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NUCLEAR REGULATORY COMMISSION

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618TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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THURSDAY

OCTOBER 2, 2014

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 1:00 p.m., John W. Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

HAROLD B. RAY, Vice Chairman

DENNIS C. BLEY, Member-at-Large

RONALD G. BALLINGER, Member

SANJOY BANERJEE, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

JOY L. REMPE, Member

PETER C. RICCARDELLA, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIAL:

KENT L. HOWARD, SR.

ALSO PRESENT:

ERIC BLOCHER, STARS Alliance

JOHN DAILY, NRR/DLR

YOIRA DIAZ-SANABRIA, NRR/DLR

BILL HOLSTON, NRR/DLR

NAEEM IQBAL, NRR/DRA

SARAH KOVALESKI, Ameren Missouri

JOHN LUBINSKI, NRR/DLR

DAVID NETERER, Ameren Missouri

GREG PICK, RIV*

MANNY SAYOC, NRR/DLR

ROGER WINK, Ameren Missouri

*Present via telephone

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P R O C E E D I N G S

1:03 p.m.

CHAIRMAN STETKAR: We are back in session and the first topic of this afternoon after a short delay is the Callaway License Renewal and Dick Skillman will lead us through this session. Dick?

MEMBER SKILLMAN: Thank you, Mr. Chairman.

Ladies and gentlemen, we're here to talk about a 20 year life extension to the Callaway nuclear plant located in Fulton, Missouri. That license expires on October 18, 2024, ten years from now. And we are here to talk about a life extension of 20 years beyond that date.

We met with Ameren Missouri on March 22nd -- was it March 22nd? In late May, excuse me, May 22nd and we went over virtually all of the material that we will discuss today. That material has been adjusted to be more current for today's date.

So, I welcome the Ameren Missouri team, the Callaway team, thank you for coming here and I'll begin by turning the meeting over to John Lubinski. John?

MR. LUBINSKI: Thank you, thank you, Chairman Stetkar, thank you, Mr. Skillman.

I am John Lubinski, I am the Director of

our Division of License Renewal and NRR and NRC.

Seated with me today, I have Yoira Diaz who's the Branch Chief of Projects Branch 1, who's responsible for the safety reviews and the final decision on licensing from the standpoint of license renewal.

What I'd also like to do today is introduce two new members of the Division of License Renewal. Seated in the first row, we have Chris Miller who will become the new Director of the Division of License Renewal starting this Monday, October 6th.

We also have Jane Marshall. Jane Marshall started with us last Monday as the new Deputy Director for the Division of License Renewal.

Also with us today on the phone line, we have Greg Pick who is the Lead Inspector. He's from our Region IV office and he was responsible for performing the inspections that supported our review of this license renewal application.

I would introduce additional staff when the NRC staff does their presentation this afternoon.

As stated, we did have a subcommittee meeting for Callaway with ACRS back in the May time frame. Since that time, we have issued a final Safety

Evaluation Report that was issued on August 21st of 2014.

That final report did close all the open items that were in the previous SER that was issued more than a year earlier and there were five open items.

Those five open items which we will discuss today in our presentation and I believe Ameren will also, had to do with scoping of fire protection equipment as part of the NFPA 805 conversion, a discussion of how they were handling a reactor head closure stud issue, PWR vessel internal program action items, ASME code class one small board socket welds and the last was environmentally assisted fatigue on the reactor coolant pressure boundaries.

Also, at the subcommittee meeting, we talked about a few other issues that had arose since the SER was issued prior to that. There were three issues that were specifically discussed at the subcommittee meeting.

We believe we had fully addressed our path forward on those issues and some of those actually had closure at that point but were not documented in the SER. We do plan to address all of those today.

At this time, what I'd like to is turn the

presentation over to Ameren Missouri and specifically the site Vice President, David Neterer and his introductions and their presentation. Dave?

MR. NETERER: Thank you. My name is Dave Neterer, I'm the site Vice President at Callaway plant. We really appreciate the opportunity to be here today to discuss our license renewal application with you.

I'd like to have our team introduce themselves.

MS. KOVALESKI: Hello, my name is Sarah Kovaleski, I'm the Director of Design Engineering.

MR. WINK: Roger Wink, Supervising Engineer of our Plant Life Extension Project.

MR. HOEHN: Mike Hoehn, Supervising Engineer, Engineering Programs.

MR. BLOCHER: Eric Blocher, Project Manager, STARS Alliance.

MR. BURGESS: And I'm Andrew Burgess, Project Engineer for Plant Life Extension.

MR. NETERER: I'd like the rest of the Callaway team to stand, please, so we can see who you are. These are the rest of the team that came with us today. Thank you.

So, today we're going to talk about

Callaway point site plant milestones, GALL R2 consistency and commitments, closure of open items and then some concluding remarks.

So, Callaway plant is located in mid-Missouri. It's on about a 7,000 acre site, about 300 feet above the Missouri River, we're about five miles from the Missouri River.

We're a single 4-loop Westinghouse plant. We were part of the original SNUPPS plan back in the 1970s. We're one of two plants that got built, us and Wolf Creek, were completed because of the slow down of the industry after TMI. Daniel International was our constructor.

So, this is a map of Missouri, the red dot there is where Callaway plant is located. We're about 80 miles west of St. Louis and about 125 miles east of Kansas City. Jefferson City is the capital of Missouri. You can see that by the red dot, but that does not Jefferson City. They're about 25 miles to the southwest.

The nearest population center is Fulton, Missouri. It's about 14,000 people. That fluctuates because there's two universities there, so it's up and down, but it's around 14,000 permanent residents. I happen to live between the plant in Fulton, so I'm

very close to the plant.

We employ about 800 employees, full-time employees at Callaway plant. We're going to enter our 20th refueling outage this year, no, this month, later this month.

Now, as we talk, we're licensed as Union Electric, that was the original name on the license and that is still the name on the license. So, you will hear us talk some about Union Electric, some about Ameren as we go through this, but they're all the same.

This is a view of our plant site looking at geograph of the north. On the foreground is our switchyard. The switchyard is operated and maintained by Callaway plant.

Our Ultimate Heat Sink pond is shown on the right there. That's a 30-day tech spec supply of immersion cooling water for the plant.

Then we have the power block and over to the left, we want to show you where we're building our dry cask storage facility. We expect to move fuel, have our first campaign in May of 2015.

Also, just this way from where we're building the dry storage, we're building our FLEX storage building there and that will be completed by

the end of 2014.

Now, I said we're about five miles from the Missouri River, this shows the Missouri River and in the background there, five miles away is Callaway plant. We do take our water from the Missouri River and that's what that structure down in the front is. There are three big pumps.

Now, this structure and the equipment there is not in scope. It's non-safety related. I just wanted to show we how we get our all the way up to the plant. Then our cooling tower flow down goes back to the river. To the right there, there's a diversion where it goes into that diversion where -- to divert it down river so it doesn't get recycled back into the plant.

Okay, I'll turn to Roger Wink to talk about some plant milestones over the last several years.

MR. WINK: Thank you, Dave. Next slide, Andrew?

We've already covered some of these dates, so I won't go into those in those in great detail. I will note that our current license expiration is October 2024 with the period of extended operation, that will give us 20 years out to October 18th, 2044.

Andrew, next slide?

So, I've listed a number of significant investments that we've made to the plant site. It's really just an indication that we are committed to long term safe, reliable operation of the plant.

The top half of that slide are modifications that have already been completed. On the bottom portion of that slide, you can see that we are replacing our reactor vessel head and then that's starting here in about a week and a half we'll start that activity.

And David already mentioned that we are constructing our independent spent fuel storage installation facility with the first spent fuel assembly will be loaded in 2015.

So, I'll turn this over to Ms. Kovaleski.

MS. KOVALESKI: Thank you, Roger. Next slide please, Andrew.

Callaway submitted our license renewal application to the staff in December of 2011. We are the first PWR to apply under NUREG-1801 of the GALL Revision 2. And we are 98.8 percent consistent with GALL. The exceptions really had to do with material and environment combinations that were not addressed in GALL.

We did incorporate Eight License Renewal Interim Staff Guidance documents as part of our application and the subsequent RAIs and we have 42 aging management programs.

Our commitments are included in our FSAR Supplement and they will be managed in our Commitment Tracking System consistent with NEI Guidelines.

Next slide, please?

MEMBER POWERS: If I could just ask, you indicate you have ten new aging management programs. How do you accommodate that in your staff?

MS. KOVALESKI: The question is how do we accommodate --

MEMBER POWERS: You've got ten new programs, I assume everybody was full-time busy before you got ten new programs.

MS. KOVALESKI: Yes.

MEMBER POWERS: Now, do they become 1.05 times busier than they were before or how do you accommodate ten new programs?

MS. KOVALESKI: It is a challenge, I agree. Part of going through the license renewal process, we have started to internalize that managing the long term aging of the plant to something that we need to apply additional focus to.

We already had long term aging plans, but not to the extent or rigor that we've learned through license renewal. So, it really is a philosophy shift. Applying aging management while there are additional programs, it is an effort that we need to do. So, it really compliments the work that we're doing already.

MEMBER POWERS: Does that mean it's worse than I thought, we have ten new programs and we've got enhancements to 32 existing programs. My question is still the same, everybody's going to starting working 12 hours days instead of eight hour days or I mean, how do you accommodate all this additional work?

MR. NETERER: Part of it is, when we formed the license renewal group that Sarah led, we added staff to her group. Some of those staff were going to continue in license or asset -- managing that after the license renewal part is done and carry out the implementation of it, some of those people in this room.

So, that will carry forward. So those are people that had other jobs before they moved into that job, now they're carrying forward and finalizing it. So that's really the answer.

MEMBER POWERS: You're going to add some additional manpower?

MR. NETERER: Yes, and let me share, we have a group that handles NSPI and all that sort of thing. Some of that we shared by them. We have discussed, just us, we haven't done it yet, talk about forming a asset management group to take care of all that within Systems Engineering, actually, it's the Program Engineering now, Hoehn's group.

Does that answer your question, sir?

MEMBER POWERS: Yes, I mean --

VICE CHAIRMAN RAY: Some of the way --

MR. NETERER: That's an answer.

VICE CHAIRMAN RAY: Some of the work, I assume, was being done already and is now captured by these new programs?

MR. NETERER: That's correct. Lee, did you have something to add?

MR. IDLE: Lee Idle, Supervising Engineering, System Engineering.

We had been working over the course of the last few years working on System Engineering for trending and monitoring programs and this fits into the trending and monitoring programs that we have already had established for the System Engineers to work on.

MS. KOVALESKI: Thank you, Lee.

At this point, we'd like to discuss the open items as they appeared in the SER with open items.

We have the five topics listed here on this slide and we'll confirm that the final SER does contain no open items.

The first topic had to do with fire protection, I'm sorry, scoping of fire protection systems, structures and components.

Specifically, the staff had asked us to provide justification for excluding portions of the Turbine Building from the scope of license renewal and asked us to discuss the changes associated to license renewal scope that will occur with our transition to NFPA 805 and the gap analysis to go along with that.

We did have our NFPA 805 license amendment request under review at the same time as the license renewal application. The NFPA 805 amendment was approved in January of 2014 and at that time, we were able to provide the staff with a gap analysis that indicated the components that were added to scope as a result of NFPA 805 and some that were removed from scope because they no longer provided a significant fire protection function.

With those changes, we updated the license

renewal application and made sure that it fully aligned to our new licensing basis under NFPA 805.

CHAIRMAN STETKAR: Sarah, do you have a ballpark estimate, you said some number of SSCs were added, some number of SSCs were deleted. Do you have ballpark estimates or perhaps precise estimates for the number of SSCs that were added and deleted?

MS. KOVALESKI: For the specific number --

CHAIRMAN STETKAR: And the problem is, I don't want to, you know, a hanger for a particular fire protection plan.

MR. NETERER: Yes, there were seven add, six removed.

CHAIRMAN STETKAR: Okay.

MR. NETERER: But, you have to look at this to –

(Ringing telephone.)

CHAIRMAN STETKAR: Hang on a second. Excuse me. Now it's off, I'm sorry, go on.

MR. NETERER: So, we've added seven, six removed, but you have to look at the significance in what those systems did. They aren't all equal.

CHAIRMAN STETKAR: Yes, no, but I was just trying to get it, as I said, ballpark, thanks, that helps.

MS. KOVALESKI: All right. Next slide, please?

The next topic is the reactor head closure studs. Specifically, the staff was concerned that the program may not be able to detect future wear, loss of materials or assure that allowable stresses are not exceeding during the period of extended operation.

Our resolution to this open item was to commit to remove stud number 18, which is our reactor head closure stud that was stuck in place prior to the period of extended operation.

Additionally, we had a number of stud holes that had previous thread damage and there were -- I'll clarify that, there are ten stud holes that were damaged, six of those stud holes had greater than one complete thread that was damaged.

And so, we have committed to inspect those six stud holes using a mapping technique prior to the period of extended operation in order to determine if there is any additional degradation going on in those areas.

MEMBER RICCARDELLA: Are you going to periodically inspect them after that?

MS. KOVALESKI: They are inspected regularly using the ASME Section 11 requirements.

That is ongoing. There's also volumetric exams over ten years.

MEMBER RICCARDELLA: Of the stud holes?

MS. KOVALESKI: And visual inspections, yes.

MEMBER SCHULTZ: So, the previous -- the statement that says with previous thread damage, is that pre-1996? Is that --

MS. KOVALESKI: Yes, that is.

MEMBER SCHULTZ: -- the time frame we're talking about?

MS. KOVALESKI: Andrew, Slide 44, please?

This slide indicates the stud holes that have that prior damage and the number of removed threads. The first six that are listed there, you can see the number of removed threads, the minimum number there is four.

Following that, in spring of 1992, we had an effort really to improve the material condition and we removed one thread or less from those other four remaining locations.

MEMBER SKILLMAN: Sarah, I think it would be valuable to communicate that, as a consequence of the stuck stud 18, the six holes that are going to be observed and the four that were repaired, there is a

license condition that comes with this. So, I think it would be prudent to communicate to the members what that license condition is, please.

MS. KOVALESKI: Yes, that's correct, thank you.

The license condition does reflect our commitment to perform both of these actions.

MEMBER SKILLMAN: And the license condition also requires removal of stuck stud 18 to inspect that hole and to give you a new stud.

MS. KOVALESKI: That's correct.

MEMBER SKILLMAN: That's correct? Thank you.

MS. KOVALESKI: That's correct.

MEMBER CORRADINI: Could you -- the three of us over here weren't at the subcommittee meeting -- the four of us. Can you explain a little bit more about what you mean by a remove of -- can you go back one?

What do you mean by remove the thread, if I understand this correctly, I don't --

MR. WINK: The thread material was physically ground out.

MEMBER CORRADINI: Oh, machined away?

MR. WINK: Yes.

MEMBER RICCARDELLA: So the damage was actually -- it wasn't cracking in the roots of the threads, it was damage to the threads themselves?

MS. KOVALESKI: That's correct.

MR. WINK: Like GALL threads.

MEMBER RICCARDELLA: GALL threads.

MS. KOVALESKI: In most cases, it was as a result of the destructive removal of a stud.

MEMBER RICCARDELLA: And then you did some analysis to show that it's safe with fewer threads?

MS. KOVALESKI: Yes, that's correct. These are ASME code acceptable repairs.

MEMBER CORRADINI: Thank you.

MEMBER BROWN: One more question. How many threads are in the stud holes? Is it 50 and you take out a third of them or 20 percent? I would like a guess, I have no idea which it is.

MS. KOVALESKI: Yes?

MR. GROSS: David Gross with Dominion Engineering.

The thread engagement is about nine and three-quarter inches at eight threads per inch. So, that's something just short of 60 threads.

The Callaway analysis shows that they can have up to 19 and a half threads lost from the hole

and still meet engagement.

MEMBER BROWN: Okay, I understand that part of it.

MEMBER SKILLMAN: Thank you.

MS. KOVALESKI: Thank you. All right, next slide, please?

This slide, I'd like to turn the discussion over to Mike Hoehn to discuss the open item associated with MRP-227-Alpha.

MR. HOEHN: Thank you, Sarah.

Again, I'm Mike Hoehn, Supervising Engineer, Engineering Programs.

These licensing action items are related to the MRP, the Materials Reliability Program, 227-Alpha document which is the Pressurized Water Reactor Internals Inspection Valuation Guidelines.

As a result of these license action items, specifically licensing action number one, we were required to demonstrate that Callaway's internals program was consistent with 227-Alpha and that was accomplished with support from our Nuclear Steam Systems Supplier, Westinghouse.

The next licensing action item number five was related to what measurement techniques we would apply on our Reactor Vessel Internals hold-down

springs. As a result of additional investigation, it was identified that the materials for that hold-spring and our Reactor Vessel Internals were 403 stainless steel and not subjected to the degradation mechanism required for the measurement.

Next slide, please?

This next item is related to materials within our Reactor Vessel Internals set, specifically materials fabricated from cast austenitic stainless steel, martensitic stainless steel and precipitation hardened stainless steel.

We had to go through and verify that our components within our Reactor Vessel Internal set were not of a specific cold work requirement or of stress requirement, specifically 20 percent cold work, 30-KSI stress. And that was verified with extensive review, again, with support of Westinghouse.

The item, licensee action item number eight is related to our Reactor Vessel Internals being of a ASME NG design set. And we have fatigue usage on those internals and we will be managing the internals and the associated environmental effects under our Fatigue Management Program into the period of extended operation.

MEMBER RICCARDELLA: And putting any new

guidance that might come out on that topic?

MR. HOEHN: Correct, again, as we're committed to operating experience, we'll address all new operating experience moving forward.

MS. KOVALESKI: Thank you, Mike.

The next topic is ASME Code Class 1 Small-Bore Socket Welds. Before we discuss this item, one of the things that we want to point out is that it is a disappointment to us that we introduced an error in the number of socket welds in the license renewal application and it's embarrassing that this evolved to the point of an open item.

The topic is the number of socket welds that are in the scope of license renewal and when we conducted our initial count, we didn't recognize that we had improperly communicated the request to our subject matter expert and we had inadvertently neglected one inch piping in our total count.

We did identify this error at the time one of the audits, the license renewal audits was underway and, at that time, we made the staff aware that we knew there was error, we knew there were at least four more socket welds included in scope but we didn't know the extent of error at that time.

We did perform a detailed recount

following that. We went through and we returned to original design and construction drawings to perform an independent verification of the complete count.

The final number that we arrived at is 80 small-bore socket welds. We did enter this in our Corrective Action Program. We performed an extent of condition review. We recognized that the small-bore butt weld population was susceptible to the same type of error and we corrected that number as well.

In the end, the sample size that is required for the Aging Management Program did not change for the small-bore butt weld population.

MEMBER RICCARDELLA: But you do have an Aging Management for the socket weld?

MS. KOVALESKI: Yes, we do. Yes, we do and we comply with the GALL requirements for that program.

Next slide, please, Andrew?

And Mike Hoehn will discuss this last open item.

MR. HOEHN: Thanks, Sarah.

This last open item is related to a GALL Rev. 2 requirement for performing a founding assessment of environmentally assisted fatigue on our reactor coolant system pressure boundary.

And as a result of that language within GALL Rev. 2, we worked with EPRI to develop a methodology to perform a screening approach for environmentally assisted fatigue.

Some questions that were raised and that were addressed through this open item were materials that were compared to equivalent materials. We don't have a Mullally steel one not bound a stainless steel component within the screening criteria that's applied.

From the level of rigor standpoint, we don't have an elastic plastic compared to a linear elastic analysis from a fatigue usage calculation standpoint.

And then within thermal zones, for example, pressurizer locations are compared to the pressurizer steam generator compared to steam generator, RCS compared to the RCS. So we don't have another thermal zone bound to another thermal zone.

As a result of this, we came up with 22 locations. Those 22 locations include the NUREG/CR-6260 locations and we will manage those under our Fatigue Management Program into the period of extended operation.

MEMBER RICCARDELLA: Twenty-two locations

that are what, that are projected to exceed usage factor one or?

MR. HOEHN: No, those are locations that are sensitive within those thermal zones to environmentally assisted fatigue. We see them as leaders that will bound the other locations within the reactor cooling systems pressure boundary into the period of extended operation.

MEMBER RICCARDELLA: And you have a monitoring program?

MR. HOEHN: We monitor them with a fatigue probe software.

MEMBER SKILLMAN: Isn't the term sentinel locations, isn't that what you were trying to say to Pete?

MR. HOEHN: Yes, that is correct, sentinel locations, yes.

MS. KOVALESKI: All right, thank you, Mike.

And, Mr. Lubinski allude to there were several issues that came up after the SER with open items was published and we have those listed here on this slide.

The first was a request to address industry operating experience related to clevis bolts

and we did address that issue.

The next two are related to issuance of license renewal interim staff guidance documents and we did fully address those LR-ISGs.

And the last one was a question related to loss of material and loss of preload in submerged bolting and we addressed those questions as well after the SER with open items was published.

At this point, I'll return it back to Dave.

MR. NETERER: As Mr. Wink talked about, we've done a lot of equipment improvements over the last ten years of plant operation to prepare the plant for continued operation for 30 more years.

We've learned a lot through the license renewal process, specifically in the area of aging management. We've institutionalized and internalized aging management through the use of training, operating experience, new programs and the strongest one is in our people.

There's a real strong program ownership of the group that Sarah formed to go through the license renewal process. It involves a lot of young newer engineers and the beauty of those young newer engineers have internalized this and they're going to

carry this forward in their career at Callaway plant and we see that every day. It's really been a team sport getting to this point in the license renewal process.

So, I'm really proud of the team and the way we're handing aging management.

So, I'll appreciate any questions and comments, appreciate any input.

That concludes our presentation.

CHAIRMAN STETKAR: You're gotten off tremendously easy, so I'm going to make your life a little bit more miserable.

MEMBER CORRADINI: He's trying to make up to somebody for what happened to him this morning.

CHAIRMANED STETKAR: I'll try to be nicer, though.

We have a number of members here that didn't attend the subcommittee meeting. So, I wanted to let you get through the presentation here.

Could you elaborate a little bit more for the benefit of the members who weren't at the subcommittee on the story of stud number 18 of how we got to where we are and what you're going to about it? I don't know how much we're going to hear from the staff about the stud, but we had quite a bit of

discussion in the subcommittee meeting about it.

MS. KOVALESKI: Yes, we can elaborate on that. Let's -- do you want to start with that and we'll --

CHAIRMAN STETKAR: As soon as you back up slides.

MS. KOVALESKI: Yes, yes. Let's go to Slide 47, please?

MR. NETERER: So, the history of this, this stud stuck in 1996 and we couldn't get it out, obviously, it's stuck. So, it was evaluated and did a cause analysis and, as you can see there, we have adequate thread engagement so we can fully tension the studs so we meet all the ASME requirements.

The stud is in a location that it cannot -- it does not interfere with fuel transfer which is a significant risk if it is. So, that's not a problem.

Go to the slide that shows the encapsulation.

MR. KOVALESKI: Forty-nine.

MR. NETERER: So, when we do refuel, let me get to the status. For refuel, we put an encapsulation over the stud and it's pressurized, that keeps any boiling water out, so there's not a boric

acid concern on the carbon steel stud.

So, why are we removing it? What we learned through the license renewal process in aging management, we really don't know the condition of the stud threads that we can't see. So, with that fact alone, it's prudent to go take the stud out and we do have that scheduled for refuel 23 which is four and a half years from now, scheduled to get ready to, you know, gear up to do it.

You may as why we're not doing it with the refuel starting this month. We're not geared up to do it, there's more risk with the exposure wise and damage to the reactor vessel plans to try to do it on short notice. This needs to be a well-planned out evolution to get that stud removed.

So, that's why it's there now and that's why we're not taking it out for three and a half years beforehand.

MEMBER RICCARDELLA: What is the removal process?

MR. NETERER: I don't know that.

MEMBER RICCARDELLA: Machining it out? I mean, in a nutshell?

MR. KOVALESKI: We have not applied any excessive force to this stud since the time it became

stuck so the first effort will be to see how freely it turns. However, there are destructive techniques that we will also be ready to employ.

MEMBER RICCARDELLA: And then rethread with a bigger hole or something, I would guess?

MS. KOVALESKI: That would be one possible option.

MR. WINK: That's the least desirable option because you're going to introduce these other problems doing that.

Go ahead, Dave.

MR. GROSS: I was just going to add a couple of things for you. The original lessons learned from the stud damage, the thread damage in the early '90s was to avoid excessive force when the stud appears to be stuck. So, it may well be possible with the, you know, additional lubrication, application of slightly more force to be able to turn the stud out without having to machine it out.

The machining out would be, you know, the next common step which would typically involve putting a giant drill press on the upper flange and drilling about five feet worth of low alloy steel out of a core and then pulling the coil of thread out and cleaning up the remaining damage.

And then if that damage is too much, the next step beyond that would be an insert into a larger hole.

MR. NETERER: Does that answer what you were --

CHAIRMAN STETKAR: Yes, thanks. As I said, we had quite a bit of discussion about it during the subcommittee meeting. It's certainly an interesting topic.

MR. WINK: I think that's pretty much --

CHAIRMAN STETKAR: I wanted to make sure that other members had an appreciation of --

MR. WINK: I think that's everything we covered there.

CHAIRMAN STETKAR: -- what you have. Yes, thank you.

MEMBER SKILLMAN: Let me ask a question or two.

Back when we met in May, you were going to embark on a cathodic protection system modification. Did that have to do with long term health of clear typing and conduit? What is your status of that, please?

MR. WINK: I'll take that, Sarah.

We had the modification that is going in.

It will be completed by the end of 2015. That modification does a number of things for our cathodic protection system.

It will bring it fully in compliance with the NASE standards. But we are installing some additional heat welding anodes as well as we're going to supplement some deep welds with some additional anodes and also add intestations and rectifiers. All that will be done to get our entire piping system that is cathodic protected up to the reliability and availability standards that are governed by the NASE standard. 2015 is when that modification will be completed.

MEMBER SKILLMAN: And why should be comfortable with not having that installed now? It gives you, if you will, a configuration, and underground configuration that is acceptable. So the question on the table regarding life extension.

MR. WINK: A number of the piping systems that we're talking about, you know, we currently have existing adequate cathodic protection. We want to just add additional design margin.

We've inspected a number of those piping systems, you know, over the year. We've had an opportunistic opportunities to go inspect these piping

systems and they've been fine. We've not seen any problems.

MEMBER SKILLMAN: Have you had any leakage at all in the varied pipings?

MR. WINK: Varied piping on a central service water, we have had some leakage there, but that was not from cathodic protection problems, that was from lack of biological influence corrosion from the ID, so we've replaced all that varied piping with central service water with the exception of some small sections that run from our strainer back to the pond.

But one of the supply return piping had been replaced with high density polyethylene pipe.

MEMBER RICCARDELLA: But you've had no leakage related to the cathodic protection, the external?

MEMBER NETERER: Not the external, that's correct.

MR. WINK: That's correct.

MEMBER POWERS: You indicated you replaced one varied piping with this polyethylene material, but you're staff has limited experience with this or extensive experience with this?

MR. WINK: Difficult to put that in that category. We do have, I'd say a moderate amount of

experience with that. We installed, prior to our circulated application of high density polyethylene pipe, we installed roughly six miles of that piping in a non-safety related application from our cooling tower down to the river.

So, we had that, you know, internal operating experience on how to construct those and infuse those joints and install that piping. So we used those individuals as well as some additional qualification processes for our safety related activity to install that piping from our central service water pump house to the power blocking vac.

MEMBER POWERS: I mean, how much experience do we have with this thing for the next 30 years?

MR. WINK: That piping material has been in use in other industries for many, many years. It's a very reliable piping. It's extremely well suited for a raw water application such as this.

MEMBER POWERS: Yes, they said about the central water piping when they put it, too, originally.

MR. WINK: Those problems were due to our lack of being able to adequately chemically treat that piping. It's basically a stagnant set of piping that

was very difficult to treat. The HDP piping, we don't have those issues.

MEMBER POWERS: You don't have issues, but there are undoubtably other issues.

MR. WINK: There could be and we have, as the part of the aging management program for the high density polyethylene piping will be periodic inspections.

MEMBER SKILLMAN: Another topic in the May meeting was mitigation, PWSEC mitigation, in reactor vessel module and bottom mounted instrumentation. What is the status of that, please?

MR. NETERER: Mr. Hoehn, would you like to address that?

MR. HOEHN: Yes, I'll take about it again.

Mike Hoehn, Supervising Engineer.

We are currently pursuing a surface RES improvement technique for our bottom mount instrument nozzles and to similar amount of butt welds off the rear of the vessel for outlet for inlet nozzles. And that surface RES improvement technique is water jet painting. And we're currently planning on applying that in Region 22 which is in the fall of 2017.

MEMBER SKILLMAN: Thank you.

MEMBER RICCARDELLA: He said the bottom

head nozzles as well as the --

CHAIRMAN STETKAR: Make sure they pick you up.

MEMBER RICCARDELLA: I'm sorry. You're applying that to the bottom head nozzles as well as the pipes?

MR. HOEHN: Correct. The disassemblement amount of welds on the inlet/outlet nozzles and then the J welds on the bottom head and the alloy 600 tubes on the bottom head as well.

MEMBER SKILLMAN: I have no more questions. Colleagues, might any of you have a question for the Callaway team, please?

MEMBER SHULTZ: I have one question. On Slide 14 associated with the total number of commitments and hoping that you may be able to, on the bottom line here indicates there's 34 associated with Aging Management Programs.

Sarah, could you characterize those somewhat for us in terms of the types of commitments that are still outstanding?

MS. KOVALESKI: The types of commitments that we have not yet implemented?

MEMBER SCHULTZ: Yes.

MS. KOVALESKI: Go over that, I think Eric

Blocher could provide some specific details on some of those as examples.

MR. BLOCHER: Eric Blocher, STARS Alliance.

The 34 AMP commitments, in just broad categories, there are eight of them in there associated with new AMP, Aging Management Programs yet to be implemented.

Approximately half of that number deal with consistency with GALL, in other words, GALL has a certain requirement or a certain inspection technique that is required and it's bringing up that particular AMP to that.

And there are several, like for example, the condition that we talked about with the studs that's tied to the head stud AMP deal with material improvements.

Those are the broad categories.

MEMBER SCHULTZ: And you indicate those are going to be managed by the commitment tracking system? Are those currently -- is that current populated in the system?

MS. KOVALESKI: There are templates that are entered upon receipt of the renewed operating license. We would enter those into our commitment

tracking system for formal tracking.

MEMBER SHULTZ: Okay, good. Thank you.

MEMBER SKILLMAN: Colleagues, any other questions for the Callaway team? If none, thank you and now we'll hear from the NRC staff.

MR. DAILY: Thank you, Mr. Chairman. We need to load our back up slides on here in case they might be needed so it might just take us a minute.

MR. LUBINSKI: If I can, this is John Lubinski, again.

I'll do the introductions while John and Andrew are getting ready.

At the table this afternoon, we're going to have John Daily, he's the Project Manager in DLR for the Callaway license renewal application.

We also have Manny Sayoc who's a Project Manager in the Division of License Renewal also.

One of the fellows I mentioned earlier, we have Greg Pick, Inspector for Region IV will be available to answer questions may they arise.

We also have many members of our management teams as well as our technical staff in the audience today in case questions do arise with respect to the issues.

What you'll find this afternoon is our

presentation and agenda is relatively similar to what you heard this morning talking about five open items as well as the three additional items that arose and how they were closed. Many of them have detailed discussion at the subcommittee meeting and we're more than willing, as John said, he's putting back up slides in place if there were more questions or details that you would like to hear that were discussed at the subcommittee meeting.

With that, I will turn to John Daily to start the staff presentation.

MR. DAILY: Thank you, John. And thank you Commission Stetkar and Mr. Chairman and Mr. Skillman and members of the ACRS Committee.

My name, as I said, my name is John Daily, I'm the License Renewal Project Manager for the Safety Review for the Callaway plant Unit 1 project. And, as mentioned, we're here today to discuss the review of the Callaway license renewal application as documented in our Safety Evaluation Report which was issued, as we mentioned, on August 21st of this year, 2014.

Also seated out in the audience, I think we mentioned before, are members of the technical staff who participated in the review of the license renewal application and I really want to thank them

for all the work that they have done. They have done the heavy lifting. They put the hours in for all of the reviews and I just want to make sure that, you know, that we mention them as well in our presentation here today.

Next slide?

This slide is just an outline overview of the items that we plan to discuss. After a brief overview, we'll discuss the closure of the five open items. We'll also discuss closure of the items that arose after the SER with open items was issued.

And then present the staff conclusions of the safety evaluation.

Next slide?

This slide here is just a presentation of some the activities that have happened in the recent past. Of course, the SER with the open items was issued in April of 2013. A License Renewal Subcommittee meeting was in May of this year.

We will mention here that all open items for the SER have been closed in the staff's opinion and they're all represented here in the final Safety Evaluation Report.

Next slide?

Going in, first of all, to the first open

item, the scoping of fire protection, structures and components. We reported during the subcommittee meeting on this open issue related to the scoping of systems, structures and performance, or SSCs, as a result of the applicant's adoption of an NFPA 805 Fire Protection Program into its current licensing basis.

Particular SSCs which were, for example, in the auxiliary boiler room, the Turbine Building, hydrogen seal oil unit and the condenser pit which originally had been omitted from the scope of license renewal and upon the staff's question and the applicant's subsequent responses, the applicant has added those back into the scope of license renewal to be in accordance with the plant's CLB.

The applicant also was able to identify and address in an acceptable amount of details the differences in the license renewal application between its pre-NFPA 805 CLB as documented in the original application and the now current NFPA 805 Fire Protection Program which was recorded and evaluated by others of the NRC staff in the safety evaluation produced for that. That safety evaluation was published in January of this year.

The staff reviewed the applicant's gap analysis and, as concluded, the applicant

appropriately identified these changes associated with its NFPA 805 transition.

And Ameren Missouri has also informed us that all of their NFPA 805 enhancements are now actually implemented and in place. So this means that in the event of the license decision and renewed license being issued by the staff, that entire NFPA 805 program will be there and will be in place and operational.

So, that's actually good news because when you have two things in parallel, sometimes it's a little hard to make sure that everything gets implemented appropriately, so we were glad hear that those things are already in place.

CHAIRMAN STETKAR: John, did -- I probably should have asked Callaway folks about this, but I just thought about it.

This is issued in the sense of scoping of the fire protection SSCs. Now, some plants, for example, in their transition to NFPA 805 have made improvements to their fire detection protection systems but they've also, as part of that process, included other equipment in the plant for mitigation of fire events.

I'm talking about, perhaps, non-safety

related equipment, charging pumps, for example, and I don't know whether any equipment like that -- it's not necessarily fire protection equipment, but it's included as part of mitigation to fires under the Fire Protection Program NFPA 805.

Has any of that type of equipment -- in other words, non-fire protection equipment but other SSCs that were not formally in the scope of aging management been added?

MR. DAILY: That's a good question, Mr. Stetkar and actually, I don't have all of the components memorized, but then I do recall as a part of the evaluation that our staff did, there were certain elements, for example, in the circulating water system which were not in scope before for anything.

But since they were a part of an ultimate cooling path and water supply for the fire protection system, those got incorporated into the scope of license renewal. And in addition, there were some concrete pads and components associated, I think, with the nitrogen storage that were also placed in those situations.

And we had discussion with the applicant as far as where they should and the applicant was able

to confirm that they had them in appropriate programs.

So there were some in that that I do recall.

CHAIRMAN STETKAR: Thanks.

MR. WINK: Roger Wink, Callaway Supervisor in the Plant Life Extension.

John, did hit on a couple of changes that were a result of NFPA 805 and, as you know, it's a PRA based fire protection system. As a result of that, there were a number of non-safety related components like our non-safety auxiliary feed water pump that was recently installed to back up these locations.

Also, we've installed recent -- a couple of years ago, an offsite diesel generator for 8 megawatts that can power either of our AMB 01 and BO 2 safety light switch fear buses.

So, yes, there are a number of non-safety related components.

CHAIRMAN STETKAR: And that's -- thanks, that helps because that's exactly the types of equipment that I was looking, the not necessarily directly fire protection related but something that because of the transition were in support.

MR. WINK: Yes, thank you.

MEMBER SKILLMAN: Let me make sure this is

clear in my mind because I tried to capture this in the draft letter that the members will use here in a few hours.

There are really two issues here. One is the population of items that were not in scope that got brought into scope.

The second item is your LRA, your license renewal amendment for 805.

And while those are cousins, they are distinct and different actions. Is that accurate?

MR. DAILY: That is correct, Mr. Skillman.

And the first issue, as I recall, and we could maybe ask the staff to clarify if I get off base here. But the first issue regarding components, for example, that were in auxiliary boiler room. Turbine Building, et cetera, those were discovered through our review. The staff felt that the current licensing basis documents actually had them in scope and yet, they were not included. And that was one of the hurdles that we were interested to make sure that that got taken care of as well as the transition to 805 itself.

MR. SKILLMAN: Okay. Now, for that population that previous that were not in the scope and were brought into scope, were those brought in as

a consequence of the gap analysis?

MR. DAILY: I don't believe so, but maybe Naeem Iqbal could --

MR. IQBAL: Naeem Iqbal, NRR.

And some of those systems are in the scope in the original license basis. As a result of the NFPA 805, those systems are in scope now.

The majority of the systems in the Turbine Building, auxiliary boiler room that John mentioned, those systems are out now. Before those systems were in because of the SER licensing risks.

MR. SKILLMAN: Okay. So, there was an SSC count, some came in and some came out? That was distinctly different than the LRA for NFPA 805. That was a different effort?. They're kind of included, they're kind of married or cousins, but they are not the same effort. That's the point I'm making.

MR. DAILY: I think the SER evaluates it in that respect. There are two phases to --

MR. SKILLMAN: Yes, I think so, too. And that's how I try to construct the work that we will do in a few hours.

MR. DAILY: In the letter?

MR. SKILLMAN: Yes. I'm just trying to make sure I've got my thinking.

MR. DAILY: The first things -- and actually, while the 805 evaluations were going on, both by our own staff as well as by, you know, the applicant in response to RAIs, at that time, we also had the question regarding those other components in the Turbine Building areas I talked about, hydrogen seal oil, you know, condenser pit and so forth.

And the applicant did agree that under the current status at that time, that they should be in and so they incorporated them into scope. Then upon the overhaul, I believe, during the 805 those get looked at again because you're transitioning your actual current licensing basis foundation to this new program. And some of them, as Naeem had mentioned actually get ruled out because they didn't perform an 805 function.

MR. SKILLMAN: Thank you.

MR. LUBINSKI: If I could, Mr. Skillman, John Lubinski.

MR. SKILLMAN: Yes, sir, John.

MR. LUBINSKI: As you mentioned, just from an acronym in the terminology here, make sure we're all on the same page.

When we talk about a license renewal application, we usually refer to it as an LRA, license

renewal application. When we're talking about something such as the NFPA 805 review, that was a license amendment request. So, we're -- it's an LAR, so that's the -- and as John's saying, that would be the amendment to the current licensing basis.

Typically, for most of the applications, a major license amendment request is reviewed and completed and approved prior to us initiating a license renewal application and, therefore, most of that scoping type discussion would be clear from when the application starts.

In this case, they were running a bit in parallel and that's why the gap analysis was needed to verify what should have been in the scope from that current licensing basis.

CHAIRMAN STETKAR: And it's going to happen. I haven't done a body count yet, but it will be based sort of situations, license renewal and NFPA 805 because I suspect that some plants that'll already have their licenses renewal will then change their licensing basis for fire protection and they'll eventually get the license amendment under NFPA 805 and then we'll have to go through this process to scope in and scope out additional equipment.

MR. LUBINSKI: The licensing will do that.

There will not be a separate amendment to the license renewal, if you will, because that'll just be part of the license amendment request process and we will look at that as part of that NFPA 805 review.

MEMBER SKILLMAN: Thank you for the clarification. Okay, go ahead.

MR. DAILY: Next slide then.

This is slide is why it was closed based upon those details that the applicant was able to provide.

In the license renewal application, the applicant submitted a total of 42 Aging Management Programs, 32 of which, by the staff's count, are existing and ten of which are new. No plant specific AMPs, or Aging Management Programs, will provide it.

These 42 AMPs were evaluated then by the staff for the consistency with the GALL Report and as Ameren mentioned, this was GALL Report Revision 2.

This table here shows how a breakdown of the programs as we evaluated them and report them in the SER.

So, on the basis of that and on the basis of the audit and review, the staff concluded that all of the AMPs present in these programs, especially when accounting for Ameren's commitments that they had

promised for enhancements and exceptions, all of these programs will adequately manage the aging effects for the SSCs for which they have been incorporated for and that the actual SSCs in those programs are appropriate as well.

MEMBER SCHULTZ: John, I see how your numbers add up. There has been some confusion as to how the numbers should be presented with regard to the consistent with enhancement and so forth.

And I'm just looking at licensee's Slide 14 and they've got 16 enhancements and five exceptions to GALL. Is there some reason why that's different from what you're showing here? Or do you count it differently in some box there?

MR. DAILY: We are counting a little bit differently from the applicant and that is a good question.

And so, one of the things that we have historically done is tried to break it down into various categories. These are the ones that seem to make sense from, you know, some of the history that, as we look at programs.

Now, what the applicant have, you know, if they don't mind me kind of interpreting their slide a little bit. When they reported 16 enhancements, they

were recording that out of all of their programs, 16 of the programs were identified for them as needing an enhancement and that five of them were identified as needing an exception.

The first thing that comes to mind is what if a program needs both a consistent -- both an enhancement and an exception? And of course, they would show up separately there as opposed to here we're showing in a separate bin.

I'll also mention the fact that, in this particular case, Ameren has been fairly proactive in actually tackling some of the commitments that they've made to the, you know, made to us.

Typically an AMPs commitment to enhance or revise it is agreed to be in place prior to the period of extended operation.

And so, what we have here in the numbers that we show, there are a handful, I think it's three or four perhaps, that Ameren has basically, in their opinion, they've completed it and so, therefore, the enhancement has gone away because it's already in there.

However, on the staff's part, we typically evaluate that during our inspection processes which will follow. And so here, what you see is what the

staff has evaluated and how we presented it. And we've actually identified it down to that and had some discussions with them just to make sure nobody was missing something in this, you know, in this regard.

But I think that that actually can account for the differences that we see.

MEMBER SCHULTZ: That certainly sounds as if it does. I appreciate that explanation and it makes it clear. Thank you.

MR. DAILY: You're welcome.

So, if there are no other questions on this slide, let's go to the next.

This particular open item, B2.1.2.3-1, is related to the reactor head closure studs and the associated reactor vessel flange threads.

As we reported during the subcommittee meeting, several reactor head closure studs have experienced difficulties in insertion and/or removal. And I know I'm going over a little bit of some of the things that have already been discussed.

But just completenesses sake here, the applicant had recorded thread damage in ten out of the 54 flange hole locations. There's 54 that go around the, you know, the circumference of the reactor vessel. And in addition to that, one closure stud,

stud number 18, is currently stuck and has been stuck partially inserted since 1996.

The staff is concerned that these existing reactor head closure issues and their reactor head stud bolting program, the program may not be adequate for detecting future wear or loss of materials and may not adequately ensure that appropriate acceptance criteria are met and the allowable stresses under the ASME code, making sure that those are not exceeded during the period of extended operation.

Now, in response to that, then the applicant has provided proposed two commitments.

The first commitment would be to inspect as a one time inspection no later than six months prior to the period of extended operation.

They would inspect the six flange stud hole locations that have the most missing threads. And I think they had a table showing the ones and how many they missed, how many were either machined or ground down.

The staff believes that this inspection for those flange hole locations is necessary to verify that for these locations acceptable acceptance criteria would be met.

The second commitment would actually

remove stud number 18, so if you're counting, that's the 11th location that we would be dealing with here, and inspect to ensure, again, that their Aging Management Program can adequately manage the flange threads and the stud and this activity should take place no later than six months prior to the period of extended operation.

Since the stud now has been stuck since 1996, almost 20 years, and the number of engaged threads are close to the applicant's minimum acceptance criteria, the staff believes that these actions for stud number 18 are essential as well in order to establish that the appropriate acceptance criteria and ASME code allowable stress limits are satisfactorily met throughout the PEO.

Therefore, the staff has concluded, based on these changes to the program as noted, that we'll have reasonable assurance if these things are done and, to that end, and the high significance that the staff places on them, the staff has proposed the license commitment to ensure that these activities do take place.

And this is an example where a commitment becomes important enough that the staff believes that they should elevate it to an obligation as a license

condition.

Next slide?

Open item B21.1.6-1 is related to the applicant's Reactor Vessel Internals Program in the PWRs. We had reported to the subcommittee that the applicant initially did not really fully cover four of the various action items that applicants were supposed to address under the applicant action items in MRP-227-Alpha and that it also needed to respond to the operating experience concerning the cracking that had been reported in some clevis insert bolts by one domestic Westinghouse PWR.

The applicant's supplied that additional information and enabled a successful resolution of these remaining open action items. Basically in its responses from the period of May 2013 until April of this year, and in addition, they addressed the clevis insert bolt experience as well and the staff was able then to close this open item based upon these responses because they demonstrated acceptable conservative bases for meeting the MPR-227-Alpha implementation items.

Next slide?

Open item B2.1.20-1 now is related ASME Code Class 1 small-bore socket welds.

We're reported to the subcommittee that the staff discovered through the audit and review process of this Aging Management Program that the initially recorded quantity of ASME Code Class 1 small-bore piping socket welds appeared to be much lower than expected.

I believe at the time that we had mentioned that there -- initially there were 19 in the population and the staff just felt that seemed awfully low.

So, under response to the audit and the request for additional information, that number expanded, eventually settling out at a final count of 80 small-bore socket welds. And then from this 80 population which did fall then within the expectations of a four-loop PWR, the samples sizes then would be taken in accordance with the recommendations in the GALL Report and things would be adequate.

The staff is also concerned as to whether this type of error might have been replicated in another area and wanted to make sure that the applicant had entered it into their corrective action program.

The applicant responded that they had indeed done that and they went through scope

verifications for other similar issues to see if this had arisen there and did identify a small increase in the small-bore butt welds. I believe it was from the high 330s up to about 343 and the final count that they had given us was 343 of the small-bore butt welds.

In this particular case, the sample population size was not impacted, whereas, obviously, it would have been impacted for the small-bore socket welds.

The staff, though, felt that its concerns had been answered and due to the applicant's actions and the applicant's recounts and the confirmation and the corrective actions that were taken, the staff is able to close this open item.

Next slide?

Open item 4.3.4-1 is related to environmentally assisted fatigue of reactor coolant pressure boundary components.

And again, we reported during the subcommittee meeting that the staff had identified a few questions on the methodology that the applicant used in the EAF analyses for these components that are subject to environmentally assisted fatigue.

We also reported that the applicant

supplied additional information during April and August of 2013 and the RAI responses documenting the assumptions in the methodologies and was able to demonstrate that its evaluations for the environmentally assisted fatigue were sufficiently rigorous and were acceptable for a plant such as Callaway.

In addition, the applicant reported that it enhanced its Fatigue Monitoring Program to ensure that these EAS susceptible locations would be updated appropriately and remain bounded consistent with any updates that they might do during their analyses.

Therefore, staff has concluded that the applicant has justified approach and the locations that require monitoring for EAF of the reactor coolant pressure boundary during this period of extended operation.

Next slide?

Several issues had arisen between the issuance of the SER with open items and the ACRS subcommittee meeting and, as mentioned, we brought some of them to the attention of the subcommittee in the discussion at that time in May.

And we would like to then just kind of reopen in the discussion here on that and mention that

they have been totally resolved.

Now, the staff issued RAIs to address these. The responses that came in, two of the issues were related to new staff -- interim staff guidelines.

And then one issue came about as a result of the applicant adding some components to the scope of license renewal which raised the question of an extra aging effect.

And we'll talk about these three things now in the next three slides.

Next slide, yes.

We reported based on industry operating experience recently that the staff had identified issues related to managing loss of coating integrity due to blistering, cracking, flaking, peeling and physical damage to the internal coatings of piping systems and components.

In addition to causing obvious degradation problems for those components problems for those components themselves, any coating fragments which break free could, obviously, float downstream and block or foul or damage downstream components as well.

Ameren Missouri responded to these RAIs related to these loss of coating integrity issues and provided additional information with responses such as

the following.

It revised multiple Aging Management Programs to make sure that it included internally coated end scope components. It incorporated periodic visual inspections of these coatings. Incorporated coating acceptance criteria and in addition, established personnel qualifications and testing that was consistent with Reg Guide 1.54 which has to do with Service Level 1, 2 and 3, protective coating training applied to nuclear plants.

So, based on this extra information and the actions that the applicant was able to take on these programs changes, staff considered this issue to be resolved.

Next slide?

Based on, again, recent operating experience and staff reviews, the staff had reported identification of some issues not necessarily covered by the existing guidance at the time related to aging management of internal surfaces of components and atmospheric storage tanks such as recurring internal corrosion, flow blockages from corrosion in fire water system piping is another example that had come up.

Corrosion insulation, particularly of tanks or coatings of systems that where they operate

either outdoors or indoors but below the dew point. There are some issues that could arise, for example, underneath the insulation there.

Ameren Missouri responded to these associated RAIs and addressed the staff concerns including such items as we show here on the slide adding several tests and inspections for detecting internal corrosion, augmenting some of the existing tests and inspections for the wetted but normally dry piping which is not easily drained and that refers, I think, specifically to some Fire Water Part Protection Systems, there's some piping runs that are difficult to drain, so we wanted to make sure that those were taken of.

Added and revised periodic inspections of outdoor insulated and indoor insulated components that might be operating below the dew point from time to time and modified an enhanced several of their Aging Management Programs.

So, based upon the applicant's responses and the program changes that they were able to supply, the staff considers this issue resolved.

Next slide?

The final topic that came up which we'll bring forward here is the one that we reported in the

subcommittee meeting concerning an LRA amendment in August of last year where Ameren Missouri added some AMR items for some submerged carbon steel and stainless steel closure bolting that was associated with pumps and pump casings in submerged systems.

We know that in these cases, more information would be needed in order to clarify that and make sure that the correct parameters are being monitored and the correct inspection techniques are being done for these closure bolts and that actions could be taken on them since now they were added into scope.

Particularly in view of the fact that in a submerged water environment, you don't get many -- I mean sumps and, you know, pits like this, you don't get many opportunities to do that, so we wanted to make sure that those things were taken care of.

Ameren Missouri provided several response that, in combination, the staff agreed would be acceptable for identifying this bolting degradation prior to loss of intended functions.

These things included such things as periodic inspections of the bolt heads during dewatering of the environment and inspecting the bolt threads during pump and pump casing disassembly

maintenance evolutions as well as operator monitoring of the pumps and the pump performance during operator rounds to ensure that, you know, if the pump's operating, you should be seeing flow, you should be seeing the sump level going down, you see a pump just running and all the water flowing out some kind of break in the casing because you've forgot to look at the casing bolts.

So, basically this issue then is considered resolved based upon the additional information there that the applicant was able to put on the record for us.

Next slide?

This is our conclusion. The staff's concluded on the basis of this review that we can determine that the requirements of 10 CFR 54.29(a) have been met for the license renewal Callaway plant Unit 1 and that speaks of the fact of actions being identified and have been or will be taken with respect to the matters identified here and such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB and that any changes thereto would be made in order to comply with the Atomic Energy Act and the Commission's regulations.

This concludes our presentation from the staff and I would just to ask if there might be any questions that we might have to clarify.

MEMBER POWERS: You mentioned someone this loss coating integrity and mentioned that they will help.

Do you understand why they're losing coating integrity?

MR. DAILY: I don't know if we have a staff member here but this was a generic issue that has been occurring several plants. Maybe Bill Holston might want to maybe speak on some of the history of that.

MR. HOLSTON: Yes, Bill Holston, the Division of License Renewal Staff.

I believe I couldn't quite hear you question. I think you asked me if we saw any operating experience at Callaway of loss of coating integrity.

MEMBER POWERS: It was one of the questions of why and this is a generic issue about the loss of coating and I wondered if we knew why Callaway in particular was losing coating integrity?

MR. HOLSTON: Callaway, when we reviewed their operating experience, actually did not have any

end scope components that were experiencing loss of coating integrity.

What we did was, though, we saw in a couple other plants and as a result of seeing it at a couple of other plants or enough other plants and enough operating experience based on our review, we developed recommendations associated with that and they addressed that in the response and so they'll ensure that they won't, you know, suffer any consequences if it occurs in the future.

MEMBER POWERS: Okay, I misunderstood, thank you.

MR. DAILY: Okay, thank you, Dr. Powers.

MEMBER BALLINGER: This loss of coating thing that's prompted me to think about something else which hasn't been discussed and that is the interface between the electrical cable systems and conduits where you can get varied conduits corrode and thereby get water access to cables which are not certified as being submersible. Has that issue been thought about and covered in an Aging Management Program?

MR. DAILY: We do have that in an Aging Management Programs and I'm not sure if we had an electrical representative with us this afternoon, but typically, in the inspection of cables and connectors

for underground and inaccessible components, I know that's come up in some other applications.

And this is typically visited during the AMP audits when some of the members of our staff actually go to look at some of the bolts and some of the manholes that may have safety related systems and they look for evidences of that.

MEMBER BALLINGER: But the first indication of something that's happening underground that you can't look at is you get, you know, problems with voltages and things like that.

MR. DAILY: Right.

MEMBER BALLINGER: So, you look in the cabinet, you don't see anything but the conduit underground has now become submerged for some reason. It wasn't certified as being submersible and now you get degradation of the insulation on the cable and you start to get issues.

MR. DAILY: Right.

MEMBER BALLINGER: Is that covered?

MR. DAILY: Right, and that is -- I wasn't talking about the cabinets themselves, I was talking about we call them underground or inaccessible cables and I know on the basis of plant -- I did not go on this particular AMP audit, but I know that on a

routine basis, that is not only visited during the AMP audit, but then it's written up.

There were some issues that our electrical branch and design engineering here at the agency concerning treeing and other insulation breakdowns. So we looked for the precursors and typically, the first place you might find that is in a manhole or a vault where the sump is not working or it's not being monitored and it routinely fills up whether it's with water, rain water, ground water.

Those are the types of things that we do look for and --

MEMBER BALLINGER: Okay, I was --

MEMBER SKILLMAN: John, could we ask Mr. Pick? Greg Pick should be online.

MR. DAILY: We could. We've got Greg from Region IV and that might be the inspection. I think from the applicant there's -- Eric, maybe if you wanted to speak and then we can turn it over to Greg and he can talk about what they found in our inspection.

MR. BLOCHER: Eric Blocher, STARS Alliance.

We have an Aging Management Program that's currently an existing program with some enhancements.

It's the Inaccessible Power Cables AMP. In that AMP, there's pieces to it.

The first piece is to periodically inspect the cable manholes for watering. Callaway's in a situation where we have recently completed a modification of the non-safety related manholes that automatically pump them down when water appears in them. So they are dewatered with an automatic pumping system. There is modifications being evaluated for the safety related manholes.

The other part of the AMP, in addition to dewatering and periodically checking for water in the manholes is periodic inspection of the cables in those manholes for degradation.

MEMBER BALLINGER: Okay, but what I'm is thinking about is something's got to be different. You have a manhole here and a manhole here and cable that runs between them underground. Water gets access to the conduit between the two manholes, perforates the conduit and you get water access to the cable that way.

MR. DAILY: Which would be question, I think, if I understand you right, we would characterize that as buried cable.

MEMBER BALLINGER: Oh, okay.

MR. DAILY: Because that's cable that would have direct, where the conduit has direct communication with the ground.

Now, I don't know Callaway's situation but there's also what we call underground cable which is underneath the ground but it's in a controlled environment such as a pipe chase or something larger than that.

MEMBER BALLINGER: I guess I used the wrong terminology, I was referring to buried cable.

MR. DAILY: Buried cable? Okay.

MR. BLOCHER: It would be inaccessible cables. AMP does cover that and the water that would enter the conduit as you described from a corrosion event would drain to the manholes.

MEMBER BALLINGER: Okay. And the way of monitoring, you said you've gone to some that are automatically pumped out. Is there recording of that so you know water's been coming through it somehow that you've cased in?

MR. BLOCHER: There is a control panel at each of those non-safety related manholes that has a high level alarm indication as well as runtime hours on the pump which are trended.

MEMBER-AT--LARGE BLEY: So, you can see if

it's been running?

MR. BLOCHER: Correct.

MR. DAILY: Greg Pick, if you're on the line, I believe, he was the lead inspector for Region IV and he perhaps maybe might shed some comments on what they found during their license renewal inspection that may relate to this.

Greg, are you there, was there something?

MR. PICK: Good afternoon. Looking at the report, recall what we did on inspection. This part of our inspection, they were just in developing what they plan to do in their procedures and we reviewed what they had been doing and we didn't learn anything any different than what applicant and Mr. Blocher just explained.

MR. DAILY: Okay. So that was all in line with I think what we've been trying to explain there. Does that?

MEMBER-AT-LARGE BLEY: Yes, okay.

MR. DAILY: Does that answer your question there?

MEMBER-AT-LARGE BLEY: You've got to find water in the man before you know?

MR .DAILY: One of the other things that a manhole inspection does is you look for water marks

on the sides, I mean on the related guides, so if you see water marks on the side, water's been there. So that's all part of the -- a typical arrangement.

MEMBER BALLINGER: I'm just thinking about -- more about predictability of perforation over the next 20 years. In other words, is there any kind of predictability that -- is there anything that you can do to say to yourself, this is going to be safe, this is going to be okay for the next 20 years or you have to implement an Aging Management Program is what you're saying to verify that it's okay? I'm assuming that's the case?

MR. DAILY: Right, and typically that program, again, I don't have a lot of the details in front of me here but it would involved the inspections and perhaps insulation testing. Maybe Roger Wink might have something.

MR. WINK: Yes, Roger Wink, Ameren Missouri.

And outside the license renewal process, we also have a buried cable testing program that, depending on the shield, the design of the cable, we have to go through a Meggering retest periodically or some Tan Delta testing which we test the integrity of those cables routinely.

MEMBER BALLINGER: I'm prompted to ask these questions because a couple of weeks ago I witnessed a test where they dropped a 460 volt, 480 volt system into water and watched what happened. It was not pretty.

MR. WINK: I understand and Eric mentioned the modifications that we've installed to keep water out of our manholes and most of that is successful.

MEMBER RICCARDELLA: Is that conduit cathodically protected as part of your safety system?

MR. DAILY: Usually not.

MEMBER RICCARDELLA: Usually not?

MR. DAILY: Usually not.

MEMBER-AT-LARGE BLEY: I mean most -- I wasn't at the subcommittee meeting here, but the ones I've attended when they have a water problem it's in the water coming into the concrete manhole seeping through rather than coming through conduit. I haven't heard anybody talk about that before.

MR. DAILY: I'm trying to think back to my days in the utility world when I was -- because I've actually been on staff at a couple of utility -- a couple of nuclear plants.

Most of the time safety related cabling is not buried but it is vaulted or I'm just saying that

I don't know the particular --

MEMBER-AT-LARGE BLEY: In May we visited a power plant not too long ago and one of the talking points was this buried cable.

MEMBER STETKAR: You have to be careful to get the terminology right because there's buried cable and there's underground cable. What John is talking about is underground cable and my experience has been, I think most of the safety related stuff tends to be underground but not buried, although I've seen buried safety related cables also.

MR. DAILY: And I've also been present at closing of 41 60 volt breakers and the fireball that came out, again, was not pretty. So, I'm personally aware of some of those things. I don't know if there's anything more the committee might want to do on that.

MEMBER SKILLMAN: No. Members, colleagues, have you any more questions for the NRR staff, please? Going once, going twice.

John Daily, Manny, John Lubinski, thank you and Mr. Chairman, John, back to you, sir.

CHAIRMAN STETKAR: Thank you. Thank you very much. As a matter of procedure, I'd like to -- we have the bridge line open, is that right, Kent, if

we can get that open. Is there anyone in the room, members of the public or anyone who'd like to make any comments? If not, we'll just wait until we get the bridge line confirmed open to see if there's anyone out there.

It is open, I've been told that it's open. Could someone just do me a favor and say hello or something to confirm that it's open. It sounds silly, but that's the only way we have of confirmation.

PARTICIPANT: Hello.

CHAIRMAN STETKAR: Thank you very much. Now, do we -- given the fact we've confirmed this, are there any members of the public or anyone on the bridge line who would like to make a comment?

Nothing. Okay. Thank you very much and, again, I'd like to thank both the applicant, licensee, Callaway. I think it was a very interesting, informative presentation and as always, the staff. So thank you very much for a lot of hard work.

And we are actually adjourned as far as the record is concerned for today. We will reconvene -- we've got a lot of time. I'll give us a half hour. We'll reconvene at 3:00 and take up the letter writing on this topic. So, any of you folks from Callaway want to hang around and see what we have to say,

you're more than welcome. It's open.

(Whereupon, the above-entitled matter went off the record at 2:29 p.m.)

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United States Nuclear Regulatory Commission

Protecting People and the Environment

Advisory Committee on Reactor Safeguards
Full Committee Meeting

Safety Evaluation Report Regarding License Renewal for Callaway, Unit 1

October 2, 2014

John Daily, Senior Project Manager
Office of Nuclear Reactor Regulation

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Protecting People and the Environment

Presentation Outline

- Overview
- Closure of Open Items
  - Scoping of Fire Protection SSCs
  - Reactor Head Closure Studs
  - PWR Vessel Internals Program Applicant/Licensee Action Items (A/LAIs)
  - ASME Code Class 1 Small-Bore Socket Welds
  - Environmentally Assisted Fatigue on the Reactor Coolant Pressure Boundary
- Closure of items arising after the SEROI was issued
- Staff Conclusion for the Safety Evaluation

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Recent Milestones Complete

- Safety Evaluation Report (SER) with Open Items issued April 23, 2013
- ACRS License Renewal Subcommittee Meeting held May 22, 2014
- All Open Items (OIs) for the SER closed
- Final SER issued August 21, 2014

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SER Section 2 Open Item Closed

OI 2.3.3.20-1: Scoping of Fire Protection SSCs

- The systems, structures, and components (SSCs) incorrectly omitted from scope have been added back within scope
- Changes to LRA due to NFPA 805 Amendment request acceptably justified via a gap analysis
  - Provided details for NFPA 805 impact on SSCs and scope of license renewal
- This OI is closed based on additional details applicant provided for gap analysis and information on SSCs added to or removed from the scope of license renewal

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SER Section 3

3.0.3 – Aging Management Programs

- 42 Aging Management Programs (AMPs) presented by applicant, evaluated in the SER. Final SER accounts for changes and additions to these programs.
  - No plant-specific AMPs

AMPs	Total	Consistent	Consistent w/ Enhancement	Consistent w/ Exception	Consistent w/ Enh&Exc
Existing	32	12	17	1	2
New	10	7	0	3	0

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SER Section 3 OI B2.1.3-1 Closed

OI B2.1.3-1: Reactor Head Closure Studs

- Issue:
  - Thread damage in 10 out of 54 RV flange hole locations
  - One closure stud stuck partially inserted since 1996
- Applicant provided an acceptable approach to manage the aging of RV closure studs
  - Commitments to inspect flange holes with most missing threads
  - Commitment to remove stuck stud
- This OI is closed based on the applicant's commitments
- Staff has proposed a license condition for the renewed license

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SER Section 3 OI B2.1.6-1 MRP-227-A Closed

OI B2.1.6-1: Reactor Vessel Internals (PWR)

- Issue: Applicant responses to MRP-227-A
  - Applicant/Licensee Action Items not adequately addressed
  - Address clevis insert bolts Operating Experience
- Applicant supplied additional information
  - Adequately resolved the actions requested in all A/LAIs
  - Demonstrated that current ASME clevis insert bolt inspection methods are adequate for aging management
- This OI is closed based on the applicant's conservative basis for implementing MRP-227-A

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SER Section 3 OI B2.1.20-1 Closed

OI B2.1.20-1: ASME Code Class 1 Small-Bore Socket Welds

- Issue: Large discrepancy among successive population counts of small-bore socket welds
  - In addition, confirmation of no other counting errors in LRA
- Applicant conducted several re-counts and confirmed
  - 80 small-bore socket welds
  - 343 small-bore butt welds
  - No other occurrences of this type of counting error in the LRA
- This OI is closed based on the applicant's actions to confirm the number of welds

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SER Section 4 OI 4.3.4-1 Closed

OI 4.3.4-1: Environmentally Assisted Fatigue (EAF) in Reactor Coolant Pressure Boundary components

- Issue: Staff identified questions on methodology
  - Underlying assumptions
  - How various EAF values were compared
  - Validity of comparing EAF values for multiple systems/components
- Applicant supplied additional information in April 2013 and August 2013 responses
- This OI is closed based on the applicant's additional justification of EAF evaluations

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Issues Identified Since SER with Open Items

Several issues arose between issuance of the SER with Open Items and the ACRS Subcommittee meeting.

Staff issued RAIs to address these and received responses.

These issues have been resolved and documented in the final SER.

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Loss of Coating Integrity – Internal Coatings

Loss of coating integrity of internal coatings

- Can expose the base material and foul downstream components
- Response included:
  - Revised multiple AMPs
  - Incorporated periodic inspections of internal coatings
  - Added acceptance criteria for coatings
  - Clarified personnel training
- This issue is resolved based on applicant's program changes

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Internal Surfaces Corrosion and Corrosion under Insulation

Recurring internal corrosion, flow blockages in fire water systems, corrosion under insulation…

- Issues arising in recent industry OE (reference LR-ISG-2012-02)
- Response included:
  - Additional/augmented tests/inspections for fire water systems
  - Tests/inspections for flow blockages of wetted piping
  - Periodic inspections of outdoor insulated and indoor insulated components
- This issue is resolved based on applicant's responses and program changes

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Inspection of Submerged Bolting

Bolting associated with submerged pumps and normally inaccessible for inspection

- LRA amendment added bolting on submerged pumps in several systems
  - Staff had concerns regarding parameters monitored, inspection methods, and inspection frequencies
- Response included:
  - Acceptable approach to manage the aging of submerged bolting:
  - Condition monitoring of bolt heads when accessible during dewatering of the environment and of bolt threads upon joint disassembly during maintenance
  - Performance monitoring of associated submerged pumps
- The issue is resolved based on this additional information

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Conclusion

On the basis of its review, the staff determines that the requirements of 10 CFR 54.29(a) have been met for the license renewal of Callaway Plant, Unit 1.

Callaway Plant Unit 1
ACRS Full Committee Meeting – License Renewal

10/02/2014

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Dave Neterer
Site Vice President

10/02/2014

Callaway Plant Site

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REPRESENTING CALLAWAY PLANT

- Dave Neterer – Site Vice President
- Sarah Kovaleski – Director, Design Engineering
- Roger Wink – Supervising Engineer, Plant Life Extension
- Michael Hoehn II – Supervising Engineer, Engineering Programs
- Eric Blocher – Project Manager, STARS Alliance
- Andrew Burgess – Project Engineer, Plant Life Extension

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PERSONNEL IN ATTENDANCE

License Renewal Team
Sharon Merciel
Dave Shafer

STARS Alliance
Tony Harris
Jim Johnson
Ken Bryant

Fire Protection
Lee Eitel

Operations
Walter Gruer

Chemistry
Joe Howard

Reactor Head Studs
David Gross

Reactor Vessel Internals
Randy Lott

Metal Fatigue/TLAA
Dave Gerber
Brett Lynch

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AGENDA

- Callaway Plant Site
- Plant Milestones
- GALL Consistency and Commitments
- Closure of Open Items and Other Issues
- Concluding Remarks

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PLANT OVERVIEW

- Callaway Unit 1 is situated on a 7,354 acre site, with the power plant site area containing approximately 2,765 rural acres on a plateau ~300 feet above the Missouri River (located 5 miles south)
- Callaway is a single unit Westinghouse 4-loop PWR with a licensed output of 3,565 MWth
- Bechtel was the Primary A/E
- Daniel International was the constructor
- SNUPPS design (sister plant to Wolf Creek)

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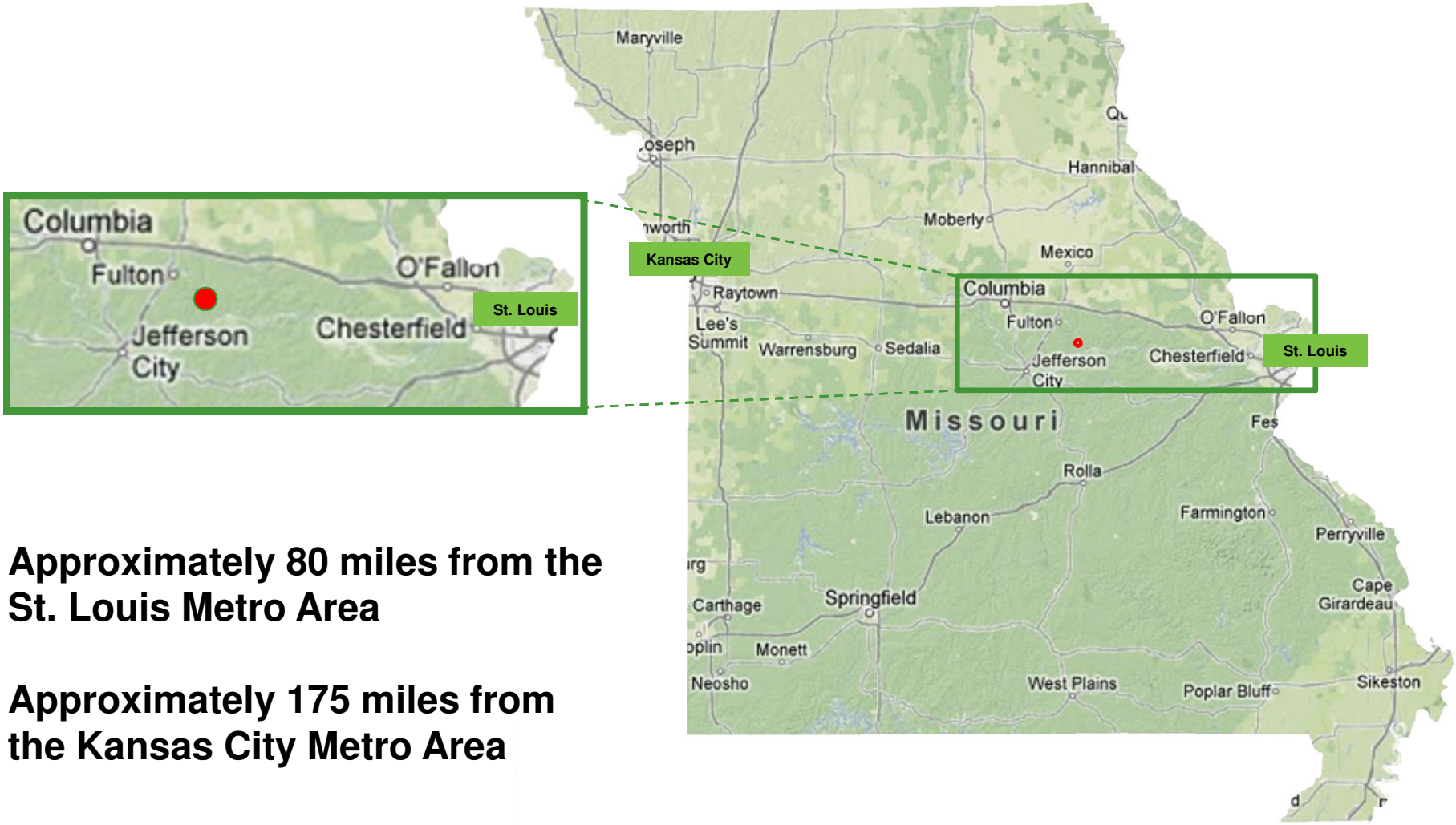
LOCATION OF PLANT SITE



Approximately 80 miles from the St. Louis Metro Area

Approximately 175 miles from the Kansas City Metro Area

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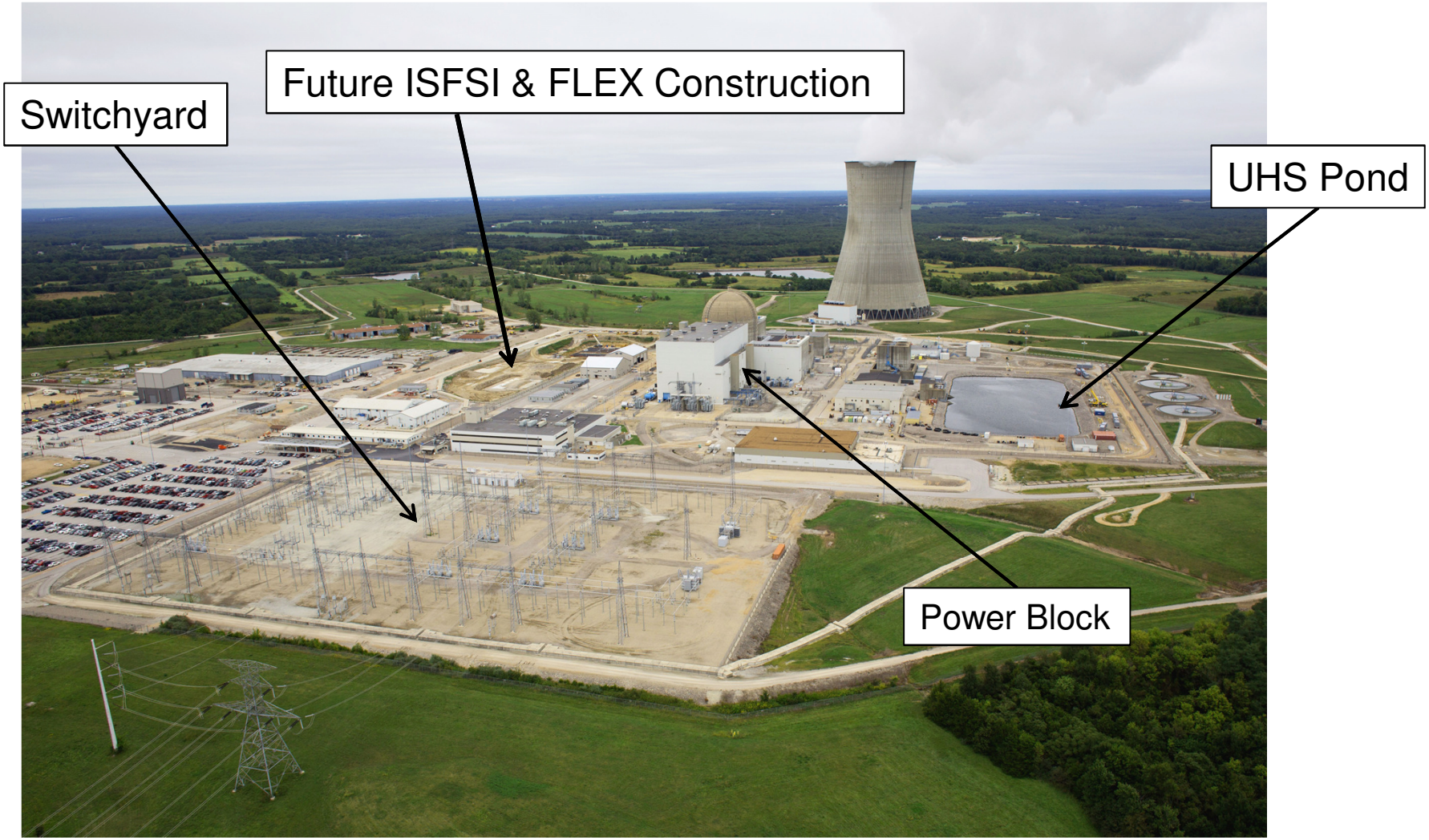
CALLAWAY PLANT UNIT 1- PLANT SITE



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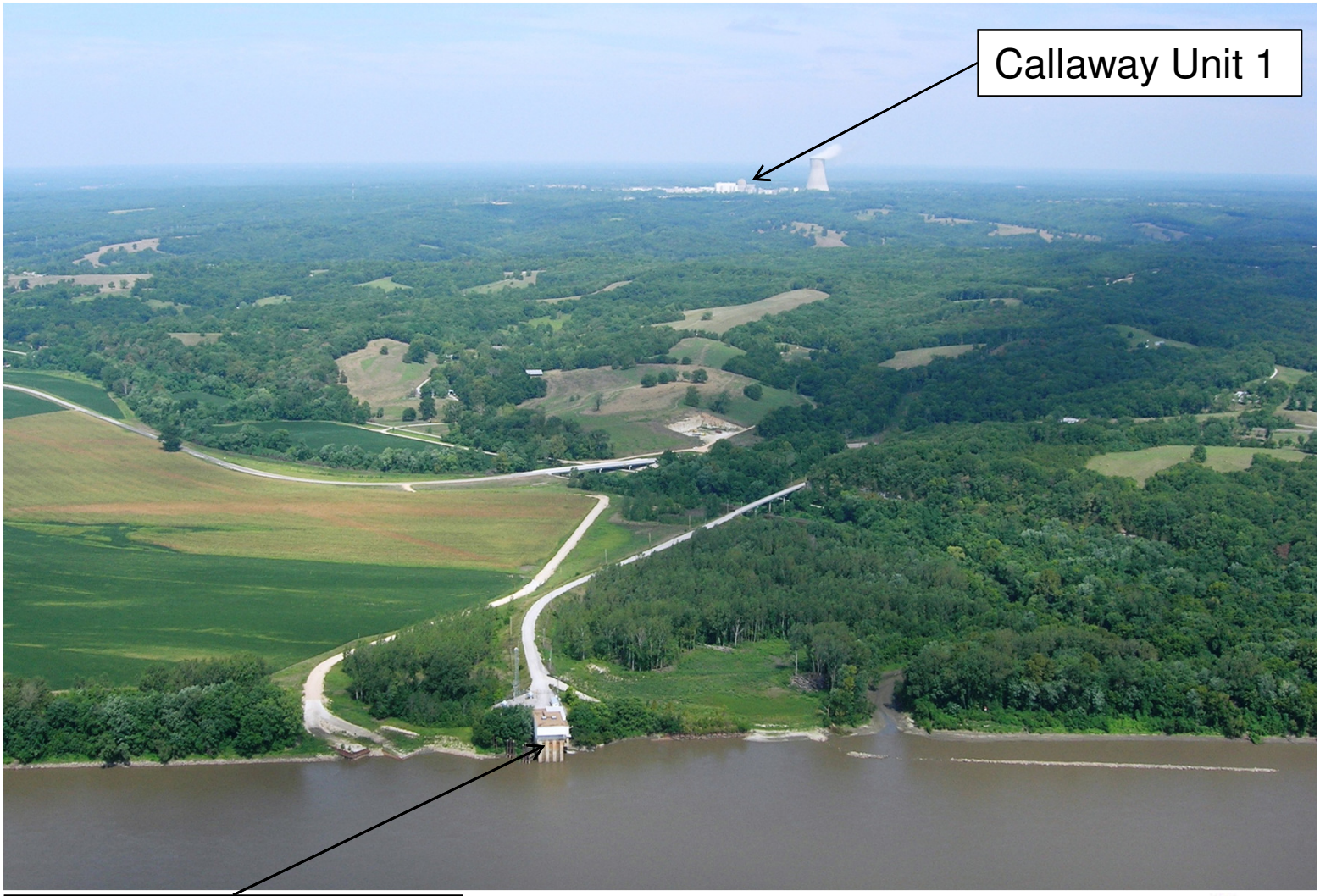
CALLAWAY PLANT UNIT 1- RIVER INTAKE STRUCTURE



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Roger Wink
Supervising Engineer, Plant Life Extension

10/02/2014

Plant Milestones

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PLANT MILESTONES

- Initial Construction Permit – April 16, 1976
- Operating License – October 18, 1984
- Current License Expiration – October 18, 2024
- End of the Requested Period of Extended Operation – October 18, 2044

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COMMITMENT TO LONG TERM OPERATION

Completed

- Replaced Main Condenser Tube Bundles (2004)*
- Replaced Steam Generators (2005)
- Pressurizer PWSCC-Resistant Full Structural Weld Overlays (2007)
- Majority of buried Essential Service Water (ESW) piping was replaced with safety related HDPE piping (2008 to 2009)

Near Term

- Reactor Vessel Head Replacement (10/2014)
- Independent Spent Fuel Storage Installation (2015)*

*Not in the scope of License Renewal

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Sarah Kovaleski
Director, Design Engineering

10/02/2014

GALL Consistency and Commitments
Closure of Open Items
Issues Since SER with Open Items

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GALL CONSISTENCY AND COMMITMENTS

- Application Details
  - Application submitted on December 15, 2011
  - Developed using NUREG-1801 (GALL) Revision 2
    - 98.8% consistent with GALL
  - Incorporated 8 License Renewal Interim Staff Guidance documents
  - 42 Aging Management Programs
    - 32 existing and 10 new programs
    - 16 enhancements and 5 exceptions to GALL

- License Renewal Commitments
  - Included in FSAR Supplement
  - Will be managed by Callaway Commitment Tracking System consistent with NEI 99-04 Guidelines
  - Total of 46 Commitments
    - 34 associated with aging management programs (AMPs)
    - 14 commitments completed/closed

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CLOSURE OF OPEN ITEMS

- Scoping of Fire Protection SSCs/NFPA 805
- Reactor Head Closure Studs
- Materials Reliability Program (MRP)-227-A Report Applicant/Licensee Action Items (A/LAIs)
- ASME Code Class 1 Small-Bore Socket Welds
- Effects of the Reactor Coolant System Environment on Fatigue Life of Piping and Components

Final SER contains no open items

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OPEN ITEM 2.3.3.20-1
Scoping of Fire Protection SSCs

Topic

- Provide justification for excluding portions of the Turbine Building from the scope of LR
- Discuss the changes associated to the LR scope that will occur with the NFPA 805 transition and provide a gap analysis

Resolution

- Turbine Building components added to scope
- LRA Amendment updated the LR scope to be consistent with NFPA 805
- A Gap Analysis was provided which described the changes to the LRA based on components added/removed from Fire Protection Program scope as a result of the transition to NFPA 805

Considerations

- The NRC approved the NFPA 805 amendment for Callaway on January 13, 2014
- NFPA 805 has been fully implemented

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OPEN ITEM B2.1.3-1
REACTOR HEAD CLOSURE STUDS

Topic

- Program may not be adequate to detect future wear, loss of materials, or assure that allowable stresses are not exceeded during the PEO

Resolution

- Commitments made to:
  - Remove Stud #18 prior to PEO
  - Inspect stud holes (6) with previous thread damage prior to PEO

Considerations

- There have been no RPV stud issues since 1996
- Stud #18 is fully tensioned & proof tested each cycle in the tensioning process

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OPEN ITEM B2.1.6-1 MRP-227-A REPORT APPLICANT/LICENSEE ACTION ITEMS (A/LAI)

A/LAI No. 1

- Demonstrate that the MRP-227-A bases and assumptions are applicable and bounding for the design of Callaway Reactor Vessel Internal components

Resolution

- MRP-191 & MRP-227-A are directly applicable to Callaway
- NSSS supplier verified all RVI components, as applicable for the design, are included directly in the MRP-191 component lists

A/LAI No. 5

- Define physical measurement techniques that will be used to determine Reactor Vessel Internals hold-down spring height

Resolution

- Callaway Reactor Vessel Internals hold-down spring is fabricated with type 403 stainless steel that is not subject to stress relaxation

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OPEN ITEM B2.1.6-1 MRP-227-A REPORT APPLICANT/LICENSEE ACTION ITEMS (A/LAI)

A/LAI No. 7

- Determine if inspections for loss of fracture toughness due to thermal & irradiation embrittlement apply to Reactor Vessel Internals components fabricated from cast austenitic stainless steel (CASS), martensitic stainless steel, or precipitation hardened steel

Resolution

- MRP-191 & MRP-227-A are directly applicable to Callaway.
- No additional components were identified for Callaway

A/LAI No. 8, Item (5)

- Address those Cumulative Usage Factor (CUF) analyses for RVI components that are TLAAs for the impact of reactor coolant on metal fatigue

Resolution

- The fatigue monitoring program will evaluate the effects of the reactor coolant system water environment on the RVI components with existing fatigue CUF analyses

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OPEN ITEM B2.1.20-1
ASME CODE CLASS 1 SMALL-BORE SOCKET WELDS

Topic

- Number of ASME Code Class 1 Small-Bore Socket Welds in LR scope

Resolution

- Original count did not include welds on 1” piping
  - 1” weld exams not required for ISI Program
- Detailed recount performed using design drawings and independent verification of results by ISI Program Owner to confirm final population of in scope socket welds

Considerations

- Extent of Condition review performed
  - Confirmed ASME Code Class 1 Small-Bore Butt Weld population

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OPEN ITEM 4.3.4-1 EFFECTS OF THE RCS ENVIRONMENT ON FATIGUE LIFE OF PIPING AND COMPONENTS

Topic

- Justify the ranking and comparison used to determine that “sentinel” locations were appropriate for Callaway.

Resolution

- Same fatigue curve for each material was used for the analyses
- The analyses have been performed using the same level of rigor
- Any transient lumping used in the various analyses have not skewed the screening and ranking results
- The comparison of Cumulative Usage Factors across multiple zones is valid

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ISSUES SINCE SER WITH OPEN ITEMS

- Industry clevis bolt operating experience addressed by existing ASME Section XI In-service Inspections
- Aging Management of Internal Surfaces, Firewater Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation consistent with LR-ISG-2012-02
- Loss of Coating Integrity for Service Level III and Other Coatings managed consistent with draft LR-ISG-2013-01
- Loss of material and loss of preload in submerged bolting managed with visual inspections and periodic testing or refurbishment

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CONCLUDING REMARKS

In anticipation of extended operation, Ameren Missouri has:

- Improved our Operating Experience program to identify, learn from, and share information on plant aging
- Invested in plant hardening initiatives
- Selected plant modifications for safe, extended operations
- Identified and trained program owners
- Established and filled the Aging Management Coordinator position

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COMMENTS AND QUESTIONS?

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