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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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SUBCOMMITTEE ON PLANT OPERATIONS

AND FIRE PROTECTION

+ + + + +

WEDNESDAY

OCTOBER 6, 2010

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Harold Ray, Chairman, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

HAROLD RAY, Chair

MARIO V. BONACA

MICHAEL T. RYAN

JOHN D. SIEBER

JOHN W. STETKAR

NRC STAFF PRESENT:

GIRIJA S. SHUKLA, Designated Federal Official and Cognizant Staff Engineer

PAT MILANO

RAGS RAGHAVAN

ROBERT HAAG

ALSO PRESENT:

MASOUD BAJESTANI, TVA

ROBERT PHILLIPS, TVA

PETER OLSON, TVA

BILL CROUCH, TVA

JERRY SCHLESSEL, TVA

KEN WELCH, TVA

STEVE HILMES, TVA

C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

8:26 a.m.

CHAIR RAY: The appointed time having arrived, the meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguard Subcommittee on Plant Operations and Fire Protection. I'm Harold Ray, Chairman of the Subcommittee for Watts Bar Two.

Subcommittee members in attendance are Mario Bonaca, Jack Sieber, and Mike Ryan. Mr. Girija Shukla is of the ACRS staff, is the designated Federal official for this meeting.

The Subcommittee will hear presentations from the NRC staff and the Applicant, Tennessee Valley Authority, regarding the status of construction inspection and licensing activities related to Watts Bar Unit Two.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's meeting. This meeting will be open to public attendance.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

The rules for participation in today's meeting have been announced as part of the notice of this meeting published in the Federal Register on September 10th, 2010. A transcript of the meeting is being kept and will be made available, a stated in the Federal Register notice.

Therefore, we request that participants in this meeting use the microphones located throughout the meeting room when addressing the Subcommittee. The participants should first identify themselves and speak with sufficient clarity and volume so that they may be readily heard.

Please silence your cell phones. We will now proceed with the meeting, and let me say that the attendance here today is not in any way an indication of a lack of interest. To the contrary, it's an indication of the fact that there is something more pressing for some of our members next door, and, I would say, the good order in which this application has proceeded to this point. So, I'll take it as a compliment, not any form of, like I said, lack of interest.

We'll call first on Pat, of the staff, for comment, introductory comments, and the, today's meeting is intended or scheduled to take just a half-

day.

MR. MILANO: Hi, good morning, Mr. Ray, and other members of the Subcommittee. My name is Patrick Milano. I'm a senior project manager in the Office of Nuclear Reactor Regulation, Division of Operating Reactor Licensing, and I'm assigned to the Operating License Application Review for Watts Bar Nuclear Plant Unit Two.

With me today, and who will also be present for the staff's portion of the presentation are Mr. Raghavan, who's the team leader within our Division, and MR. Robert Haag, who's the Branch chief in the Division of Construction Projects in Region Two and assigned with oversight and management responsibility of the inspection efforts.

The general topics for today's meeting will center, first, on the resolution of action items that came out of our last Subcommittee meeting in March of this year. Then, the staff and representatives from the Applicant, Tennessee Valley Authority, plan to give you a brief overview of the status of the project, including engineering, construction, the Project Refurbishment Program, licensing, and inspection of Watts Bar Unit Two, focusing primarily on what's been transpired since our

last presentation in March.

Lastly, we'll be, the staff will be providing a brief look ahead regarding the staff's expectations for presentations of information at our next meeting with the Subcommittee, currently scheduled for February of 2011.

Regarding the action items from our last meeting, and, in the course of discussions, in March, both the NRC staff and TVA had indicated that a review was underway of TVA's Refurbishment Program.

As you'll hear from TVA, this program addresses both the refurbishment and replacement or, of commodities that have been degraded since construction and preservation activities had ceased. And, and also the inspection and evaluation of systems, structures, and components not being refurbished, i.e., used as-is.

TVA been providing a summary of the scope and elements of that program. The staff will address it's review of the program and the assessment of TVA's implementation, which is currently ongoing during it's portion of the presentation.

Several of your Subcommittee members, also asked how TVA would be addressing potential issues with buried pipe and cable, and this will also be

included in TVA's presentation.

During the discussions last time on the project's Schedule, TVA noted that it would be coordinating with the management of Unit One to ensure that Unit Two's Integrated Safeguards Test would not impact the safe operation of Unit One. TVA will address the comments raised by your Subcommittee in this regard.

Lastly, the staff had previous describe it's, it's oversight functions with regards to this project, and specifically, the scope, priorities, objectives and activities of the Watts Bar Reactivation Assessment Group.

Specifically, the Subcommittee questioned the language in the assessment group charter about voting membership and how voting would be accomplished. Subsequent to that, the staff provided the Committee with a Revision One to this charter which deleted, removed that misleading language.

The primary role of the group members will be to make a recommendation to senior NRC management about the possible issuance of an operating license for Watts Bar. This would not be the subject of a vote, but rather an agreement among all the members at the proper time.

However, as part of the, its normal course of doing business, the group member--issues are identified, which, which the group decides what, if they need further evaluation, review, or action by one or more of the members.

And the charter defines the necessary quorum of members when deciding on whether these actions will be added or removed from the action item list.

CHAIR RAY: If the Applicant would respond, we'd appreciate it.

MR. MILANO: Okay, sure. I'll now turn over the presentation to, to TVA and with that, I'll introduce the TVA members who will be coming up. First will be Mr. Masoud Bajestani, who is the Vice President for Unit Two, Mr. William Crouch, who is the Unit Two licensing manager, and Mr. Peter Olson, who is the, the Unit Two startup manager. Thank you.

CHAIR RAY: Thank you.

MR. BAJESTANI: Good morning.

CHAIR RAY: Good morning.

MR. BAJESTANI: Today I am going to provide you a brief summary of where we are with respect to construction, completion of Watts Bar Unit Two, specifically some of the topics that came up from

previous discussions.

If you go to page three of the presentation, I'm going to go over some of the changes from the last discussion that we had when we went over this project Schedule. A couple of major changes that we have had, one is--well, update, actually--one is the engineering completion.

We have essentially completed engineering. Engineering now is moving to field support, very little work left under program and design of the document. The, the other major change that we have was on Integrated Safeguard Test. Initially, when we came over here last time we discussed that we were going to do the Integrated Safeguard Test during the upcoming March outage of Unit One.

WE looked at the, where this Integrated Safeguard Test is scheduled and where we are with respect to completion of the construction work, and we decided to move the Integrated Safeguard Test to after Hot Functional Test. I believe one of the main reason for that is obviously was to be sure that all the construction work is completed and all the safety related systems that's required for Integrated Safeguard Testing.

We just recently submitted our response to

your staff NRR that why it's to do this test online with Unit operating and if there are more questions specifically on Integrated Safeguard Test and how we're planning to perform this test, Pete is going to address that.

CHAIR RAY: I didn't understand your last comment. Certainly, we have some interest in that, it sounds like the right thing for you to do. The only question is whether, you know, one should be kept at power during the Safeguards Testing and I guess we'll hear more about that, will we?

MR. BAJESTANI: Yes, we can go over that in detail when, when it gets to Pete, you know, the test that we have done on Unit One, when we went through, basically, we're going to, we'll go over that again. Pete is going to explain, we still maintain a dependence and how we're going to do this test is not going to impact Unit One operation.

CHAIR RAY: All right, that seems like the right thing to do, as I would judge it.

MR. BAJESTANI: Those are the major changes on page three. If you go to page four, give you a brief, again, overview of where we are on construction and engineering. Engineering, like I said, is essentially complete, but the design of the document,

which is really design modification, is 98% complete. Calculation, 88% and programs about, almost 80%.

Again, the engineering focus has changed from issuing design product to really, field support and closure of the open items. We had a lot of open items as we completed the engineering, like, unverified assumptions, open items that we left that we had to come back after implementation of the field work, come back and update certain things and engineering calculations or engineering programs.

CHAIR RAY: Masoud, why do you call them "design modifications" as opposed to just "design"?

MR. BAJESTANI: Okay. You know, as you know, the plan, construction was stopped back in 1985. A lot of work was done on the, basically, what the drawing came up, says, "go implement this" so we went ahead and did that. In 1985, we stopped that.

Then, after 1985, there were work that was still there that we didn't complete. The other part that we did is, any changes that came, when we came online, from 1996, that was when Unit One came online, until, really, now, essentially, we went ahead and look at everything that was working at One is done and planning to do for the next five years, really, when we started this project.

We added all that as a design of the document, basically. What do we need to do to get all this done.

CHAIR RAY: All right, but your aim still is to, to be consistent with Unit One, so the modifications really are more things that were done to Unit One after they, suspension of the work on Unit Two?

MR. BAJESTANI: Absolutely.

CHAIR RAY: I see. I see.

MR. BAJESTANI: The other thing that we are doing is, this is the third week of what we call vertical slice. We picked a couple of systems in engineering, specifically RHR, Residual Heat Removal, and Component Cooling Systems.

We picked those two systems, we brought an independent team, eight-member team, with very experienced, actually, completely independent of Watts Bar Unit Two project. And a member, actually, from INPO, to take a look at everything we have done in engineering, essentially, on these two systems, and see if we are right track, or we missing something that we need to go back and re-look at.

Again, very experienced team. This is the third week actually that they are going through this,

we have an exit meeting on Thursday and there are issues that's coming up from this assessment.

Very good findings, and there are issues that, really, that we are going to have to address, but nothing technically, that basically, as far as what we have put up to go implement in the field, is, is, come up that says "hey, we did this wrong".

There are some paperwork issues that are, the way we have done, actually, business, like, we got too many unverified assumptions and some of them are not in main database, some of them are fragmented a little bit.

Issues like this has come up that's going to help us to really make sure when we're finished with this project everything is lined up and there is a good road map from how you get from point a to point b.

CHAIR RAY: Well, that, it's, sounds good. I think decoupling Unit Two's schedule from Unit One, operating and refueling schedules, gives you the flexibility to do whatever you need to do. It gets done when it gets done.

MR. BAJESTANI: Actually, I think, again, good comment that we had--last time we had this discussion, you guys asked the question and we went

back and looked at it, and, you know, really, we had to do all the work, integrate safeguard testings, all the system work is complete, and then we do the test.

CHAIR RAY: That's right.

MR. BAJESTANI: So, good comment from a previous discussion. Next page, on the, I just listed some of the improvement initiatives that we have on Watts Bar Unit Two. These are, a lot of these, really, I'm just going to mention two or three of them. It's the lessons learned from Watts Bar Unit One operation and industry that we decided that rain and wait until problem comes in, first cycle, second cycle, go take care of it now, specifically, like, flow-accelerated corrosion.

Okay, the first couple of cycle of operation on Watts Bar Unit One, we found lot of piping that we had to replace because of the flow-accelerated corrosion. We decided to go ahead and replace it, all this piping now before we start up. We have some issues on essential flow cooling water pumps, we replace, we are replacing all eight pumps.

Actually, one of them is being replaced as we speak. We put the--bigger pump, we had some issue with the margin as far as EFCW. We went ahead and took care of that for the bigger pump, so, for two Unit

operation, actually, we're going into a lower margin than what we had initially.

And, same thing on some of the switchyard stuff. We decided to go ahead and rearrange the switchyard to have basically a better, better switchyard with additional breaker, 500 kV breaker that is going to help the stability of the switchyard.

CHAIR RAY: That's what you mean by the additional off-site power source?

MR. BAJESTANI: No. The additional source of power actually, what we end up doing, we actually putting a tap changer, a tap changer one of our, two of our common station service transformers that is going to now qualify--before, it wasn't qualify as off-site power. Adding that tap changer, adding tap changer is going to make it a qualified off-site power, which we didn't have before.

And, as you can see up there, you know, I don't need to go through every one of these example. If there are any specific questions, but as you can see, lot of lessons learned from Watts Bar initial startup, industry, we decided to add all this and do it now versus first or second cycle, you know.

CHAIR RAY: I have just one general question. How have you dealt with unintended

consequences in those evaluations for any of these additions or changes?

MR. BAJESTANI: Well--

CHAIR RAY: I mean, have you had a program to examine while we're adding this new feature, or we're changing out this piece of equipment, is there any unintended consequence or impact on related systems or adjacent systems?

MR. BAJESTANI: Part of the design process is actually, there has been, when you go through the checklist, some of those questions that ask and you specifically ask for unintended consequences, specifically address part of the design output process. So, when we, you know, when we upgraded the EFCW pump, actually, we look at the two Unit operation.

The margin that was there, the, what's the new, you know, what's the new margin. We look at the diesel generator loading, we looked at all the, it's looking at here, not just, okay, go ahead and do this, it's everything that could be impacted by--

CHAIR RAY: They, look, it's just some interactions, and--

MR. BAJESTANI: Yes.

CHAIR RAY: --could be, as a result of the

change and all that, in some detail.

MR. BAJESTANI: Exactly.

CHAIR RAY: Okay. That's fine, for now. But I'm guessing you had a fairly rigorous program and a structure by which you had a--

MR. BAJESTANI: Yes.

CHAIR RAY: --go through that, and quality assurance, and all the rest that goes with it?

MR. BAJESTANI: That's right. We have it, really, actually, big QA, since you asked that question, the quality assurance program that we have, we have a EPC, Bechtel that has their own QA plan. On top of that, we have put TVA on top of the, what Bechtel QA program is. So, it's really getting a lot of attention.

CHAIR RAY: Lots of help?

MR. BAJESTANI: Lots of help. Lots of help. The other thing actually that I looked at are QAQC organization. On Bechtel side, we have a almost 80-some people, on that organization. Then on top of that we've got seven or eight TVA guys that are watching also.

CHAIR RAY: Okay. I noticed that you include spit--split pin replacement prior to operation on your list here?

MR. BAJESTANI: Yes.

MEMBER SIEBER: A, sort of a companion issue about the time split pins became a problem in this type of plant was baffle jetting. Do you plan to do anything with baffle, baffle bolts, to prevent or mitigate baffle jetting problems that this reactor type had?

MR. BAJESTANI: We, obviously replaced the split pins on the baffle plates. Are we talking about the X750 bolts?

CHAIR RAY: No.

MEMBER SIEBER: No, these are different.

MR. BAJESTANI: These are different?

MEMBER SIEBER: The baffle is form-fit around the fuel outline and it's bolted together. Sometimes those bolts relax, water shoots through the baffle, vibrates the fuel, wears holes in the fuel which gives you fuel leaks. And that's been a problem, traditional at this point.

MR. BAJESTANI: Sure. Robert, do you have any update on the--

MR. PHILLIPS: Certainly. My name is Robert Phillips, senior metallurgical engineer, represent TVA. We, TVA, have participated in the Westinghouse Owner's Group, and the Westinghouse Owner's Group have

came out with specific models for each plant for converted upflow and converted downflow and we have plans for when we need to replace those and we're following the Guidelines of the industry.

MEMBER SIEBER: Okay. Thank you.

MR. BAJESTANI: Any other questions on that page?

(No response)

MR. BAJESTANI: On page six, construction, overall construction is over 60% complete. Major work that we are doing in construction right now, we are focusing on all the conduit cable installation cable, cable pool. All the hangings, small-bore, large-bore supports.

We have almost 4,000 supports that we have to modify, we have done about 2,500 of them. Sense and sample lines, and a lot of refurbishment activities that's all, both passive and active, which we're going to discuss a little bit later.

On critical path, critical path for construction is really bulk work, what I just mentioned about those four items. And, specifically on the critical path, there's four major systems, safety injection, chemical volume control, essential raw cooling water, and component cooling.

And the next thing is obviously the ice condenser and ice loading that's coming up. We still on track to complete the construction and, and the fuel still on scheduled as I went over on page three for April of 2012. Any questions? If not, I'm going to turn it over to Pete.

MR. OLSEN: Good morning, Pete Olson, startup manager, TVA.

CHAIR RAY: Good morning.

MR. OLSEN: Good morning. I'm on page seven, for status is preoperational startup testing program. The program has gotten underway, we have completed the turnover, nine systems that are, that are listed on the slide there.

You notice the focus of those is generally support systems and the turbine generator and getting those in service to support our major process systems that'll be turned over here later this year or early next year. The condenser cooling water system is our first system that will receive preoperation test performance.

That system has been run a number of time sin various configurations, good, good pump performance, good overall system performance. We, we have it shut down right now to do some, some

maintenance on it before we run the preoperation test, which is scheduled for late November.

MEMBER SIEBER: You're, you're re-tubing the condenser?

MR. OLSEN: The condenser has been re-tubed.

MEMBER SIEBER: Okay, that's finished?

MR. OLSEN: Yes, sir. As Masoud mentioned, the integrated safeguards test, we took a hard look at, here, this past summer. WE have currently scheduled it for after Hot Functional Test on Unit Two with Unit One online.

I appreciate your comments earlier about doing it late in the startup program and also the impact to Unit One, which we, we of course share. Bill, can we, can you go to the other slides, and we'll walk through the, walk through some--I'll walk through some specifics for you here on, on what we looked at.

Little background--we, we originally placed the Integrated Safeguard Test during the Unit One outage primarily because of the need for looking at the testing related regulatory guide 1.41, which verifies the load group assignment redundancy between ESF systems.

The safeguards testing includes, really, four, four pieces of testing--manual, response to manual safety injection, response to loss of off-site power, response to safety injection coincident with loss of off-site power. Those tests by themselves are quite similar, very similar to the surveillance testing that was performed on the operating Unit on eighteen month refueling frequency and will be performed on Unit Two on that same frequency.

The fourth piece of the test is the load group assignment test that falls out of reg-guide 1.41. The, the purpose of this is to verify the, in the Regulatory Guide, is to verify redundancy between the two ESF trains, such that a total loss of one train will not result in the opposite train being able to perform its intended function.

When we looked at this hard, we looked at the regulatory, the purpose of the 1.41 Regulatory Guide and what was done on Unit One. Can we go to the next slide? The, the electrical distribution system at Watts Bar is a common electrical distribution system. There's four 6.9 kV shutdown boards, one alpha, one brave, two alpha, two bravo--again, load group A, load group B--in each Unit.

Four diesel generators associate with each

of those shutdown boards, and then ESF loading is coming off of each of those shutdown boards. Those further cascade down to the 480 volt load centers, 120 volt load centers, vital AC, vital DC load centers.

All of those electrical distribution systems are currently licensed with Unit One under technical specifications control of Unit one and surveillance testing of Unit One.

During the Unit One startup, we performed a full reg-guide 1.41 test which de-energized the opposite train, not under test, including both Unit One and Two boards, the entire off-site feeds to the plant, the Unit board, non-safety related Unit boards, and the opposite channels of vital AC and vital DC.

And we successfully completed that test on Unit One, verifying the Unit One loads were totally independent from one another to support Unit One licensing. That electrical distribution system stands today as it did back in the 1995, 94 time frame when we did that test, it is identical. It has not changed.

So, the load independence between those two buses still, still stands. The last bullet, you'll notice, is that the lower distribution system--by that, I mean the loads, the Unit Two specific loads that come off the Unit Two buses--have not been

verified independent of one another.

An example would be a, a, a Component Cooling System pump, two alpha and two bravo. Their functions have not been, with them, have not been determined to be independent yet because those were not in service for a startup of, as far as an ESF for Unit Two, for Unit One startup.

So we need to do that test to satisfy the Regulatory Guide. We still need to complete that for Unit Two startup, no question whatsoever. Looking at that, we can go ahead, and, those, those systems have been disconnected from Unit One, and we can go ahead and connect those to the buses and perform independence tests one bus at a time, two alpha and two bravo, to go ahead and verify the load independence of those, of those subsystems coming off those electrical boards.

And what we're doing is taking credit, you know, relying on the testing that was done in Unit One for the actual electrical distribution load independence. Can we go to the next slide?

What that would do for us is verify, is take credit for Unit One testing, but we will in fact verify independence between the Unit Two load groups, alpha and bravo. We'll fully, fully demonstrate that.

So, being able to do that, that allows us to move it out of the Unit One outage, because we will not, in order to accomplish this test, we will not effect the Unit One shutdown boards, one alpha, one bravo. We will not de-energize those boards, we will not touch those boards.

There are some common systems that we'll be involved in that we need to look carefully at, for example the Auxiliary Building Gas Treatment System for, which is common between two units. It is f-ed from Unit Two boards, so I'll have to take appropriate precautions there in LCO space when we test those.

Some other common systems that, main control and ventilation, which we will actuate, but the power feeds for it are off the Unit One buses. Some other systems are spent fuel pool cooling, which is quite diverse in its power feeds, with an alpha and a bravo pump and a swing pump.

And also the Emergency Gas Treatment System, which is, has some common filters and fans between the two units, but it's electrical power sources are off the Unit One buses. So, we have some common systems we'll have to pay particular attention to.

Earlier, I mentioned that the test is, the

first three sections, the manual safety injection and loss of off-site power, and the loss of off-site power coincident with safety injection, is, is very similar to the Unit one testing and it be done on a refueling basis.

The significant difference between the startup test and that test, the surveillance testing, is in fact, we will perform full flow ECCS flow to the reactor vessel during the preoperational test, which is intended to verify maximum horsepower of the pumps on the diesels, in that condition.

We will repeat the test for future baseline with the pumps on recirc, which is normally done during the refueling surveillance frequency. The other ones we'll do is, we will transfer the ESF flow from the diesels back to off-site power.

Again, those diesels will be the two alpha and two bravo diesels. The last piece, the load independence test, is a one time test. It's only performed once, unless there's a significant modification done to the plant.

Again, the, it's set up, the test is set up with the core bar removed. I said we have full flow to the vessel on Unit Two. We've, we've estimated about four days per train to do the test, which is

well within the LCO time with the diesels.

We are discussing, currently our PRA folks looking at the risk perspective of the test online with Unit One. Initial feedback, I do not have a number to provide to you, but the initial feedback is that it's a very manageable number related to risk, risk profile for Unit One.

The--I'm sorry.

CHAIR RAY: Tell me some more about that. I mean, I guess I would tend to think of this as a deterministic conclusion rather than something you'd base on a PRA.

MR. OLSEN: Well, in looking at and protecting, the reason we will looked at the PRA is in the, in looking at protecting Unit One. The Unit Two piece is totally separate from that, but--

CHAIR RAY: No, I know, but what, I guess, what is the risk that you're weighing when you're doing that?

MR. OLSEN: Well, we're going to have one shutdown board de-energized for a brief period, the Unit Two shutdown board, and it's diesel inoperable for a brief period during the performance of the test.

MR. BAJESTANI: It is within allowable tech spec limit--

CHAIR RAY: Yes, that's what I would think--

MR. BAJESTANI: Yes. But still, we wanted to really go back and look at it, just make sure there's nothing else that we're missing as well as impact. But it is within allowable tech spec. That's really what matters.

MR. OLSEN: Yes, yes, it is.

CHAIR RAY: That's what I was thinking, is, well--

MR. BAJESTANI: Yes.

MR. OLSEN: Okay.

CHAIR RAY: What's the--

MR. OLSEN: Yes. I see your point.

CHAIR RAY: --what are you looking at, it's really--

MR. OLSEN: That's what's modeled in the PRA--

MR. BAJESTANI: You're right--

MR. OLSEN: --takes credit for the fact that's within the tech specs.

CHAIR RAY: By the way, as long as I interrupted, are these slides going to be on the record?

MR. BAJESTANI: Yes.

MR. OLSEN: Yes.

CHAIR RAY: Because I don't have the--

MR. BAJESTANI: They are not on the hard copy, by the way.

MR. OLSEN: Right, they're not in the hard copy, these were backup slides and they're on the disk I gave you.

CHAIR RAY: Okay, well. Go ahead.

MR. OLSEN: So, we reviewed this, this approach with the staff back in August 3rd. In September, we submitted a detailed writeup on our proposed approach to satisfy Reg Guide 1.41. That's with your staff now. We're anxious to engage in conversations with them on any detailed questions they may have in satisfying that Reg Guide.

Any other questions on safeguards testing? Okay.

CHAIR RAY: Anything?

MEMBER RYAN: No.

CHAIR RAY: Okay.

MR. OLSEN: Okay. Thank you. Back to page seven, then, just the last comment is the essential raw cooling water system, which is a common system between Unit One and Two. We will be doing flow balancing of that system with Unit One's refueling

outage.

This does have significant impact to tech specs and, and impact Unit One. So we have that slated to be done during the Unit One refuel outage, and preparations are being finished up with construction completion and all the prerequisite procedures to accomplish that.

CHAIR RAY: Okay.

MR. OLSEN: That's the end of my presentation, unless you have any questions.

CHAIR RAY: No, I think that's fine.

MR. BAJESTANI: The next topic, what some of the special topics that you guys have specifically asked, that we're furnishing.

MR. SCHLESSEL: Good morning. Jerry Schlessel, TVA construction manager. The refurbishment program falls under my purview. The refurbishment program includes equipment that are safety related, both active and passive. Refurbishment program goes through a process of steps, including identification, which we use our Master Equipment List to ensure that we've captured all the components, classification, that's where we determine if we're replacing piece parts, whole devices. A functional test, or the startup test, if the equipment meets our requirements.

Next comes inspection and evaluation, those are technical evaluations. In the passive program, Ken Welch will give you the details for how that's accomplished. And then, refurbishment or replacement, that's actually the performance of the work. And finally, component and system testing.

Required outcome of the program, we, original, processing, design, and equipment vendor specifications. Current status of the program, safety related valves, all types, 34% complete. That includes AOVS, manual valves, MOVs, check valves, relief valves, et cetera.

Large safety related pumps, 30%. Our safety related and quality related motors were 40% complete. Any questions with regard to the program and the current status?

MEMBER SIEBER: When you do the refurbishment of a valve, exactly what is it that you do to, just change the packet?

MR. SCHLESSEL: Okay--

MEMBER SIEBER: Set the clearances?

MR. SCHLESSEL: For a valve, we've got classifications that make us, make the determination of what we'll do. If they're in a high pressure, high temperature system, radiation carrying system, or

items inside the polar crane wall, those get the packing, gasket replacement.

Any, any organic material that might be in the valves will all be replaced, the valve will be then put back together. If it doesn't meet those criteria, we'll do a functional test--check with the operator, if there's any degradation determined from the operator's functional check, we'll go into those valves.

MEMBER SIEBER: On the severe duty valves, what you're doing is changing the soft materials?

MR. SCHLESSEL: That's correct.

MR. BAJESTANI: Anything that's--

MEMBER SIEBER: Metal parts you leave as is?

MR. SCHLESSEL: They're left as is. When they're apart, if anything's noticed, those will, corrected at that point. Ken in the passive program is notified, he makes selections to go in, look at those. If there's degradations in them, we'll address those as, as fit.

MEMBER SIEBER: And what do you do with pumps, just packing plans?

MR. SCHLESSEL: Pumps are completely torn down. Most of the pumps are sent back to the vendors.

There are a few of them that were rebuilt on site, procedurally, go through the vendor manual, take them down, replace all the same organic parts that could age and put them back together. And there are measurements there.

MEMBER SIEBER: Then you have the motors, what do you do? High pot them, or--

MR. SCHLESSEL: Yes, they're all, they're all, the VLF testing, vapor testing. All those large motors were sent off site.

MEMBER SIEBER: Okay.

MR. SCHLESSEL: And to vendors to refurbish.

MEMBER SIEBER: You send them off site to do that? You can't do that on site?

MR. SCHLESSEL: To get a good quality product, we're sending them all off site.

MR. BAJESTANI: And also, keep in mind that, again, for quality refurbishment, really, on the, going after any material that's susceptible to aging, we replace it.

MEMBER SIEBER: Right--

MR. BAJESTANI: At the same time, Watts Bar Unit Two, a lot of the equipment, like valves, they were missing, you know, either by Unit One or Sequoyah

Unit One or Two. So we were actually replacing 4,500 valves.

MEMBER SIEBER: Yes, I noted that when we walked through the plant--

MR. BAJESTANI: Right--

MEMBER SIEBER: --that you were--

MR. BAJESTANI: --replacement.

MEMBER SIEBER: --that, if I were to characterize this in my own mind, I would call this more, more of a, akin to a preventative maintenance program as opposed to wholesale replacements.

MR. SCHLESSEL: That's correct, but no--

MEMBER SIEBER: Okay.

MR. SCHLESSEL: --that was a large quantity of replacement, a large quantity.

MEMBER RYAN: What percentage would you say have been replaced rather than refurbished?

MR. SCHLESSEL: From a valve standpoint?

MEMBER SIEBER: Pick one item.

MEMBER RYAN: Not going to hold you to a half, three quarters, ten percent?

MR. SCHLESSEL: After 4,500 you're going to be close to half.

MEMBER RYAN: That's interesting.

MR. SCHLESSEL: I'll make sure I get that--

MEMBER RYAN: That is not an urgent number than I need--

MR. BAJESTANI: We do know that we're going to replace 4,500 because we have ordered and received a lot of these, 4,500 valves we have ordered, we have a purchase order. Half of them are received, actually installed some of them. But we know we're going to replace about 4,500 valves.

MEMBER RYAN: And I'm sure you've addressed this question, forgive me for asking if it's a dumb one, but when you have refurbished parts, you know, and then you've got new parts going into old casings and things like that, have you--has that been a problem, or have you addressed that?

MR. SCHLESSEL: We really haven't had any issues there. You know, you order the material, you check your fits, you reassemble the test valve, identify if anything's--

MEMBER RYAN: So the functional testing in place after assembly--

MR. SCHLESSEL: That's correct.

MEMBER RYAN: --you'll know if you had a--

MR. BAJESTANI: I just want make sure we expand on that. There are times that we go in and we look for some specific part replacement and we find

that it's obsolete, and we go back to engineering and we get a whole replacement, basically, because--

MEMBER RYAN: So, so you really got to--

MR. BAJESTANI: Yes.

MEMBER RYAN: -re-engineer the replacement--

MR. BAJESTANI: Exactly. Re-engineer the replacement.

MEMBER RYAN: That's a formal step.

MR. BAJESTANI: That's right.

MEMBER RYAN: How about this whole issue, we've seen in the press a lot lately, of counterfeiting, and bad metals, and metallurgy, have you run into that, or?

MR. BAJESTANI: Well, what--let me, let me explain what we did. Right at the beginning of the project, we understood that some of the issues as far as fraudulent, you know, materials--

MEMBER RYAN: Valves and all that, right.

MR. BAJESTANI: Yes. So what we did, first of all, we actually took al those and put them in our process, specifically like for QC inspections, looked for certain things, like breakers, you know, this, that.

The other thing that we did, we actually

right at the beginning of the program, we went ahead and basically for every vendor that we had, we put a shop surveillance. We have done over 500 shop surveillance that, that, we have gone to different vendor.

Actually, look at right here, application looking at their, Appendix B program and so on and so forth, and we have found problem. There is list of issues that we came up, but that, because what we did is actually the beginning of a good product, you know, we finding the problem, and we still finding issues even on the received inspection.

But, a lot of this surveillance that we did has helped us to get to really identify all this problem up front.

MEMBER RYAN: So it sounds like you feel like you're ahead of the curve on these issues that come up when you're--

MR. BAJESTANI: Yes.

MEMBER RYAN: --your refabrication program?

MR. BAJESTANI: Well, because of the industry, we decided right up front to do this structure events, you know, so, we sending people to specifically to every vendor, looking at process, procedures, and look at actually the fabrication.

MEMBER RYAN: And as you said, that's an ongoing activity?

MR. BAJESTANI: Ongoing activity.

MEMBER RYAN: All right.

MR. BAJESTANI: Thank you.

MEMBER BONACA: The question I have is, you rely those on the, on the layout, very, have you performed that assessment of the, of the effectiveness of the layout?

MR. BAJESTANI: Ken is, Ken is going to address that on the passive refurbishment in a minute.

MEMBER BONACA: Because, I mean, I'm sure that that's a tie to decisions on which valve we are going to maintain and how you're going to do that, so, again.

MR. SCHLESSEL: With that, if there's no other questions, I'll turn it over to Ken to talk about the passive refurbishment program.

MR. WELCH: And that is really a very good lead in for this discussion, because we want to talk just briefly--excuse me, my name is Ken Welch and I'm the lead for the passive refurbishment program.

As I said, that's a good lead in for this discussion about the passive component refurbishment project because really what prompted this program is

concerns about not having an adequate layout program. That's really what prompted this whole program to exist.

So, what we are doing in the passive program, which is a smaller but very important part of refurbishment in general, is we are focusing on passive components in the plan. We have a procedure which defines what's a passive component and what's an active, but a very simplistic definition is to say if it doesn't have moving parts, it's considered a passive component.

MEMBER SIEBER: Is it guaranteed that a given part will either fall into the passive or the active component, or is there another group out there that's--

MR. WELCH: No, there's, there's--

MEMBER SIEBER: --not in any program?

MR. WELCH: There's really only those two groupings. And what we did was basically out of our master equipment list, we dumped every equipment description we have into a big database and segregated those and called each one either a passive or a active component.

MEMBER SIEBER: Now, does that include components that don't have mark numbers, like pipe

hangers and--

MR. WELCH: That is a part of it, and that was part of the challenge early on in this program, is we recognized that there were things, and a good example of that is if you get a skid mounted pump--

MEMBER SIEBER: Right--

MR. WELCH: They're making things on there that don't necessarily have a mark number and those have to be identified by review of vendor manuals and by walkdown in the field. And pipe, of course, is a prime example of something that doesn't have a mark number and that's one of the things we spend most of our time on.

MEMBER SIEBER: Right, it's sort of a, it's interesting to note that if you decide to count all the valves in the plant and categorize them by size, you end up missing all the skid mounted valves.

MR. BAJESTANI: That's right.

MR. WELCH: That's exactly right, yes.

MEMBER SIEBER: Now, as they come as a package, typically, they don't have mark numbers.

MR. BAJESTANI: That's right.

MR. WELCH: And that has been one of our challenges early on, but we recognize that, that that was going to be a lot of what we were looking at in

the passive program, is things that do not have unique identifiers in our system.

MEMBER SIEBER: You probably don't have much skid mounted equipment, right?

MR. WELCH: We have--

MR. SCHLESSEL: The BOP side has quite a bit.

MEMBER SIEBER: Oh, really?

MR. SCHLESSEL: On the balance--

MEMBER SIEBER: I can think of a half a dozen, but more than that, it would be a stretch unless it's in the chemistry area.

MR. SCHLESSEL: Yes.

MEMBER BONACA: You will have to go to a license renewal, I'm sure, at some point, so, have you considered the benefits of looking at the definition of passive components versus active, coming from license renewal? That would help.

MR. CROUCH: Back when we wrote the procedure for the passive refurb--

MEMBER BONACA: Yes.

MR. CROUCH: --we went to the Generic Aging Lessons Learned to pull out the various failure mechanisms, and, and--so we based it upon the license renewal process, even though it's not called license

renewal.

MEMBER BONACA: Yes, not as such, I mean.

MR. BAJESTANI: But, some of the elements, we actually took it from--

MEMBER BONACA: It gives you a way of thinking, see the thinking of the stuff--

MR. CROUCH: Yes.

MEMBER BONACA: I mean--

MR. CROUCH: That's exactly the reason we did it.

MEMBER BONACA: Okay.

MR. WELCH: So, the Passive Refurbishment Program is, basically, is focused on original equipments. We're focused on things that were original, originally installed in the plant, not being modified, not being replaced under some modification. We're looking, focused on pre-service degradation, that's what we're looking--we're looking for corrosion in pipes, we're looking for that kind of problem with existing equipment.

We are integrated with the plant's schedule, which means we do our inspections generally along with other work that's going on in the system and I'll give you an illustration of that in a little bit here. And, in that respect, we're, we're staying

on schedule with the plant construction.

Things we look at--some of the things that fall in that category are shown in the bullets there, like I said, we spent a lot of time looking at pipe, hangs, orifices, heat exchangers, ducts, electrical penetrations, mechanical penetrations, electrical disconnect switches.

That's the types of things we're looking at in our program. And to date, we have not found any, we haven't had any unexpected findings to date. That's really all we have, prepared remarks I had for the passive program, unless there's any further questions on that.

MEMBER SIEBER: How do you integrate Unit One operating experience with your Passive Refurbishment Program?

MR. WELCH: Well, one thing we've done is enter, entered--put in our program a plant experience review, basically, which has the guys in my group including myself, we basically use the corrective action plan database, we call it PERs, or Problem Evaluation Reports.

But we've, we've instituted in our program a formal review of Problem Evaluation Reports in the plant, so if things come up that might effect our

program that are not directly reported to us that we can, we find out about those things through the plant corrective action database.

And I can tell you that, since we work with the craft, a lot of things like that, we get directly thrown in. There's some issues that come up, we get that directly from the craft, but we have--as a formal program, we've introduced a corrective action plan review on a regular basis.

MEMBER SIEBER: How do you do the refurbishment, passive refurbishment, system by system?

MR. WELCH: Most of the commodities are addressed on a system by system basis, that's true.

MEMBER SIEBER: So, if you, for example, did a walk-in study on Unit One, you know, might break, found a geometry in Unit One that were, could cause excessive wear to a pipe, that would somehow or other, reach to Unit Two so you would correct that geometry?

MR. WELCH: That--that's a true statement but I think probably most of what you're concerned about would be like a FAC concern--

MEMBER SIEBER: Right.

MR. WELCH: --and as Masoud already

discussed, we've already made the commitment to go ahead and replace FAC susceptible pipe on Unit Two.

MEMBER SIEBER: Yes, well.

MR. WELCH: And implement lessons learned on--from Unit One construction on Unit Two.

MEMBER SIEBER: All right. The, the susceptible--one issue for fact, another one is the geometry.

MR. WELCH: Yes. When we selected the scope of piping to be replaced in the back, we went into the Unit One FAC that had been done over the first three refueling outages.

MEMBER SIEBER: Right.

MR. WELCH: And by that way, we, we, we were able to address things that were material related as well as geometry specific related. There was other replacements that were later than that, but we decided that even if it was after the first three outages, it was so geometric specific that it wouldn't necessarily exist in Unit Two, and so--

MEMBER SIEBER: Yes, but you have to look to see whether that's the case or not.

MR. WELCH: Right.

MR. BAJESTANI: And part of our program was, you know, we go in through the same program that

Unit One went through. Part of our program is actually for flow accelerated corrosion is, we're all going to go ahead and look at, we'll go through, we'll actually have a, a, a--

One of our contractors is going to study basically establishing the baselines so that every, the elbow, everything that's really susceptible to, and then we're going to actually do the UT, we're going to measure, here's the baseline, and then we monitor it from here on.

MEMBER SIEBER: All right. Okay, that answers my question. Thank you. Appreciate it.

MR. WELCH: Okay, if there's no more discussion on the passive program, then we'll move on to the next special topic, Bill. The next topic we want to discuss is buried piping at Watts Bar Unit Two, and the way I'd like to approach this is, the first part of this I'd like to discuss the population of buried piping at the whole site, what exists at the whole site, and what systems are involved.

And then I would like to discuss what's being added new from completion of Unit Two and then after that, discuss what programmatically we have in place at Watts Bar to address all buried piping and concerns that, that arise from buried pipe.

So, starting from the first slide, here, buried piping of course is a concern for two reasons. Because it's subject to external corrosion, as you know, that piping in the powerhouse would not be, and the other reason is it's just simply not accessible, you don't see it during a routing system engineer walkdown. You can't see if there's any degradation going on with the piping.

So, there's two reasons for it to be more of concern. When we're looking at first discussing what is Unit Two completion going to bring into the picture that's not already there, when you look at safety related buried piping, the answer is, there's none, that there is no addition safe--another way of saying that is, all the safety related buried piping that Unit Two depends on is already in service for Unit One.

We do have, there is safety related, what I've called "underground piping" that will be new to the plant when Unit Two is brought online, and that's piping that basically run through the Unit Two pipe tunnel to the refueling water storage tank and the primary water storage tank.

There's twenty-four inch refueling water header, there's a six inch containment spray test

return line, and there's primary water suction and recert lines that go through that tunnel also.

MEMBER SIEBER: You just have one tank for both Units and refueling water?

MR. WELCH: No, sir, there's a separate tank for each Unit.

MEMBER SIEBER: Okay, so it's not a, not a common system?

MR. WELCH: No, they're, they're on opposite sides of the plant, there's--

MEMBER SIEBER: You have two refueling pools?

MR. WELCH: No, sir, we just have one pool.

MEMBER SIEBER: Okay.

MR. WELCH: Just to give you an idea of what, what you're looking at in the pipe tunnel, and, and one thing I did want to mention before we left that last slide, is we do, we do introduce some, some buried piping with Unit two that's non-safety related piping, and that, one of the obvious ones there is the condenser circulating water.

We have four large circulator pumps that supply water to the condenser, that's all new piping, that's precast concrete piping, so that's new non-safety related piping. Cooling tower number two's got

a blowdown line and a desilting line that would not have been in service up until now. Those will now be in service.

And there's a very short section of hydrogen supply piping that's basically from right outside the turbine building and into the turbine building, and that will be, again, non-safety related but that is new. So, that's new buried piping for Unit Two, is what we're talking about there.

Now, when I talked about underground piping, if you go to the next slide, I just want to give you an idea of what, what we're talking about when we're talking about that. This is a picture taken inside our Unit Two pipe tunnel. Remember, our pipe tunnel is really an extension of the Auxiliary Building, it's really part of the Auxiliary Building. It's a wing of the Building, if you will.

There's a Unit one--

MEMBER SIEBER: Does it have a sump?

MR. WELCH: Sorry?

MEMBER SIEBER: Does the tunnel have a sump?

MR. WELCH: No, sir, what the tunnel does, is, it's got, if you were to have leakage in that tunnel, there are channels on each side of the tunnel-

-the whole thing runs downhill, back towards the Auxiliary Building, and at the end of the tunnel, there's drains that feed into the Aux Building radwaste system.

So, if you were to have any leakage--I'm sorry--

MEMBER RYAN: No, go ahead.

MR. WELCH: If you were to have any leakage in this system, it would show up in the floor drain collector tank, which is the waste processing system. That, that's where it ultimately shows up.

MEMBER RYAN: The question I was going to reach for is, this is fairly representative of all underground piping, this arrangement in this Unit?

MR. WELCH: This is--that's right. This is what I call "underground piping"--

MEMBER RYAN: Yes, okay.

MR. WELCH: --when I use that term as opposed to "buried piping", this is what I'm talking about.

MEMBER RYAN: Okay, so, the buried shows up in your slides here, here and there, is this what you're talking about?

MR. WELCH: Yes, and so I, and this thing here--

MEMBER SIEBER: That's a different--

MR. SCHLESSEL: This is underground.

MEMBER RYAN: Underground, okay, and--

MR. WELCH: This one, this is not called underground, buried piping, I don't have any pictures of buried piping.

MEMBER RYAN: Well, no, I understand, but that, that's pipe endured, so--

MR. WELCH: That, that's correct, yes.

MEMBER RYAN: Very good.

MR. BAJESTANI: Well, if I may differentiate, this is a good example of that from the CRS. Buried piping means the piping is encountering the soil.

MR. WELCH: That's correct, sir. Yes.

MR. BAJESTANI: And underground means in some kind of--

MEMBER RYAN: Tunnel.

MR. BAJESTANI: --case or chamber or--

MEMBER RYAN: Chamber, or--

MR. WELCH: That's correct. It wasn't in the original presentation, but Bill, if you can go to our backup slide forty-two--I believe it's number forty-two on your list. And the reason I want to look at that is, I mentioned the new safety related

underground piping, one of them was the twenty-four inch refueling water storage header.

And, and there's a, just a picture of that that I wanted to show you that I thought might be a little bit help in illustrating what we're, what we're doing in the program.

MEMBER BONACA: The question I have in the, page eleven, top of the page, you say no additional service, but the piping is not in service. This to me says that you have something like a buried pipe in there?

MR. WELCH: There is--the plant has safety related buried piping, but the safety related buried piping in the plant is already in service right now, supporting Unit One.

MEMBER BONACA: I understand now what you're saying, all right. If you give me an example of systems, safety related that aren't buried?

MR. WELCH: Essential--

MR. BAJESTANI: EFCW.

MR. WELCH: I have two examples of that, and I'll be, I can, we can go over it now or it'll be in the next slide, or--

MEMBER BONACA: Oh, okay.

MR. WELCH: --coming up very soon, here.

One reason I, and this wasn't in the original presentation, but one reason I wanted Bill to look at this is, I mentioned that this is one of the new safety related headers, and, and this is in the Unit Tow pipe tunnel.

And really I wanted to show this to kind of illustrate the passive refurbishment program, what we're doing, so I'm digressing a little bit right here to talk about the passive refurbishment program. This particular section of pipe had been blind flanged because it's part of the secondary containment boundary.

MEMBER RYAN: Right.

MR. WELCH: You know, the refuel water storage tank is a vented tank, so it can't, this pipe connects directly to that. So we had blind flanged this to maintain secondary containment in the Aux building. Part of the construction work for Watts Bar was to go replace this spool piece.

So when we're talking about the passive refurbishment program, this is what my organization is doing when construction gets to this point where they're actually taking that blind flange off, it gives us an opportunity to go look at that stainless steel pipe and get an idea of what's the condition of

it after thirty something years.

And so, we've integrated ourself into the plant by basically, we've put prerequisites in their work packages that says call design engineering when you get to this step.

MEMBER RYAN: So, what processing and tests do they go through to examine this pipe?

MR. WELCH: Well, it will be a visual inspection, we'll look for corrosion, we'll look for grease, oil, look for anything like that. If we see some indication of corrosion, we'll take some UT measurements. We--if it's stainless steel, we might take some chemistry swipes and look for chlorides, fluorides, that sort of thing.

But we're looking for pitting, we're looking for corrosion, that's really what the program is about, and this kind of illustrates, you know, how we're getting involved in the plant construction work and how we're doing the passive refurbishment program, at least for piping, anyway.

MEMBER SIEBER: So that's just at the accessible end?

MR. WELCH: That is correct, and, and, it's a sampling program for piping, it is a sampling program, and we've strategically picked where we want

to take samples and it's an opportunistic program which means when they're doing work in a plant like this, we're going to go look at it and see what the condition is and document that.

MEMBER SIEBER: Right.

MR. WELCH: So that, that's, so I kind of digressed from buried piping, but that, this was, this is an example of underground piping but it also illustrates what we're doing with the Passive Refurbishment Program.

MEMBER RYAN: So the inspection really starts with a visual inspection and its found condition and then ramps up or ends there, based on what's--

MR. WELCH: That's correct, dependent on what the visual indications are.

MEMBER RYAN: Yes, okay.

MR. CROUCH: And when Ken was selecting his locations for this, he selected them strategically to select low points in the systems in places where he would suspect that problems might have occurred, so it's a, it's an educated sampling.

MEMBER RYAN: Right, and intentionally biased to find things that might be--

MR. WELCH: Yes.

MEMBER RYAN: --problematic.

MR. CROUCH: That's right.

MEMBER RYAN: Okay. Very good.

MR. WELCH: Okay, so. I want to go back to--

CHAIR RAY: Ken used an interesting term a minute ago, "secondary containment".

MR. WELCH: Can I--

CHAIR RAY: Maybe that's a--

MR. WELCH: I'm a boiling water reactor background, so maybe, but, Aux Building secondary containment and closure, the Auxiliary Building--

CHAIR RAY: Yes. Do you guys call it that?

MR. CROUCH: Yes. Pete, do you want to explain--

MR. BAJESTANI: Pete, actually, was ex-SRO, basically--

MR. OLSEN: Pete Olson, startup manager. The secondary containment, we affectionately call a auxiliary--

MEMBER SIEBER: Move a little closer to the MIC--

MR. OLSEN: Okay. Pete Olson, startup manager. The secondary containment, we affectionately call the Auxiliary Building Secondary Containment and

Closure. It's maintained at a negative pressure related to atmosphere, with emergency filtration, ozone gas treatment system for accident conditions.

It is common, the Auxiliary Building is common for both Unit One and Unit Two, so as we do work on Unit Two, we have to maintain the integrity of that boundary, and that's what Ken is talking about here. So, when that piece of pipe was replaced that was in that slot, we had other actions we had to take to make sure we maintained the boundary of that, that enclosure.

CHAIR RAY: Interesting. Okay, thank you.

MR. BAJESTANI: Actually, just to give you some--that's one of the barriers we have--I mean, not barriers, actually--that was one of the real difficult point that we had for pulling cable, you know, we go through the penetration, we can just pull the cable through so many square inches.

You know, you have to watch every, because when we do the secondary containment test, we actually measured what, what kind of margin we had. So, we used that basically to pull cable.

So we can't pull cable through a big hole, or--we have to do it one at a time, you know, so. Big, big construction--

CHAIR RAY: Consideration.

MR. BAJESTANI: -consideration.

CHAIR RAY: All right. Well, as part of the original design, to treat it as a filtered containment, I guess, won't go into why now, because that's--but it's interesting. Okay, thank you.

MR. WELCH: Okay, Bill, I'm ready to go to the next slide if you--Now, we've kind of distinguished between buried and underground piping, give us some illustrations there, I'd like to talk about the buried piping program that Watts Bar have.

And now, this is a program that we've instituted that, you know, we call it the BPIP or Buried Piping Integrity Program. Watts Bar is a member of the EPRI working group on buried pipe, and we were involved in the initial development of EPRI program and our program mirrors the EPRI program.

It's already been established at Watts Bar Unit One and at all the other TVA sites. The program is there to address external corrosion of buried pipe, that's the primary concern that it's addressing. There are other programs that are primarily in place to address internal corrosion of pipes, so this program just focuses on external.

It does apply to all buried piping,

whether safety related or not, and it's an anticipatory program, which means our intent is to identify where we're likely to have problems, do inspections, learn from those inspections, and do proactive repairs.

If you'll flip over, this is where your question came up a few minutes ago about what systems we're talking about. There's nineteen systems that fall within the buried piping program, and this is a list of those systems. Two of those that I've got in bold there are actually, have safety related portions or are wholly safety related.

Sixty-seven, essential raw cooling water, that's essentially all safety related piping. Fire protection, there are safety related portions of that that are buried. That's really all I have to say about that.

MEMBER SIEBER: Do you have stations where you need to go, I take it that's floor drains, and--

MR. WELCH: Yes, sir.

MEMBER SIEBER: --things that are not radioactive. If you have a pipe break inside a cubicle, for example, and the floor drain, open drainage system is malfunctioning, is that going to make it more sever or have a safety related

implication if that drain doesn't work?

MR. WELCH: Maybe I'll have Pete, maybe Pete's got a little bit more training in this--

MEMBER SIEBER: --station flooding, for example--

MR. OLSEN: Pete Olson, TVA startup. I believe your question was, if we had a leak and it flooded a cubicle, what would be--

MEMBER SIEBER: Water from someplace that's flooding--

MR. OLSEN: Yes, in the ESF pump rooms and lower elevation Auxiliary Building, the ESF pump rooms, there is flood level indication so we do get in alarm in the control room to indicate a flood. There's also a blowout panel in the floor such that if the water gets up to a certain level, it blows out.

And on the bottom of the Auxiliary Building is what's called the passive sump, which is a big catacomb room that all this water will fall down to protect the pumps that are in that cubicle.

MEMBER SIEBER: There was an incident many years ago at Surrey where they had a flooding incident caused by that, and the drains were inadequate to remove the water.

MR. OLSEN: Yes, I think what's unique with

this station is our passive sump with the blowout panels in those lower pump rooms.

MEMBER SIEBER: Right, I have not heard of that yet before.

MR. OLSEN: Yes. It's different.

MEMBER SIEBER: Okay. Thank you.

MR. WELCH: Thank you, Pete.

MEMBER SIEBER: Do you have any polyethylene or fiberglass pipe in any of these categories--

MR. WELCH: The potable water system uses PVC pipe.

MEMBER SIEBER: Okay, so, drink bottled water.

MR. WELCH: Okay, are you ready to go on the--this slide is just to talk about some installation details for buried piping. In other words, what, what do we do when we're putting buried piping in the plant, so that's just a little bit of background. When we put buried pipe, it's continuously supported along the bottom quadrant of the pipe, that's to support the weight of it.

When we're back filling a trench, we backfill it with at least twelve inches of rock free earth or sand. The idea there is you don't want

something that's going to destroy the protective coating because the pipe is coated when we put it in there.

Next bullet is about coating. Steel piping, we either get it with a cold tar epoxy coating or we get steel pipe and we wrap it with a coal tar wrap. Basically what you do is you heat the pipe to remove moisture from it, that also helps the coal tar adhere to it.

You wrap it with a 50% overlap by our procedures, that gives you double thickness on the tape--

MEMBER SIEBER: Right.

MR. WELCH: --and then when you're done with that, you do inspection for holidays or defects in the pipe.

MEMBER SIEBER: Your wrap coating is far superior to the other--

MR. WELCH: And that's what we've used, they're in typical reason replacements, I believe Tapecoat is the product name that we typically use. So that's just to give you some idea of what, what we doing for buried piping. But coating of the pipe is our primary protection for buried pipe at all the TVA sites.

The next slide starts to begin to talk about the program itself. Our program has six major steps associated with it. That is consistent with the EPRI guidance, if you're familiar with that document.

Steps one and two really are laying the foundation or putting the infrastructure in place for the program. Those have been completed at Watts Bar. Steps three through six are ongoing activities that we'll do throughout the life of the plant, essentially.

And, Bill, let's go ahead and continue with the next slide, and we'll begin talking about each of the steps. Our first step is establishing site documents, databases. This is the infrastructure for the program.

First thing you've got to do, is you've got to identify where your buried pipe is. We showed you the list of nineteen systems. Where that list comes from is a collaborative effort at the plant.

Basically we look at, we start with EPRI list of commonly buried systems at a site. We've done interviews with the Buried Piping Program Manager, interviews with system engineers, and, of course, look at plant drawings.

And that's really the sources for coming

up with data to identify what lines are buried. Once you've done that, we subdivide the lines into smaller groups which are called segments, and the smallest group which is called a zone.

And, basically, a zone is just a, is a section of a segment that has a unique physical characteristic. Let me give you an example. If you have a straight piece of pipe that's underground and it goes underneath a road, you would have a zone for the piece of pipe that approaches the road.

You would have a zone for the pipe that's under the road, and then you would have another zone for the pipe as it moves away from the zone. And the reason for that is the zone that's underneath the road has more susceptibility to failure because it's located under a road.

So, that's kind of the idea of dividing it up into zones, is the smallest, it's the smallest segment that has a physical configurations that are common. Zones are, could be as small as one feet, or, I think, we don't allow zones to be any bigger than twenty feet of pipe, so there's thousands of zones once we got done with this whole thing.

MEMBER SIEBER: Have you, at Watts Bar Unit One, have you had any failures of buried piping in its

lifetime, history?

MR. WELCH: Yes, sir. We have had some buried piping issues with, with Watts Bar Unit One.

MEMBER SIEBER: Could you briefly tell me what they were?

MR. WELCH: We've had a number of potable water--that's probably the biggest one we've had, is potable water in general. Those are PVC pipes.

MEMBER SIEBER: Right.

MR. WELCH: We have had some failures on fire protection piping.

MEMBER SIEBER: This is cast iron piping?

MR. WELCH: Some steel. We have some cast iron piping but we've had some fail of steel piping as well.

MEMBER SIEBER: That's, that's typically what a main fire header is, is cast iron, which is very brittle, and isn't hardly anything you can do to protect an incipient failure of that. On the other hand, those systems are built as loops, so you can isolate the break and still have 98% of your fire protection system.

MR. WELCH: Our typical failures on fire protection piping, most of those we've had have been due to microbiologically induced corrosion, or MIC.

MEMBER SIEBER: Right.

MR. WELCH: That, that's been our biggest contributor to failures in fire protection piping.

MEMBER SIEBER: And do you use any chemical treatment to stop MIC attack? That's another, that's a big industry problem.

MR. WELCH: Yes, sir. Watts Bar uses continuous sodium hydrochloride--its, the process has evolved over the years in all of the TVA fleet. Our practice is to use continuous sodium hydrochloride treatment for essential raw cooling water and for fire protection.

MEMBER SIEBER: Yes. Typically, MIC is most severe where you have stagnant water or pockets where the flow mixing doesn't occur. Is that, in your experience, and, have you singled out areas like that to examine for MIC attack?

MR. WELCH: I can tell you that it's, TVA has had issues with MIC in dead legs of piping, so we've observed that same thing.

MEMBER SIEBER: Right.

MR. WELCH: Our essential, our buried headers, we don't have, in the essential raw cooling water, most of that line is not dead legs. There are some dead legs that go to the diesel generator

buildings. We've not had those, that is all mortar line pipe we haven't, haven't experienced MIC problems in those lines.

MEMBER SIEBER: Okay. I just have a comment that's back on slide fifteen, the last word you talk about, holidays. I interpret that as areas in, where a pipe that's supposed to be coated has been missed?

MR. WELCH: That's, that's right.

MEMBER SIEBER: Just so the record is clear as to what that really means.

MR. WELCH: Yes, what I--

MEMBER SIEBER: Because that's a common term.

MR. CROUCH: That's a defect in the coating--

MEMBER SIEBER: Right.

MR. WELCH: --that's correct. Holidays can be quite small when they--

MEMBER SIEBER: Yes. Some are the fourth of July, some are not.

MR. WELCH: Okay, so we're down to where we've identified in step one, down to zones. Step two is once you've identified your zones, which there, again, there would be thousands of these--

MEMBER RYAN: Ken, I'm sorry. You mentioned

cooling water, fire protection water. Were there any examples where radiological contaminated water was a problem, leaking?

MR. WELCH: Yes, sir, we had one notable example in 2003, I believe it was--

MEMBER RYAN: If you go over it later, that's fine, but--

MR. BAJESTANI: No, we weren't going to cover that, but go ahead.

MR. WELCH: We had, we had one fairly notable example where we, and we found through routine tritium monitoring, we saw increased levels of tritium in monitoring wells. That turned out to be a combination of things, actually. The primary leak was a rad waste line, which is common for both Units, and rad waste lines to carry radioactive materials, and we had a failure in one of those.

That was an external coating failure. What, what was finally determined when they dug that up and fixed it was, there appeared to be a tear in, in the protective coating and the pipe basically had corrosion from the exterior in.

MEMBER RYAN: So it wasn't just tritium, it was the rad waste line.

MR. BAJESTANI: Yes, sir--

MR. WELCH: That's right, but it was originally identified by tritium monitoring--there was some, there was also, part of the, there was actually two parts to that, particularly. There was a leak between the fuel transfer canal and the, there's basically a seismic gap between the shield building and the Auxiliary Building. It's about a one inch gap, but it's called the seismic gap.

And there was a leak that came from the fuel transfer canal into the Unit Two, into that seismic gap in Unit Two, and that ended up in the drains in the annulus area, which is outside of containment, and that also got in the groundwater.

So, the, the drawing that Bill's put up there, the blue area in there is areas where we saw tritium that resulted in the leak in the seismic gap, which ultimately came from the fuel transfer canal, and then the green area, the leak was, location was actually there, near, between the two cooling towers and migrated both south and west and the green's showing the path of migration from the rad waste line leak.

MEMBER SIEBER: Is the normal water table above or below the lowest buried piping that you have?

MR. WELCH: Most buried piping is below the

water table.

MEMBER RYAN: Yes. The water table in this part of the world is pretty close to the surface.

MEMBER SIEBER: Right, and I recall that the chemistry, the soil chemistry, was not real aggressive there. Do you happen to know what the numbers were for--

MR. WELCH: I don't have the numbers, I, I, one thing I was going to discuss but only in qualitative terms is, is soil chemistry and how we've analyzed that on a site-wide basis.

MEMBER SIEBER: Sounds like you should wear boots when you walk around your site.

MR. WELCH: Yes.

MEMBER RYAN: So, you, I'm sure you fixed the leaks and identified them fixed and all that. Now, what happened in terms of pump backage, do anything alone those lines, or are you just watching the plume at this point, or?

MR. WELCH: Basically the plume is being monitored under our groundwater protection program, and--

MEMBER RYAN: Roughly, what's the range of tritium concentrations? Just out of curiosity.

MR. WELCH: I can--I don't have those

numbers at my fingertips. I can tell you that our acceptance criteria and our sampling is 20,000 picocuries per liter.

MEMBER RYAN: Right, that's the groundwater standard. So, you're below that, you know that?

MR. WELCH: Yes, it's below that and then generally trending down. I can't tell you--

MEMBER RYAN: Below that and trending down?

MR. WELCH: Yes.

MEMBER RYAN: That's close enough--

MR. WELCH: I can't tell you--

MR. BAJESTANI: It's trending down.

MR. WELCH: I can't tell you the specific numbers.

MR. BAJESTANI: Do you have the numbers?

MR. CROUCH: Pat just handed me a page from the SECI evaluation report, and it lists the pH, the chloride, and the sulfates for both river water and the well water. And, so, you, you, the river water, the pH was like, 8.15 to 5.5, or 8.15, and the well water was 7.13. So, slightly more acidic.

Chlorides, the river water was 7.88 PPM, and the well water was 6.9, and the sulfates was 16.9 versus 74 PPM.

MEMBER SIEBER: So, the well, well water is

slightly acid as opposed to everything else that it's based--that's unusual.

MEMBER RYAN: Okay. To go back to the tritium concentration, the highest values you're seeing in the plume areas, 10,000 picocuries per liter or less, is that right?

MR. WELCH: Well, again, I don't have those numbers at my fingertips. I am familiar with our procedure, and I know our acceptance criteria is 20,000 picocuries per liter, so, we're below that number and the feedback I've gotten from chemistry is that, that, they, they sample on about every six month basis, and that those wells are trending downward and it's below that acceptance criteria. So that's the only qualitative I can give you.

MEMBER RYAN: Great. Close enough. Thank you.

MEMBER SIEBER: Can we have your backup slides?

MR. CROUCH: Sure. I believe that they've got them up--you don't have them now?

MEMBER SIEBER: I'd like to get a set.

MR. CROUCH: Because we didn't know which backup slides we used, we didn't put them in the package.

MEMBER SIEBER: You might as well just give them all to me, if you have them.

MR. WELCH: Yes, he's got them all.

MEMBER RYAN: So, just to close out the story on groundwater protection, is a seismic barrier on this Unit, have you looked at any form of reaching issues for the new Unit, the restart?

MR. WELCH: Well, the, the leak was actually on Unit Two--

MEMBER RYAN: That's right, yes it was--

MR. WELCH: --because the fuel transfer canal, basically, you have a fuel transfer tube on Unit Two, and you have a tube on Unit One, but the canal is common to both, and where we were having the leak was on the Unit Two tube.

And so, where, the way that was fixed was that tube was basically cut off and flanged at the time--

MEMBER RYAN: Yes.

MR. WELCH: --now, there is construction work going on even as we speak to restore that tube to it's original design--

MEMBER RYAN: Right, so--

MR. WELCH: --so it'll have to address that leakage through that gap, and so that's being done

through our, through our construction process right now.

MEMBER RYAN: So far so good on the Unit One side?

MR. WELCH: I can't speak to the results of any leak testing they've done on that.

MEMBER RYAN: Well, the Groundwater Protection Program is on that side too, I'm sure.

MR. WELCH: That, that, that's true. I'm sorry. I thought you were talking about the ramification--

MEMBER RYAN: Oh, no, no. I'm just saying that you haven't seen any of the leaks--

MR. WELCH: That's true, that's true. That's a true statement, yes.

MEMBER RYAN: Thank you.

MR. WELCH: Okay, going back to talking-- we're talking about step two on the buried Piping program, which is where we've identified all our zones, which is the smallest Unit of Piping that we're going to evaluate for risk. The next step in this, and remember, the whole direction we're going with this program is we want to develop a proactive inspection plan that looks at pipe that's the highest risk sensitive and that's where we focus our efforts first.

So, once we've identified all the zones, we risk-rank those zones. Basically for every zone of Piping, we apply a susceptibility factor, which there's a lot of different things that go into that, shown on the chart there. And susceptibility is just what's the likelihood that the physical conditions are going to result in pipe leak for this location.

And then a consequence factor, which is, means, what does that mean, is that, what bad thing happens if you have a pipe leak. So, susceptibility factors, just the physical configuration is a big part of that. I mentioned being under a road, that's a risk factor for a leak.

Being under a railroad, if there's a T that's underground, that's a factor. If it changes elevation, if you go into or out of a building, that's a risk factor. So all the, those are things where you can apply some, you'll apply a factor that says you are more or less likely to have a leak in this pipe.

And then, other things that go into that cathodic protection, obviously. What the pipe's made out of, whether the pipe's coated or not, which ours are, by typical practice for steel pipe. But one other thing that does figure into that is the age of the coating.

If it was coated and the pipe was buried a long time ago, then that's a, considered a risk factor, that the coating's got some age on it. Is the fluid inside it, is it a corrosive fluid? Is it a hot fluid? That's a consideration. Do you have a history of pressure transience in this line? That's a consideration.

And probably the two highest considerations for susceptibility are the last two, what's the characteristics of the soil around it, is it corrosive? And, just, what's your operating history, and that, that makes sense that that would be one of your heaviest weighting factors, is what's been your history.

And then the consequences. Is there an environmental concern if this leaks? Is it fuel oil, for example? Is it something that has tritium in it? You know, those are things that would be consequence factors. Is it going to be a threat to power production? That kind of concern is brought in when you're talking about, for example, turbine lube oil.

You know, if you lose a turbine lube oil line, would you be having to take the turbine offline. Is that a potential. Are the costs of repair--

MEMBER SIEBER: If you have the part--or

would you have the part?

MR. WELCH: That's correct, yes. That's right. Cost of repair is a considered consequence, and frankly, that's a concern for just about any buried piping repair. And finally, but not least, nuclear safety--is it a safety related header, and would you have a loss of a nuclear safety function.

So, all these things--

MEMBER SIEBER: This slide is at the top of your list.

MR. WELCH: I put them backwards, didn't I?

MEMBER SIEBER: Yes.

MR. WELCH: Yes.

MEMBER SIEBER: Let me ask--

COURT REPORTER: Mr. Sieber, can you move closer to the mike, please?

MEMBER SIEBER: Yes. Let me ask you a question that is, doesn't occur at all plants, a situation that doesn't occur at all plants, but it does at some. If you leave a turbine spindle or replace your steam generators or something of that nature, does it come by rail, does it come by truck, does it come by barge?

MR. BAJESTANI: Well--

MEMBER SIEBER: If so, does it have to--

MR. BAJESTANI: Barge.

MEMBER SIEBER: Barge? Okay. Does it have to move across any of these buried pipes?

MR. WELCH: It would almost certainly have to cross some buried pipes, yes.

MEMBER SIEBER: And what do you do to, to--

MR. BAJESTANI: We actually, just, just to give you example, we replace all three low pressure turbines.

MEMBER SIEBER: Okay.

MR. BAJESTANI: We brought them through, by barge, came actually from Germany. Finally, got to Watts Bar, and then, what we have, actually, we look at the low path, we look at how we're going to get there. We take that drawing, we get it to engineering, they sit down, take a look at every piping, where we need to put plates, where we need to do--what do we need to do to get--

MEMBER SIEBER: You can build a, you can build--

MR. BAJESTANI: Exactly.

MEMBER SIEBER: --little bridges across, and you can use vehicles with multiple axles to distribute the weight, but you have to know where these lines are, because--

MR. BAJESTANI: Exactly. Exactly.

MEMBER SIEBER: These things can do a lot of damage.

MR. BAJESTANI: Exactly. That's really why, any time we bring any heavy loads, we go through this engineering evaluation, and we put a lot of, you know, like I said, for the low pressure turbines that we brought, we actually end up putting a lot of plates.

MEMBER SIEBER: Thank you.

MR. WELCH: Okay, so, step two of establishing risk factors and, again, that's been completed for Watts Bar One. We're actually, have a contractor who's doing that for the new Unit Two buried piping right at this moment. What do you do with that information?

As I mentioned, in step three, what you're ultimately trying to get to is informed inspections, proactive inspections of underground pipe. The figure on the left, figure one, is just a graphical depiction of risk, and it's just plotting your susceptibility factors on the y-axis and your consequence factors on the x-axis, and you would just put those numbers on there and it would give you an idea of where your largest risk pipe zones are.

Taking that one step further is the graph

on the right, and what we've done on that graph, is we've, we've plotted on the x-axis risk, which is the product of susceptibility times consequence. So, what our strategy is for determining our inspection plan is to get that total risk number, put that on this chart, and put it against where, geographically, is this zone of pipe located.

Is it in a highly corrosive environment? Is it in a corrosive environment, or a mildly corrosive environment? And where that information came from was, in 2009, TVA commissioned a study of pipe corrosion at Watts Bar and part of what that study did was look at the surrounding area around the plant and it divided it into nineteen geographical sites, is what they called it.

And, basically, went to each of those sites and did a series of soil resistivity tests and soil chemistry tests and based on those tests, assigned each site to one of these three categories, either highly corrosive, corrosive, or mildly corrosive.

And there was some in each grouping. So, what you would do here, is you would take your zone, you'd, you know the risk number, now you know where it is located in the plant, and you know what kind of

corrosive environment is. That puts it one of these four groups for inspection priority, with number one obviously being the highest priority.

Now, what we've laid out here is basically, groups one and two are groups that you're going to do proactive inspections on. You're going to go out and you're going to dig up piping just for the purpose of taking measurements that will inform your program.

Groups three and four, those would be the lower risk ones. Those ones you would do basically on an opportunistic basis. If you had to dig up that pipe for some other reason, if you had some other work going on in the area, then you would take information that would feed the program but that would not be done on a proactive basis.

MEMBER RYAN: How often do you catch pipe in that way, where you just ad hoc, you happen to be there--

MR. WELCH: This--

MEMBER RYAN: --do you get those once a month? Once a year?

MR. WELCH: It's, I would say it's probably more in the once a year category because it's usually addressing some kind of failure. You're usually out

there trying to fix some other kind of failure.

MEMBER RYAN: Just an off the wall question. Everything we've talked about so far is outside the pipe sort of testing and observation. Do you have anything that crawls in a pipe?

MR. WELCH: No. We have not done any kind of pipe crawl, we've not tried to any robotic type internal inspections to date.

One comment about this chart, and that's in red at the bottom, is that we do give special priority to anything that contains radioactive materials. And what that means is basically we're going to put them in either group one or two, which is the proactive inspection categories.

So, for, as far as inspections, now we've determined what's our highest priorities, what, this is kind of where we are right now, TVA, all the sites are currently developing ground--or, buried pipe inspection plans based on the data that they have derived up until the previous slide.

And that, basically, will put together what are the pipe segments, what are the pipe zones that we want to go look at. What kind of inspection techniques are we going to use, is that going to be excavation UT, is it going to be guided wave, is it

going to be pipe to soil potential measurements?

Those are the kind of things we're looking at right now. And then, that plan also establishes a schedule, a schedule for when we're going to do pipe inspections.

MEMBER SIEBER: NEI has a working group now on tritium and releases from nuclear power plants. Are you part of that? Do you participate in it, or follow it?

MR. WELCH: I don't know the answer to that.

MR. BAJESTANI: I don't know that either, we've got to check on that. I'm sure, I don't know that for a fact.

MEMBER SIEBER: Okay. Seems like you're doing all the right things, but there is, I think there is an industry group out there that's doing that. Because this is, occurred other places.

MR. BAJESTANI: We'll find out.

MR. WELCH: We'll find out.

MR. BAJESTANI: We'll find out and get back with you.

MEMBER SIEBER: Okay.

MR. WELCH: As far as actual implementation of our plans, we've actually done--Oh, I'm sorry.

MEMBER BONACA: No--and, by the way, I mean, staff is issuing a Revision to GALL that has a significant focus on, of buried piping. So, we will review it now, I don't know how far they've gone, but they certainly are addressing it there too, so.

MR. WELCH: Okay.

MEMBER BONACA: This seems to be quite aggressive program.

MR. WELCH: Yes, sir, like I said, it's consistent with the EPRI efforts and I believe the revisions to the GALL you're talking about are following those industry efforts.

So, as far as implementation, we have done some preliminary guided wave testing, full implementation of the inspection plan we've committed in our program to begin those by June of 2012, and as far as condition assessment, and really, this is step four of it, was doing a fitness for service assessments for piping that has radioactive materials.

We've committed to have that completed by June of 2013, so that would be for systems that contain, normally contain radioactive materials. Bill, if you want to flip over to the next one.

Steps five and six, these are steps that are going to be ongoing throughout the life of the

plant. Step five is identifying repair options for degraded pipe. Typically, when we've had leaks on underground piping, what we've done is simply dig up, isolate, and replace that segment, but there are a lot of other options for it.

We discussed earlier that there have been some operating experience at Watts Bar with varied piping leaks. I mentioned fire protection has had a number of those. The majority of those have been MIC induced and we, and the ones that have been external corrosion, which is what this is concerned with, those ones have been basically the result of a flaw in the protective coating.

And then, finally, step six, which is prevention and mitigation. The one other thing we're doing which we've already discussed somewhat is the groundwater prevention program. I've got a little but more information on that on the next page.

This is primarily a monitoring plan. It specifies the, it specifies the frequency and locations that we'll do groundwater monitoring. It specifies the procedures for doing it, and the acceptance criteria and what type of trending we do. And again, that's focused a lot on tritium.

One other thing was, we just, we also did

an engineering assessment of which systems in the plant are most likely to be a contributor to groundwater leakage, and we've identified leak detection methods for all those.

MEMBER RYAN: Have you considered any strategies that might eliminate leak pathways altogether?

MR. WELCH: The idea of the risk assessment was to identify what our leak pathways were and use that as an input to deign modifications, maintenance work, outage planning. So, the idea is, is to make it as a tool to understand that you're dealing with a system that is, got a, has a higher potential for groundwater leakage. We haven't used it specifically to modify systems--

MEMBER RYAN: The basic strategy is, got to have an underground piping, you have, you know, aboveground piping and ten collection points at various, you know, parts in the process to make it easy. Have you looked at eliminating--

MR. WELCH: And frankly, that has, and in some cases that has been our course of action, usually as a corrective action to a leak.

MEMBER RYAN: Yes.

MR. WELCH: We got a diesel fuel oil fill

line right now that we developed a leak on, and part of our, we're processing a modification right now, we're basically going to route that above ground, so that would be a case where we're doing that. We're just basically getting rid of an underground pipe where we don't need it.

MEMBER SIEBER: Have any of your studies led to a conclusion by you that you need cathodic protection or need to change cathodic protection on piping?

MR. WELCH: No, sir, not to date. The primary method for protecting the pipe is the coating, and, and, so that is the TVA primary method. We do not employ cathodic protection at this time. It's, it's, it's--it's, we do not employ it right now. It is an option that we could look at in the future, but it's a, it's a future option right now.

MEMBER SIEBER: Okay.

MR. WELCH: Our conclusion is basically the, it's our program is what's going to ensure reliable operation of systems that have varied piping. We are sticking with the current industry initiatives as we discussed.

We already have a plan in place for doing inspections, and for fitness for service assessments,

and we've committed for radioactive systems to have that completed by June of 2013. The other learning from our operating experience is, is buried piping leaks have not caused system operability or loss of function at our plant.

They've been, typically, pinhole leaks, which, admittedly, is not desirable, but has not caused the loss of function for a system. And we feel like the program gives us the process and procedures to maintain reliable operation of the pipe for the life of the plant.

MR. BAJESTANI: Steve?

MR. HILMES: Hello, my name is Steven Hilmes. I'm the electrical and I&C design manager for the Watts Bar Two project. Going to discuss buried cable.

First of all, let me say that Watts Bar doesn't have any direct buried cable. It's for process systems, they're all buried in, in duct bank type setups. Additionally, Unit Two is not adding any underground cable.

As far as the cable that is, is there, it's essentially for safety related, it's cable that is installed between the diesel building and the Aux Building and from the Aux Building to the intake

pumping station.

All the safety related cables are routed through duct banks, and they are all--and they are all in service for Unit One operation and have been since startup. There is a, a small section of instrument, instrument cable that runs through the refueling water storage tank for Unit Two. However, it is actually ran in that tunnel that he was showing earlier.

Going to the, to the duct banks. Watts Bar fortunately, during the construction period, it was realized that we needed to do something to prevent submergence of cables in, in our duct banks. So what we did is, we installed sump pumps in all of the man, the manholes.

And these, in the safety related manholes, there are also level alarms and pump run time meters. Okay, the alarms are local and, the operators rounds check them, and, to ensure they're not submerged. And we also have a P.M. in place that verifies all that equipment is operating properly on a six-month frequency.

Okay. It's--going to the next slide, yes. It's part of the issues in the industry with cross link polyethylene cable and the treating effects, TVA has been very aggressive at attacking this. I believe

we're one of the first to implement a testing program. We do medium, we do, we use VLF testing, which is called Very Low Frequency testing, on any of the medium voltage varied cables.

We have specifications that give acceptance criteria for the cables. As an example, I'm showing you the one for cross link polyethylene here. Our, our testing categorizes the cable from the testing as whether it's good, and no signs of degradation, aged cable.

If it hits the aged category, we actually accelerate the testing to a one year frequency and if it falls below our degraded replacement category, obviously we replace that cable. From the standpoint of Watts Bar, and as I said, fortunately, we put in a sump system very early, in Two, sump pump system very early in the construction phase.

So, as, as far as testing, so far what we have done is we have completed the testing on our ERCW cables. Those, we consider the highest risk because of the amount of time that they are energized.

The testing for those cables has shown that they essentially have like-new signatures to them. There is no degradation. The trail-off curves for the voltage levels did not change their flat

curve. Very good shape.

For the diesel generators, we have those slighted in future outages. Those are less susceptible just because the fact that they are not energized all the time. So, essentially, everything that we have tested so far has resulted in signatures that would indicate that there's degradation of these cables. Again, our sump system has been effective.

In addition to the safety related cable, there is also four non-safety cables going out to the condenser circ water pumps. Those were also tested, they showed no degradation. We are also doing VLF testing for aboveground medium voltage cables and, as of this time, we have not seen any issues on any of those cables, either.

So, to summarize, underground cables at Watts Bar have not been submerged for long periods of time, unlike many utilities. We do have an aggressive testing program for the medium voltage cables across lengths that are susceptible to treating and we're not seeing any degradation due to it.

Overall, we believe our cables are, are in good shape and are reliable for future operations. Any questions?

MEMBER RYAN: And I'm guessing you have an

ongoing program similar to what you've been through so far for both units?

MR. HILMES: Yes. It's, it's on a five year frequency unless we have an issue with one of the cables, then we will go into a more aggressive program.

MEMBER SIEBER: Yes, I noticed that the more aggressive phases, annual examinations, how do you do that with equipment that's continuously in service?

MR. HILMES: Well, our ERCW is, cables, we have four square pumps so we can swap them out.

MEMBER SIEBER: So that's the way you--do you have any situations where you, you can't do testings because cable is already in service?

MR. HILMES: The diesel generators are in the outages right now for the first go-around--

MEMBER SIEBER: Eighteen months.

MR. HILMES: Yes.

MEMBER SIEBER: Okay. I think you have all the elements of a good program.

MR. HILMES: Any other questions?

MR. BAJESTANI: Okay. In summary, again, as far as the refurbishment program, we do have a solid, inclusive program for both active and passive

component. A lot of replacement and a lot of refurbishment.

We are using both internal and external operating experience. Internally, we have a lot of experience, especially when we finish the Watts Bar Unit One. We using all those lessons learned to help us to do the right thing, and Watts Bar Unit Two, also.

Out goal is to have the highest operating capacity for, when we, come out of, when we close the breaker on Unit Two, and, that's really what we, that's the goal, and as you heard about the refurbishment program, very solid, solid program. Any questions?

MEMBER BONACA: I have a question. On your page eighteen--first of all, I believe that you have a solid program, that you've shown to us. But I had a question just for information. Page eighteen, you have consequence factors. And I would have thought that, among them, you would have also public impact.

MR. BAJESTANI: Public impact?

MEMBER BONACA: I believe there have got to be implications, I mean, certain sites are more vulnerable than others. The other issue is the long-term cost, and what I'm talking about is the cost of

remediation during, when you retire the plant, if you have contamination in the ground--

MR. BAJESTANI: Sure.

MEMBER BONACA: --we've seen at some sites where the cost associated was huge, and, you know, when you're operating the plant, you don't think about that, but, there, at some point, you have to pay for it. Just have a look.

MR. BAJESTANI: No, very good point. I appreciate that. Good feedback, and we'll make sure that we incorporate that.

CHAIR RAY: Well, I, I, I echo my colleagues comments about, in fact, your own, Masoud, about the program is solid. I think that although in fact you have Unit One operating causes some complications, it also provides a lot of reassurance that if we were sitting here talking about Bellefont One and Two, it would be subject to a lot more inquiry, I think.

So--but we're not. And I have a lot of compliments I could say but I won't about what you guys are doing. I think it's, it's good that, mainly before I've had you addressed, which is to not get, become a prisoner of Unit One's operating schedule.

And as long as that's the case, I think

you'll make the right decisions. We'll hear from the staff after break. We'll take a break now until 10:30. Thank you.

(Whereupon, the above-entitled matter under investigation when off the record at 10:08 a.m. and resumed at 10:28 a.m.)

CHAIR RAY: Back on the record. We'll now hear from the staff on Watts Bar Unit Two. Pat?

MR. MILANO: Okay, good. Again, my name is Pat Milano. I'm licensing product manager for Watts Bar Unit Two with the Office of Nuclear Reactor Regulation.

Before I get started into the portion of the actual presentation, I'd like to address something that Mr. Ryan brought up earlier.

When you, you had asked TVA some questions with regard to what we, what we on our staff call licensing basis preservation, where you're asking about whether these modifications, whether they're looking for impacts on, on other, on other systems or components that have already been designed and installed.

MEMBER RYAN: Right.

MR. MILANO: Early on in the process, we worked with TVA in ensuring that they develop a

program to cover just that and, and also that program was reviewed by the staff and accepted. And the only thing I'd like to mention on that is the fact that, as part of that program, TVA and its primary contractor, Bechtel, had put together a, put these, put these elements into their general design procedures, which require the design engineer and the other staffs to review specific things which address, address those.

And in particular, also address what impacts that may have on the, since the two units are, the design of both units are supposed to be, try to be, maintained consistent, that there could be some things that, that, in the design of Unit Two, they find that could impact the design on Unit One.

And all that's in this program, which has been accepted by the staff. And, I just wanted to reiterate that--

MEMBER RYAN: No, I appreciate that clarification. That's, that puts it formally in the licensee's hands, and also formally in your inspection program, so. Yes.

MR. MILANO: That's correct. Okay.

MEMBER RYAN: Thank you very much.

MR. MILANO: As you're well aware, the history of construction licensing of Watts Bar has

been somewhat unique. And we cover most of those details in the last two presentations that we made to this Subcommittee.

Thus, I'd only like to, with regard to the operating license application, I'd like to repeat that, that the application currently before the staff was originally submitted by TVA in 1976 and in March of 2009, TVA updated its application to specifically support licensing of Unit Two.

The staff noticed this in the Federal Register and offered an additional opportunity for hearing. There was a request for a hearing and two contentions were admitted. Subsequently, TVA submitted information that sort of filled the issue raised in one of the contentions, and the parties to the hearing have agreed that no further action is needed on that contention.

Thus, when it does go to hearing, there will be only one contention remains, and it's in the area of having to deal with aquatic studies, and it's an environmental.

MEMBER RYAN: What, what is the issue with aquatic studies?

MR. MILANO: The, the petitioners had indicated that, that the, the, the number and the

extent of the aquatic studies on the river were not sufficient on the part of TVA. And, in this regard, TVA has, had agreed to conduct further studies over the course of a year.

And in those, and in that case, from what the staff is current aware, most of it, most of the data has been collected and TVA is, is, they do, they do a review quarterly, and most of that, so, again, the studies have been, the data has been collected, the studies are still underway.

MEMBER RYAN: Okay.

MR. MILANO: Also, as you're aware, the Commission directed the staff to use the current licensing basis for Watts Bar Unit One as the reference basis for licensing review of Unit two. And now I'd like to highlight some of the activities that have taken place since our last meeting with the Subcommittee. Next slide.

We've already talked about the--or, we've already heard TVA talk about the refurbishment program for Watts Bar that was initially, that was initiated to identify and correct and degradation to the plant caused by the delay in reactivating construction, and also the stopping of preservation and maintenance activities.

Because most of Watts Bar Unit Two safety related piping and safety related, excuse me--and quality related equipment was installed during original construction, TVA developed the program to ensure that the equipment design specifications would be met. Excuse me.

As you heard from TVA, the program performs inspections, evaluations, dues refurbishment, replacement, and system testing to ensure that the plant will continue to meet its original design specifications.

The safety related systems, structures, and components would be inspected and evaluated for pre-service degradation in accordance with the requirements of the program and to ensure that it continues to meet the design specification and vendor functional specifications.

In this regard, the staff--the staff's review focused on the basic program elements of, of looking at the identification of the passive and active components or commodities, the materials and their environments, the potential degradation mechanisms, susceptibility, and then finally inspection methods that could be employed to address or quantify any degradation that took place.

It was primarily an engineering review on the part of the staff. However, the systems branches were also brought in to help with systems related insights that would, that would aid the technical, or the engineering-technical specialists in, in evaluating the program.

Finally, the TVA's procedures and implementation were, the review of that was taken on by the Region two staff and Mr. Haag will discuss that later.

The, with regard to the refurbishment program, the staff concluded that the, the scope of the program was comprehensive and that, that TVA had identified adequate and appropriate evaluation criteria, which was based on design and procurement specifications and the specifics of which would be enumerated in the implementing procedures.

The staff also found that the scope of, and, of the refurbishment was adequate, and we also validated the types of degradation mechanisms, the environments, and the susceptibilities that TVA had presented in, in the course of its program and also verified, we also reviewed and accepted the type of verification of the condition, whether it be by inspection testing or evaluation that would be taking

place against the acceptance criteria.

MEMBER BONACA: The question that I had was, for the collection, Unit Two is identical to Unit One, from a licensing standpoint.

MR. MILANO: Pretty much so, yes.

MEMBER BONACA: Okay. But Unit One must have gone through a number of design changes.

MR. MILANO: That's correct.

MEMBER BONACA: Okay. So are you reflecting the design changes in Unit Two? Are they reflected?

MR. MILANO: Yes we are, and that's why we, I, that's why we call it reviewing against the reference of the current licensing basis for Unit One. It is not the licensing basis as it existed in 1996 when they received the full power license.

TVA's--actually, that's, that's been the, that has been the majority o the staff's review effort in, over the last fifteen years. TVA has made a number of changes that have been reflected either by amendments or, or 50.59 reviews and modifications.

And we are specifically looking at those, those changes against what was originally licensed for Unit One. So, the answer to your question, yes.

MEMBER BONACA: Yes. Everything is being incorporated into the, okay, thank you.

MR. MILANO: In our last presentation, we noted that TVA had submitted a Unit Two specific FSAR, Final Safety Analysis Report, as part of it's updated application. This basically took the, what was the, originally, the Unit One and Two FSAR that was used when Unit One was licensed and made, now, a specific Unit Two FSAR.

The actual changes to the Watts Bar Two application have been coming in as amendments to the FSAR since April of 2009. However, the first several amendments contained a relatively small amount of work. As the major workload that began with Amendment 95 in, last November, and 97, that came in in January of this year.

Later amendments from 98 through what's currently 100, and 101 is on its way, have generally incorporated items that have been brought up during the staff's review or identified, or TVA identified issues that have come up during the course of discussions with the staff.

With regard to the staff's current schedule for review, the review of most of the area is covered by the SER, and the preparation of the SER inputs will be completed in early 2011. The staff is currently preparing Supplement 22 to the safety

evaluation report, and expects to have that published in December or early January of next year.

CHAIR RAY: Would you remind me how you guys look at the objective of having Unit Two as identical to Unit One as possible? In the context in which you're talking about now, which is amending the licensing basis for Unit Two?

MR. MILANO: What we did was, initially, TVA and the staff independently looked at, it's called regulatory framework. We looked at what was, what was done in the 80's and 90's, early 90's, to, to review the Watts Bar Unit One and Two and, subsequently, just Unit One.

And, and what, what issues had been evaluated and accepted that were, that applied to Unit Two, and what items were not fully evaluated for Unit two. And that became, that became the initial starting point as to what was reviewed or not reviewed.

After that, TVA went through and looked at, at all the changes that had been made to the licensing basis after the operation, after Unit One became in operation. And, and were reflected in the updated safety analysis report amendments that have come in.

And, currently TVA's at Revision eight of

the updated safety analysis report. What TVA--and, what, in these, the amendments that are taking place to the Unit Two FSAR have reflected the changes that have been made that, and identified on Unit One, and now are being, and now are being reviewed for Unit Two.

Not sure if I answered your question--

CHAIR RAY: No, not exactly. I guess I'm really trying to ask, do you share the goal, as worthy, to try, as best all of us can, to make Unit Two like Unit One?

MR. RAGHAVAN: May I answer this?

MR. MILANO: Sure.

MR. RAGHAVAN: Rags Raghavan, I'm project manager at the, for the Watts Bar. Basically the objective is not to say, let's make the Unit Two identical to Unit One, but keep it, preferentially, to keep it the same so that, you know, from the operator licensing and the fragility point of view, it's better to have both licensing basis the same.

But if there is something, new information that comes up, it's better to do something in Unit Two. Those kinds of modifications are in fact taking place, and then at future time the Unit One will also be brought up to the same thing as the Unit Two.

So, it's not that we go and just say, regardless of what happens, we'll keep exactly same as the Unit One, but--

CHAIR RAY: Well, of course, I would expect that, but, I mean, you see some value in doing that where it doesn't require us to compromise any position that we've taken before. You know, I think about the little discussion we had with a member of the public on instrumentation, for example, at the site. Okay, go ahead.

MR. RAGHAVAN: Did I answer that question? Did I answer your question, sir?

CHAIR RAY: Yes, I think so. Yes, I wouldn't expect you to say, you know, we'll do something wrong on Unit Two just because it makes it like Unit One, but, you know.

MEMBER BONACA: Just to complete a train of thought, now, what about the PRA and the maintenance Rule? Now, is the PRA going to be the same, or is it going to be reflecting any differences in there are, or--

MR. MILANO: TVA has, as you, as you saw in one of the earlier slides that was discussing their enhancements, they have done a Regulatory Guide 1.200 compliant PRA. That was for the, that was for both

units.

That PRA was submitted to the staff in support of it's review for the, the independent plan examination program. And indeed that has been, that has been reviewed. We--the staff focused predominantly on the elements having to do with a, with assurance that TVA and its contractors had done a thorough peer review of the development.

And we have, we have not issued our safety evaluation yet of on the IPE or the IPEEE, but those, those should be taking place before the end of the year.

MEMBER BONACA: Yes. Why I was asking that was mostly because of maintenance Rule implication. I mean, is it, the basis going to be the same, or, or, I was trying to understand how you were going to--

MR. MILANO: No, no. The basis, the specific basis for the maintenance Rule in those actions were, are, yes, are the same for both Units.

MEMBER BONACA: Okay. Right.

MR. MILANO: Lastly, I'd like to mention that there, you know, there are some challenges to the completion of the project, and talk to them a little bit more later, but they fall in the areas of instrumentation. The Fire Protection Report and the,

the Final Environmental Statement for the operating license.

Last year, we spent, we spent some time describing the history of the staff's oversight of TVA's nuclear performance plan, which was prepared in response to an NRC demand for information in 1985 pursuant to 10 CFR 50.54(f).

In that letter, the staff requested information about TVA's actions to resolve NRC concerns about it's nuclear program, and TVA response was in the form of a nuclear performance plan which includes, which was, which included both corporate activities and, and sight specific activities.

Regarding Watts Bar, the, it's performance plan incorporated a set of twenty-nine corrective actions and special programs. The NRC staff reviewed these programs, and were documented in reports, NUREG 1232 and also in the safety evaluation report, NUREG 0847.

Implementation, however, only occurred at Unit One because of TVA's decision at the time to suspend or defer construction on Unit Two. And although TVA has informed us that it would implement most of the corrective actions as approved for Unit Two, some, some items were changed for Unit Two based

on insights from Unit One and also to incorporate more efficient approaches.

The staff has completed its review of these program changes and, and found them to be acceptable, and the inspection staff will, will be assessing the implementation of those corrective actions.

As, as we indicated in Supplement One to the safety evaluation report--Supplement Twenty-one--there were a number of items of generic communications that the staff stated it would be reviewing to determine whether the safety issues were resolved or if additional corrective actions would be needed.

In this regard, the staff also noted that the expected actions that remained open for Unit Two from each of the generic communication items and expected staff actions that are currently open.

The staff found that most, that the, most of the items were resolved at the time of licensing of Unit One. Most of these pre-1995 items that remain open are waiting for submission, or were waiting for submission, of the Unit Two technical specifications and, or the applicable FSAR sections, which have now been received.

So, in that regard, the, there's no

specific review of the pre-1995 generic communications there being done as the staff does, conducts its normal business of reviewing the information in the FSAR. On the post-1995 items, the staff, the staff reviewed each of those, each of the twenty-five that, that were applicable to Watts Bar Unit Two.

And, currently, two remain open for staff review. These are related to the, the containment sump, the GSI 190, 191 issues, and also for the, that ECCS gas binding and venting issue.

And, lastly, the acceptability of implementation will again be inspected by the Region. Application for a facility whose construction or operation may be determined by the Commission to have a significant impact on the environment has to be accompanied by an, an--excuse me, an environmental report, required under subpart A of part fifty-one.

And a final environmental statement was prepared by the staff in 1978 to support operation of the, both Units, and because of the delay in licensing, Unit One, a Supplement was prepared in 1994 to assess the changes that occurred from the, from 1978 until licensing and was made into, as a Supplement to the Final Environmental Statement for, for the operating license.

And, similarly, the staff, TVA has supplemented its environmental impact statement to support operation of Unit Two. That information was provided in late 2008, early 2009, and has been, and the review by the staff has been underway.

There were some issues early on with regard to, need to Supplement some of the information. That was in the area of a supplemental condenser cooling system that TVA had, had not described in its EIS and also, there was an issue with regard to the, the severe accident mitigation alternatives that's required under the NEPA requirements.

In that regard, early on, TVA had, TVA had done it's SAMA analysis with regard to its original PRA. And subsequently, with the issuance of the Reg Guide 1.200 PRA, TVA has done a sensitivity assessment of all those changes to see if they remained the same, whether there, there were some other SAMA, SAMA's, some alternatives that would rise to the level of that, the cost-benefit would make them appropriate for implementation.

So, these issues caused the staff, caused some delays in, in the staff and completing the staff's review of the Environmental Impact Statement. And with that, we now expect to issue the draft

Supplement for public comment for, in November of this year.

MEMBER RYAN: Are there any other regulatory changes between the initial impact statement and the current one that you had also addressed? You mentioned NEPA, was there anything else that creeped in?

MR. MILANO: No, there weren't. No.

MEMBER RYAN: Okay. Thank you.

MR. MILANO: With regard to the other programs that are required by, by 10 CFR 50.34, just mention a brief, a brief summary of the status of each of those, you know. In section 13.3 on emergency planning of the FSAR, TVA stated that the, the radiological emergency plan provided protection for TVA personnel for public health and safety in the event of a radiological emergency resulting from an accident at Watts Bar.

Excuse me. The TVA's core nuclear REP contains site specific activity at, excuse me, appendices for each of the Units. In 1993, TVA withdrew the Watts Bar portion of the REP and resubmitted it only for Unit One.

Thus, in, and that was part of the dilemma now that the staff had in this area, and the staff had

to do a, another review, and also, FEMA had to do it's review of offsite. Looking now as a, as a site, a site REP, and, rather than a Unit specific REP.

And, that review is, is pretty much done by the staff. It has not been completed. We have received an interim finding of reasonable assurance for the offsite effectiveness by FEMA and we're hoping shortly to, to get that finalized.

With regard to the physical security plans, the, this similarly, as the, as the radiological emergency plan, the security plan for Watts Bar was for Unit One, and now, and now it's going back to, to a site emergency plan. The staff has reviewed the plan. However, in order to, in order to finalize its review, TVA needs to complete the development of the target sets and submit them to the staff.

And, so, that, we're expecting the submission of those target sets in November to support a completion of our review by the end of this year. With regard to the fire protection program, TVA has, will be submitting its final fire protection report in December 2010.

This, this, because of the submission at such a late date, that is the reason for, for the fire

protection program review to be a critical path issue to the overall review of this. In, in the hopes of helping to make the review when it gets, the final review when it gets started in December a little easier, we, the NRC staff requested a number of items from TVA which TVA has provided in, in August and September of last--of this past year.

And those are currently under review as some preliminary information. However, you know, we'll need the report in December in order to really get started in completing the review. Yes, sir?

MEMBER SIEBER: Is Watts Bar going to be an NFPA 805 plant, or fuel deterministic--

MR. MILANO: Fuel deterministic.

MEMBER SIEBER: Okay.

MR. MILANO: Finally, the startup test program, and I believe TVA is, TVA is pretty much pressed. They have programmed, you know, it is, it is being submitted in accordance with NRC Regulatory Guide 1.68 and the reviews of the specific programs as they come in will take place.

As TVA indicated, with regard to the integrated safeguards test, they, that, they did provide a proposal to us to modify the testing in order to eliminate portions that TVA believes were

adequately conducted during the Unit One licensing. That is currently before the staff for review.

We've had it for about two weeks now, and we're, we're only in the initial stages of that review and I can not speak to, to where that's going to, where that appears to be coming out.

Lastly, I'd like to, you know, mention to you, there, you know, as I indicated, we have, we have three critical paths. And the reason why I say three critical paths is the fact that they, each one of these items is scheduled to be completed within about a month of each other.

So, it's, it's hard to say which one is really the true, the true critical path. So I just, I just estimate each one of these as, they're co-critical paths. The first being, having to do with our review of chapter seven, instrumentation section of the FSAR.

And, what's driving that one is the fact that TVA has elected, as Mr. Raghavan had indicated, to do some upgrades on, on Unit Two in advance of what they were going to do for Unit One. And in this case here, the, the longest, the longest review time item in that area has to do with their use of the Common Q platform for post-accident monitoring, that digital

platform.

And, our review of that is scheduled to be completed in about April of 2011. Also, also, there are some non-safety control systems that TVA has elected to use, digital, you know, a digital control scheme for, such as, feed water, feed water control and stuff.

So, and the staff, even though its, even though it's non, it's a non-safety system, the staff is looking at some aspects of that, specifically for communications mechanisms to ensure that, you know, that nothing on the instrument data bus will affect safety related components and stuff like that.

MEMBER SIEBER: The post accident monitoring, that's also non-safety related, right?

MR. MILANO: It's--in--

MEMBER SIEBER: It connects to safety related sensors, but it's non safety related as a system.

MR. MILANO: However, in TVA's, in TVA's selection and identification on its Q list, they have, they have defined the post accident monitoring system as safety related.

MEMBER SIEBER: But that's--the regulations don't require that. Is that correct?

MR. MILANO: That's right.

MEMBER SIEBER: That's what I thought.

MR. MILANO: It is an indication only system. It provides no actuation function.

MEMBER SIEBER: Right. Okay. Thank you.

MR. MILANO: I've already talked about the fire protection program, and the reason for its, for its delay. And the staff, the staff, current, schedule for completion of that is in April or May of next year. And, finally, the supplement to the final environmental statement.

As indicated, we're going to, trying to issue the draft for public comment in November and issue the final, the final Supplement to the final environmental statement in June, possibly July, time frame of next year.

MEMBER SIEBER: I have another question about digital instrumentation.

MR. MILANO: Yes.

MEMBER SIEBER: Some of the common upgrades for that besides digital feed water control has been rod position monitoring. A lot of plants have done that.

MR. MILANO: And they--

MEMBER SIEBER: --safety related part of

that is the rod bottom lights to make sure that you, the scram. Do you plan on a digital upgrade in that, or are you going to stick to the--

MR. MILANO: Mr. Hilmes will answer that question.

MR. HILMES: Steve Hilmes--Steve Hilmes, electrical and I&C manager. Actually, Unit One had already replaced their rod position indication with a CERPE system, and we are implementing the same system on Unit Two.

MEMBER SIEBER: What about plant radiation monitoring system, will that be digital?

MR. HILMES: Yes. It will be. Unit Two is--sorry--Unit One is doing a, the same modifications on their units, they're a little bit behind us, but yes. The actual, the monitors that go into the actuation system, those will remain analog. However, the ones that are just purely indication are, will be digital.

MEMBER SIEBER: The area radiation monitors exclusive of containment, which I think actuates some of your engineered safety features.

MR. HILMES: The only ones are the purge exhaust monitor, that's the only one that we're--that one is an ESF function and it will be analog.

MEMBER SIEBER: Okay. I also presume that

your turbine control system is going to be digital?

MR. HILMES: No, it will not be.

MEMBER SIEBER: It's going to be the old oil pressure type?

MR. HILMES: It, it's a, it's, it's an analog, yes, EHC type system, AEH, I'm not sure if you're familiar with the Westinghouse system.

MEMBER SIEBER: It's a Westinghouse turbine?

MR. HILMES: Yes, The voltage regulator is digital. It's being implemented, this coming outage on Unit one will follow suit along the same lines, and pretty much all our non-safety process controls are being implemented as digital, as he said, feed water--

MEMBER SIEBER: And then we heard safety features will still be analog?

MR. HILMES: ESF will still be analog. We, we will be changing, for the miscellaneous ESF controls like aux feed water, we will be changing platforms to, versus what Unit One has. It was kind of a mixed bag on Unit One. We are standardizing with a Spec 200 system on Unit Two.

MEMBER SIEBER: Now, all of your emergency buses, they will be not digital, but relay actuated, as the 19Seventies brand--

MR. HILMES: That, that's correct. Our generator protection relays, however, are digital relays. But, you know, one also has digital relays.

MEMBER SIEBER: Now, the sequence for the diesels, is that going to be analog, digital, or hybrid?

MR. HILMES: It's analog. It's, it's a time delay relay type system done in the individual breakers.

MEMBER SIEBER: So you're going to rely on capacitor discharge for the timing of the sequencing?

MR. HILMES: They are, they are Agastad electronic relays--

MEMBER SIEBER: As opposed to digital counters?

MR. HILMES: Yes. Not digital, they're, they are analog.

MEMBER SIEBER: Okay. At Unit One, have you had any difficulty calibrating the timing of the Agastad relays?

MR. HILMES: We, we had originally had some, some pneumatic relays which we had to replace with digital relays. Pretty much, that was done before, before Unit one started though.

MEMBER SIEBER: Okay. You, you replaced

pneumatic with digital, or pneumatic with capacitor discharge?

MR. HILMES: I'm sorry with--

MEMBER SIEBER: Capacitor discharge.

MR. HILMES: With electronic capacitive discharge type relays. I'm sorry, I misstated that.

MEMBER SIEBER: I have a question for our, for our staff that's unrelated to this that I want to ask it before I forget it.

MEMBER RYAN: Go ahead.

MEMBER SIEBER: I went through all my document lists, and I do, don't appear to have in my computer memory the latest FSAR for Unit Two. Was the distributed, and if it wasn't, can I get one?

MR. BAJESTANI: The 100 was given to everybody, yes.

MEMBER SIEBER: Okay. Maybe I have it and didn't find it, but it, it would be simpler if you--if you look at my filing system if would be simpler if you could just give it to me.

MR. BAJESTANI: It was sent on a CD. I'll give it to you in a little bit.

MEMBER BONACA: You have a filing system?

MEMBER SIEBER: Yes, my filing system is not perfect. It's not bad, I mean. It's all in one

place, at least.

MR. MILANO: Just, in that regard, unlike what was done in terms of submissions prior to Unit One licensing. When Unit One licensing, all those amendments would be just, you know, a set of pages that would replace the original FSAR.

Since, since we weren't talking about that, you know, that extent of Revision, what we decided to do just to make it easier for the technical staff, so they wouldn't have to thumb through four, five amendments at the same time trying to find things.

Each, each Amendment that we get into, to the, to the FSAR come sin as a whole FSAR with those sections highlighted. So, so when you get Amendment 100, you've got the whole FSAR.

MEMBER SIEBER: Thank God, otherwise, at my age, I won't live long enough to be able to put it together.

MR. MILANO: Well, that takes, that takes care of my staff presentation from the program review side. Now, I'll turn it over to Mr. Haag, will talk about the current status of inspection program.

MEMBER SIEBER: Thank you.

MR. HAAG: Good morning. As Pat mentioned,

my name is Bob Haag, I'm a Branch chief in Region Two with oversight responsibility for Watts Bar Two construction, for inspection staff, dealing with Unit Two.

Just wanted to, a similar, to give you an update of activities that we've been involved with from an inspection standpoint, since the last time we met back in March. I'll go over my slides and the bullets.

The first thing I want to mention is that we certainly have increased our amount of inspections, both resident staff and regional inspectors. That's not, that was not unexpected. We, we recognized as the amount of situated work was increasing at the site, we would have to increase our inspection activities. And that has occurred.

For example, we had one week last month where there were seventeen inspectors on site. Some of those were in training, but there was a large number of people. That's certainly not status quo every week, but it just goes to show you, we, we do have a presence out there.

We've also changed the way we're documenting out inspection results. We had been just issuing quarterly inspection reports, and now we're

doing that but we're also issuing team inspection reports, just to keep down the large volume of what's in one quarterly inspection report, and it's been successful in keeping, keeping them down to a manageable standpoint.

We finished our second Problem Identification and Resolution inspection back in June. We follow a similar approach to, to what the operating sites do for looking at corrective action programs. This was a two week team inspection, we identified one square double four violation dealing with criterion sixteen, corrective action program Appendix B.

We had several example of where we felt TVA had either not identified issue within a, in a prompt time frame, or the identification really didn't capture all the issues, so that was a set of examples.

And then we also had another set where we felt like they had intended to take some actions, their, their PI&R evaluator had, had recognized there were certain things they wanted to do and they just failed to capture those.

So, again, we identified, we looked at a large number of documents, I think we looked at over 170, their problem identification reports, and we identified some problems. I would characterize those

though as just areas where we believe need improvement, but, but overall, we felt their program was on track.

CHAIR RAY: Have they responded to those violations?

MR. HAAG: We issued them as a notice of violation, a notice of non-cited violations so they don't have to formally respond to us on the docket. We will look at those as part of our followup to all violations and make sure they have properly addressed those in a future inspection.

MEMBER SIEBER: Do you--have you found--have your inspectors operated under a set of inspection procedures that--

MR. HAAG: Yes, they have.

MEMBER SIEBER: --has, and has developed. In the course of all these inspections, which I believe have been pretty intensive, have you found either gaps or other areas where all the inspection procedures that your inspectors use do not actually match the situation that you're finding at the plant causing you to either revise, rethink, or modify the original set of inspection procedures?

MR. HAAG: The answer would be yes. Let me elaborate on that. And I'll--let me step back, and how

we approach the inspection at Watts Bar Unit Two.

MEMBER SIEBER: Okay.

MR. HAAG: We have--Agency has established programs for doing construction inspection, pre-op startup testing.

MEMBER SIEBER: Right.

MR. HAAG: Those were done back in the Seventies and 80's and they were successful. What we elected to do was for Watts Bar Unit Two was to maintain those same inspection procedures and not go through and change them to all our current means of inspection, philosophies, things like that.

We issued a inspection manual chapter 25.17 that takes many of the things that, how we do business now, and institutionalizes those, and that's what we're following. But the, the point you brought up, as far as our old inspection procedures and are there areas that are not covered by the inspection program, perfect example would be refurbishment.

You know, our inspection program did not anticipate a long delay, and there for, is there, are there enhanced inspections you need to do to be able to address that long delay.

MEMBER SIEBER: Yes.

MR. HAAG: So, what we did was, and I'm

going to get to that later on, there was a, there was an inspection procedure, you know, issued, developed and issued specifically for Watts Bar Two refurbishment program inspections, and we're implementing that now.

MEMBER SIEBER: Okay.

MR. HAAG: The corrective action programs, the CAPs, and special programs that pat mentioned, those twenty-nine unique programs that was meant to address historical issues, the TVA, our inspection program, inspection procedures don't address those.

We have temporary instruction out, but they're very general in nature so we've had to customize and develop individual inspection plans--

MEMBER SIEBER: Okay.

MR. HAAG: --that, that would really lay our what we want the inspectors to do, sample size, and, that's how we're using, bridging those type of gaps.

MEMBER SIEBER: Okay. Now, the work that you've done to sort of customize the inspection manual and your inspection procedures to match Watts Bar, will they be useful in developing new inspection procedures or new units that are beginning construction right now? Region Two is responsible for-

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MR. HAAG: Yes.

MEMBER SIEBER: --all the construction activity, so, that comes with important, another issue.

MR. HAAG: I believe they would be looked at, but for those examples I just laid out, I don't believe it would be applicable. A refurbishment--

MEMBER SIEBER: Well, refurbishment obviously--

MR. HAAG: --for refurbishment, the CAPs and SPS--we are--

MEMBER SIEBER: That might be in a couple of instances, but not across the board, you're right.

MR. HAAG: We did recognize that Watts Bar Two, our inspection would give us some opportunities to maybe pilot some of the new regulatory processes that will be envisioned for part fifty-two, and we stated that, as appropriate, we would be doing that.

MEMBER SIEBER: Okay.

MR. HAAG: And we haven't taken on a process wholesale and said we're going to pilot it, but, for example, PI&R. I would say that, that is an example of where we're taking the methodology that had been used, has been used over the last ten, five, ten

years for operating sites, trying to customize it for construction site application.

MEMBER SIEBER: Yes.

MR. HAAG: And then, during inspections for the Part Fifty-Two plants. Hopefully, they'll use lessons learned that we have as far as how you have to make that change.

MEMBER SIEBER: Do you, when you look out into the future, do you see the development of construction and inspection procedures and engineering inspection procedures for Part Fifty-Two plants as a big job, or a modest job?

MR. HAAG: It's, it's a huge job. I mean, staff in Region Two, and the NRO staff has, a large part of their effort has been in developing infrastructure. You know, the programs, the procedures, and how we're going to inspect.

MEMBER SIEBER: So, do you believe the agency is aware of the size of this job? Because, in, my view of it is that it's a big job, there's a lot of things that are different now than they were when construction, the last construction boom was going on.

As far as resource allocation is concerned, to actually get the work done. Do you think that, do you think that's been properly communicated

so that the commissioners and the executives are fully aware of it?

MR. HAAG: At least from my perspective. I mean, I'm in the construction organization in Region Two for inspection. I'm focused on Watts Bar Two. I hear the interactions and the activities they have at Part Fifty-Two and I can tell you that they are significant.

There's a huge staff down there who are both developing the programs, the processes, and how they want to do business. And I know that, you know, they have routine briefings, so, from my perspective, that is getting communicated, but, you know, certainly NRO and Region Two people who are dealing with Part Fifty-Two would be the experts there.

MEMBER SIEBER: Yes, it's been two years since we've been down to Region Two and it was discussed at that time that, as time goes on, I see the, the, at least as I see the elements of the scope firm up a little bit, it seems to me like there's a lot of work to do.

MR. HAAG: Yes, you're right. There is.

MEMBER SIEBER: Okay. Thank you.

MR. HAAG: Okay. The next point I want to mention was our mid cycle review. Again, we followed

the ROP process in setting up how we wanted to assess performance, particularly construction performance, by TVA on Watts Bar Unit Two.

So, we've completed the mid-cycle review that was held back in July of this year, and overall we felt like the construction programs and activities were being properly implemented. There were no trigger points, as we've defined in the program, that would cause us to elevate our inspections.

We have--we used traditional enforcement, that would be analogous to, in the ROP, you have color findings. And we didn't have any escalated enforcement to cause us to enhance our inspections above and beyond what had already been laid out. So it's pretty much the outcome of our mid-cycle review.

In preparation for the Mid-Cycle Review, we looked at the past twelve months, both inspection, findings, issues that we've identified, inspection effort. And I wanted to point out there, was that, during that past twelve month review, we looked at number of inspection hours related to Watts Bar Two and we were surprised to see that we were right at the 10 FTE allocation.

I think that's good news and it's also a reflection of what's to come. Good news in that we

aren't using resources that have been given us as far as our inspection Watts Bar Two, recognizing, you know, the increase inspection effort, certainly going to happen over the next year or so.

Having said that, I feel confident that we have enough inspector assigned to the Region. I mentioned the last time I was here that we've taken all of our inspection activities and we've assigned an inspection order, so everyone understands their scope of work.

Clearly, our expectations to the individual inspectors are, you know, you need to map out what work you need to do, and if there's problems in not being able to accomplish that over the next period of time, you need to let us know.

And we hold periodic meetings with the inspection staff as far as where they're at in accomplishing their inspections, you know, are there problems that are arising where they see difficulty, and I take all that into consideration when I say I believe we have sufficient resources to complete the inspection program.

We'll know, you know, as we get closer to completion of construction and our inspections have to ramp up because we've got a lot of things we want to

look at. We may be borrowing people, we may be having to increase, certainly, above that 10-FTE burn rate, but hopefully it's going to be for short periods of time.

MEMBER SIEBER: Thank you.

MR. MILANO: We're fully staffed from the resident inspection standpoint. We had our third and fourth resident inspectors come on, on board, back in March and July of this year. That's our current staff. We don't anticipate going any higher than that.

We just, I just recently selected a new construction senior resident inspector. Bill Riordan, our current resident, current senior for construction is going to be retiring at the end of this year. So, we've got a new senior in place, and they're doing a turnover during these three months prior to the end of the year.

And that, the last bullet on this slide was to recognize an effort that, when we started looking at the increase of construction inspection and there have been a few issues coming on, happening with Unit Two construction work impacting Unit One, we recognize that we need to ramp up our oversight efforts on what controls TVA has in place and how effective those controls are to prevent Unit Two from

adversely affecting Unit One.

We issued a regional Office notice that, that formally lays out the activities that we're doing, and they involve both the Unit One and the resident inspectors with specific activities, whether its making sure they're communicating on some periodic frequency, attending meetings with TVA where they're talking about their controls they have in place, and actually we implemented some proactive inspections.

This would be another area that goes beyond what our inspection procedures as they currently exist, we implemented additional things, again, really to look at the controls to make sure that TVA has that in, in sight and preventing these things from happening.

Going to the next slide, just some of the activities we've been doing from an inspection standpoint. The inspectors that are assigned to the Unit two welding inspections recognize the importance of some earlier weld repairs that were being done on the RC--RCS piping welds.

So, they concentrated on those, to make sure that they understood TVA's plans and what they were doing in, in their final inspections. So we had a concerted effort of the regional inspectors with

expertise in welding and metallurgy look at these weld repairs.

And one in particular was the hot leg weld. This was the V.C. summer crack location, making sure that we felt that TVA was complying with the codes and requirements as far as that, that repair.

MEMBER BONACA: Was this, was this a defective weld?

MR. HAAG: This was a defect that they identified during RT inspection. One of the corrective action programs they have in place for welding, and they were, looking back at the quality of welds, and quality of RTS, and looking for defects.

They identified a number of problems with some of the RTS and had to go back and do some reshoot--reshooting the RTS and identifying some flaws. And, this was a repair, because of that effort.

MEMBER BONACA: Yes. Just a, I mean, does this have any generic implications?

MR. HAAG: As far as the cause of the flaw, implications to other welds, I'm not familiar with that. I know our inspectors are specialists, welding inspectors in Region Two looked at that, identified it as an area that we certainly wanted to have oversight presence on and performed that.

MEMBER SIEBER: Yes. It seemed to me the summer flaw had to do with the composition of different materials in the weld, and--

MR. HAAG: Yes. And I just mentioned that, as far as it was the weld location, it was that, dissimilar, it was part of the--

MEMBER SIEBER: Okay.

MR. HAAG: --reactor vessel to the RCS piping, and that's one of the reasons we focused on that.

MEMBER SIEBER: Yes. But you, you, you can't tell us at this time whether the cause of the flaw is the same as the summary cause or not?

MR. HAAG: I'm not, I'm not making that, that, that--

MEMBER SIEBER: Okay--

MR. HAAG: --assertion, no. Other than just--

MEMBER SIEBER: Okay.

MR. HAAG: --it was the weld, the RCS weld in particular.

MEMBER SIEBER: Something for us to research a little bit, because that is an interesting--

CHAIR RAY: Well, let's stop here and ask

the Applicant if they want to comment.

MEMBER SIEBER: Yes.

MEMBER RYAN: Yes.

MR. BAJESTANI: This is--

CHAIR RAY: Why don't you step to the microphone, there, Masoud.

MR. BAJESTANI: I think Bob mentioned, part of our CAPs, a special program, one of the program that actually we have, which is really program that we had for Watts Bar Unit One was welding program. We had some deficiencies as far as some of the weld, some of the RT shots, the densities, so on and so forth.

Based on what we did on Unit One, we picked that program, we actually have about 400 welds, you know, essentially the extend of condition, there are 400 welds that we had to go back, do another RT shots. Part of those RT shots that we did, we found some more problems, and we are fixing every one of those. So it's not just isolated to those one or two specific, there are over 400 that we are looking at.

MEMBER SIEBER: And it wasn't necessarily driven by summer, it was driven by your own reexamination program.

MR. BAJESTANI: Exactly.

MEMBER SIEBER: Okay.

CHAIR RAY: Well. But still, I think the obvious question is, what's your opinion? Is this, defined, a problem of some cause, it was, don't know why, but in the same location as a crack found elsewhere. Obviously you want to know, is this merely a coincidence, or is it something systemic.

MR. BAJESTANI: Well, again, this goes back to really what we did part of Unit One, we did the root cause analysis, we had to beef up our process and procedures, welding process and procedures.

CHAIR RAY: Okay, I understand what caused you to find it. What I'm asking though is did you consider whether the cause was the same as the cause that was attributed at summer?

MR. BAJESTANI: I guess I did not look at it from the summer perspective--

CHAIR RAY: It's like a Part Twenty-One issue--

MR. BAJESTANI: Right.

CHAIR RAY: --is it something that has generic implications.

MR. BAJESTANI: Right.

CHAIR RAY: That, that's the point.

MR. BAJESTANI: Yes. We, we need to take a look at it, but, again, this program is really part of

Unit One.

CHAIR RAY: All right.

MR. BAJESTANI: Another thing, let me ask Robert to see if he can expand on that.

MR. PHILLIPS: Yes. Robert Phillips, TVA senior metallurgical engineer. One of the things we did do in regards to V.C. summer, I think if you go back and look at the root cause, that one was because of multiple weld repairs that had occurred in there.

And so, it, it, it was also, it had been in operation and seen service for--at Watts Bar Unit Two, I was haven't seen any services, but it was at a dissimilar location. So we went back and we, as a--

CHAIR RAY: At a dissimilar location?

MR. PHILLIPS: Sir?

CHAIR RAY: You said it was at a dissimilar location, is that what you--

MR. PHILLIPS: Yes, a dissimilar--

CHAIR RAY: It was at the, the same location but a dissimilar metal weld, okay. I got it.

MR. PHILLIPS: Right, yes, sir. Where you have Incanel and stainless involved.

CHAIR RAY: Yes, I know. Okay. I understand.

MR. PHILLIPS: Certainly, but as Mr.

Bajestani had pointed out to you, what we primarily focused on was the themes that had occurred and we went back and looked at all the film and checked densities, and went down to make sure that we complied with all the rules an regulations on 1974 code.

MEMBER BONACA: My question was--my question was, not question in your action, activities, you go on back and reviewed and done. The question that comes in my mind is, is it something that is specific to the location and the welding complexity that may be at other plants? Should it be a part twenty-one?

CHAIR RAY: That's why I referred to Part Twenty-One. Does it have some generic lesson, Jack?

MEMBER SIEBER: Yes, I think what I heard as part of the earlier answer was that you had concerns about reading radiographs that had to do with densities, which has to do with the way the film responds to the exposure.

And so, it may not necessarily be an actual flaw, but you can't tell because the radiograph plates don't show clearly enough. Is that a correct explanation of what was, that's what I got out of the discussion on density.

MR. BAJESTANI: That was part of it. Part

of this 400 RT shots that we hit, we did, is because of that.

MEMBER SIEBER: You couldn't actually read the radiographs to draw a definitive conclusion, is that a fair statement? Or was--

MR. BAJESTANI: I think it's a combination, because we did have some issues with the process that we were looking at, doing actually the weld, so we have incorporated all this now into the new procedure that we have. So, I think it's a combination. We can, we can go back--yes.

MEMBER SIEBER: Okay. I think I get--

MR. BAJESTANI: But, the question that comes up is really you're looking at from, from really Part Twenty-One on this specific weld that we are doing. I've got to go back and re-look at that.

CHAIR RAY: Did you reshoot the weld before repairing it?

MR. BAJESTANI: Yes.

CHAIR RAY: Okay. So the earlier radiograph was just a trigger for you to do something, but we're still trying to figure out, is there something in what you ultimately found, however you found it, that should be recognized as having implications beyond Watts Bar?

That's the question that's, the implication of a Part Twenty-One report is to try and surface those sort of things so people will be aware of them. And, I, that's the only reason why you're asking these questions.

It's not to question what you did, but to figure out if there's some information that ought to be recognized as having broader implication, that's all. What's your opinion on that, Masoud?

MR. BAJESTANI: I guess, what I'm saying is, since we went through all this, same issues on Unit, on Unit One, if there was Part Twenty-One, specific Part Twenty-One, obviously we issued that, went through Unit One. But we'll go back, check that to make sure that that happened.

Really, this is a continuation of the problem identification back in 1985, where we're not under Part Twenty-One r some sort of non-conformist report, we'll go back and check that.

CHAIR RAY: Only issue is whether there's something that has applicability beyond you, not what you did.

MR. HAAG: Right.

CHAIR RAY: What you did is unexceptional.

MR. BAJESTANI: That's right.

CHAIR RAY: But the issue is, is there something that we should recognize as broader implications, like a particular weakness or susceptibility or vulnerability of this location, something like that.

MR. BAJESTANI: I'm saying that, I've got to go back and get this--

CHAIR RAY: All right.

MR. BAJESTANI: --corrective action that we put in place and look at it, see if there are some lessons learned that we need to--

CHAIR RAY: I'll leave it to you, because I assume you'll be responsible and say this is unique to our situation, or--

MR. BAJESTANI: Exactly. Right. We look at it then get back to you.

CHAIR RAY: All right.

MR. HAAG: Continuing on with our inspection activities, I wanted to mention the vendor that, vendor inspection that was done earlier this year. One of the things that we struggled with was to recognize how our inspection program really promotes vendor inspections, because if you look at it, there's very little guidance on performing vendor inspections.

Back in the Seventies and Eighties, they

had a very robust, NRC did very robust inspection, vendor inspection program, and they were very proactive in going up, looking at vendors. That doesn't exist right now, at least as part of the NRR effort.

So, the, the, the Watts Bar WREG asked us to go back and look at opportunities to do a vendor inspection, and if there were ones that would be meaningful. The NRR vendor Branch and the Region Two inspectors collaborated on coming up with a vendor inspection of Bechtel.

We thought that would be useful in, in looking at their oversight, Bechtel's oversight of procurement activities, vendor supply and services for Watts Bar Two projects. So, that was done early this year.

MEMBER SIEBER: Do you find greater use these days of commercial dedication as opposed to Appendix B vendor qualifications for materials and components that are being purchased?

MR. HAAG: I mean, I can give you an answer from what we've been inspecting--

MEMBER SIEBER: Right.

MR. HAAG: --and what we're looking at, certainly TVA would be the best, you know, we still

need a response to that.

MEMBER SIEBER: Maybe each of you could address that.

MR. BAJESTANI: I'm sorry, we didn't hear the question.

MEMBER SIEBER: Question is, in today's vendor climate, do you find fewer vendors qualified under Appendix B to supply qualified components that there were, like, twenty years ago, and because of that, must you employ commercial dedication more often to new components that you're purchasing for installation at your plant? And, if so, what do you do to do a commercial dedication?

MR. BAJESTANI: Okay. The, the, the answer to your first question, there are less number vendors that we have now versus--

MEMBER SIEBER: Right.

MR. BAJESTANI: --early eighty, for sure. That's, we are experiencing that, when you want to go to, ASME section three valve, essentially, we got couple of vendors that we have to go to, two, three of them, that's it, so it is a little bit.

Now, the commercial dedication, on the instrument, on the electronic part of it, we have had Steve to talk about what we are doing, actually.

MR. HILMES: Most of our site related instrumentation is being purchased from, you know, either Foxboro or Westinghouse, who have an Appendix B programs.

MEMBER SIEBER: Okay.

MR. HILMES: What we, I had noted is, Westinghouse relies a lot on commercial grade dedication of subcomponents or software, things along those lines. That's being reviewed, actually it's one of the activities--

MEMBER RYAN: Could you speak up just a little, please?

MR. HILMES: That's one of the primary activities we've been going through with NRR is their commercial grade programs, and reviews of those. Foxboro is less reliant on it.

But we have some subcomponents, some components out in the field that we use third-party vendors. And, you know, who dedicate the products for us, I don't think we've had major challenges along those lines.

MEMBER SIEBER: Yes, well, they're--I guess in the latest proposed regulatory staff guide that's about to be published, subcomponents like circuit cards and so forth, which, testing program that

verifies the outputs are okay, can somehow or other be qualified and considered as safety grade if it meets a parameter of attributes into which that fits.

That, to my knowledge, has not been extended to mechanical to straight electrical components beyond the I&C field. Is that basically correct?

MR. HAAG: I am not familiar with that.

MEMBER SIEBER: Okay. Well, a lot of that is still under development, and I guess we have to wait for--there is sort of a little bit of a cloudy area there, and I don't think there's a vulnerable--a, a physical vulnerability associated with it, but, because most of the stuff has now been earned, so.

There is, I think there is an issue when Appendix B qualified suppliers, the number of them drops off, it makes it much more difficult to--

MR. BAJESTANI: That's absolutely true.

MEMBER SIEBER: Okay.

MR. HAAG: And our inspection program does have us look at procurement activities, both from a program standpoint, do we have a program in place, and implementation of any of our individual inspection procedures or instrumentation would go up there and look at, on a sampling basis, how are they procuring

instruments, how are they storing instruments, how are they doing receipt inspection.

MEMBER SIEBER: Right.

MR. HAAG: And that kind of leads us into my, my next bullet. We have seen some problems with material procurement and storage. Isolated cases where either all the procurement requirements, design requirements, weren't in, inputted into the procurement requirements, and therefore when they get something from a vendor, questioning whether it's, the quality is there.

We've identified some examples there, and we've also identified some problems with the storage. So we've increased our efforts there in looking at TVA's corrective actions.

MEMBER SIEBER: Okay.

MR. HAAG: The independent design verification program inspection, IDVP, we're well underway as far as our planning and determining what we want to do for that effort. That was one of the things that we had done, either IDVPs or integrated design inspections back in the Eighties.

But, questioning how we want to do that for Watts Bar Unit Two was really something we needed to look at as far as the uniqueness of this program

and how we're taking many of the Unit One designs and making them applicable to Unit Two.

And, and, also the fact that now there's going to be faced with moving that operation, now, there's particular areas that we want to focus on doing our operation from design standpoint.

So, if we came up with, and also recognizing that TVA's initiative, as Masoud was talking about, as far as their independent assessment, their engineering effort, be able to take that and review the results of that, do some independent verification to be able to have some assurance that the outcome that they're going to reach in that inspection, whether we trust that or we think there's additional need.

So we've, we've came up with a plan, we briefed, the last WREG meeting, we briefed them as far as our, our position going forward. We got acknowledgment to move in that direction. NRR is writing an inspection procedure that takes parts of the existing guidance and kind of customizes it for Watts Bar Unit Two.

We have a team leader who's been selected for that effort. We're engaging NRR in coming up with a contractor support inspectors, recognizing that NRC

has very few inspectors with the detailed design background that you really need for this type of inspection.

So, we're going to be using contract inspectors, similar to the CDBIs that are being done on the operating site. Our plans are to perform a two-week inspection, either in January, February, where we've got the team leaders actually observing TVA's efforts this week, so we'll be able to see that firsthand.

We'll review their report, which will be issued in, probably sometime in November, factor in how we want to go about doing our inspection in that area. And then, preparations for preoperational testing.

That's certainly something that we have understood and recognized we need to prepare for. While our focus has been on construction inspections and trying to get those accomplished, we don't want to let this get too far ahead where we're not prepared for preop testing.

My sense is though, for us, to really get into the inspection of the preop testing, it's not going to take place until sometime next year. They may be doing some preop testing later this year, it's

going to be on non-safety systems and we're not going to spend much time looking at those.

One other thing that we're looking at as far as the transition for oversight responsibilities for Watts Bar Two going from a construction staff having oversight responsibilities to the operations staff, the Division of Reactor Projects, and how we're going to phase that in, what are the milestones that we're going to use for the handoff, as far as lead responsibilities.

And, we're, we've got a plan, we're briefing senior management in the Region as far as how we're going to accomplish that. Going onto refurbishment activities, I think, mentioned earlier, we talked about that inspection procedure, 37002, was issued specifically for our inspection of refurbishment.

We actually had one of our senior inspectors draft that report, or draft that inspection procedure, and incorporated many of the things that we felt were important both in looking at scoping and making sure that TVA has incorporated the right, the right SSCS into the program and then looking at the actual activities, making sure they're, they're accomplishing those, as the procedures require.

So we've got an active role in developing that inspection procedure, and its broken down really into two major parts. The first part would be scoping, you know, Pat mentioned earlier, they have a program, the program guidance kind of is overarching, defines how they want to look at degradation mechanisms and apply those to SSCS.

What we did, from our scoping standpoint, we did a sampling of several systems and making sure they have all the components, all the systems, all the passive items within their, within their, they've identified them, and they have plans to do something with them.

That was part of our scoping inspection, that was a team inspection that we did back in June, and for the most part we felt like they have the right component systems and structures identified as far as wanting to do something, you know, they've got plans to do something.

So, the next step would be the implementation, and we've broken that down into passive, active components and we've got sample size for the different mechanical, electrical I&C systems, several area.

And that's continuing on, as far as our

inspection of implementation and, you know, they've gotten identified as they want to work on, you know, are they properly implementing their program requirements, do we think they're, you know, diligent, are they really getting this equipment back to this design state where it needs to be to support licensing of the plant.

And again, that's ongoing and I anticipate we'll be doing that through the majority of next year. One of the things that we had build into the inspection procedures that, our sample size, we want to make a smart sample size, obviously.

We can't look at the thousands of components they're doing from a refurbishment standpoint, so, are we smart in doing our selection, and we're both focusing on, PRA risk perspective into that sample, and also the degradation mechanisms. What, what's the potential damage that some of these degradation mechanisms can cause on the equipment?

And one other thing that we factored into our sample selection is the vulnerability of the activity to be successful or not successful. And, let me give you an example of that.

When we looked at, they talked about refurbishing pumps, one of the things we wanted to

focus on were the pumps that are going to be refurbished on-site by the Bechtel craft versus pumps they're sending back to the original manufacturer for refurbishment.

We certainly feel like there's more of a vulnerability, that they may not be getting it right on the ones they're doing on site, so we're spending our oversight focusing, advising oversight for this type of activities.

Pumps are just one example, there are other examples of where, again, trying to make a smart sample selection because of just the number of activities that are ongoing, we certainly can't look at all of those.

That's pretty much it for refurbishing, any questions on either that program or our inspection efforts?

MEMBER RYAN: No.

CHAIR RAY: Okay. Seems straightforward.

MR. HAAG: Thank you.

MR. MILANO: Next slide. I would like to conclude the staff's presentation just recapping some of the, some of the items. You know, the staff's, the staff's review is continuing, and with however we have experienced some delays, we initially hope to be

completed with all our reviews by the end of this year.

And as we indicated with this critical path items, some of the items are going to proceed into, into early 2011 before we can complete them. The milestones for 2011 is, again, to complete most of the technical cues by the first quarter of next year.

The safety evaluation report and the final environmental statement for the operating license currently plan to be complete in June of 2011. At that, after that time, we will then be looking to come to the ACRS full Committee for it's review and decision recommendation.

And, also, concurrently, there will be, the Atomic Safety and Licensing Board will be conducting it's hearing in, and hopefully providing it's decision to the Commission. The regional staff with, probably with assistance from the headquarters offices, will be conducting an operational readiness assessment in the fall of 2011.

And, likewise, also, there will be certifications on both the part of, of TVA and also the regional staff, certifying that the plant has been built and inspected and complies with, with the, or with the design requirements. Next page.

As I initially indicated, our last item that we wanted to cover today was an expectation for our interactions with the Subcommittee over the course of, specifically, the next, the next meeting in February. But, but generally, for the three meetings that we plan to have next year with this Committee.

Again, we currently have been working with your staff and we have initially identified Subcommittee meetings for February, May, and July of next year. In the sequence of the, the sequence of the reviews--based on this sequence of our reviews, we hope that in the, in the February 2011 time period, that when we come before you, most of the mechanical and electrical systems will be ready for, ready for presenting the staff's findings in those areas.

In May, we'll, we'll, current, we believe we'll be talking predominantly on that critical path items, you know, particular, the instrumentation area, fire protection, and, and possible other, other items that may, may end up being a little bit longer lead in terms of completion on the part of the staff.

And, leaving the July 2011 Subcommittee meeting to handle followup items, items that may come up on, especially in light of, let's say, the May Subcommittee meeting. And, finally, I'm going to

mention that in the February Subcommittee meeting we--when I say most of the electrical mechanical systems, what I'm saying is, is we're going to be coming in to talk to you with, and the exceptions will be chapter seven, the instrumentation, chapter fourteen, conduct of operation, and chapter fifteen, dealing with the, transience and accidents.

Those, those will be, we'll be talking to you in May on. And, with that, that concludes the staff's presentation.

MEMBER RYAN: Great.

CHAIR RAY: Any further questions for staff?

MEMBER RYAN: No, sir.

CHAIR RAY: All right. We have on the agenda a provision to inquire about any public comments at this meeting. We have a line open, do we? No, we don't. All right, are there any--then, present with us here, that, members of the public?

Okay, hearing none, and we bring this meeting to a close. We don't anticipate, and I assume you're not expecting, a letter from the Committee at this point. It seems like we're very current with what's going on.

I think we've shared with everybody what

would be on our mind at this point in time, and I don't foresee at this point anything that requires more than the kind of review that you've outlined. Okay?

MR. MILANO: Thank you.

MEMBER BONACA: May I ask just a question--

CHAIR RAY: Yes, Mario--

MEMBER BONACA: You have a significant experience in restarting a plant, with Browns Ferry One. How do you bring that expertise to start this plant?

CHAIR RAY: It's a good question that they addressed at length in our visit at the site, but you weren't there, so--

MEMBER BONACA: I wasn't there, no.

CHAIR RAY: --so I'll ask Masoud to summarize again.

MR. BAJESTANI: Okay. We have a lot of lessons learned from Brown's Ferry. Some of the, I'm just going to point out two or three things that, really, it was significant and what are we doing about it.

One was, on the balance of plant, the construction completed late. We really didn't have enough run time on secondary site. So, what we did, on

Watts Bar, we came in and put that plan in place so we make sure the secondary site is in place early enough that we can run and get some run time, that we can fix all the problems.

As a matter of fact, we are on schedule to have the turbine and turning gear in October. And, as Pete mentioned, we are retesting some of the secondary site, like CCW pumps and the oil system and so on and so forth. So, that was one of the major lessons learned.

The other thing that we learned, was a lot of, we lost a lot of our startup engineers, which they were contractors, actually, when we needed them, at the end of the project. So, what we decided to do, is we go ahead and hire some TVA engineers to run some of the startup.

So, Pete, actually, which he is our startup manager, hired twenty-five TVA engineers to run some of those tests, and they're actually running some of those tests. We had some specific construction lessons learned, like the compression fitting and instrument sensing lines, and so on and so forth, that would pick those.

We brought them here, we put in a specific Unit procedure, we provided training for the craft,

how we missed it at Browns Ferry, what caused, you know, what are some of the training that we need to do.

So, we brought home all those lessons, we put them either in our process or procedures, or we trained the craft to a specific requirements to make sure we don't have some similar type of problems.

MEMBER BONACA: Thank you.

CHAIR RAY: Anything else? All right, hearing nothing, we will adjourn.

(Whereupon, the above-entitled matter under investigation was taken off the record at 11:55 a.m.)

ACRS Subcommittee Meeting Regarding

Watts Bar Nuclear Plant Unit 2

Status of Licensing and Inspection

Docket No. 50-391

October 6, 2010

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

U.S.NRC
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Protecting People and the Environment

Agenda

- Action Items from Last Meeting
- Current Status of Project
  - TVA
    - Engineering and Construction
    - Refurbishment Program
  - NRC
    - Licensing
    - Construction Inspection
- Expectation for Next Meeting

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Action Items from Last Meeting

- Pre-service condition and refurbishment
- Aging of buried pipe and cable
- Safe Conduct of Integrated Safeguards Test
- Watts Bar Reactivation Assessment Group

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Reactivation Assessment Group

- Revised charter to delete voting criteria
- Meetings
  - September 2009, and January, May, and September 2010
  - Held meeting with TVA on January 12, 2010
- WRAG Action Item List being tracked, resolved, and documented for closure

NRR Presentation of Status of Licensing Activities

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Status of Operating License Application

- Safety, environmental, and program reviews continue
- Critical path items and project milestones identified
- Staff Review Status
  - Resolution of open items in safety evaluation report
  - Generic communication items
  - Corrective action program plans
  - Programs – security, emergency preparedness, fire protection, anti-trust, quality assurance
  - Technical Specifications

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TVA Refurbishment Program

- Program Elements
  - Passive and active components
  - Material and environment
  - Degradation mechanisms
  - Susceptibility
  - Inspection methods
- Engineering review with system insights
- Procedures and Implementation

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TVA Refurbishment Program

- Staff Assessments
  - Scope of Program is comprehensive
  - Adequate/appropriate evaluation criteria identified
    - Based on design and procurement specifications
    - Specifics enumerated in implementing procedures
  - Scope of refurbishment and replacement adequate
  - Validation of degradation mechanisms, environmental contribution, and susceptibility
  - Verification of condition by inspection, test, and evaluation

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Safety Evaluation Report Topics

- TVA amendments to FSAR received (A92 to A100+)
- Staff review in progress
  - Supplements to original SER
  - Unit 1 current licensing basis (USAR) – reference for Unit 2
  - Most reviews complete in early 2011
  - Project challenges

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Corrective Action Programs

- Developed in 1985 in response to NRC letter regarding indentified construction deficiencies
- 29 Corrective Action and Special Programs
- Staff completed program reviews
- Inspection of implementation in progress

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Generic Communications

- Approach to review
  - Reviews completed during licensing of Unit 1 (pre-1995)
  - Pre-1995 items reviewed with applicable SER sections
  - Items issued after 1995 separately reviewed
- Status of generic communications in SSER 21
  - Post-1995 items - Review completed – 23 of 25
  - Pre 1995 Items

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Final Environmental Statement

- NUREG-0498, Final Environmental Statement (December 1978)
  - Supplemented in 1994 for Unit 1 operation
- TVA Final Supplemental EIS, February 2008 and January 2009
- Status of review
  - September 2009, notice of intent to prepare supplement to FES-OL for Unit 2 and conduct a scoping meeting
  - October 2009, public meeting near the site regarding environmental scoping process and to obtain comments
  - Expect to publish Draft Supplement for Unit 2 in November

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Status of Program Reviews

- Radiological Emergency Plan
  - Interim FEMA finding on off-site planning
  - Staff input on onsite planning prepared
- Physical Security Plans
  - Staff input on plan prepared
  - Awaiting TVA completion of target sets
- Fire Protection Program
  - Final Fire Protection Report due in December 2010
- Startup Test Program

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Critical Path Items

- FSAR Chapter 7 – Instrumentation
  - Common Q – post-accident monitoring – digital upgrade
  - Non-safety control systems – digital upgrades
- Fire Protection Program
- Supplement to Final Environmental Statement

Region II Presentation of Status of Construction Inspection Activities

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Inspection Activities

- Resident and regional inspections increasing
- Completed second PI&R team inspection
- Performed 2010 Mid-Cycle review
  - construction programs and activities properly implemented
  - no significant performance issues were identified
- RII staff hours at burn rate of allocated 10 FTE/ year
- Four construction resident inspectors assigned
- Guidance issued for U1 and U2 resident inspectors to inspect construction activities to ensure Unit 1 not adversely impacted

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Inspection Activities (Cont.)

- Inspected repairs of RCS piping welds including a hot leg inconel/SS weld (V C Summer crack location)
- Vendor inspection – Bechtel oversight of vendors supplying services for WBN2 construction
- Focusing on material procurement and storage – several violations identified in this area
- Planning for Independent Design Verification Program (IDVP) inspection
- Preparing for system preoperational testing (IMC 2513)

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Refurbishment Activities

- Inspection guidance provided by IP 37002
- Scoping team inspection - verified appropriate SSCs included in the program; passive and active items reviewed
- Ongoing review of implementation activities including inspections, rebuilds, and replacements
- Samples selected based on risk significance and potential damage from degradation mechanism

Watts Bar Unit 2 Activities

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Conclusion

- Staff review continuing, with some delays
- Milestones for 2011
  - Complete most technical review by 1st quarter
  - SER and FES-OL complete by June 2011
  - ACRS review and decision
  - Conduct hearing and ASLB provide decision
  - Operational readiness assessment in Fall 2011
  - Certification of as-built construction

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Schedule

- ACRS Subcommittee Meetings
  - February, May, and July 2011
- Sequence of reviews before ACRS
  - Feb 2011 – Most mechanical/electrical systems
  - May 2011 – Critical path and long-lead items
  - Jul 2011 – Follow-up issues
- Next SC Meeting
  - SER Sections except 7, 14, and 15

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT UNIT 2

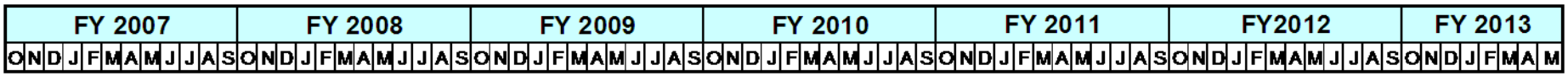
Advisory Committee on Reactor Safeguards

October 6, 2010

Agenda

- Construction Completion Status – Masoud Bajestani
  Pete Olson
- Special Topics
  - Refurbishment – Jerry Schlessel
    Ken Welch
  - Buried Piping - Ken Welch/Robert Phillips
  - Buried Cable – Steve Hilmes
- Questions

WBN2 Project Completion Status



DSEP

Construction Reactivation letter

TVA Board Decision

Regulatory Framework

Detailed Project Schedule

Commence Principal Construction Activities

Major Engineering Completed

FSAR Amendment / OL Updated

Turbine on Turning Gear – October 2010

U2 Emergency Plan Drill – May 2011

Integrated Safeguards Testing – Sept 2011

Primary Hydro – May 2011

Fill Ice Condenser – July 2011

Hot Functional – August 2011

Containment ILRT– July 2011

Ready for Fuel Load April 2012

Full Power Operation October 2012

Licensing Activity

Significant Project Milestone

WBN2 Construction Completion Status

Engineering

- Overall Progress – 88% complete
  - Design Modifications – ~ 98% complete
  - Calculations – ~ 88% complete
  - Programs – ~ 79% complete
- Focus Areas
  - Field Support
  - Program Completions
  - Open Item Closure
- Independent Design Verification Program
  - Residual Heat Removal and Component Cooling Systems
  - Experienced Team – Eight Engineers with >25 years experience each
  - Findings

WBN2 Construction Completion Status

Improvement Initiatives:

- Replace All 8 ERCW Pumps to Improve Flow Margin
- Mitigating Multiple Spurious Shorts
- Reduction of Appendix R Operator Manual Actions
- Replacement of Piping Susceptible to Flow Accelerated Corrosion (FAC)
- Ice Condenser Glycol Chiller Replacement
- Double 500 kV Breaker Arrangement in Switchyard
- Add Zinc Injection System for Reactor Coolant System Passivation
- Add ERCW Strainer Bypass for On-Line Maintenance
- RG 1.200 Compliant PRA
- Retube Main Condenser
- Intake Pumping Station Diver Barrier
- RCS/Pressurizer Weld Mechanical Stress Improvement Process (MSIP)
- Additional Offsite Power Source
- Split Pin Replacement Prior to Operation
- Reduction of Pipe Support Snubbers
- Improvements to Containment Sump Performance
- Replacement of SR Limitorque Motors

WBN2 Construction Completion Status

Construction

- Overall Progress – >60% complete

- Construction Focus Areas
  - Cable Pull
  - Hangers
  - Sense and Sample Lines
  - Refurbishment Activities

- Critical Path
  - Bulk Work
  - Four Major Systems (Safety Injection, Chemical Volume Control, Essential Raw Cooling Water, Component Cooling)
  - Ice Condenser Ice Loading

- On Track to Complete Construction Activities to Support Current Fuel Load Schedule of April 2012

WBN2 Construction Completion Status

Start-up Testing

- Overall Progress
  - Nine (9) Systems Turned Over to Start-up Test Organization

    Raw Cooling Water, Condenser Cooling Water, Annunciators, Foxboro Control System, Turbine/Generator Lube Oil, Turbine Drains, Seal Oil, EHC, Control Air

- First Pre-operational test scheduled for early fall (Condenser Circulating Water System in November 2010)

- Integrated Safeguards Test – Perform with Unit 1 on-line after Hot Functional Tests

- Essential Raw Cooling Water – Flow balance during Unit 1 outage Spring 2011

Special Topics

Refurbishment Program

- Equipment Scope
  - Safety Related
  - Active / Passive
- Refurbishment Program Process Steps
  - Identification
  - Classification
  - Inspection/Evaluation
  - Refurbishment/Replacement
  - Component/System Testing
- Required Outcome
  - Plant meets original licensing, design and equipment vendor specifications

Refurbishment Program

Active Refurbishment Program Status

- Safety Related Valves (all types) – 34% Complete
- Large Safety Related Pumps – 30% Complete
- Large Safety Related Motors – 40% Complete

Passive Refurbishment Program Status

- Program in progress and on schedule
- Attributes Evaluated
  - Pipes, tanks, orifice, Heat Exchangers, Traps
  - Duct
  - Instrument Sensing lines
  - Electrical Penetrations, Disconnects and Terminal Blocks
  - No Unexpected Findings To Date

Buried Piping

- No additional safety-related *buried* piping is placed in service by Unit 2 completion.
- Unit 2 safety-related *underground* piping is routed through the Unit 2 pipe tunnel to the Refueling Water Storage Tank or Primary Water Storage Tank.
  - 24” Refueling Water Storage Tank header and 6” Containment Spray test line.
  - 6” Primary Water Makeup pump suction and 3” Primary Water Makeup pump recirculation lines.
  - **Not in direct contact with soil**. **Entire length of piping is accessible.**
- Unit 2 non-safety-related buried piping being placed in service:
  - Condenser Circulating Water pump supply and discharge lines, cooling tower #2 blowdown and desilting lines.
  - Generator Hydrogen supply from turbine building secondary control cabinet to turbine building.

Unit 2 Pipe Tunnel

Buried Piping

- Integrity and reliable operation of all plant buried piping is ensured by Buried Piping Integrity Program (BPIP).
  - The objective of the BPIP is to provide a comprehensive program to reduce the probability and consequences of buried piping failure.
  - Program based on EPRI Report 1016456 "Recommendations for an Effective Program to Control the Degradation of Buried Pipe", December 2008.
  - BPIP established for WBN-1 and all TVA nuclear plants
  - The program addresses external (OD) corrosion and/or degradation of buried piping; it is not intended to address internal (ID) corrosion.
  - The program applies to safety-related and non-safety-related piping systems.
  - Anticipatory Program – Replace piping before an issue exists.

Systems with Buried Piping

System #	System name		System #	System name
014	Condensate Demineralizer		032	Control Air
015	Steam Generator Blowdown		033	Service Air
018	Fuel Oil		035	Generator Hydrogen Cooling
020	Central Lubricating Oil		036	Secondary Chemical Feed
024	Raw Cooling Water		039	Carbon Dioxide
025	Raw Service Water		040	Station Drainage
026	**High Pressure Fire Protection (safety related)**		059	Demineralized Water
027	Condenser Circulating Water		**067**	**Essential Raw Cooling Water (safety-related)**
028	Treated Water		077	Waste Disposal
029	Potable Water			

Buried Piping

Installation

- Buried pipe is bedded to provide a continuous and uniform earth bearing from trench bottom to bottom quadrant of pipe.
- Trenches are backfilled with rock-free earth or sand compacted to a minimum depth of 12” over top of pipe.
- Steel pipe is either coal tar epoxy coated or spiral wrapped using coal-tar protective coating in tape form. Spiral wrap is overlapped more than half-width of the tape to provide a minimum of double thickness of tape.
- Pipe is heated to remove moisture prior to wrapping.
- Prior to backfilling, externally-coated pipe is inspected for holidays.

Buried Piping

The Buried Pipe Integrity Program (BPIP) is implemented in six steps:

Steps 1 and 2 establish the program.

1. Establishing site documents/databases.
2. Risk ranking of in-scope pipe segments.

Steps 3 thru 6 ensure adequacy of the piping.

3. Inspections of in-scope piping systems.
4. Fitness-for-service evaluations of inspection results.
5. Identification of repair options for degraded piping.
6. Prevention and mitigation measures for reducing risk of failure.

Steps 3 thru 6 are ongoing throughout the life of the plant.

Buried Piping

Step 1 - Establish site documents/databases

- Identify buried lines (any piping branch which has at least one section of buried pipe).
- Divide lines into segments and zones:
  - Segment: A contiguous section of line within the same system containing the same fluid under all operating conditions.
  - Zone: A portion of the larger segment that has been reduced into smaller sections for the purpose of evaluating a specific pipe external physical configuration or installation situation.

Buried Piping

Step 2 - Risk Ranking of Pipe Segments

- Each zone is assessed for total risk factor.
- Risk Factor = Susceptibility Factor x Consequence factor
- Susceptibility Factors:
  - Physical configuration.
  - Cathodic protection.
  - Pipe material.
  - Pipe coating.
  - Internal fluid.
  - Pressure transients.
  - Soil and fill characteristics.
  - Past history.
- Consequence factors:
  - Environmental hazards.
  - Threats to power production.
  - Cost of repair.
  - Nuclear safety impacts.

Buried Pipe

Step 3 - Inspections of in-scope piping systems.

	No Consequence	Low Consequence	Medium Consequence	High Consequence
High Likelihood				
Medium Likelihood				
Low Likelihood				

Figure 1 - Example of a 3x4 Risk Matrix

	Low Risk Ranking	Medium Risk Ranking	High Risk Ranking
Highly Corrosive Environment	GROUP 2	GROUP 1	GROUP 1
Corrosive Environment	GROUP 3	GROUP 2	GROUP 1
Mildly Corrosive Environment	GROUP 4	GROUP 3	GROUP 2

Figure 2 - Inspection Selection Matrix

The "**GROUPs" identified in Figure 2 are defined as:**

• **GROUP 1 - Buried piping segments and/or zones in this category should have priority,** and the inspection plan should address this buried piping first.

• **GROUP 2 - Buried piping segments and/or zones in this category should have** secondary priority, and the inspection plan should address this buried piping second, unless engineering judgment changes the priority.

• **GROUP 3 - Monitor and record surface conditions of buried piping systems when** excavations or repairs are made.

• **GROUP 4 - Monitor and record surface conditions of buried piping systems when** excavations or repairs are made. This category has less priority than GROUP 3.

Special emphasis is given to buried piping that contains radioactive materials. These will automatically be placed in Group 1 or 2.

Buried Piping

Step 4 – Inspection

Each TVA site is developing an inspection plan for each site to provide reasonable assurance of integrity of buried piping. The inspection plan includes the following key attributes:

- 1. Identification of piping segments and/or zones to be inspected.
- 2. Potential inspection techniques such as Guided Wave technology.
- 3. Inspection schedule for buried piping segments and/or zones based on risk ranking.
- 4. Assessment of cathodic protection, if applicable.

Plan Implementation

- Preliminary inspections using Guided Wave testing were completed in June, 2009.
- Full implementation of Inspection Plan scheduled start no later than **June, 2012.**
- The condition assessment of buried piping containing radioactive materials scheduled completion by **June, 2013.**

Buried Piping

Steps 5 and 6 (On-Going Throughout Life Of Plant)

- Step 5 - Identification of repair options for degraded piping.
  - WBN Operating Experience
  - Piping Repair/Replacement
  - To date there has not been any occurrences of major failure (loss of safety related system function).
  - No impact on system operability or function

- Step 6 - Prevention and mitigation measures for reducing risk of failure.
  - Groundwater Protection Program

Buried Piping

TVA Groundwater Protection Program

- The purpose of this program is to minimize the potential for inadvertent releases to the environment from plant activities.
- Provides for a site risk assessment for groundwater protection:
  - Identifies each system/component that involves licensed material and has a credible mechanism for licensed material to reach ground water.
  - Identifies the leak detection mechanism for any system/component noted above.
  - Each site's risk assessment is available for review and use by applicable engineering, maintenance planning and other site personnel as a routine "ground water risk tool" for new designs, changes, or modifications, preventive maintenance work and outage management planning.
- GWPP Monitoring Plan including the following constituents:
  - Monitoring locations
  - Sampling frequencies
  - Sampling protocols and/or procedures
  - Analytical protocols and/or procedures including sensitivity limits

Buried Piping

Buried Pipe Conclusions

- The piping system will maintain reliable operation.
- WBN Unit 2 is currently following the industry initiatives for buried piping, which is assessing the conditions, performing risk ranking models and replacing pipe as required.
- The TVA fleet has a plan for inspections and assessments to be completed by June 2013.
- The type failures that could occur will not challenge the operability of the systems and/or their functions.
- To date there has not been any occurrence of major failure (loss of safety related system function).
- WBN has processes and procedures to monitor all safety related piping.

Buried Cable

- TVA Construction Practice: No Process Cables Are Directly Buried In Soil, Regardless Of Safety Class.
- No Additional Buried Or Underground Safety-Related Power Cable Added By Unit 2
- Safety-Related Power Cables At WBN That Are Routed Underground Include:
  - Cables from the Diesel Generator building to the Auxiliary building
  - Cables from the Auxiliary building to the intake pumping station
- All the Safety-Related cables above are routed thru duct banks, and all are currently in service to support Unit 1 operation.
- Safety-Related signal cables from Refueling Water Storage Tank level transmitters to the Aux building are routed thru divisional conduit in the Refueling Water Storage Tank pipe tunnel, and are not considered to be buried cables.

Buried Cable

Duct Banks

- Sump pumps have been installed in all underground duct bank manholes.
- Safety-related duct banks have local level alarms and pump run time meters.
- Routine operator rounds monitor alarms to ensure prompt identification and action to prevent cable submergence.
- Manhole sump pump operation is verified once/6 months under plant preventive maintenance program.

Buried Cable

Testing

- Medium voltage underground cables are periodically tested using Very Low Frequency (VLF) dissipation factor testing (also known as tan-δ).
- TVA specifications provide specific acceptance criteria for each insulation type. For example, for Cross Link Polyethylene (XLPE) insulated cables, the criteria is:

Tan-δ at $2V_o$	Differential of Tan-δ	Assessment	Testing Frequency
< 1.2 E-03	< 0.6 E-03	Good	Repeat VLF test within 5 years
≥ 1.2 E-03	≥ 0.6 E-03	Aged	Repeat VLF test annually
≥ 2.2 E-03	≥ 1.0 E-03	Degraded – replace cable	N/A

- Acceptance criteria for all insulation types conforms to IEEE 400.2.

Buried Cable

Testing Results

- Very Low Frequency (VLF) testing indicates no degradation of safety-related cables.
- Results of underground cable testing:
  - 20 underground medium-voltage safety-related cables.
  - Tan-δ testing on all completed in 2008.
  - All test results were satisfactory, and cables remain on a 5-year test interval.
  - 4 non-safety-related cables for Unit 2 Condenser Circulating Water pumps were also tested satisfactorily.

Buried Cable

Buried Cable Conclusions

- WBN performs periodic testing of medium voltage cables and underground duct banks cables
- The cables will maintain reliable operation.

Summary

- We Have a Solid, Intrusive Program for Both Active and Passive Components
- We Are Utilizing Internal and External Operating Experience and Industry Programs to Guide the Refurbishment Program
- Our Goal Is To Have the Highest Operating Capacity Factor After Commercial Operation of the Unit.

QUESTIONS