.

Q. But you can't identify here today where, in any of your statements made to the Highway Patrol,

that someone had jacked with the evidence, or tampered with the evidence?

A. No, sir, I cannot. Based on what --

Q. Do you acknowledge that you made the statement to the press that someone had "jacked" with the evidence?

A. Yes, sir. I did.

Q. Do you have regular contact with the press?

A. I have had a number of times. Yes, sir.

Q. How often would you say you have contact with the press in your position -- at your program, or your division?

A. I have, probably, half a dozen times a year.

COMMISSIONER CLAYTON: Judge, I don't have any additional questions.

If I could do something, we did want to acknowledge J.C. Kuessner is here -- I'm not sure of his district. Is it Shannon or Reynolds County?

MR. KUESSNER: Shannon and Reynolds.

COMMISSIONER CLAYTON: He had inquired and we wanted to acknowledge him.

COMMISSIONER GAW: I don't have very many questions.

QUESTIONS BY COMMISSIONER GAW:

Q. Mr. Alexander, you testified, I believe, that you have read, or perused, or scanned, or something, the FERC Independent Panel of Consultants report that was submitted, I believe, on May 24, 2006; is that correct.

A. Yes, sir. I have seen that report and have looked at it, but it has been many, many months since I did that. It's been close to two years.

Q. Do you know whether or not that report makes any findings in regard to the height of the two Warrick probes at the time of the breach?

A. I don't recall, sir.

Q. Do you have a copy of that report with you?

A. No, sir. I do not.

COMMISSIONER GAW: Does someone have a copy for purposes of reference, because I suspect it's the FERC report that was done by the Independent Panel of Consultants.

MR. BYRNE: We have it.

MR. THOMPSON: I have a copy upstairs, Commissioner.

COMMISSIONER GAW: My copies have writing on them. Let me see if I have a -- let me see if I have an extra copy that's got some highlight on it, hopefully none of my other notes on it. Should be

interesting if it does.

Can we give that some sort of a number?

JUDGE DALE: Are we going to use it?

COMMISSIONER GAW: I suspect so, because it is one of the more significant documents in regard to the technical reason for the breach.

It's a document that's entitled: Taum Sauk Reservoir Dam Breach No. P-2277, Technical Reasons for the Breach of December 14, 2005 by FERC Panel of Independent Consultants, dated May 24, 2006.

JUDGE DALE: Let's go ahead and mark that as Exhibit 3, and we'll get a copy of it and make sure we get a clean copy into the record.

(Hearing Exhibit No. 3 was then marked for identification by the Court.)

COMMISSIONER GAW: I'm not going to spend much time on this.

QUESTIONS BY COMMISSIONER GAW:

Q. Mr. Alexander, do you have that document in front of you?

A. Yes, sir. I do.

Q. And you have you seen it before?

A. Yes, sir.

Q. Okay. Is that the document that you refer to earlier as the report of the FERC Independent Panel

of Consultants?

A. Yes, sir.

Q. Look at Pages 25 and 26 where it refers, under 7.3, emergency water level protection backup system as found. Do you see that?

A. On Page 25?

Q. Hopefully we're on the same document. Do you see Page 25? Is there a 7.3?

A. Yes, there is. Paragraph 7.3.

Q. Would you read that, from 7.3 on into the next page, to the end of that paragraph, that first paragraph on 26?

A. An internal e-mail, dated October 7, 2005, stated: The Hi and Hi-Hi Warrick probes were seven inches and four inches from the top of the wall respectively. So if, on 9/27, the level was four inches below the wall, the Hi level Warrick should have picked up. And if you want to lower the Hi level probes, we can do that, but I think we chose the levels so that normal wave action wouldn't cause nuisance trips. Since the top of the wall --

COMMISSIONER GAW: Let me stop you for a moment. There is an ending quote there, you have stopped the quotation of an e-mail; correct?

A. Yes, sir.

Q. Now continue.

A. Since the top of the wall at the location of the Warrick probes was determined to be at elevation 1597.92 by AmerenUE in 2004 and 1598.0 by KDG after the breach in December 2005, the Hi-Hi probe would have ranged between elevation 1597.59 and 1597.67. The Hi probes could have ranged from 1597.35 to 1597.42.

Q. Now, would you agree with me that that appears to be a conclusion of this Independent Panel in regard to the height of these probes?

A. That is their best estimate, sir.

Q. Were you aware of the fact that they made a finding of that sort before your testimony today?

A. I did not recall that. No, sir.

COMMISSIONER GAW: That's all I have. Sir, thank you.

COMMISSIONER APPLING: Just two questions for clarification.

QUESTIONS BY COMMISSIONER APPLING:

Q. You talked a lot today about the Warrick probes that have been removed?

A. Yes, sir.

Q. What is that number, is that two, five, or what?

A. Two.

Q. Two. And those were on the ground in the warehouse when you first saw them?

A. Yes, sir.

Q. Give me a brief -- if you would -- talk to me just briefly about what the Department of Natural Resources's responsibility was to this investigation? If you have -- and if you don't, I'll ask somebody else later on.

A. I think there was -- and I'll put my two cents worth, and let others speak as they will.

My opinion was, our responsibility was to the State of Missouri in that State property was damaged, and we needed to make sure that the truth was known as to what caused the failure, what resulted in the failure, and that justice was served.

Q. Where were the two Warrick probes, were they close to the breach or away from the breach?

A. They were located -- no, sir. They weren't close to breach. They were located fairly close to the end where the tunnel was. And the breach occurred -- that would have been the southeast -- no, southwest corner, and the failure occurred in the northwest corner.

COMMISSIONER APPLING: Thank you very much.

I appreciate your comments today.

THE WITNESS: Thank you.

QUESTIONS BY COMMISSIONER GAW:

Q. I want to follow-up on something I didn't do.

Mr. Alexander, I want to ask you whether or not you have had any experience or training in dealing with this particular type of a reservoir, and if you can answer that question?

A. This is not the typical type of reservoir that we regulate, although it bears a great deal of similarities to those. So, this would be the -- we do not have a pump-storage facility located in -- as part of the dams that we do regulate.

This does not pose all that great a difference between how this one was built as to a lot of the industrial dams that have been built.

Q. The reasons I'm asking this question has to do with whether or not you have any experience or training regarding the appropriate protocol on filling water in a reservoir of this type, up against a wall -- a parapet wall -- in such as the one that we're dealing with?

A. I'm not aware of there even being a training on how to -- that addresses that particular

subject.

Q. So, the answer to that is you don't have any special --

A. I have not gone to any training that would instruct me on how a reservoir should be filled. It just comes from general engineering experience.

Q. I understand. What I'm looking for here is, there are other reservoirs of this type, not necessarily constructed in the same fashion, but there are other functional reservoirs that exist in the United States and around the world?

A. Yes, sir.

Q. And there is some reference to the level -- fill level -- in some of the FERC report. And what I'm looking for is whether or not you have any experience or training in regard to the opinions that are in that report about the appropriateness of the fill level that was being done according to the historical records we have at Taum Sauk, the height of the water level up against that wall?

A. No, sir. The only thing I would say to that is, the general practice of filling it within one foot of the top of the wall was pushing the curve to a certain extent, and when you don't know what the water level is in the reservoir with a great deal of

accuracy, that is being -- it's a dangerous practice to go that close to the edge.

Q. Your specific comment at this point relates to the question of whether or not they were filling it too close to the top; correct?

A. Correct.

Q. In regard to whether or not there was a danger or a high risk of overtopping as result of instrument failure or improper placement of instruments and not having appropriate fail-safe, those kind of things? Is that a yes?

A. Yes, sir.

Q. The question that I'm asking is a little bit different than that. If you would look at that FERC report again, on page -- let's start at Page 10, under 3.2. If you can get to that point with me. Are you there?

A. Yes, sir.

Q. Look at the last sentence on that first paragraph, and if you would read that to me, and then I want to ask you if you have an opinion about that?

A. The design decision -- excuse me. The design decision made for Taum Sauk Reservoir Dam to routinely store water six to eight feet high on a ten-foot high parapet wall, then daily operations,

made the Taum Sauk rockfill CFRD -- and it says quotes -- unprecedented as compared to the previous CFRDs as summarized by Cook 1988 -- and then it says in quotes, figure three dash one.

Q. First of all, do you understand what that statement -- that sentence is saying?

A. I think -- well, I have an opinion what it says.

Q. I want to make sure we're on the same wave length. Do you understand what that sentence says?

A. I think so.

Q. And do you have an opinion in regard to whether or not that sentence is accurate?

A. No, sir.

Q. Let me then ask you -- and the answer may be exactly the same here because it's the same basic topic. Turn to Page 12, are you there?

A. Uh-huh.

Q. First full paragraph, look at -- let's see -- the sixth line down, where it begins "the rockfill embankment?"

A. Yes, sir.

Q. Read that for me if you would.

A. The rockfill embankment, as discussed in Section 3.1, was a steep dumped rockfill, and the

storage of water on the Hi parapet wall was unprecedented.

Q. Go ahead and read the next sentence as well.

A. There was most likely no margin for additional loading or overtopping, as was the case with the breach on December 14th.

Q. Once again, I'll ask you whether you understand what you just read?

A. Yes, sir.

Q. And do you have an opinion as to its accuracy?

A. No, sir.

COMMISSIONER GAW: That's all I had. Thank you, sir.

JUDGE DALE: Are there any other questions from the Bench?

With that, does Ameren have any questions?

MR. HAAR: Just a few, Your Honor.

QUESTIONS BY MR. HAAR:

Q. Mr. Alexander, I want to make sure that the record is clear. I think you testified that you recall scanning the FERC Independent Panel of Consultants Report at some point?

A. Uh-huh.

Q. When do you think that was?
A. Shortly after its coming out.
Q. But it's been a long time?
A. Yes, sir.
Q. Did you ever review the report that was done by FERC's staff on April 28, 2006?
A. I'm sure I've seen it, sir. But I don't recall it.
Q. You don't recall the details of it?
A. Yes, sir.
Q. And you don't recall whether it addresses any of your questions?
A. That's correct, sir.
Q. Do you recall whether you ever reviewed the Rizzo Report of April 5, 2006?
A. I have seen that report. Yes, sir.
Q. And do you -- when did you last review it?
A. It's been well over a year ago.
Q. Do you have any recollection of it, any specific recollection, as you sit here today?
A. Not particularly. No, sir.
Q. So, you don't know if that report may have addressed the questions that you've asked?
A. I do not recall it having done so. No, sir.

Q. But you don't have much of a specific recollection of it today?

A. No, sir. That's correct.

Q. And I think you did testify that you have not read the Missouri Highway Patrol report?

A. That is correct.

Q. Now, I want to follow-up on the question about your discussions with the press. And you were quoted in the press as saying AmerenUE jacked with the probes; is that correct?

A. Yes, sir.

Q. What do you mean by "jacked?"

A. I meant, in that conversation that they had, someone had gone up there and removed the probes.

Q. And what do you mean by removed?

A. That they had taken them off the side of the reservoir rim and had taken them down to the power house.

Q. You're sure about that?

A. That's what I was told by Ameren.

Q. You were told that by Ameren?

A. Yes, sir.

Q. I take it then, you don't have any information that the probes were raised or removed after the breach for any purpose other than to test

them, you don't have any other information do you?

A. No, sir.

Q. You don't have any information that they were removed for any improper purpose or to instruct an investigation; you don't have any information like that, do you?

A. No, sir.

Q. And when -- there was a reference to your interview by the Missouri State Highway Patrol. And do you recall being interviewed by Sergeant Wiedemann on February 2nd, 2006?

A. I was interviewed by the Highway Patrol. Yes, sir.

Q. And is it your testimony that you haven't seen a copy of the report of your interview?

A. I have seen what I -- the summary of what I said. I have not seen the Highway Patrol report, but that is supposedly contained in that report.

Q. Do you have any explanation why, in Sergeant Wiedemann's report on February 2nd, 2006, there is no reference to you suggesting to him that you thought AmerenUE had jacked with or improperly handled the probes.

A. It surprised me -- if that's not been mentioned in that report it would be a surprise to me.

Q. So, you have no explanation as to why it's not there?

A. No, sir.

Q. Now, there was some questions about your trip to Taum Sauk on December 29, 2005; do you recall that?

A. Yes, sir.

Q. In fact, I think you have a copy of that memo in front you?

A. Yes, sir.

Q. And that was the first time that you went to Taum Sauk after the breach; is that correct?

A. That is correct.

Q. And that was to attend a briefing on the failure of the reservoir, was it not?

A. Yes, sir.

Q. And in fact, in addition to you being present, there were representatives of FERC present; do you recall that?

A. Yes, sir.

Q. And there were representatives of the Public Service Commission, was there not?

A. Yes, sir.

Q. And do you recall that -- when you went to that presentation or briefing -- that on

December 29th, AmerenUE told you, and the representatives of the other agencies present, that the breach was due to human error and malfunction of equipment?

A. Yes, sir.

Q. Do you recall being told that?

A. Yes, sir.

Q. And do you recall in that same meeting, two weeks after the breach, AmerenUE representatives telling you that the Warrick probes had been placed too high?

A. I don't not recall that, sir. The first time I remember any reference made to the Warrick probes was when I saw them in the power house and asked what they were.

Q. And was that on the 29th?

A. Yes, sir.

Q. Are you sure you saw the Warrick probes?

A. That's what I was told they were, sir.

Q. Well, let me refer you to your report. Do you have it there? Your report dated January 19th of your December 29th visit?

A. Yes, sir. I have that.

Q. Do you see the second full bullet point in your memo that begins: The second set of instruments

served as a backup? It's on the second page of your report.

A. Yes, sir.

Q. And if you'll look at the third sentence in that bullet point, does it read: Statements were made by AmerenUE staff that this set of instruments appeared to have been improperly set at the wrong elevation?

A. Yes, sir. It does say that.

Q. It goes on to say: They commented that the instruments may have been set at an elevation that was set higher than the minimum top of wall elevation?

A. Yes, sir.

Q. And you understand that's a reference to the Warrick probes?

A. Yes, it is. I was wrong in what I said.

Q. You were told that on December 29th by Ameren?

A. Yes, sir.

Q. Now, you -- in the bullet point above that -- refer to certain piezometers; is that correct?

A. Uh-huh.

Q. What's a piezometer?

A. That's basically the same thing as -- I'm referring to those as -- that's the Warrick probes.

Q. What is the purpose of a piezometer?
A. That was incorrect, me referring to them as piezometers. That was my understanding of what they were, but that was not -- they were not the pressure transducers.
Q. Right. In fact, there are two different types of probes in this case; is that correct?
A. Yes, there are.
Q. There are the piezometers, or level transducers?
A. Yes, sir.
Q. And what's the function of the piezometers, or level transducers?
A. It is to tell you what the water level is in the reservoir.
Q. And the Warrick probes are not piezometers, are they?
A. My understanding is they are not.
Q. They are called conductivity probes?
A. Yes, sir.
Q. They work on an entirely different principle?
A. Yes, sir. I understand that now.
Q. So, in that paragraph when you refer to the piezometers have been removed and put on the table in

the power house --

A. That was the Warrick probes is what I was referring to.

Q. How do you know if they were the Warrick probes if you referred to them as piezometers?

A. Because that was the emergency set, was what it was explained to me.

Q. So, you couldn't, looking at them, determine if they were Warrick probes?

A. No. I did not know what a Warrick probe was, at the time.

Q. Would you be surprised to know on December 29th the Warrick probes were up at the Upper Reservoir?

A. I was told they had been removed the morning of the failure.

Q. Do you know who told you that?

A. Mark Birk and Warren Witt were the ones conducting that meeting.

Q. So, you don't have any personal knowledge of where they were that day?

A. No, sir.

Q. So, in addition to AmerenUE telling you on December 29th, your first visit at the reservoir, that the probes were put too high, they provided you and

your agency other information, did they not?

A. They provided us a great deal of information.

Q. In fact, when you did talk to Sergeant Wiedemann, you provided him a copy of your PowerPoint presentation; is that correct?

A. As it was at that point. Yes, sir.

Q. Was that the same PowerPoint presentation that you presented to us today?

A. No, sir.

Q. Are there any slides or information that you removed from your PowerPoint presentation?

A. Not that I recall having removed any. There may have been some that didn't really tell much of a story, but I basically added to it. I haven't removed much.

Q. Do you recognize this drawing?

A. Yes, sir.

Q. Was that part of your PowerPoint presentation before today?

A. It may have been.

Q. What is this drawing?

A. I believe that indicates the level -- the water level controllers.

Q. This was a drawing that you were given by

AmerenUE, you and the other agencies, setting out where it had been determined the Hi and Hi-Hi probes were located on the day of the breach; correct?

A. It was their best estimate, yes.

Q. And that shows that those probes were too high --

A. Yes, sir.

Q. -- to detect the water level at the time of the breach; is that correct?

A. That's correct.

Q. Do you have any explanation why you didn't include that in your presentation this morning for the Commission?

A. Primarily, because this is a presentation that I had been making to a number of people, and they didn't understand what they were looking at, so I just limited it.

Q. So you decided to keep it out?

A. It may be a hidden slide that's on there, I'm not sure. Just in the name of brevity, I eliminated that.

COMMISSIONER GAW: Pardon me. It would be helpful if the Bench could have some idea of what that looks like.

MR. HAAR: I will mark it as an exhibit,

Commissioner Gaw.

JUDGE DALE: It will be No. 4.

MR. HAAR: I'm sure I can find other copies.

COMMISSIONER GAW: I don't need it now, but it would be helpful to have it.

MR. HAAR: I will mark it has Exhibit 4 at the end of the examination.

QUESTIONS BY MR. HAAR:

Q. Were you aware that members of the DNR were present on December 15th, the day after the breach?

A. Yes, sir.

Q. In fact, part of your PowerPoint presentation was a photo of the control box where the probes are located; is that correct?

A. Yes, sir.

Q. And did your staff, on December 14, 2005, when the probes were -- that includes both the piezometers and the Warrick probes -- were up at the Upper Reservoir, do you recall whether your staff asked Ameren to take any measures with respect to those probes?

A. No.

Q. Did your agency ever ask AmerenUE to take any measures with respect to the probes?

A. I can just speak for the Dam Reservoir Safety Program, and we did not.

Q. Now, there is another aspect of your testimony that I wanted to clarify.

You referred to various locations of overtopping; do you recall that?

A. Yes, sir.

Q. Now, it is not your testimony, is it, that those areas of overtopping occurred prior to December 14th?

A. I don't know when those occurred, sir.

Q. So, they may have occurred at the time of the breach?

A. It's a possibility.

Q. But you have a question about that?

A. Yes, sir.

Q. And you don't know whether any of these reports may have addressed those questions, do you?

A. No, sir.

MR. HAAR: I have no further questions.

JUDGE DALE: Does DNR have any?

MS. VALENTINE: Just a few.

QUESTIONS BY MS. VALENTINE:

Q. Jim, Mr. Haar asked you about being at the dam on December 14th for an inspection. Do you recall

if you were actually there on the 14th or was it the following day on the 15th?

A. We had people there on-site on December 14th, the morning of the failure, but we were not allowed to go to the Upper Reservoir. The first time we were able to go to the Upper Reservoir was December 15th.

Q. And when you say you were not allowed, is that because AmerenUE wouldn't allow you to inspect the reservoir on the day of the breach, on the 14th?

A. They wouldn't -- basically, we were prevented from going up there for safety purposes while they were stabilizing the structure.

For safety reasons, I think, no one was allowed to go up to the Upper Reservoir.

Q. Now, how many regulated dams are there in the State of Missouri?

A. Six hundred and sixty-one, I believe.

Q. All right. And did you -- I believe you already testified that, under the Dam Safety Law, DNR does not regulate the dams that are primarily regulated by FERC; is that correct?

A. That's correct.

Q. How many FERC dams are there?

A. I believe there are eight, but I'm not

positive.

Q. Do you know how many of those are owned by Ameren?

A. Four. I'm not sure of that either.

Q. So, as Chief Engineer, your primary focus was on the 661 dams regulated by the State of Missouri and not FERC?

A. That's correct.

Q. When did you first learn about -- that you would be summoned to testify or answer some questions at this hearing?

A. I was contacted by someone from the Public Service Commission about a month ago, or maybe longer, where they asked me if I would be willing to do that.

I was contacted yesterday, I believe, and told that the meeting was today, and I needed to be here at 1:30.

Q. So, you learned yesterday that you were going to have to testify at this hearing today?

A. Yes.

Q. During the questioning you were asked about several reports including the FERC report. And some of those you couldn't remember the details of those reports; is that correct?

A. That's correct.

Q. And Jim, is part of the reason for that because you didn't have a whole lot of advance notice that you would be testifying at this hearing today?

A. That's correct.

Q. But as an employee, and as Chief Engineer, you are willing to answer any other questions and make yourself available if the PSC has any further issues?

A. That's correct.

COMMISSIONER CLAYTON: Can I ask for clarification?

Who called -- he only got notice yesterday, who called him to testify? He wasn't subpoenaed.

MR. THOMPSON: I arranged it with Mr. Childers.

COMMISSIONER CLAYTON: Yesterday?

MR. THOMPSON: No, it was last week.

COMMISSIONER CLAYTON: You said you were contacted a month ago by the PSC?

THE WITNESS: Someone from the PSC contacted me and asked if I would be willing to come before you at some point in time and show this PowerPoint presentation. And I said I would be willing.

COMMISSIONER CLAYTON: And you don't know who contacted you?

THE WITNESS: I don't know who it was, sir.
MR. THOMPSON: That was me.
COMMISSIONER CLAYTON: That was you a month ago also?
MR. THOMPSON: Yes.
THE WITNESS: But all that was specified then was to ask if I would be willing to show the PowerPoint presentation that you saw today.
MS. VALENTINE: I have some more questions.
QUESTIONS BY MS. VALENTINE:
Q. I don't know if we've gone over this. As far as appearance today, were you served with a subpoena?
A. Yes, I was.
Q. But not until you actually showed up and you were served after you arrived?
A. That's correct.
MR. HAAR: I do have, for the Commission, a copy of that document, which I think you indicated would be marked Exhibit 4.
JUDGE DALE: Yes.
(Hearing Exhibit No. 4 was then marked for identification by the Court.)
MR. HAAR: That's an extra copy.
JUDGE DALE: If there are no further

questions for this witness, you may step down. Pursuant to Counsel's request earlier, you won't be excused, but you can leave for the day. Good luck getting to your meeting on time. And you are excused.

THE WITNESS: There was a number of things that had been handed to me, I should leave them here?

JUDGE DALE: Actually, give them to me.

MR. THOMPSON: I have a question about those things. Exhibits 3 and 4, have they been received into the record?

JUDGE DALE: They have not been. Nor has Exhibit 1. We should also do your PowerPoint.

THE WITNESS: You are welcome to keep that.

JUDGE DALE: Can you eject it?

MR. THOMPSON: I thought that Exhibit 1 was received, but in any event, I will move that it will be received at this time.

JUDGE DALE: Any objections?

MR. HAAR: No, Your Honor.

We'll also move for Exhibit 4.

JUDGE DALE: In that case, Exhibits 1, 3 and 4 are admitted.

(Hearing Exhibits 1, 3 and 4 were then entered into evidence.)

COMMISSIONER GAW: Judge, at some point in

time -- the parties can help facilitate this -- I would like to be able to have the other FERC documents in so we can refer to them.

MR. THOMPSON: It's always been our intention to put them into the record.

COMMISSIONER GAW: I expect that it was, but I don't know if that had been discussed. And I want to let you know the actual FERC report, and then the Rizzo Report, is out there, too -- for what they are worth. They are all elements of this investigation, and I don't know if there is something else that might come into play here, but I will toss that out to you. So, you all figure out what you want to do, and if it's not objectionable --

MR. THOMPSON: Thank you, Commissioner.

JUDGE DALE: This seems to be a good time for a break. Why don't we take a little bit longer one and then go all the way to seven -- well, roll your eyes all you want, let's reconvene in 20 minutes at ten-of, and the next witness is Mr. Zamberlan and then Mr. Bluemner. And at the rate we're going, I bet you we don't get to Mr. Pierie. I'm seeing nods.

MR. THOMPSON: Thank you.

(An off-the-record discussion was held.)

JUDGE DALE: We're back on the record, and

it's five to five, and we're going to go straight through to seven o'clock.

We're are going to call Mr. Zamberlan to the stand.

ANTHONY ZAMBERLAN,

Of lawful age, being first duly sworn by the Notary Public, testified as follows:

JUDGE DALE: And we will begin with questions from Staff.

MR. THOMPSON: Thank you, Your Honor.

Q. Did you state your name?

A. Not myself, no.

Q. Go ahead.

A. My name is Tony Zamberlan.

Q. Is that Anthony or --

A. Yes, sir.

Q. Could you spell your last name?

A. Z-A-M-B-E-R-L-A-N.

Q. Now, Mr. Zamberlan, how are you presently employed?

A. I'm an engineer for the firm of Laramore, Douglass and Popham Consulting Engineers.

Q. And how long have you been so employed?

A. It would be four-and-a-half years now.

Q. And at one time, it's true, is it not, that

you were employed by Ameren?

A. Yes, sir.

Q. Of the Ameren entities, was it UE or another?

A. It was UE.

Q. Okay. And in what capacity were you employed by UE?

A. Basically, I was an engineer for the utility working on the power plant operations side of the business, working as a plant engineer or a corporate engineer, before I left the utility for a consulting firm.

Q. And you left, do you recall what year?

A. It was 1998/1999 time frame. I apologize I don't have better dates for you.

Q. And did you work for someone between your present employer and Ameren?

A. Yes, sir.

Q. Who was that?

A. The company's name is Fru-Con Engineering, F-R-U dash C-O-N.

Q. And that was your only employer in between?

A. No, sir.

Q. Who else?

A. I also worked for GE Automation Services.

Q. Anyone else?
A. That is it.
Q. And for both Fru-Con and GE Automation Services you were employed as an engineer?
A. Yes, sir.
Q. Now, within the realm of engineering, is there a particular area that you specialize in?
A. The majority of my work is in the control systems engineering part of the business; however, I do power engineering as well.
Q. Are you what's called an electrical engineer?
A. Yes, sir.
Q. And are you a licensed Professional Engineer?
A. I am a licensed Professional Engineer in the State of Missouri. Yes, sir.
Q. Are you so licensed in any other jurisdiction?
A. No, sir.
Q. And where did you receive your engineering education?
A. I attended the University of Missouri, Columbia.
Q. Do you recall the year you graduated?

A. I graduated in 1991.
Q. And what degree did you receive?
A. I received a degree in Electrical Engineering and Computer Engineering.
Q. At the same time?
A. Yes, sir.
Q. Were those bachelor degrees or masters degrees?
A. They are bachelors degrees.
Q. And have you sought a higher degree since then?
A. No, sir.
Q. So, you have all the degrees you need to do the work that you do?
A. Yes, sir.
Q. And since you have worked for your current employer -- who I think is, perhaps, abbreviated as LDP?
A. Yes, sir.
Q. Since you worked for LDP, you have had occasion, have you not, to do projects for Ameren?
A. Yes, sir.
Q. Under some sort of contract?
A. Yes, sir.
Q. The contract, I guess, is probably with

your current employer, and then, in the course of your employment, you go where they direct you, and you do what their customer asks you to do; correct?

A. In essence. Yes, sir.

Q. Have I misstated the --

A. At times it would be as a Contract Engineer working directly for Ameren under their direction.

Q. I see, you're kind of loaned out or rented out?

A. Yes, sir.

Q. It's a way for them to have more engineers available without having to hire them, I supposed?

A. Yes, sir.

Q. In the course of this, have you had occasion to work at the Taum Sauk Plant?

A. Yes, sir.

Q. Do you recall when you worked at the Taum Sauk Plant?

A. That would be the project in 2004.

Q. And what was that project, if you recall?

A. The project was to replace the control system for the Taum Sauk Power Plant.

Q. And was that, perhaps, in conjunction with some other work there? Maybe not performed by you, but other work done at that plant?

A. Certainly. Yes, sir.
Q. If you recall, was it in conjunction with the installation of a liner at the Upper Reservoir?
A. Yes, sir.
Q. And in conjunction with that, new instrumentation was placed?
A. Yes, sir.
Q. And you were involved in that?
A. In some of it. Yes, sir.
Q. And when you say "in some of it," exactly what was your responsibility with respect to the new instrumentation?
A. My responsibility was to design the computer controls for the plant and how they brought the information from instrumentation into the plant for its operation.
Q. So, your area was the computer controls?
A. Yes, sir.
Q. If you know, did the system at Taum Sauk involve something called a programmable logic control switch?
A. It's not a programmable logic control switch, it's a programmable logic controller, and it functions essentially as a computer.
Q. Is that abbreviated as a PLC?

A. Yes, sir.
Q. And it is, like you say, like a computer?
A. Yes, sir.
Q. And what exactly is the purpose of a PLC?
A. The purpose of a PLC is to contain a program which analyzes inputs and generates outputs.
Q. And if you recall, what were the inputs to the PLC at Taum Sauk?
A. There were several PLCs --
Q. There were more than one?
A. -- working in conjunction at Taum Sauk, yes, sir.
Q. How many, if you recall?
A. I believe there was at least eight PLCs at Taum Sauk.
Q. And --
A. Excuse me, sorry. I apologize. At least nine.
Q. And did you program all nine?
A. No, sir.
Q. Who else did you work with on this project in 2004?
A. There were several people involved. Tom Pierie, from Ameren, was who I was essentially working for on that project. But at the same time, a company

by the name of American Governor was installing a new PLC control system that actually controlled the turbine pump assembly for pumping back or generating power.

Q. Is that one of the nine PLCs you referred to?

A. That is four of the nine.

Q. Okay. Do you recall what the other five were for?

A. There would be one PLC at the Upper Reservoir, one PLC at the Lower Reservoir, a PLC for Unit 1, and a PLC for Unit 2, and a Common PLC, and finally, a PLC for what is called a liquid rheostat.

Q. What is a liquid rheostat?

A. A liquid rheostat is a device that can do many things. It helps start large motors. In this case, to bring it up softly and not over-current the system.

Q. Would these be the large motors that were used for pumping?

A. They would be motors attached to those assemblies, to bring them up to speed before they connected them to the line. Yes, sir.

Q. Then you said there was a Common PLC. Could you explain a Common PLC?

A. Certainly. There were points in the plant that were common to both Unit 1 and Unit 2, and the way the information was brought into the plant was through that Common PLC.

Q. Now, do you recall the sensors or probes or instruments that were located at the Upper Reservoir?

A. Yes, sir.

Q. Would you agree with me that there were two systems?

A. Yes, sir.

Q. One system consisted of what have been called Warrick, or conductivity probes?

A. Yes, sir.

Q. And the other system consisted of three piezometers?

A. Correct.

Q. And did those instruments feed into the PLC?

A. Yes, sir.

Q. Now, you told me there was an Upper Reservoir PLC?

A. Yes, sir.

Q. If you know, were those instruments connected to the Upper Reservoir PLC?

A. Most of them. Yes, sir.

Q. Were they connected also to the Common PLC?
A. There was a set of the Warrick probes that was connected to the Common PLC.
Q. Now, we've heard that there were actually four Warrick probes and two sets. There was a Hi and a Hi-Hi probe, that's two. And there was a Lo and a Lo Lo probe?
A. Yes, sir.
Q. Is that your memory?
A. Yes, sir.
Q. And if you recall, which of those was connected to the Common PLC?
A. I don't recall.
Q. It's also -- well, the Warrick probes were intended to be backups to the piezometers?
A. Correct.
Q. If I'm saying that correctly?
A. Yes, sir.
Q. And the piezometers were the primary operating instrumentation?
A. Correct. It was a continuous level transmitter that would show what the level of the reservoir was at, essentially, any given time.
Q. And those levels, did they appear on an operator's screen -- or something of that sort --

somewhere?

A. Yes, sir.

Q. There was a special name for that, wasn't there, some sort of interface?

A. It's a term, HMI, or Human Machine Interface.

Q. Is that what we would consider to be like an operator's computer terminal?

A. It would be the equivalent of a computer that you would use for Word or Excel, that kind of idea. It would have had special graphics on it and special interface functions so an operator could operate his or her plant.

Q. The three piezometers provided three measurements; isn't that right?

A. That is correct.

Q. Which were then averaged by the logic circuit?

A. Yes, sir.

Q. Was the logic circuit part of the PLC?

A. Yes, sir.

Q. And it was the average value then that appeared on the controller at the interface?

A. It was one of the values that could be displayed.

Q. Were there three separate values displayed, if you know?

A. They could be. It was an operator selectable feature.

Q. So, whoever happened to be operating at any given time could select the display they want?

A. Yes, sir.

Q. And what about the Warrick probes, do you know whether the values -- whether the Warrick probes displayed a value on the control?

A. The Warrick probes would display a value only when an alarm condition existed.

Q. And they didn't measure a depth, did they?

A. No, sir.

Q. They just measured on or off; correct?

A. Correct.

Q. And they would trip on when they became wet?

A. Correct.

Q. In the case of the upper probes?

A. Correct.

Q. And I guess the lower probes if they became dry?

A. Correct.

Q. And the purpose of the upper probes was to

prevent the reservoir being filled too full?

A. Correct.

Q. And the purpose of the lower probes was to prevent the reservoir from being emptied too low?

A. Correct.

Q. Now, there was a problem, was there not, if you recall, with the lower probes on the night of November 30th/December 1st of 2004.

A. To the best of my memory, yes, sir. There was.

Q. There was an alarm from one of the lower probes that, in fact, stopped the operation that was going on at that time, whether it was generating or pumping?

A. Yes, sir.

Q. Okay. And if you recall, was in fact the water level low when that occurred?

A. To the best of my recollection, I believe it was not low at the time.

Q. So, that would have been considered an anomalous alarm?

A. Spurious trip. Yes, sir.

Q. But from the point of view from Ameren, that would be something of a serious matter, would it not, if it stopped the operation?

A. Certainly.
Q. Something they would want to fix?
A. Yes, sir.
Q. Do you recall whether you traveled to Taum Sauk on December 1st to assist Ameren in resolving the problem with the probe?
A. Again, to the best of memory, I did travel to Taum Sauk to assist in that and other things.
Q. And your specific jobs was controlling logic, the program, correct?
A. Yes, sir.
Q. So, your job would have been to make sure that the logic circuit was programmed accurately?
A. And the value that was coming up was a valid signal to the PLC.
Q. Would it have been part of your job to check the physical condition of the instruments?
A. At the time, it would have been something I could have done; however, I didn't have as much knowledge of that system as others. My focus was on the PLCs and communications and things to that extent.
Q. Was it ever part of your job to install the instruments, physically install them at the plant?
A. No, sir.
Q. Who had that job, if you know?

A. During the outage, I believe it was Sachs Electric that installed those probes.

Q. Do you recall being interviewed by the Missouri Highway Patrol?

A. Yes, sir.

Q. And at that -- have you had a chance to review the Highway Patrol notes of those interviews?

A. Yes, sir.

Q. Have you reviewed them recently?

A. Yes, sir.

Q. And do you have any corrections that you feel need to be made?

A. Several.

Q. Very good. Let me bring you copies of those.

MR. THOMPSON: And Judge, I would ask that they be marked as Exhibits 5 and 6.

JUDGE DALE: Tell me which ones are which, respectively.

MR. THOMPSON: Exhibit 5 would be the interview of Mr. Zamberlan by the Highway Patrol which occurred, I believe, on January 23, 2006. And Exhibit 6 would be the interview of Mr. Zamberlan that occurred on December 7, 2006, so nearly a year later.

And I have copies for the Bench if you will give

me a moment to find them.

THE WITNESS: Your Honor, may I get my pen?

JUDGE DALE: Absolutely.

MR. THOMPSON: That would be the one, that would be the other.

JUDGE DALE: The one being 5, and the other being 6?

(Hearing Exhibit Nos. 5 and 6 were then marked for identification by the Court.)

MR. THOMPSON: That's exactly right, Your Honor. You're staying with me on this. This would be Exhibit 5 and 6. I think there are enough copies.

QUESTIONS BY MR. THOMPSON:

Q. I'm looking now at Exhibit 5, which is the interview report from January 23, 2006; do you see that one?

A. Yes, sir.

Q. Lets go through it and see what corrections you feel need to be made. Do you see Paragraph No. 1?

A. Yes, sir.

Q. Do you have any corrections for that paragraph?

A. No, sir.

Q. How about No. 2?

A. No changes, sir.

Q. How about Paragraph No. 3?

MR. THOMPSON: I would request, Your Honor -- I apologize for this, but our preparation time was not too lengthy -- the details of Mr. Zamberlan's home address appear in Paragraph 2. And in the copy you will eventually put in the record, I request to redact that, so that will not become part of any public record.

JUDGE DALE: Yes, we will do that.

MR. THOMPSON: I have not had an opportunity to redact the copies I have for you today. I think the date of birth is on there as well.

JUDGE DALE: If all the attorneys could please turn their attention to personal information, that should not be included in open record, and be sure we have redacted that properly -- what we need to redact.

THE WITNESS: Thank you.

QUESTIONS BY MR. THOMPSON:

Q. So, we'll make that correction to Paragraph 2, we'll take out your address and date of birth. How about three, do you have any corrections for that?

A. No, sir.

Q. Paragraph 4?

A. Yes, sir.

Q. What are your corrections?

A. Towards the bottom third of the paragraph there was a summary statement made that says: He stated in December 2004 he was at the Taum Sauk facility and made a direct modification of the upper probe to level 1596.5.

I would not be permitted to make that change. There would be somebody at the plant who would make that change.

Q. How exactly do you want to correct it, do you want to say that, for example, you know that such a change was made at that time; is that the case?

I mean, you can make whatever correction you want, you just need to tell us exactly what the correction needs to be?

A. Uh-huh.

Q. Do you want to have a moment to confer with your attorney?

A. I believe the statement would be, "involved with."

Q. So, read it the way you believe it should appear?

A. He was at the Taum Sauk facility and was involved with the modification of the upper probe to level 1596.5.

My biggest problem with this is, I don't have direct recollection of being involved with that change.

Q. So, you don't recall it now?

A. No, sir.

Q. And I guess this does not refresh your recollection?

A. No, sir.

Q. Do you have any reason to believe that the officer who took notes of this discussion with you made an error?

A. No, sir.

Q. So, you're content with that change?

A. To the best of my knowledge. Yes, sir.

Q. Do you have any other changes for that paragraph?

A. No, sir.

Q. How about Paragraph 5?

A. Best of my knowledge, that is also correct, sir.

Q. Are you still under contract with Ameren today?

A. No, sir.

Q. You're not, okay. Are you, to your knowledge, able to discuss the post-event

investigation today?

A. To the best of my knowledge, I'm not permitted to discuss that.

Q. Now, Mr. Haar is not your lawyer is he?

A. No, he is not.

Q. Your lawyer is Mr. Slavens?

A. Yes, sir.

Q. Have you discussed this issue with Mr. Slavens?

A. Yes, sir.

Q. And his instructions were not to talk about that?

A. Correct.

Q. Very good. So, with the corrections that have been made, is it your opinion today, or your belief today, that this summary of the interview with you on January 23rd, 2006 is true and correct to the best of your knowledge and recollection?

A. To the best of my knowledge. Yes, sir.

Q. Okay. Very good. Let's turn now to Exhibit 6.

Do you have any corrections for Exhibit 6?

A. Again, the same with Paragraph 1 as we discussed with Exhibit 5.

Q. With the birth date and address?

A. Phone numbers -- yes, sir.
Q. Yes. Absolutely.
MR. THOMPSON: And Your Honor, we will redact those from the copy that's submitted for the record.
QUESTIONS BY MR. THOMPSON:
Q. Any corrections for Paragraph 2?
A. No, sir.
Q. Paragraph 3?
A. Paragraph 3, to the best of my knowledge, is correct, sir.
Q. Paragraph 4?
A. Several corrections, sir.
Q. Great. Let's take it from the top of that paragraph and make those corrections.
A. Paragraph 4, first page. The sentence starts with: Zamberlan explained with series that, when the water level reached the Hi probe, an alarm would sound.
Q. Okay?
A. The correction there is -- my recollection is not clear on whether it was the Hi or Hi-Hi probe that was connected to the alarm system. I would have to look back in programming and other things to be able to identify what was really going on there.

Q. Is it possible that your recollection was better at the time this interview was done?

A. I believe that one of the two probes, as I explained to the officer, would sound an alarm.

Q. But you don't recall which one?

A. No, sir.

Q. And you're not certain that you got it right at this time or if the officer got it right at this time?

A. Correct.

Q. How would you like to change that, when the water level reached one probe an alarm would sound?

I don't want to put words in your mouth, but why don't you take some time and see what correction you would like to make to it?

A. To be honest, I'd remove both that sentence and the following sentence.

Q. Remove them completely?

A. Completely.

Q. Okay. Very good. Any other changes to that paragraph?

A. Next page, it would be the sixth line. On the previous line it starts with: He stated, the logic on the probes was hard coated --

It would actually be "coded," C-O-D-E-D.

Q. Okay.

A. -- in the program and could not be changed -- the word "with" is there, the word should be "without" -- manually changing it in the program.

Q. I see. If I could ask you to clarify, is this speaking of the piezometers or of the Warrick probes, if you recall?

A. These would be the continuous level transmitters.

Q. Which are the piezometers?

A. Yes, sir.

Q. Any other changes, sir?

A. No, sir.

Q. Very good. On to Paragraph No. 5, do you have any changes for that one?

A. To the best of my knowledge, that is correct.

Q. And how about Paragraph No. 6?

A. That also appears to be correct, sir.

Q. Okay. And I guess No. 7 just, simply, the time the interview concluded?

A. To the best of knowledge, that's correct.

Q. So, with the changes you've made, are you comfortable that Exhibit 6 is now true and correct to the best of your knowledge?

A. To the best of knowledge. Yes, sir.

MR. THOMPSON: Your Honor, I would move for admission of Exhibits 5 and 6.

JUDGE DALE: Any objections?

MR. HAAR: No, Your Honor.

JUDGE DALE: Hearing none, Exhibits 5 and 6 will be admitted.

(Hearing Exhibits 5 and 6 were then entered into evidence.)

MR. THOMPSON: And we will make substitutions of redacted copies as agreed.

JUDGE DALE: Excellent.

QUESTIONS BY MR. THOMPSON:

Q. Now, in the course of your employment at Ameren in the fall of 2004, you had occasion to exchange e-mails with other people you were working with?

A. Yes, sir.

Q. And those e-mails were done at the time?

A. Yes, sir.

Q. And some of the people that you exchanged e-mails with were Mr. Cooper?

A. Yes, sir.

Q. And Mr. Pierie?

A. Yes, sir.

Q. Mr. Bluemner?
A. Yes, sir.
Q. Mr. Hawkins?
A. Yes, sir.
Q. Jeff Scott?
A. Yes, sir.
Q. Those are all people you worked with at the plant?
A. Correct.
MR. THOMPSON: If I could have a moment, Your Honor?
JUDGE DALE: Yes.
MR. THOMPSON: I have a packet of e-mails here, Your Honor, that I'm going to show to Mr. Zamberlan, and I'd like to mark them as Exhibit 7.
There will eventually be many, many e-mails in this case, and so I would identify this one by the e-mail that appears at the top of the first page, which is from Mr. Zamberlan to Mr. Pierie, and is dated December 2, 2004 at 1:41 p.m.
MR. HAAR: Mr. Thompson, do you have extra copies so we can follow along?
MR. THOMPSON: I do.
(Hearing Exhibit No. 7 was then marked for identification by the Court.)

QUESTIONS BY MR. THOMPSON:

Q. The e-mail on top of the front page, dated December 2, 2004 at 1:41 p.m., from Mr. Zamberlan to Mr. Pierie.

I wonder if you would take a look at the top, the very top message, and then read that message for me? It starts, "Tom."

A. Tom, they were supposed to do that today. I thought it was the 125 volt DC, but we were up at the Upper Reservoir to pull up the Hi level Warrick probes to 1596.5, and we heard a terrible noise come from the Warrick relay. It lasted a couple seconds. We were either going to replace it or swap it with the high level probe to see if it is a relay problem or something else. That is the current status.

Q. Okay. And this is referring to the possibly improperly operating relay in the Warrick probe system that is making a noise in the box; is that correct?

A. Yes, sir.

Q. Do you know if that was ever swapped or replaced?

A. I don't recall, sir.

Q. And this e-mail seems to indicate that the probes were moved on that day, doesn't it?

A. This e-mail says we were up there to do that, we heard the buzzing noise, but it doesn't complete the statement whether it was done or wasn't done at the time.

Q. Do you happen to remember, today, whether it was done or not?

A. I don't recall.

Q. Do you know who you were up there with?

A. I don't recall. At the time, as I've told the gentlemen from Highway Patrol -- the officers from the Highway Patrol -- I believe it was Bob Scott or -- I just went blank on his name -- another technician who generally worked with me when I was down at the plant.

Q. Could it be Mr. Pierie?

A. I don't believe he was on site; otherwise, he would have known, and I wouldn't have sent him an e-mail.

Q. And in fact, his question that you were responding to was, "Did we replace the bad wire coil?"

A. Yes, sir.

Q. And I think you indicated you don't recall?

A. Correct.

Q. What is a software timer?

A. A software timer would be a piece of

program that would -- you take an input, and when it sees the input, it would time for some amount of time that you program into it, and then generate an output.

Q. On the second page in this packet, there's an e-mail from you to Cooper, copied to Pierie, dated December 2nd, 2004 at 7:35 a.m. Do you see that in the middle of the page, second page?

A. Yes, sir.

Q. Could you read the very last sentence of that?

A. All four of these points have timers on them to verify that the signal is accurate and not intermittent.

Q. And those points that you're referring to are, in fact, the Warrick probes?

A. Yes, sir.

Q. And so there was some sort of software delay built into the logic circuit?

A. That is correct, sir.

Q. Programmed in?

A. Yes, sir.

Q. And would you agree with me that the reason was to prevent a momentary blip in the signal from stopping the operation?

A. That would be correct. Yes, sir.

Q. So that, in other words, it was to make it harder for the probes to stop the operation?

A. Quite the opposite. It was to make sure that is a valid operation.

Q. In other words, that it was a real emergency?

A. Correct.

Q. And this e-mail also indicates that -- in fact, why don't you just go ahead and read the first sentence of that, too?

A. I have to yield to Tom Pierie on the wiring design, since I did not do that, but I can tell you that a high and low Warrick probe going into the Upper Reservoir PLC and a high and low Warrick probe going into the Common PLC.

Q. So, both of those PLCs -- am I correct in believing -- that if they received the right sort of activation signal from a Warrick probe, they had the power to send signal -- produce output -- that would stop operation?

A. Yes, sir.

Q. And that was automatic?

A. Yes, sir.

Q. The operator didn't have to intervene?

A. No, sir.

Q. What does it mean if the probes are set up in series?

A. When the probes are set up in series, it would essentially mean both probes would have to indicate a problem in order for an output to occur.

Q. And if they are set up in parallel?

A. It would be one or the other would have to show a problem for an output to occur.

Q. Now, isn't it true that the high probes were set, essentially, one above the other at different elevations; isn't that correct?

A. To the best of my memory. Yes, sir.

Q. And if they were set in series, then water would have to touch both probes simultaneously?

A. No, not simultaneously. It could be one probe. It could be one second, one minute, one hour, one day, hit the other probe, and then it would occur.

Q. And with the time delay, would it have to hit each probe for the length of the delay?

A. Yes, sir.

Q. Do you recall how long the delay was?

A. I do not, sir.

Q. If I told you it was 60 seconds, would you have any reason to disagree?

A. No, sir.

Q. Are you familiar with the report, produced by Ameren's independent consultant, referred to as the Rizzo Report?

A. Vaguely.

Q. Have you read it?

A. Not that I remember, sir.

Q. And if I told you that report says the delay as 60 seconds, you would have no reason to disagree?

A. I would have to look at the PLC program to see what it was, but I have no reason to disagree, sir.

Q. Let's take a look back at Exhibit No. 6. And I'm looking at Paragraph 4 of Exhibit 6.

Now, you made some corrections to that paragraph, but my interest is in a part you made no correction to.

Could you read Paragraph 4 down to the start of the line that you removed?

A. Certainly.

Zamberlan stated, during November or December 2004, there had been some problems with the Warrick probes. He stated that the probes were tripping for no reason, preventing the reservoir from filling.

Zamberlan stated, he talked to either Bob Scott or Ron Brooks and explained how to remove them from the logic. This made a program loop around where the probes come in, basically taking out one level of protection.

Q. And the next?

A. Zamberlan said, following this, the programming on the probes was changed from parallel to series.

Q. Do you know who made that change?

A. I did, sir.

Q. And who authorized it, if you know?

A. Anything I did at the plant was reviewed with the plant staff before any changes were made.

Q. So, you would have discussed it with Mr. Cooper, for example, or Mr. Scott -- Jeffery Scott?

A. Yes, sir.

Q. Maybe both?

A. Maybe.

Q. And they would have agreed that was a change that was sensible to make?

A. Yes, sir.

Q. And these were, after all, new instruments, weren't they?

A. Yes, sir.
Q. And they had just been installed that fall?
A. Yes, sir.
Q. And you were still in kind of the shake-out period, if that's the right term?
A. Yes, sir.
Q. And so, would you consider that to be a normal sort of adjustment that you might make to get new instruments finally calibrated and working properly?
A. I'm not sure what you're asking, sir.
Q. Well, they were originally set up in parallel?
A. Correct.
Q. And they were changed to series?
A. Yes, sir.
Q. And if I'm -- am I not correct -- that the precipitating reason was because of the apparently baseless tripping that had occurred?
A. Yes, sir.
Q. So, this was done as an adjustment to make the system work better?
A. Correct.
Q. It wasn't intended to remove the fail-safe or backup operation?

A. No, sir.

Q. I'm going to --

MR. THOMPSON: May I approach, Your Honor.

JUDGE DALE: Yes.

QUESTIONS BY MR. THOMPSON:

Q. I'm not going to mark this. But I'm going to show you Data Request No. 24 that we received from Mr. Hawkins in response to a data request.

And that would indicate that, in fact, there was kind of a shake-down period, with respect to the new instrumentation; do you see that?

A. Yes, sir.

Q. And can you see on there, does it say how long that shake-down period was?

A. It states that the start up period lasted from approximately November 17th until December 2nd, 2004.

Q. And in the course of that period, the reservoir was gradually filled higher and higher; isn't that correct? Do you see the chart there showing numbers?

A. I guess I wouldn't say gradually, it was filled. Yes, sir.

Q. Each day it was filled a little higher, wasn't it?

A. Not necessarily.
Q. Okay. And do you recall what the standard operating depth was?
A. To the best of my recollection, it was 1596.
Q. And if you know, how much free board was there at 1596?
A. I don't recall.
Q. But you're not a Dam Safety Engineer, are you?
A. No, sir.
Q. And that would be someone else's problems; would it not?
A. Yes, sir.
Q. And if you were told that was the right elevation then it was okay with you?
A. Yes, sir.
Q. Were you aware at any time that the retaining wall, or the parapet wall, of the Upper Reservoir was not level?
A. Yes, sir.
Q. So, you knew that was the case?
A. I knew of it. Yes, sir.
Q. But so far as you knew, 1596 was a safe level, with respect to the actual elevation of the

parapet wall?

A. To the best of my knowledge. Yes, sir.

MR. THOMPSON: Thank you very much, Mr. Zamberlan. I have no further questions.

QUESTIONS BY MS. BAKER:

Q. During this shake-out period for the probes, did you have any redundant systems behind them to verify what the Warrick probes were telling you?

A. Inside the programming for the continuous level transmitters there was a hard coded value that basically set a top level of 1596.5.

What that was, was a way of backing up the backup system -- in my mind, as I was programming the system -- to generate an output if it ever got to that point.

Q. Do you know if those redundant systems were retained within the logic circuit?

A. To the best of my knowledge, they were retained in the logic circuit. Yes, ma'am.

MS. BAKER: That's all the questions I have.

MR. SCHAEFER: Judge, Kurt Schaefer for the Department of Natural Resources. Miss Valentine had to leave, so if it's okay with the Commission, I'll actually be cross-examining.

JUDGE DALE: Okay.

MR. SCHAEFER: Is it all right if I sit, Your Honor?

JUDGE DALE: Please make sure you use your microphone.

QUESTIONS BY MR. SCHAEFER:

Q. I want to ask you, first of all, we're aware that you were involved by the Highway Patrol; correct?

A. Yes, sir.

Q. Were you under oath, were you sworn in, when you gave that testimony?

A. I actually don't recall.

Q. And other than the officer who interviewed you, who else was present during both of your interviews?

A. During both of the interviews, I believe Ken Slavens -- or one of his people that work with him -- were there, one of my partners in the firm was present.

Q. Anyone else present at either one of those?

A. I believe the representative from Ameren was present.

Q. Do you recall who that was?

A. I think it was Mr. Haar was present, and

there may have been two officers from the Highway Patrol, but I'm not very clear on that, sir.

Q. And do you recall if you were under oath or not?

A. I don't recall, sir.

Q. You don't recall being sworn in?

A. No, sir.

Q. Is it fair to say that testimony was not under oath?

A. To the best of my knowledge, that's how I think it happened. But again, I don't really recall the beginning portion of the interviews.

Q. Now, are you aware that FERC did some of its own investigations of the incident from December 14, 2005?

A. Yes, sir.

Q. And are you aware that there are -- let me state it this way, have you seen the report, primarily authored by Paul Rizzo as an independent consultant hired by Ameren?

A. Again, I vaguely know of it. I don't remember ever reading it in any great detail, anything like that.

Q. But you are aware that that was actually the report conducted by Ameren?

A. I'd have to take your word on it. I didn't pay attention to who --

Q. Are you aware that that report was actually conducted through the law firm that was representing Ameren at the time, Foley and Lardner?

A. I don't necessarily recall who was doing what at the time.

Q. Were you ever interviewed by Paul Rizzo or anyone acting with Paul Rizzo in conducting that investigation?

A. I don't remember Paul Rizzo's name. I was interviewed by FERC, and I was interviewed by the Highway Patrol. Other than that, I didn't have any statements with anybody else.

Q. The next report in time would have been the FERC Staff Report, have you seen that?

A. Again, I know of it. I have not studied it in any great detail or read it.

Q. Do you think you were interviewed by someone from FERC?

A. I definitely was interviewed by someone from FERC.

Q. Who interviewed you from FERC?

A. I don't know.

Q. Do you remember the date of that interview?

A. I do not recall. It was a large room of people that were there, so --

Q. And you don't recall anything from the FERC report, but you did look at it?

A. I know it exists, that's the best I can do for you.

Q. Are you aware if any information you provided was actually used in that FERC report?

A. Again, I don't recall the report, so I can't tell you.

Q. Are you aware if FERC had an independent panel of consultants also conduct an investigation?

A. It may be those -- that independent panel that I talked to. I remember talking to a group of engineers about things. But again, it's a vague recollection.

Q. Did you ever look at the FERC Independent Panel Report?

A. No, sir.

Q. Do you know if any information you may have supplied was used in that report?

A. I'm sorry, I don't.

Q. But you have looked at the statements you gave to the Highway Patrol?

A. Yes, sir.

Q. In fact, some information you gave to the Highway Patrol, whether it was something you said or something taken incorrectly by the officer, some information was incorrect in that report?

A. Yes, sir.

Q. When was the last time you were at the Upper Reservoir?

A. It may have been as late as February 2004, but again, that recollection is vague.

Q. Do you recall what you did the last time you were at the Upper Reservoir?

A. I believe I was looking at the wireless communication between the Upper Reservoir and main tower on site.

Q. Were you there -- the last time you were there -- for the purpose of adjusting any of the gauges of the probes.

A. No, sir.

Q. Are you aware there's indication, that Ameren has stated, that possibly you were the last one to raise the probes in February '05?

A. I didn't recall that. No, sir.

Q. I believe you said that you were aware, in at least December of '04, that the normal operation level was 1596?

A. Yes, sir.

Q. But as we saw from e-mail you were involved in, December 2nd, 2004, there was discussion about raising the Warrick probes, at least the high probes, to 1596.5?

A. That is correct, sir.

Q. Did you have any concern, at the time, that you were actually involved in a conversation about raising the probes above the operating level?

A. No, sir. It's an emergency backup which -- its function is, when it acts, it shuts down the plant with a rather large stress on the equipment.

The function of the system is to operate at 1596 and shut down the system in a controlled manner, which prevents the early deterioration of the equipment.

The safety backup is set at a higher level so that the system doesn't race to see which one trips the unit first.

Q. But for the unit to work at all, it has to actually come in contact with the water?

A. For the Warrick probe?

Q. Yes.

A. Yes, sir.

Q. If you raise it above the water level it won't work; isn't that correct?

A. In a perfect world, sir, the Warrick probe is never supposed to touch water, that probe. Because it's an emergency eye.

So, if it goes past -- for whatever reason the operating level is not controlled -- and it goes past the operating level, that is when the Warrick probe would touch water and then shut down the plant.

Q. But you pretty much guarantee that if you raise it above the possible water surface that it could ever reach?

A. I don't understand the question, sir.

Q. At 1596, how much free board was left before you ran over the top of the wall?

A. I really don't recall.

Q. So, you certainly agree with me, that if you raise the Warrick probes higher than the very top of the wall, the water will run over the wall before it will ever hit the Warrick probes; isn't that correct?

A. That would be common sense, sir.

Q. Thank you.

Maybe you said this in your previous answers. Do you recall, did you actually raise the Warrick probes at any time?

A. My memory of the accident at Taum Sauk was,

I was involved with the continuous level transmitters. We raised those probes at one point to adjust the calibration on those probes.

Q. And that was in, approximately, December 2004?

A. Early December 2004. Yes, sir.

I do not recall ever having assigned anybody, worked with anybody, rode with anybody to the Upper Reservoir for the express purpose of raising the Warrick probes. So, I do not recall any event associated with raising the probes.

Q. But after that time that you were there, December 2004, you never raised the probes after that; did you?

A. No, sir.

Q. Are you aware of anyone else at Ameren that raised the probes after that?

A. No, sir.

Q. Are you aware of whatever probes were even adjusted between December 2004 and December 2006 -- 2005, excuse me?

A. Not to my knowledge. I have no knowledge of that at all.

Q. You mentioned, on the piezometers, which were averaged by the logic circuit, that the operator

could actually evaluate and look at different information at different times?

A. Yes, sir.

Q. Could that information be saved on a computer or printed out so it could be referenced at a later date?

A. I believe there was a historian on site that would collect the level data, although they wouldn't collect -- to the best of my knowledge -- all three transmitters at the same time.

Q. When you say a historian on site, do you mean a piece of equipment or a person?

A. Sorry about that. The historian, essentially, is a computer which looks at the control system and says, I want to read this point, this point, and this point and stores it in memory.

Q. What was the name of that system, did it have a name?

A. I believe -- and again, this is the best recollection I have -- it was a Wonderware Industrial SQL Server.

Q. Wonderware?

A. That's the name if it -- Industrial SQL Server.

Q. SQL Server?

A. Yes, sir.
Q. What does SQL stand for?
A. Simple query language, I think, but I really don't know. It's a data base.
Q. And were you involved in actually installing or programming that data base?
A. No, sir.
Q. But information on the equipment that you installed would go into that data base?
A. Yes, sir.
Q. And are you aware, is it a practice of Ameren to maintain that information?
A. To the best of my knowledge. Yes, sir.
Q. Do you know how long they maintained that information?
A. No, sir.
Q. Who at Ameren, that you worked with, would know that?
A. To the best of my knowledge, it would be Chris Hawkins, as he designed the system.
Q. Who is Chris Hawkins?
A. He's an engineer for Ameren, to the best of my knowledge.
Q. For Ameren?
A. Yes, sir.

Q. And again, I believe you testified that you were actually involved in changing the Hi and the Hi-Hi from the parallel to series; is that correct?

A. Yes, sir.

Q. And why did you do that?

A. The system at the time was generating spurious trips of the unit.

Q. What do you mean "spurious trips" of the unit?

A. It would be the equivalent of you driving down the road in your automobile and it shut off. That would be a spurious trip.

Q. It was acting like water was hitting it, and it was shutting off the system; is that correct?

A. Incorrect. It was mostly generated -- completely generated -- by the lower probes which are always in the water, they are always conducting. And again, to the best of my knowledge, there was a problem with that part of the system.

Q. So, if the lower probes were malfunctioning, why would you rewire the upper probes to be in series and raise them to a higher level?

A. The higher level, again, was so the system would shut down properly in the event of a normal operate. The half a foot above it was a safety.

The programming to change it from parallel to series was, again, done to make sure that it was a true fault, which would have been also compared to the continuous level transmitters.

Q. So, is it your testimony today that this spurious tripping of the system was actually not from wave action on the Hi-Hi and the Hi but was, rather, a result of the malfunction of the low probes?

A. I have no knowledge of that.

Q. You have no knowledge of any wave action on Hi and the Hi-Hi?

A. No, sir.

Q. Let me ask you this; explain to me, physically, on the low -- the low probes -- how were those physically attached?

A. If my -- you mean the physical installation of those probes?

Q. Yes.

A. Those probes were installed down some rather large pipes, or conduits. They slid down into the reservoir and were located at some point down in the bottom of the reservoir as being the accurate spot.

Q. What do these things look like down in the bottom?

A. The low probes?
Q. Yeah.
A. If I can think of a good description. It would be like a mini Mag flashlight, that size roughly. Again, these are vague recollections, I didn't do much of them. It would be that, you know, similar weight with batteries in it, something heavy that would just lay down inside the pipe.
Q. So, do you recall, actually, what the system looked like that ran up the side of the reservoir on the south side that went up to the control box?
A. Yes, sir.
Q. There was a series of black PVC tubes, I assume, that ran down the side to the bottom?
A. Yes, sir.
Q. And at the bottom of those tubes is where you had this thing that looked like a mini Mag flashlight?
A. Somewhere in those tubes. I don't think it was the bottom, I think it was a little higher than that. But somewhere in that tube. Yes, sir.
Q. And there's a cable connected to that thing?
A. Yes, sir.

Q. And the cable runs up through that PVC pipe and goes up to the box?

A. The PVC pipes come up into an enclosure, but the wire actually leaves that enclosure and goes over to the PLC that was up there.

Q. Which was up kind of inside the box?

A. No, it was inside a building next to the box.

Q. And let me ask you this; the wires -- that's running down there -- is that wire kind of pulled taught -- kind of tight -- or does it have a lot of slack in it?

A. It doesn't have slack but it's not real tight either.

Q. Is a function of that device how tight or how loose that cable is?

A. No, sir. It's strictly conductivity.

Q. Are you aware of the piezometers that were also on that system?

A. Yes, sir.

Q. Were you involved at all in adjusting the piezometers?

A. When we first installed the system, we had the probes in place and I was involved with -- I believe it was Bob Scott -- to adjust those probes for

the first installation. After that, we didn't touch them.

Q. And was this also in 2004?

A. Yes, sir.

Q. After 2004, did you work on piezometers at all?

A. No, sir.

Q. So, lets say December 2004, is it fair to say, after that, you didn't do anything with the piezometers?

A. I believe that's correct. Yes, sir.

Q. Let me ask you about the piezometers, because they also functioned off that black PVC cable, the tubing, that came down the side; correct?

A. Correct.

Q. And then there's some part of that piezometer down under the water; correct?

A. Yes, sir.

Q. Does it matter how far that thing is from the bottom of the reservoir?

A. Certainly.

Q. Because you adjust it either close or far from the bottom depending on what you want the reading to be; correct?

A. The system functions as a differential

pressure transmitter, so basically it looks at where ever it is in the water and it will tell you how much water is above it.

Q. Based on how much pressure is coming down on it?

A. Correct.

Q. So, if it's closer to the bottom or higher up from the bottom, it's going to sense that pressure distance. In other words, how much water is up on top of it; correct?

A. Correct.

Q. Now, that piezometer, does it float down there?

A. No.

Q. But it's fixed, it's somehow stationary?

A. It's stationary by the weight of the probe.

Q. And then it's attached to a cable, and the cable goes up the side and goes to that black PVC pipe?

A. That is correct.

Q. And the cable comes out of the box on top?

A. Yes, sir.

Q. And now -- a similar question that I asked you about the low probe -- but does it matter how taut or how loose that cable is that's attached to that

piezometer as it's going up the side and into the box.

A. It's less a matter of how taut it is versus if the capillary tube -- if you want to call it that -- that ran down the cable, whether it had dirt or water or something else in it that would prevent it from sensing the atmosphere verses the amount of water of those two pressures.

Q. Now, you were involved in installing all this equipment after the lining was installed in 2004; correct?

A. I was involved with the probes. Yes, sir.

Q. Were you involved in how those PVC pipes were going to be attached to side of that reservoir?

A. No, sir.

Q. Do you know how they were attached?

A. I have a recollection of it. Yes, sir.

Q. They were attached by turnbuckles, weren't they, that held them onto the side?

A. I guess so. I would call it a conduit clamp. I guess they have many names.

Q. Do you recall how many clamps were supposed to hold that thing down?

A. No, sir.

Q. But if there weren't enough clamps, and the black PVC pipe with the cables inside were allowed to

sway as much as ten to 15 feet from side to side, would that affect the reading you were getting from the piezometers telling you how much water was in that reservoir?

A. If the continuous level transmitter moved, changed heights by some method, it would change the reading of the level transmitter. Yes, sir.

Q. And in addition to the information that was being supplied to the PLC by the low and the high probes, was information also being supplied to the PLC by the piezometers?

A. Yes, sir.

Q. And you were involved in programming the PLC?

A. Yes, sir.

Q. But the PLC was only as good as what the piezometers were telling you?

A. That is correct.

Q. So, if piezometers weren't working correctly, basically it was faulty data in the PLC?

A. Correct, sir.

Q. Did you ever discuss with Ameren that there was faulty data coming from the piezometer going to the PLC?

A. The time that I was on the site, everything

was installed and working properly. So I had no action of discussing that at any time.

Q. Were you ever involved with Ameren -- for lack of a better term -- determining a fudge factor, trying to figure out how much water was in there when the piezometers were off?

A. No, sir.

Q. One more quick question.

At the time that the low probe was apparently malfunctioning, how did you know it was malfunctioning?

A. The system had on that probe an alarm that would be generated. And when you know there's water in the reservoir, and the alarm comes in and out, you know that it's malfunctioning.

And in this case, that's what was happening. It was an alarm would come in and go away, come in and go away.

Q. So, at some point, you were aware that an alarm was going off and it shouldn't be going off?

A. Yes, sir.

Q. Did you ever go and look and see how much was actually in the reservoir?

A. The continuous level transmitters -- when I was on site -- were working properly. And you could

tell from those that there was water in the reservoir. And you could see the alarm coming in and out, which pointed to the fact that there was a problem with that part of the system.

Q. So, you never physically looked to see, you just relied on the information you were getting from the other gauges and sensors?

A. My job was to verify the data inside the PLC, how it was acting, to make sure it wasn't a PLC that was generating a problem, or something like that.

Q. And at one point during your previous testimony, you said you didn't have as much knowledge of that system as others at Ameren; is that correct?

A. Yes, sir.

Q. Who at Ameren had more knowledge than you?

A. That would be Tom Pierie.

Q. Because I believe you said, on the Hi and the Hi-Hi, there was the ability to program into the system a delay to basically make sure that the sensors had to be wet, for a certain period of time, before they would actually either sound an alarm or shut off the system; is that correct.

A. That is correct.

Q. How long of a delay could you program into that?

A. To be honest, I'd have to look at the PLC programming manual, because we don't generally do anything longer than three seconds, to a little over a minute, depending on the system.

Q. Why is that?

A. It's just typical. The PLC itself, theoretically, could put any length of delay on there if you program it properly.

Q. So, if you were experiencing some kind of temporary wave action, couldn't you just program in a delay to compensate for that instead of moving the probe up to where they didn't work at all?

A. Theoretically, yes.

JUDGE DALE: Thank you.

Were there questions from the Bench?

COMMISSIONER GAW: Good evening, Mr. Zamberlan. Some of these things may have been covered, I will try to avoid duplication.

QUESTIONS BY COMMISSIONER GAW:

Q. I think you gave your educational background?

A. Yes, sir.

Q. I want to know your employment history, please?

A. Again, I was employed with Ameren.

Q. And what time frame?
A. Roughly 1992 to 1998 or 1999, I apologize, I don't know.
Q. What positions did you hold?
A. I was an engineer for the company.
Q. And for which Ameren affiliate?
A. AmerenUE.
Q. And who did you work under?
A. At the first job within Ameren, I was working for Eric Stratman. The second job was with Mike Knott, K-N-O-T-T. The third assignment within Ameren would have been for Bob Horine, H-O-R-I-N-E. And then my final assignment would have been for Bob Ferguson.
Q. Give me the titles that you held in each one of those positions, or what it was that you were doing in each one of those positions?
A. I was an engineer for all those positions.
Q. But what did you do, you said you were transferred to different positions. I want to know specifically what it was that you were doing in these positions?
A. My first position; I was a Plant Engineer, I was responsible for daily operation of the plant as far as my systems were concerned. I was responsible

for analyzing new projects as they were brought to the plant in the areas I was concerned with.

I was responsible for the computer systems, networking systems at the plant. I was responsible for the communications systems at the plant. At times I was responsible for the environmental controls of the plant. At times I was responsible for the generators at the plant, the transformers at the plant. Essentially, systems from 5 volts to 345kV.

Q. What plant or plants were you responsible for?

A. I was assigned to Labadie Power Plant.

Q. And when you say you were responsible for the generators, what do you mean by that?

A. Responsible for the generators, that would entail understanding their proper operation; understanding, when a fault occurred, how to assess the fault, troubleshoot the fault, figure out what to do to fix it; and not "oversee" the people fixing it, but at least understand that the work they're doing is proper.

Q. Okay. And your next position was under Mike Knott?

A. Mike Knott, yes.

Q. What was that position?

A. It was a stint working with the IT group for Ameren.
Q. Out of which office?
A. That was out of the office at 1901 Chouteau.
Q. And how long did that one last?
A. Not a very long time.
Q. What about the first one?
A. Roughly four years. Three, four years.
Q. Then you moved on to -- is it Bob?
A. Bob Horine.
Q. What was that responsibility?
A. I was the generator specialist for UE.
Q. What does that mean?
A. I was responsible -- much like I was at the plant -- for the generator, but for all the generators within the Ameren system.
Q. What would be your job doing that, was it a consulting type job, was it a management job?
A. It was more like a consulting job. The plants were still responsible for their equipment; however, during times when an overhaul would take place or a fault occurred or some other event happened, I would help out with assessing the system, figuring out what needed to be fixed, figuring out

what preventative maintenance programs may or may not need to be applied to the system, things like that. Helping plan future outages.

Q. What was Bob Horine's position at that time?

A. I believe he was a Superintendent of Turbine Maintenance.

Q. Is he still with the company?

A. No, sir.

Q. Is he retired?

A. Yes, sir.

Q. Were you also -- did you also work in conjunction, in that position, with the Taum Sauk Plant?

A. I had knowledge of the plant. I assessed a few things of the plant. But at the time, I had never been down to the plant.

Q. Do you remember specifically what you did assess, or do, in regard to the Taum Sauk Plant?

A. I reviewed the winding maintenance reports for many years to make sure things were looking proper. Try to assess the condition of the windings, if we needed to plan for a rewind.

Q. Tell us what a rewind is?

A. A rewind would be the replacement of the

copper inside the generator that generates electricity.

Q. How long did you have that position?

A. I believe that was for a couple years.

Q. Do you remember approximately when you left that position?

A. No, sir. I don't.

Q. Then you went to work under Bob Ferguson?

A. Yes, sir.

Q. Do you remember when that was?

A. I want to say, maybe 1997.

Q. And what was that position, what did it involve?

A. Bob was in charge of the Power and Controls Group for Ameren or ENC Electrical Group, it has many names.

Q. What did it do?

A. The function of the group is to essentially design projects to be installed at the plants, act as consultants when an event occurs and they need extra help with troubleshooting or whatever, provide assistance or direction in budgeting of new Capital projects, helping plan outages and some aspects for major overhauls.

Q. And is that area, or division -- I'm not

sure what the right term is -- is it still in existence at Ameren?

A. Yes, sir.

Q. Is Bob Ferguson still there?

A. Yes, sir.

Q. In that same position?

A. I think so.

Q. And you say you did plan outages, or work to plan outages, in that position?

A. Yes, sir.

Q. And can you tell me, when an outage was planned, were there any others, besides that particular department, that were consulted about planning outages for generators?

A. There were many different divisions. The various groups inside of ENC would have been involved with it.

Q. ENC meaning --

A. Engineering and Construction Group.

The Turbine Maintenance Group would have been consulted for direct turbine and generator related activities. The plant would have been consulted for direct activities, and then a group called Power Plant Maintenance would have been consulted for those activities.

Q. Who was in that group at the time?
A. I apologize, I don't remember.
Q. That's all right. I didn't hear you mention anyone regarding those that might have been responsible for the marketing of energy, were they not consulted --
A. Not to my knowledge.
Q. -- at that time, is that correct?
A. Correct.
Q. And do you know when you left Ameren again?
A. It was roughly '98/'99.
Q. And did you go directly to work for LDP?
A. No, sir. I went to work for Fru-Con Engineering.
Q. And tell me who that is?
A. Fru-Con Construction Company is a large construction company in St. Louis. They had a division called Fru-Con Engineering that did engineering projects for various clients.
Q. How long did you work with them?
A. The first time, it was three years.
Q. You worked for them more than once?
A. Yes, sir.
Q. What did you do after you left them the first time?

A. After the first time, I went and joined GE Automation to open an automation office for them. Shortly after I was hired on by them, they changed their mind and didn't want to open an automation office, which kind of left me in the lurch. I continued to work for them for a little while.

Fru-Con was getting ready to start designing several power plants. They asked me if I would come back and run the automation group. I did, and stayed with them for a while, until January 1st, 2003, when I became a partner with LDP and opened the St. Louis office.

Q. And LDP, how long had it been in existence at the time, do you know?

A. At the time, it would have been 65, 70 years.

Q. And who were the -- how many partners, approximately, were there in the group at the time you joined?

A. I believe the number is, approximately, eight.

Q. And how many are there now?

A. I believe we added another five. We're up to their thirteen, or so.

Q. Do you know whether or not LDP, at the time

you joined, had any relationship with Ameren?

A. To the best of my knowledge, they had not done any work for Ameren that I knew. I discovered later on they had done some very minor work for CIPS, which became part of Ameren down the road.

Q. But at the time they had done the work for Central Illinois Power they were not part of Ameren?

A. Correct.

Q. That system was not a part of Ameren?

A. Correct.

Q. In regard to them, the time frame subsequent to you joining LDP Consulting, did LDP have a relationship with Ameren?

A. Yes, sir.

Q. When did that occur in relationship to your joining LDP?

A. It was, roughly, in the early 2003 time frame where we started doing some work.

Q. And you joined when?

A. January 1st, 2003.

Q. So, fairly shortly after you joined LDP, LDP received a contract with Ameren?

A. To the best of my knowledge. I'm a little fuzzy there but to the best of my knowledge.

Q. Did you have any involvement in the

relationship between LDP and Ameren?

A. Yes, sir.

Q. Can you describe that involvement, please?

A. From LDP's perspective, I was the one who was responsible for developing a relationship and maintaining a relationship with Ameren.

Q. Okay. And did you make the initial contact with Ameren?

A. Yes, sir.

Q. Who did you talk to?

A. Bob Ferguson.

Q. What was the initial relationship between LDP and Ameren about, what was the job generally?

A. It was actually to assist -- if I remember correctly -- assist in the budgeting process for Capital projects.

Q. Can you just, very generally, describe what that would mean?

A. Not that this was a project, but let's say they were going to replace a turbine. Somebody would be involved with that budgeting process. Well, for Bob Ferguson's group, it was replacing transformers at the plants or replacing electrical equipment at the plants, thing like that. I was to help him with the budgeting and project assessments.

Q. Okay. And at some point, did the work that you were doing through LDP for Ameren change, and if so, can you describe it?

A. I guess I don't understand what you mean by change.

Q. Other than what you've just told us in regard to helping with budgeting items, did it change and go into other areas?

A. At one point we had an engineer that was, essentially, contracted to Ameren for various things under their direction. We did some work for the Turbine Maintenance Group developing -- and again, I don't remember the title of the documents -- but it was related to generator outage maintenance items.

We did some work for the AmerenUE on the combustion turbine side, just very small projects.

And then we were awarded the Taum Sauk Project. Actually, not awarded the Taum Sauk Project, they contracted me as a Contract Engineer to work with Tom on the Taum Sauk Project.

Q. Tom who?

A. Tom Pierie.

Q. And when did that occur?

A. It would be spring 2004 -- no, excuse me. It was later than that because it was a tight

schedule. It would have been May or June -- and again, fuzzy memory -- 2004.

Q. And your specific role in regard to this work was?

A. I was to work with Tom on the programming of PLCs for the control replacement at Taum Sauk.

Q. Now, how long was that contract supposed to last with that job?

A. It was through the outage of December 2004 to get the project up and running, and that was it.

Q. Just for clarification, when you say outage at Taum Sauk, you're talking about what?

A. At the time, this would have been a major outage where the unit was shut down for overhauls, and at the same time the outage was for the installation of the liner at the Upper Reservoir.

Q. Had you been involved, in any way, in dealing with others that were working on this project at Taum Sauk that involved this outage?

A. I worked with Tom Pierie; Art Fishman, who was a drafter there; and Chris Hawkins.

Q. I think you've said who Chris Hawkins -- what his position is -- can you refresh my memory?

A. He's an engineer that also works for Bob Ferguson, works with Tom Pierie.

Q. What's the relationship, in the structure of Ameren, between Bob Ferguson and Tom Pierie?

A. Tom works for Bob Ferguson.

Q. Is he, Bob Ferguson, Tom Pierie's direct supervisor?

A. Yes, sir.

Q. In the course of your work involving Taum Sauk, how often would you go down to the site at Proffit?

A. Early on, it wasn't extremely often. It was visits to meet with Jeff Scott or Rick Cooper to understand how some wiring might be and understand how the system was put together already, the existing system.

As we got closer to the outage, those trips had picked up. And then, during the outage, we were down on-site working with the electricity on the install process, making sure the PLCs were programmed properly and communicating to each other, things like that.

Q. I want to ask you about the contract. Did the contract pay a lump sum for your work, or was it a payment by the hour, or some other arrangement?

A. It was a time immaterial type arrangement -- a T and M type arrangement -- where we were paid by the hour.

Q. Any minimum guarantee to the job?
A. No, sir.
Q. Did you then send bills on as the job progressed, or was it a bill that was sent at the end of the project?
A. It would have been monthly invoicing sent to Ameren, for the project, for my hours worked.
Q. And how did you keep track of your hours?
A. We have a time sheet system that we keep track of hours.
Q. And when you record your time, do you do that yourself?
A. Yes, sir.
Q. And that time as it's recorded, do you make any notations about what you're doing when you're making those records?
A. No, sir.
Q. You just write down so many hours?
A. And I forget the project number that LDP had assigned to it, but we'd put down the project number and how much time we worked on the project.
Q. And there are no recordings at all in regard to what you've actually done other than --
A. No, sir.
Q. -- how many hours you spend?

A. Correct.
Q. Do you keep notes in regard to what you do on your jobs?
A. Not on that project, sir. I had been chided for that already.
Q. Pardon me?
A. I had that discussion with others about keeping better notes with future projects.
Q. With others like who?
A. Like, guys I work with. Paul Young, who is one of my partners. Did you keep notes? No, I didn't. You should really keep notes.
Q. Do you keep notes on any of your jobs?
A. Now I do.
Q. Did you prior to the Taum Sauk dam collapse?
A. No, sir.
Q. Do your other partners keep notes?
A. Some do, some don't.
Q. Did they have a change, in regard to their keeping of notes, subsequent to the Taum Sauk dam collapse?
A. There's a few who are thinking twice about it. Yes, sir.
Q. So, there would be a schedule then of the

time that you've spent dealing with this project. Would those time sheets reflect where you actually were?

A. No, sir.

Q. Did you bill for mileage?

A. I believe I did. Yes, sir.

Q. Did you bill for stays overnight?

A. Yes, sir.

Q. Did you stay overnight at the Taum Sauk site? Was that a yes?

A. Yes, sir.

Q. The court reporter may have difficulty picking it up.

A. I apologize.

Q. In regard to the job, other than those individuals that you've mentioned, who else would you have been dealing with at Ameren involving the Taum Sauk project?

A. And that's besides Chris Hawkins, Tom Pierie, Art Fishman? Well, of course, Rick Cooper and Jeff Scott down at the plant. The maintenance guys that worked for Jeff down at the plant. Bob Ferguson would have been involved at some level because he's Tom's boss, and I was contracted to him.

I believe, for the most part, to the best of my

knowledge, that's everybody I worked with.

Q. Okay. And these conversations that you would have had with these individuals -- let me strike that.

Of the individuals that you named, was there anybody in particular that you were under the impression they were in charge of this project, in that group that you were talking about?

A. It would be Tom Pierie, at least for -- excuse me -- for part of the project. Chris Hawkins had responsibility for the data historian that was on site and a few other pieces of that. Tom Pierie had responsibility for the controls up there.

Q. Once again, run through with me -- Chris Hawkins --

A. Chris Hawkins was responsible for the data historian that was placed on site and some data collection in regards to the data historian.

Q. And Tom Pierie?

A. Tom Pierie was responsible for the controls upgrade. That would be the overall -- the PLC programming design, etc., wiring design, overseeing American Governor in their installation.

Q. I want to stop you for one second. Who is American Governor and what is their installation?

A. American Governor is a company that produces hydroelectric turbine governors, the part of the system that controls the speed of the water wheel, both in generate and in pump mode. They were replacing the existing system with a PLC based system.

Q. What had been in there before, in a general sense?

A. It was more of a hard wired control system with relays, physical wiring, things like that.

Q. The previous system, were you able to do regulation with Taum Sauk, for instance?

A. I don't know. Again, I don't know what it was -- that old system. I don't know what it was doing.

I believe the new system somewhat replicated the old system. The new system was designed for regulating Taum Sauk as far as how much power generated, things like that.

Q. And after the installation of this new system, Taum Sauk was capable of doing, for instance, regulation?

A. Best of my knowledge, yes, sir.

Q. Now, go ahead. You were explaining some things?

A. Additionally, Tom was responsible for

monitoring budget, monitoring contractors, things like that. Monitoring consultants or contract employees.

Q. Now, when you were dealing with Tom Pierie or Chris Hawkins, if you made any -- first of all, would you report to both of them in their areas?

A. Somewhat. Yes, sir. Yes, sir.

Q. Can you tell me the parameters of what you would do to, first of all, give them information?

A. If the "whatever" I was working on happened to affect the data historian -- or that portion of the system -- any designs I came up with would have to be reviewed and approved by Chris Hawkins, and the plant, and in some respects Tom Pierie, since I was working a lot for him as well.

On the flip side, if a design I was working on affected the control system on the rest of the plant, it would be reviewed by the plant, and reviewed by Tom Pierie, and in some cases, Chris Hawkins, if Tom wasn't available.

Q. Were there occasions, when you would be making decisions, when you would need their approval in order to move forward?

A. Yes, sir.

Q. What was the protocol there?

A. Basically, it involved design review

points, where we would be at a point in the project where this is what we want to proceed with on the design of the PLCs, for instance, and Tom or Chris would say, "I like that approach, let's move with it."

Or if they didn't like that approach, he would say, "Maybe we should do that instead."

We would work through those parameters and proceed with the project.

Q. Tell me, if you could, give me an example of a decision you might make, in regard to the project, where you would not -- it would not be protocol to tell Tom?

A. Not any instance that I can recall. But they wouldn't have been involved with that because I was working for them.

Q. Sure, okay. I want to spend a little bit of time understanding your involvement with the safety features at Taum Sauk.

And first of all, I want you to, if you would -- and I know you've touched on this -- but I want you to generally describe, to the extent that you know, what the safety system was at Taum Sauk prior to the changes that were made in the liner and other the other changes that were made in '04?

A. To the best of my knowledge, there were

some type of conductivity probe -- mounted on the Upper Reservoir parapet wall for the highs and down in the reservoir for the lows -- which essentially functioned the same as the new ones, to the best of my knowledge.

Q. What are you basing that on?

A. During the course of the design review, part of our function was to review the existing electrical design of the plant, because it was relay based, and convert that logic to PLC logic.

So, part of it was interpreting the existing drawings on the system -- my direct, what I had to do -- and convert it to logic programming inside the PLC.

Q. Did you actually see this system?

A. Not the physical system. No, sir.

Q. But you saw drawings of it, or pictures, or what did you see?

A. There would be schematic diagrams that described how the system worked.

Q. Now, the new system that was there, first of all, I want you to describe it for me -- I know you've already been through quite a bit of this -- but I want you to describe it for me?

A. The new system -- as a point of

clarification; the whole system or just the Upper Reservoir? Or how far do you want to go?

Q. I want you to give me a -- how long would it take you to do the whole system?

A. I could probably provide a synopsis which would give you the idea without spending too much time.

Q. Lets start there and see where we go.

A. The control system that was going to be installed was a series of programmable logic controllers -- PLCs -- which were located at the Upper Reservoir, the Lower Reservoir, Unit 1, Unit two, Common PLC, liquid rheostat and the governor system.

Q. I want you to tell me what the liquid rheostat is?

A. The liquid rheostat is a system that was used to start the water wheel spinning before it was connected across the line for pump operation.

Q. And the governor?

A. The governor was the system that controlled the speed of the turbine during operation.

Q. So, you could control how much energy output there was or how fast the water was being pumped back up?

A. That is correct.

Q. Go ahead.

A. The Upper Reservoir PLC was used to bring in inputs from the Upper Reservoir and communicate it to the plant. The Lower Reservoir PLC was used to bring inputs from the Lower Reservoir and send them back to the plant, as well as generate an output to control the gates at the lower dam for how much they opened or closed.

The liquid rheostat PLC was to make the liquid rheostat work. The governor PLCs -- there were several -- were used to make the governors work.

Unit 1 and Unit 2 PLCs were designed to be the ultimate controllers for the system. They would replace the existing relay logic with software that analyzed inputs and generated outputs to make the plant function.

Q. Now, how did those -- how are those things related to safety?

A. The upper reservoir PLC brought in two Warrick probes, which would be the backup safeties for the Upper Reservoir.

The Common PLC -- I forget to mention the Common PLC, I apologize -- it was used to bring in inputs that went to both units where both units need the information. But you couldn't wire them to both

units, you wired to the one PLC and communicated the information to the others.

Two Warrick probes came into the Common PLC. Both those PLCs brought in the probes, communicated it to the appropriate PLC -- Unit 1 or Unit 2 -- and the Unit 1 PLC or the Unit 2 PLC analyzed that data and generated an output that would either shut it down, if an event occurred, or let it run.

Q. There was -- you said, I think -- you established there were two Warrick probes that were designed to be -- to deal with the backup system to ensure that the water didn't rise above some level?

A. Yes, sir.

Q. There were also lower Warrick probes that were designed to do what?

A. To keep the unit from running dry and going too low, essentially.

Q. It has been described earlier, there can be some harm to the generating units if the water got too low; is that accurate.

A. To the best of my knowledge. Yes, sir.

Q. Is it also a problem, if they get too low, of actually being able to pump back up if you don't have water up over the pumping units or not?

A. My recollection is yes, sir. But it's

fuzzy. I think that's correct.

Q. Those are four Warrick probes that you just described?

A. Yes, sir.

Q. Is it true that there's a fifth one?

A. To the best of my knowledge, there were only four probes at the Upper Reservoir; a Lo and a Lo Lo, a Hi and a Hi-Hi.

There's a reference probe, if that's what you're talking about.

Q. Is that reference probe a Warrick probe?

A. Not in the strictest sense.

Q. What sense is it?

A. It's a probe that -- if I remember correctly -- generates or detects the voltage from the Warrick probes so that it -- the electricity has to have a conductive path, so when you get a probe wet, and it either has a voltage or it has to sense that voltage -- and I forget which it is -- it would conduct.

And you need the reference probe to provide that return path for the current, so that you actually get a signal generated instead of just having a probe sitting out there and it can't conduct anything.

Q. Where is that probe placed?

A. Again, I think -- fuzzy recollection -- that it was actually down at the bottom by the lower Warrick probes.

Q. Did that probe play into your work on the software?

A. No, sir. That was strictly for the relay system that would detect when the conductivity occurred. It would close a contact on that relay system, and the PLCs I worked with would detect that contact closure, and that would be the input to the system.

Q. So, was that a critical element in order for the top two probes to communicate with the system?

A. The reference probe?

Q. Yes.

A. Yes, sir.

Q. Also for the two lower probes?

A. Yes, sir.

Q. And how was it connected, again, with the other four probes?

A. It's a reference. It provides -- and again, I apologize, I don't recall it very well -- it provides a path for the current to flow between the probe that is wet and the reference probe so you have a complete circuit, so you can generate a relay

output.

Q. What I'm asking is, how is that connection -- is it a hard wire connection? I'm trying to understand that.

A. It's much like the Warrick probe, in that it has a cable that's connected to it that runs all the way back up the black pipes and then to the relay house at top of the hill.

Q. How does it connect, for instance, to the two high probes?

A. It's all through the Warrick relays mounted inside the relay house with wiring down there.

Q. So, in essence, there's a wire connection that ends up connecting all of the system?

A. Yes, sir.

Q. Okay. Now, do you have any specific training regarding dams or dam safety?

A. No, sir.

Q. And what was your involvement in regard to the setting of the Warrick probes themselves?

A. During the initial portion of the project, I was working on the PLC programming code, as we've discussed, and the continuous level transmitters, the piezoelectric transmitters. I received inputs from the Warrick system into the PLCs.

Q. How did you receive them?
A. They were either wired into the Upper Reservoir PLC or over a cable that would run from the Upper Reservoir down to the plant into the Common PLC.
Q. Were you there when the information was initially available from the Warrick probes, when you were --
A. When we were testing them? Yeah, I was looking at them down in the plant to make sure they were coming in.
Q. Who were you working with?
A. That would be Tom Pierie.
Q. Who was he working with, if you know?
A. I don't know. I believe it was Sachs Electric, but it could have been a plant guy. I don't recall.
Q. But you do know you were working with Tom Pierie?
A. Yes, sir.
Q. Do you know approximately when that was?
A. No, sir.
Q. Can you give me an estimate of a month?
A. It would have been during the outage, which I believe was mid-November time frame, I think. But again, vague recollection.

Q. Do you know whether the Warrick probes -- the Hi and Hi-Hi probes -- were set at the same time as the Lo and Lo Lo probes?

A. I don't recall directly. I would venture a guess they were, because they were the same system, but I don't recall.

Q. But as far as your involvement in the testing of it, do you recall whether that was the same time?

A. When we did the testing, all the probes were there, we saw inputs. Yes, sir.

Q. How about the piezometers, were they tested about the same time?

A. They were checked for as best we could without any water in the reservoir.

Q. Yes.

A. And then the day we filled the reservoir, or started to fill the reservoir, is when we started analyzing the piezoelectrics to make sure they were functioning properly.

Q. When you say checked them the best you could, describe what that means?

A. When we connected into the system, a bad transmitter would essentially give no information back to the PLC. We were able to sense that each

piezoelectric was reading something, and that they were electrically working on the system. It required some other things to occur, such as putting water in the reservoir in order to determine whether they were functioning properly, the rest of them.

Q. Now, in regard to the Warrick probes, how did you determine that they were functioning?

A. To the best of my knowledge -- and again, I believe this is how Tom tested them -- he put a reference probe and a probe in a bucket of water. Because we needed water to conduct between the probes in order to show they were functioning.

Q. Would you also have to have water on the Hi or Hi-Hi probes when you were testing them, or would it just be the reference probe that you would put in water?

A. Both the Warrick probe -- whichever the case may be, Hi-Hi or Lo Lo -- would have to be touching water when the reference probe is touching water in order for the system to work. Again, best of my knowledge.

Q. Now, when you did this test initially, would it have been necessary for both the Hi and Hi-Hi probes to be underwater to be able to see whether one of the probes was working?

A. No, sir.
Q. And that was because --
A. The way the PLC works, each probe is wired to an individual point. So it would be the equivalent of looking at light bulbs. When a point would come on, you would the see light bulb go on the PLC -- or actually, inside the computer, you would see the data register turn on.
Q. Initially they were done in parallel?
A. Yes, sir.
Q. Which would have allowed you to discover whether a probe was working just by having water on one of the probes and the reference probe; correct?
A. Even when it was in series you would still be able to see the individual points come in to determine whether they were working.
Q. Okay, that's fair. I'm going to jump with that comment so I don't miss this.
In what was done after these two Hi and Hi-Hi probes were changed from parallel to series, was there an ability for someone to see something on a computer screen, or hear something with an alarm, that would reflect that only one of the probes had been hit with water for the required length of time?
A. Yes, sir. There was an alarm generated off

one of the probes on the highs -- I don't recall which one it was -- but one of the probes was tied to an alarm inside the system that would generate an alarm any time it touched water.

Q. But that was not true of both of them, or was it?

A. It was not true of both of them, only one of those probes generated an alarm.

Q. And would it require -- your testimony is that it would have not required both probes to have been in water?

A. Not for the alarm. No, sir.

Q. And who would have received that alarm?

A. The alarm would have come up on the operator's screen down at the -- I think it's level three -- down in the plant where the operators watched the system.

Q. Which plant?

A. Taum Sauk.

Q. What if there was no one in the plant?

A. I think, and again vague recollection, I believe there was -- that alarm could be seen over the system, where the intent was for the alarm to be seen over the system at Osage. But that part of the system I didn't do anything with, so I don't recall what was

being passed and what wasn't.

Q. So, in essence, you cannot testify here today that, during the nighttime hours, that that alarm would or would not have been visible -- assuming that it went off -- to anyone?

A. To be honest, I would have to do more research before I could give you an accurate answer.

Q. And at the time you were doing this work, and you changed the system to series from parallel, wouldn't you have known that information?

A. Again, it was outside my responsibility -- I guess is the best way to put it -- as far as what information would be passed down to the Osage Plant.

Q. Were you aware or were you not, Mr. Zamberlan, that the Taum Sauk facility was not staffed at night?

A. Oh, I'm aware of that. I just don't know what information off the system was passed down there. It's quite possible that that alarm point was passed down there, I just don't know.

Q. Okay. Then who was responsible to ensure that someone would have been available to see that alarm, who was responsible?

A. Again, from a power operations perspective, I don't know that side of the business as far as who

is watching the board, or doing whatever.

The system I'm talking about would have been the system Chris Hawkins was working on, which collected data from the plant and passed it along to Osage.

Q. I'm jumping ahead, but would Chris Hawkins have known about your changing the system from parallel to series on Warrick probes?

A. I did not tell him specifically, but that doesn't mean he didn't know. I don't know what he knew at the time.

Q. Well, if he's responsible -- and you know he's responsible -- for this communication back and forth with Osage, where was the check to ensure that this alarm, if it went off when no one was at the Taum Sauk plant, could have been heard by anyone.

A. Again, I don't know. That was, again, not part of the design work that I was tasked to do.

Q. But you're the one that changed it, Mr. Zamberlan?

A. We're talking about two different things though, sir.

Q. That could be, but I'm trying to follow you, sir.

A. The alarm was a single point, on either the Hi or Hi-Hi probe, that any time it came in an alarm

was generated. That's completely separate from the parallel and series programming that affected the tripping of the plant. They were two totally different things.

Q. Well, they certainly could have been related together?

A. They use the same data.

Q. Yes. All right. Now, at what point in time were you contacted about making this change from parallel to series on the Warrick probes?

A. I forget the time frame. It was somewhere in the December/January/February time frame. Again, I apologize for not knowing the date.

Q. Who contacted you?

A. The initial contact was a phone call from the plant that they were having problems with the system.

Q. Who was it that called?

A. I believe it was Bob Scott.

Q. Who is Bob Scott?

A. He is a technician -- or whatever the appropriate term is for his responsibility -- at the plant.

Q. And how does he fit into the hierarchy on the supervisor --

A. Best of my knowledge, he worked for Jeff Scott.

Q. And what's his position?

A. Again, best of my knowledge, he was a Supervisor and Plant Engineer at Taum Sauk Plant.

Q. And who does he report to?

A. Rick Cooper.

Q. And who does Rick Cooper report to?

A. I really don't know.

Q. How does Rick Cooper's position interrelate with Tom Pierie's position?

A. Rick Cooper -- to the best of my knowledge -- is operations, and plant maintenance, and things like that.

Tom Pierie is projects, Capital projects, engineering and construction.

If a project was at Taum Sauk, Tom wouldn't necessarily report directly to Rick but would have Rick involved with the decisions going on down there.

Q. Okay. And you have a call that comes in. And to the best of your ability, recount what you were told?

A. Best of my knowledge, Bob called and said he couldn't get the unit to go into pump-mode or gen-mode -- I'm not sure which it was -- to one of the

modes, and he wanted to know how we could get it working.

So, I walked him through how to bypass the alarm point, or the trip point, at that time, so he could get the unit working.

Q. Okay. Again, what was -- the problem was that the unit was shut down?

A. The unit shut down. Again, the spurious trip we talked about earlier. It just shut down.

Q. I'm going to come back to this spurious trip thing. But right now your testimony is that you were being asked how do we get one of the generating units back online?

A. Yes, sir.

Q. Do you know which one it was?

A. No, sir.

Q. And you explained to him how to do that?

A. There is a way we could do it so he could get the unit back online and keep an eye on things.

Q. And what was that?

A. We programmed in the equivalent of a jumper that went around the Warrick probe contact input so they could get the unit working.

Q. Now, Mr. Zamberlan, at this point in time, does it enter into your mind that there could have

been a reason for that probe to go off?

A. We went through that during the call.

Q. Tell me what the conversation was?

A. Again, the conversation would have been something to the affect of: He had this trip occur, what caused it, I believe it was a false indication on the Warrick probe.

Q. Did he tell you which one?

A. No.

Q. Keep going.

A. We went through whether or not it was valid. He said no, there's water in the reservoir. So, okay. So, it's -- I believe it was the lower probe then, if the water is in the reservoir, it came in.

He asked, how can we get it working. I said, you can do this. I said, you know, it removes your Warrick probes. He said, okay, we need to get it working.

I walked him through how to do that, and they got the unit back running to the best of my knowledge.

Q. So, he told you there was water in the reservoir?

A. Best of my knowledge.

Q. And you then said, well it must be one of

the low probes; correct? Something to that affect?

A. I don't recall. He could have said it was the low probe. Again, it had something to do with the Warrick probes. We validated that it wasn't an actual problem, and then we determined a way to get it working for them.

Q. Now, your earlier -- are you changing your testimony now, Mr. Zamberlan?

A. No, sir. Again, it's the best of my knowledge. I don't know the exact words.

Q. But your testimony earlier was that you came to the conclusion that it was one of the low probes because there was water in the reservoir. Are you changing your story?

A. Then I must have misspoke on that, sir.

Q. So, you believe he's the one that said it's the low probe?

A. No, I don't know, sir.

Q. At the time, would you have been concerned that it might have been one of the high probes that was actually generating the signal?

A. In the -- I believe -- I believe they were in generate mode, which would have only used the lower probes as part of the tripping scheme. And when you are in one mode or the other, the other probes, they

don't have an affect.

Q. When was the event?

A. It was late.

Q. Late being --

A. Eight p.m. at night, 9 p.m. at night, something like that. I think it was 8 p.m., thereabouts, I think.

Q. Do you recall what day?

A. No, sir.

Q. Is there a record of that?

A. I don't recall, sir.

Q. Do you recall specifically asking him the question about whether or not he was sure that it was a low probe that was issuing the signal and not one of the high probes?

A. I do not recall at the time, sir.

Q. So what you did, basically, was to -- I don't want to put words in your mouth, and maybe you said it this way -- but you basically jumped the system around the safety?

A. That is correct, sir.

Q. It would be like -- you've got a riding lawnmower?

A. No, sir.

Q. Do you have a push mower?

A. Yes, sir.
Q. Does it have one of those bar things on it that, if you turn it loose, the bar comes down and the motor shuts off?
A. Yes, sir.
Q. Something like disconnecting it?
A. Yes, sir.
Q. Now, is this a temporary disconnection that was done?
A. Yes, sir.
Q. How do you know that?
A. That was the intent of it.
Q. Well, I understand that may have been your intent, but how do you know that it was temporarily done?
A. I do not know.
Q. And again, the individual you were talking to, what was his training in regard to --
A. He was a technician at the plant. He was the one that worked with the PLCs, instrumentation, things like that.
Q. So, you had some confidence in his knowledge about being able to follow your direction?
A. Very much confidence in his abilities.
Q. Did you tell him how to make -- turn the

safety devices back on?

A. Yes, sir.

Q. Did he tell you whether or not, while you were on that phone call, whether or not he did it?

A. We couldn't do it at the time.

Q. Couldn't do what?

A. Turn those back on at the time.

Q. You could not?

A. No, sir.

Q. Do you know if they were turned on subsequently?

A. To the best of my knowledge, they were.

Q. Do you know how long it was before they were turned on?

A. No, sir.

Q. And when they were turned off, did it turn off all the Warrick probes or just the low ones?

A. I don't recall which ones we did. I think it was just the low ones, but I don't recall specifically.

Q. Is it possible that it was all four?

A. I guess it is possible. Yes, sir.

Q. Now -- and again, you don't recall how soon afterwards the safety switches were turned back on?

A. No, sir.

Q. I'm sorry for the bad terminology.

A. No, sir. I don't recall when they were turned back on.

Q. Were you involved in getting it turned back on?

A. I don't recall if that was part of my responsibility at the time or not. It was a call that we needed to address, this issue. I think we, at some point, had cleared it up, but I don't know what the length of time is.

Q. So, you have no idea how long the safety devices, whichever ones they were, were actually turned off?

A. No, sir. I don't.

COMMISSIONER GAW: The Judge is brow beating me over here that I need to stop for the evening. And despite the fact that I am sort of moving along a line of questioning, I'm going to stop, Mr. Zamberlan. I apologize for that interruption.

JUDGE DALE: But we'll be convening tomorrow morning, picking up where we left off, at ten o'clock.

(WHEREIN, the recorded portion of the hearing was concluded.)

INDEX

JAMES ALEXANDER

ANTHONY ZAMBERLAN

EXHIBITS

(Original exhibits were retained by the Court.)