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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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PLANT LICENSE RENEWAL SUBCOMMITTEE

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FRIDAY

OCTOBER 22, 2010

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 8:30 a.m., Mario Bonaca, Chairman, presiding.

SUBCOMMITTEE MEMBERS:

MARIO V. BONACA, Chairman

J. SAM ARMIJO, Member

CHARLES H. BROWN, Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

WILLIAM J. SHACK, Member (via telephone)

JOHN D. SIEBER, Member

JOHN W. STETKAR, Member

DESIGNATED FEDERAL OFFICIAL:

PETER WEN

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

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

8:30 a.m.

CHAIRMAN BONACA: Okay. The meeting will now come to order. This is a meeting of the Plant License Renewal Subcommittee.

I am Mario Bonaca, chairman of the subcommittee. ACRS members in attendance are Sam Armijo, Jack Sieber, John Stetkar, Joy Rempe, Michael Ryan and Mr. Brown.

Dr. Bill Shack is not present, but he's attending the meeting through teleconference. Peter Wen of the ACRS staff is the designated federal official for this meeting.

The purpose of this meeting is to review the Draft Revision 2 to NUREG-1801, "Generic Aging Lessons Learned Report," and NUREG-1800, "Standard Review Plan for License Renewal."

We will hear presentations from representatives of the NRC staff. We have received no written comments or requests for time to make oral statements from members of the public regarding today's meeting. The entire meeting will be open to public attendance.

The subcommittee will gather information, analyze relevant issues and facts, and formulate

proposed positions and actions as appropriate for deliberation by the full committee.

Rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register Notice. Therefore, we request that participants in this meeting use the microphones located throughout the meeting room when addressing the subcommittee. The participants should first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We will now proceed with the meeting and I call upon Mr. Brian Holian of the NRC, the Office of Nuclear Reactor Regulation to begin.

Mr. Holian.

MR. HOLIAN: Good. Thank you, Chairman. And thank you ACRS members and subcommittee for taking the time today to review the GALL report.

This report, the staff is happy, only comes around every five years or so. It's an awful lot of work. As you see, it's an awful big document. Yet, it's very useful work, and we'll get into that today.

The GALL is a useful tool for us. It's proven to be a useful tool. We've seen the ACRS support for the origination of the GALL years ago and your help towards kind of helping us push applicants towards use of the GALL.

It has proven to be a very efficient tool as you look backwards over five to seven years on both the applicants for them to come in with a known aging management program that is acceptable to the staff and at least use that as a starting point. And so, its application has been well used by them and by us.

We do realize that it needs to be updated, and so we take that project on seriously. The operating experience in some ways, I wish I could fold it in on a yearly basis vice a five-year basis, and we do have the ability to do that.

It's our interim staff guidance procedure where we can use that, and that's one area that the staff, and we might touch on this at the end, is trying to be more efficient to be more timely in updates to guidance like this.

One area you're going to see discussed in great detail today is the buried piping, and we think that's a success story the way it worked through the GALL timing here, you know.

In some ways, we're leading the NEI industry initiative in that and that's still coming down in Part 50's phase, but it's the right thing to be doing in Part 54 to be addressing it now with this revision of the GALL. And so, you'll see that.

I did want to just do introductions, and then I'll turn it over to the staff and we'll start kind of like the process this morning to get through probably 45 slides or so that we have.

First to my left is Melanie Galloway. She's the deputy in Division of License Renewal and we're glad to have her here today. Melanie is also since she's been in the division, been really overseeing aspects of what we've called the consistency or how are we dealing with some of these GALL updates for the 15 applications that are in-house now. So, that's something we'll address towards the end of the presentation.

I wanted to highlight Jerry Dozier, branch chief in Division of License Renewal. Jerry was around for the first GALL update. So, there's not many of us that were at least in - and we've been at the NRC, but maybe not in License Renewal. But Jerry and some of his staff - you'll hear from Amy Hull from research, a couple key staff that were here at Rev.

GALL 1 update. So, that's been proven to valuable.

We actually pulled Jerry out of his branch chief role for about six to seven months. Had a substitute branch chief in for his branch so he could concentrate his energies and oversight into the GALL update in particular and that was valuable to us.

Also at the table is Bob Gramm. Bob's a senior reviewer and senior engineer in License Renewal. He's had a longtime experience in NRR in many different divisions. And we've been glad to have him in License Renewal for the last year-and-a-half, two years, and immediately we put him on the GALL update over a year ago. So, Bob has taken the bulk of the organization and the impetus for getting this done.

I would also like to highlight before turning it over to staff, industry representatives that are here today. They're not on a panel. They're here. I've talked to them. There's been an awful lot of industry interaction.

Julie Keys is here from NEI, and several individuals from the plants that have worked with us really as GALL went out for public comment, at least available for comment, back in January.

So, we've been getting those comments in

and it's been very fruitful; one, for the industry to see them up there, the staff's original thoughts up there on the web, and then we've had organized meetings that I'm sure Bob will cover.

The second introduction I'd like to make is just if you see a couple individuals come into the room, for the ACRS members, they're from the IRRS team. The International Regulatory Review team is on site. 15 to 20 people from overseas organized through the IAEA, they've been taking NRR - primarily NRR through its paces this week, and they're back next week for a two-week mission.

So, I highlighted the fact that ACRS is in town and they might want to stop by and at least observe part of this meeting. They may come over about ten o'clock, but it's the team leader Jukka Laaksonen from Finland, and Gustavo Caruso from the IAEA.

So, they were hoping to at least see on a break and maybe observe parts of this meeting. GALL was an item we discussed with them as part of our good practices, how we see it and how we do aging management in the United States.

With that, I'll turn it over - while Jerry's up there, I'm going to turn it right to Bob

Gramm who's going to start the presentation.

Bob.

MR. GRAMM: Thank you, Brian. Hello, Mr. Chairman and other members.

We're happy to be here today with you to discuss our two draft documents that have been prepared by a large number of staff members over, as Brian said, a course of a year-and-a-half.

I was the project manager for that effort and I'm happy to be here on behalf of all the folks to do the macro presentation. And we will provide you with many of the details and get into the substance of the documents as we go through our discussion this morning.

CHAIRMAN BONACA: Let me just add that there is one document, NUREG-1950, that we have not seen. And I understand what I see from your slides, that you reference that.

So, I would like to know at some point what kind of limitation that represents for us in writing a letter, if any.

MR. GRAMM: We can discuss that and we have a couple of slides and we can get into those particular aspects of that companion NUREG.

Again, 1950 is not a guidance document.

It serves as a knowledge management transfer tool to articulate the bases for our decisions and some of the public comment resolutions, but we'll cover that.

CHAIRMAN BONACA: All right.

MR. GRAMM: This slide serves as a roadmap for our presentation. So, it identifies the topics and the presenters that you'll be hearing from this morning as we go through the various subject matter materials.

We will selectively focus on a few AMPs and provide greater details and elaboration to the changes, because we feel that there's been extensive interactions on some of those and that they're worthy of further discussions.

And so, there's many AMPs that we will not discuss, but they were - but changes were made. We believe we've got a good basis for those, but we will simply focus on things that we feel are appropriate for the course of this meeting.

We will drill down in the area of, for example, electrical aging management programs in the submerged cables, and we'll give some elaboration on buried piping and tanks aging management program, which was changed extensively based primarily on operating experience, as Brian indicated.

Each document has a list of participants. There were over 90 staff members supplemented by experts from our contractor, Advanced Technologies and Laboratories.

These people have worked very hard over a year-and-a-half and have come together in expert panels where we basically synthesized information from these folks. And they gathered together, as we discussed, the proposed changes as we evaluated public comments. And we brought together the best expertise that we could from a variety of headquarters organizations both within NRR, Division of License Renewal and Office of Research.

We also had the benefit of inspection expertise, and all of that collectively was brought together to bring forward the draft documents that you see.

So, it's not a product of any one individual, any one part of the organization, but was in fact a very collegial effort that we arrived at these changes.

As Brian indicated, we've had extensive interaction with industry, and this has been very constructive. Even in 2009 before we published drafts of these documents on the web, we received several

letters from industry with proposed changes to the documents, suggested changes. This came in from both NEI, as well as from EPRI, with suggestions for PWR internals.

We took those comments into consideration as we moved forward, and that provided a good first step.

We held two multi-day workshops in January, and then later on in May, to discuss the various drafts of these documents. And we had very fruitful interactive discussions with members of the public that involved not only industry, but other interested external stakeholders participated in those. And we had very constructive feedback and a good dialog.

It was an opportunity for the staff to present the basis for why we were making changes so the industry could better understand some of the products we were putting forward, as well as the industry could comment upon how the effects of the documents - how the document changes would affect them in real practice.

We had a formal 45-day comment period. There was ten formal letters that came back. Most were from industry, but we did have other interested

external stakeholders provide comment letters.

And then, lastly, we held several public meetings and telephone conferences to discuss the buried piping and tanks aging management program.

So, there were a number of iterations late in the process on that document, and it received quite a bit of attention late in the comment phase.

CHAIRMAN BONACA: Well, at some point we will appreciate there were a number of programs that five years ago the most expectation there was would be a onetime inspection, which essentially is a presumption that you confirm that the effect is not taking place.

Some of those programs have evolved now into full programs with multiple inspections, which means we have learned in the past five years that the problem is more widespread and more common.

And, you know, where there are examples of those, it would be appreciated if you can bring it up when you go through the presentation.

MR. GRAMM: Okay. These are some of the forcing functions behind the changes. Again, it was a domestic and foreign operating experience.

So, we actually backtracked into 2004 to ensure that we received a proper consideration of the

overlap of operating experience that may have come to light during the course of preparation of Revision 1.

We carried forward through 2009, essentially, for the cutoff point. Again, we looked at databases both of domestic and foreign experience. Also took into account personal experience from many of the reviewers.

We looked very hard at license renewal applications in the accompanying safety evaluation reports to apply precedence, lessons learned from those applications and fold that into the documents. Again, the comments we received from industry were a very important consideration.

Interim staff guidance documents, there were several that were folded in and changes made. In particular, a new AMP was created, AMP M41, as a result of ISG. And there were other changes both in the electrical and structural areas from these interim staff positions that have been put forward.

And of course we accounted for any changes of regulations and new industry guidance documents that have become available over the intervening five-year period since Revision 1 was published.

MEMBER ARMIJO: Bob, are you going to cover the extent of information you've received from foreign

operating - from foreign plants, Asia, Europe and so on?

MR. GRAMM: Not in detail.

MR. DOZIER: Actually, I can address just one of those.

Before we did the License Renewal Guidance update, we did an extensive review of foreign operating experience.

You may be familiar with the IRRS database that the IAEA manages. We have reviewed that document. And an example of one of the things that we identified was that stress corrosion cracking occurring in stainless steel in an outside - in an outside environment had happened at one plant.

Basically, we made a new aging management review line item for that particular experience, but that - other than the international experience, we also looked at license reports, inspection reports to gain our in-house operating experience as well as foreign.

MEMBER ARMIJO: Okay. Thank you.

MR. DOZIER: Yes.

MR. GRAMM: Some of the very high-level changes that were made to the standard review plan were for Appendix A, which defines a template of ten

elements for aging management programs.

We went and reformatted material, augmented and changed that information, and then utilized that to rewrite the contents of the GALL report AMPs themselves.

So, the template was revised. And then that flowed through for consistency changes through the actual AMPs.

As applicants proposed plant-specific programs, they will now follow that general template that's available in the standard review plan as well.

Of course the standard review plan rolled out the changes we had made throughout the GALL report. So, in some situations we found that further evaluation was no longer required because we had either augmented the AMP or had gained confidence in the ability of the AMP to manage aging effects.

And so, there's a lot of textual material on further evaluations no longer present, because it's not deemed necessary in the standard review plan.

And all the tables in the standard review plan were aligned with the accompanying AMR line item changes. And so that we worked on the GALL first, and then flowed those changes back into the standard review plan and ensured consistency between the two

documents.

I'm going to turn it over now to Erach Patel. Erach has also brought a lot of corporate memory from Revision 1. He is a - works for Advanced Technologies and we've been very fortunate to have him as part of the Revision 2 update process.

And he's going to explain the general changes we made to the GALL report, and then we'll get into later on discipline-specific changes we made in various functional areas.

MR. PATEL: Thank you. Good morning.

2005 GALL was in two parts, in two volumes, Volume 1 and Volume 2. A lot of information in Volume 1 was repeated in the SRP, and some of it was in the GALL report.

So, this time we consolidated two reports. We took the background information and some pertinent to application - of the GALL report information and put it in the GALL report itself.

And some portions of the table we took out of the GALL Volume 1 and put it in the SRP table with the result of we were able to eliminate Volume 1 and have only one GALL report come out of it.

The other change that we made was in the first chapter in the GALL report talks about

application of the ASME Code. And we are now using the 2004 edition of the code.

And we also clarified based on our experience with the applications, the use of Code Cases and Relief Requests.

Some of the other information we put in there as Bob and Jerry mentioned, relevant operating experiences plugged into the report. We aligned the AMP content a little bit better for the 10-element template in some cases in Volume 1.

In 2005 edition, information that should be detection of aging effects was put into monitoring and training. So, we reviewed that and put it properly into each element as it applies and edit 2004 edition under code where it was applicable.

And we added a preamble in Chapter 11 where some of the industry documents got changed. So, we wanted to make sure we put some guidance into the GALL report so that when the applicant puts the application together, they have an idea of what revisions to use, etcetera.

A new subsection was added. This is a part of the system that are in the COL for license renewal, 10 CFR 54.21 RFR 2, which is the non-safety systems that would come under the scope of license

renewal because they impact safety components.

We didn't have this code in 2005. So, we added a new subsection to include the systems in there.

Some of the other things we did based on our experience with review of the SER over the last several years, is in 2005, for example, we had water chemistry and we had said verification for effectiveness and further evaluation required.

All of the applicants had been using onetime inspection as protocol M11, M32, and we've accepted that in the past.

So, in this revision what we've done is if they use water chemistry and onetime inspection, then we don't need further evaluation.

So, we made changes to reflect that. So, we reduce the number of further evaluation based on our work review of the applications.

Some of the other thing we did was in some cases we have plant-specific programs called out. For example, for Boraflex we didn't have a program for that. We now have a program in the GALL report. So, we call that program out, and therefore we don't need a plant-specific program.

MR. MEDOFF: Erach, can I make a

clarification? Because I think we've got a couple --

MR. GRAMM: Make sure they know who you are.

MR. MEDOFF: Hi. This is Jim Medoff of the staff. One thing I wanted to clarify is when Erach was talking about the consolidation of the two prior GALL versions and the SRP, and now you only have one SRP and one GALL, let me clear that up a little bit for you.

In the AMR tables of - in the old version in the AMR tables of the SRP, in the AMR tables of GALL 1, they were almost identical except for a couple of differences.

Therefore, what was happening was you had the SRP refer to the tables in GALL 1, and then the generic line items in GALL 1 would break out which more plant-specific line items in GALL 2 were derived from them.

What we did is we consolidated the tables in the SRP in GALL 1 to match up so that we didn't need to have an extra document. So, right now what happens is they're all - we consolidated them so that right now the SRP points to the more plant-specific line items in the GALL that are derived from those line items.

So, we don't have to go between three different documents now. We can go from the SRP directly to GALL 2 to figure out which plant-specific items are derived from the more global, larger-scale items in the SRP.

MR. GRAMM: Okay.

Thank you, Erach.

John.

MEMBER STETKAR: Yes, I had a couple of questions on definitions. And I know you're going to jump into the individual AMPs here pretty soon. So, can I get those out of the way since it's kind of the front end of the document.

And I don't know if Erach's the appropriate person or -

MR. GRAMM: Well, either Erach or Amy who's sitting directly behind you -

MEMBER STETKAR: Excellent.

MR. GRAMM: - would be the owner of the information.

MEMBER STETKAR: The one I got most confused about, and this is just perhaps personal education, was in Section 9D where you're defining environmental conditions, there's one environment called an uncontrolled indoor air greater than 35

degrees C, greater than 95 degrees F.

And in the current definition it says in this environment, any resultant thermal aging of organic materials can be considered as insignificant over the 60-year period of extended operation.

And there's a reference. The reference happens to be to a metals handbook. So, I don't know what that has to do with organic materials.

In Rev 1 of the GALL report in the same definition, it says if ambient is less than 95 degrees, then any resultant thermal aging of organic materials can be considered to be insignificant over the 60-year period.

So, for some reason we've gone from a definition that says if I'm less than 95 --

MR. GRAMM: Covered all the way.

MEMBER STETKAR: - I'm okay, but I need to worry about it if over - but I need to worry over 85. Where in Rev 2 it specifically says if it's over 95, I'm okay, but I need to worry about some other types of aging mechanisms.

Is that a simple typo or -

MR. DOZIER: Yes, sir.

MEMBER STETKAR: Okay. Please correct that.

MR. DOZIER: The greater than 95 degree threshold, we primarily use that for elastomers.

MEMBER STETKAR: Yes.

MR. DOZIER: Okay. And we're saying carbon materials, but primarily we're saying elastomers.

MEMBER STETKAR: Yes.

MR. DOZIER: So, it is greater than 95 degrees when we do have that affect and the aging should be managed.

MEMBER STETKAR: Check that then -

MR. DOZIER: Okay.

MEMBER STETKAR: - because some people might read that and say oh, my God, you know, these people got really smart and I don't need to worry about a bunch of things now in certain parts of the plant if they actually read all of these definitions.

It's nine, you know, IX D for air indoor uncontrolled greater than 35 degrees C.

MR. GRAMM: Thank you.

MEMBER STETKAR: I just thought maybe the thinking had changed, but - the other one, and this is more minor, it's more stylistic, in 9F under Aging Mechanisms where you talk about water trees, there it says water trees occur when the insulating materials are exposed to long-term continuous electrical stress

and moisture.

And there's - it goes on. The thing I hung up on was the "continuous" term because there's been a long discourse about whether or not the cables need to be energized and what fraction of time they need to be energized.

And I thought that the current thinking, at least, is that we're de-emphasizing the fraction of time that they're energized, and yet the definition seems to focus on continuously energized cables.

So, I don't know whether you need to think about that. Again, it's just in terms of people scoping in particular cables. If it says only worry about energized cables, that's different.

MEMBER SIEBER: And now we say -

MEMBER STETKAR: It was traditionally 25 percent or more of the time for medium-voltage cables. Now, we'll see this morning that we're extending the scope down to lower-voltage cables. And I thought we were removing that criterion of there being energized some fraction of the time.

We're just looking at cable insulation in a particular environment. So, you might want to clarify that.

MS. HULL: Yes, we will double-check this

in the context of the revised AMPs.

MEMBER STETKAR: Thank you.

MR. GRAMM: Actually, Cliff Doutt from our electrical group -

MR. DOUTT: Cliff Doutt, DLR.

MR. GRAMM: Move that up. You've got to talk right into it.

MR. DOUTT: Cliff Doutt, DLR. It shouldn't - you're correct. The "continuous" there was - it should be the cable needs to be energized and subject to moisture, but not necessarily continuous.

MEMBER STETKAR: Yes, I think if you just take out the "continuous" term, it reads fine and avoids that potential source of confusion. Thanks.

MR. GRAMM: Thank you.

MEMBER STETKAR: You're welcome.

MR. GRAMM: I'm now going to turn it over to Amy Hull from the Office of Research, and she's going to speak to what we call the consolidated NUREG-1950. And again, this is a knowledge management transfer where the staff can articulate the bases for our decision making and it captures all the public comment dispositions.

Amy.

MS. HULL: Okay. NUREG-1950 is evolution

from what we had in 2005. In 2005, we had 1833, the basis document, and we had 1832 which was focusing on the public comments.

We didn't have a very good tie-in between the two documents, 1832 and 1833. There was some duplication. There was some redundancy. When you count the number of pages between those two volumes, it was about 1,376.

With what we're putting together now - and here's the draft - it's about 920 pages. It's much easier -

(Off-record comments.)

MEMBER STETKAR: No wonder I got through it so quickly.

MS. HULL: It's a 33 percent reduction in total pages.

As Bob mentioned earlier, the basis document and the disposition of the public comments is really useful as a knowledge management transfer tool. It's not used so much on a day-to-day, year-by-year basis. It's very, very useful when you come in five years later and see why things were changed.

With my work in research, I usually used the Excel spreadsheet, the GALL master, to determine what was being done and it's very, very valuable.

The basis document, NUREG-1833, was good as a double-check of what ultimately was done in NUREG-1800 and 1801. I mention that because there is some question about whether NUREG-1950 was ready to be reviewed at this point.

NUREG-1950 lags behind 1801 and 1800 reflecting what has changed in them, why it was changed, the consistency. Because if it's not the same time and there are changes in 1800 and 1801 that are not captured in 1950, it loses some of its utility.

So, I wanted to mention that up front.

CHAIRMAN BONACA: That's the reason why I raised the question. If, in fact, 1950 has the logic behind the reasons for the change, that is forcing us to make a judgment without the help of the document.

MS. HULL: It does contain the logic. The logic has also been presented at the public meetings and has been presented in the presentations that individuals are giving to you today.

MR. DOZIER: For the basis document - we did summarize the information that was in the basis document in a presentation that was given to the ACRS that provided the changes that occurred.

We knew that when you picked up a document

like this, you know, you would want that information sanitized. So, we tried to provide a summary to the ACRS members of when we - when we gave the initial document.

If you would like to see the draft as we have it, you're welcome - in 2005, however, when the letter was written from ACRS, it did reflect the GALL report and the standard review plan. It only talks about this document as a reference.

Does that - would that - is that what you'd like?

Would you like a copy of this?

MEMBER STETKAR: Yes.

CHAIRMAN BONACA: Yes.

MEMBER STETKAR: Some of us at this table were not here in 2005.

MR. DOZIER: We'd be glad to provide that.

CHAIRMAN BONACA: I mean, I'm not uncomfortable with the basis for the changes that you have presented - that you are presenting today, okay, because we have gone through this license renewal. So, we know why certain things happen and the history, etcetera.

But when you're telling me that you have the basis for the changes summarized inside a

document, I get, you know, just my appetite goes up.

(Laughter.)

MS. HULL: It's still a living document. It's still being processed as we speak.

MR. GRAMM: Yes.

MS. HULL: We're still making changes and digesting information and -

MR. DOZIER: When we update these documents, of course when we make changes to the GALL report, the GALL report tables changes, the standard review plate changes. And then following all of that, this document, our basis document changes.

So, that's why she talks about this lagging information. But, as I said, we'll be glad to provide you with a draft, realizing that this is a draft and we're working hard to complete this for publication in December.

CHAIRMAN BONACA: But as a minimum, I think, you know, we will have to provide the full committee with our judgment regarding whether or not we should postpone the issuance of the letter after we review the document, or if we feel that we have sufficient information to go ahead and produce a letter now.

MEMBER ARMIJO: Well, it is kind of funny

that the basis document is not being reviewed if that's the foundation for the standard review plan and the GALL report.

If it's a supplementary thing of basically, you know, capturing information, that's a different story. I'm not so uncomfortable. I'm interested in it, but I don't feel it's mandatory.

MR. DOZIER: It does provide - as Amy had talked, it does provide - it is not considered a - when we talk about license renewal guidance, we're talking about the GALL report and standard review plan.

This is our - this is our knowledge transfer tool to get to that information so that in the future we'll know why we made the changes that have occurred.

And, also, it, as I said, in the 2005 letter from the ACRS endorsing these documents, they did provide this reference. but we were not specifically asking the ACRS to endorse this particular document, because it was not guidance.

But we'll be glad to provide the information to you and also help you - help in any way we can in digesting this information.

MEMBER ARMIJO: Is there a timeline on 1950

when it will be ready or -

MS. HULL: It will be published in - at the end of 2010 along with 1800 and 1801. Jerry can speak to it more.

CHAIRMAN BONACA: I think what we should do, we should get this to the members of the subcommittee and, you know, we have a chance to go through, look at some examples and then make a judgment.

And I think that we should be on track with representation the next meeting anyway. The issue is going to be are we ready to write the letter or should we review this document.

MEMBER STETKAR: We can probably discuss that, you know, at the close out of this session whether -

CHAIRMAN BONACA: Yes.

MEMBER STETKAR: - we think it's appropriate to go forward to the full committee or not.

CHAIRMAN BONACA: Yes.

MEMBER STETKAR: Okay. Thank you.

MEMBER SIEBER: Is the draft of NUREG-1801 that we got about two weeks ago from Peter, is that the current GALL report that we're reviewing?

MR. DOZIER: The ACRS was provided with NUREG-1800, 1801, which was -

MEMBER SIEBER: Rev 2.

MR. DOZIER: Right. And, like I said, a summary of the changes.

MEMBER SIEBER: Okay. So, we don't need - we don't need an additional copy of 1801 Rev 2.

MR. DOZIER: No.

MEMBER SIEBER: Right. Okay. We already have it.

CHAIRMAN BONACA: Okay.

MR. GRAMM: We're going to shift gears now and get into the electrical comments. I'm going to be joined by Matt McConnell and Cliff Doutt who are going to make the presentation on electrical items.

We are going out of sequence here and we will cover the aging management program E3 first, and that's done on intention.

MR. DOUTT: Good morning. Cliff Doutt from DLR. I'll do the - I'll essentially go through the AMPs.

As Bob said, we're starting with E3 first simply because that's the major change of most of the AMPs.

When we were doing this originally, it

became apparent that with operating experience and responses to Generic Letter 2007-01, that there were cable failures that were outside the recommendations of GALL E3 from the standpoint of 2K and up. So, that's the major change.

It's based on plant-specific and operating history starting with the, essentially way back, 2002-12 Information Notice on responses from the generic letter, some license to inspections and audits.

And in addition to that, we worked with the Division of Engineering electrical branch and Office of Research to revise the document to reflect what we think is current information.

MEMBER STETKAR: Cliff, before you get into this -

MR. DOUTT: Yes, sure.

MEMBER STETKAR: - just point of information, what's the status of the whole GL 2007-01 process?

It's part of the current licensing --

MR. DOUTT: Right.

MEMBER STETKAR: - you know, issues.

MR. DOUTT: That's correct.

MEMBER STETKAR: What's going on?

We haven't heard anything about that other

than a presentation a while ago on -

MR. DOUTT: Do you want to do that, Matt?

MEMBER STETKAR: - the results -

MR. McCONNELL: That's fine.

MR. DOUTT: Okay.

MEMBER STETKAR: - of the survey and what people came back with.

MR. McCONNELL: Well, good morning. My name is Matthew McConnell. I work in the electrical engineering branch. I'm a senior electrical engineer in that branch in NRR.

Basically, Generic Letter 2007-01 has been reviewed by the staff. All the responses came in. And we actually responded to the licensees saying that they have submitted all the information that was necessary.

In, I believe it was, 2009, early, we issued a summary report that actually documented our findings. And there were some follow-up items that were very minute follow-up items, but they also included discussions on potentially going forward with developing test techniques and things like that. And that's where our Office of Research came in.

And right now we have already issued a NUREG-7000, which talks about the - it establishes

test practices or characteristics of effective monitoring and maintenance programs for cables.

The other aspect is there's a draft guide that's already out there that's - right now I think research is actually addressing the public comments on that guide. And that also addresses different techniques for testing of power cables and - but as far as Generic Letter 2007-01 goes, that is actually - that is resolved. That is considered closed.

MEMBER STETKAR: And there's no guidance that's gone out to currently operating plants with similar - similar guidance to what's in the GALL report now in terms of scope and frequency of inspections?

MR. McCONNELL: Nothing specific with the frequencies that we - that obviously the Part 50 process is playing out and there is different guidance inspections taking place that are identifying different aspects in the - obviously in the submerged cable world.

MEMBER STETKAR: Okay. Thank you. Sorry about that.

MR. DOUTT: No, that's fine.

MR. McCONNELL: We were looking at it from the standpoint - we're looking at aging management and

aging effects.

MEMBER STETKAR: The only reason I bring it up is in some of our deliberations it's come up, you know, in terms of how should we - especially in a couple of letters we wrote, let's say, a couple of years ago, two, three years ago, because this was part of the current license, you know, was a current licensing issue, should we highlight it as an aging management concern or let the system play out, you know, for the currently operating plants.

So, that's - I was just curious as far as where that interface is right now.

MR. McCONNELL: Okay. Thank you.

MR. DOUTT: The only other - the other major change here, obviously, and you mentioned it earlier, was energize to de-energize.

We removed the criterion E3. The 25 percent criterion is gone. We did that for two parts. One is when we expanded the scope looking at those failures, that was not dependant on being energized or de-energized.

We had de-energized failures. So, it made sense to take care of the medium-voltage cable and remove that criteria as well.

So, that's another major change to that

document. And, again, that's essentially based on, again, operating experience that we have currently.

The other thing that - the other major change was in the cable test frequencies. That was changed to six years. It's mostly based on data that we had in generic letter response and operating experience. And it was just trying to cover that last five year - we had it at ten, which covered the end of the five-ten grouping. It just brings it forward.

There are some criterion there that that's based on operating experience. So, again, if you find - that's essentially a backstop at this point, but it could be different depending on plant specific and operating experience for different applications.

The inspection frequency for water collection was also revised. It was revised to one year instead of two. Our reason to do that was coupled.

One was that coincides with the inspection procedures that were issued by NRR, which looks at they sample two to four manholes per year. So, we coincide with that.

The other thing was is in the two-year frequency, we're looking at some operating experience where you would find the case where one year was fine,

went to two years, there was water in the manholes and it was repeating.

We didn't have an event driven, which we'll get to in a second, so we ended up with cables being submerged for significant periods of time. So, we brought that back, again another backstop, but again operating experience would dictate what the plant-specific frequencies would be.

The next thing is obviously event driven. Again, it's operating experience. We found situations where depending on rain, flood, cases that without - you have a situation where you may have drains, you may have sump pumps, you may have alarms, but you may not.

So, this drives an inspection in case you have flooding or some event. It's triggered on whatever criteria the applicant comes up with. And we're invoked this to try to minimize exposure to significant moisture within the three-day definition.

MEMBER STETKAR: Will you in your reviews of the particular AMPs, be looking for how each applicant invokes that in event-driven part of the inspection program?

MR. DOUTT: We have looked at that. What you end up looking for is you go out and say okay,

look at operating experience, you know. Depending on what the configuration is, sump pumps, what type of covers, there's a different - is it susceptible to it, are there condition reports that indicate that that has happened, and then coordinate all the - then they end up coordinating, you know, you have to have event driven, you have to have inspection frequencies, whatever.

MEMBER STETKAR: I'm just, you know, in terms of looking at where we are now in sort of the history of what we've seen, I haven't seen a lot of pressure from the staff in terms of going back to applicants to say, you know, applicants - some applicants have come in and highlighted the fact that they do indeed have an event-driven inspection frequency. And, you know, the staff says, you know, well, that's good, basically.

But I haven't seen the staff going back to an applicant and saying, you know, have you identified a particular causal mechanism, you know, whether it's locations that are more susceptible to groundwater or whether it's event driven by, you know, rain or other types of precipitation.

I haven't seen the staff going back and sort of asking people to think about that box.

MR. DOUTT: Probably two parts. One is going forward in the last year and a half or so where based on information, we have asked that question.

MEMBER STETKAR: Okay.

MR. DOUTT: Going back on plants that are currently under review as part of this revision here, we have issued RAIs. Part of that RAI is to address event driven.

We haven't necessarily depending on the plant to say yes, we have an event-driven procedure that will invoke that if it - not necessarily the details of so many inches or whatever.

Some licensees have provided that information, others have not, but we're looking just for procedurally that it's accounted for, yes.

MEMBER STETKAR: So, we should expect to see more of that?

MR. DOUTT: You'll expect to see more, yes.

MEMBER STETKAR: Okay. Thanks.

MR. DOUTT: Let's see here. Other than that, there was some - we updated operating experience in this AMP just to cover what's currently happening. So, there's references to the inspection procedure 06 2007-01 NUREG-7000 input. And I think we jump to references.

There was a question as far as applicability goes. I think we - if you want, you know, we've discussed that in the past.

MEMBER STETKAR: There's one minor thing you might want to look at in the introduction to the AMP, the program description. I got a little bit confused because it says as stated in NUREG-CR5643, a major concern is failures of deteriorated cable systems, ya-dah, ya-dah, ya-dah, might be induced during accident conditions. Since the instrumentation cables and connections are not subject to the environmental qualification requirements, an AMP is required to manage the aging effects. This AMP provides reasonable assurance the insulation material for electrical cables will perform.

It sounds like something might have been excerpted.

MR. DOUTT: What happened here, there was the standard phrasing in all the AMPs.

MEMBER STETKAR: I know where it came from.

MR. DOUTT: That's what happened.

MEMBER STETKAR: You just might want to purge it.

MR. DOUTT: We caught it.

MEMBER STETKAR: Since you've already gone

down to 400 volts.

MR. DOUTT: Right. Right. In the copy I have, I think it's corrected.

MEMBER STETKAR: Okay. Thanks.

MR. DOUTT: Right.

Next. In no particular order, 11.E1, which is Insulation Material for Electrical Cables and Connections Not Subject to 50.49 requirements, there was - the only - the major change here was not really a major change. A clarification on adverse localized environment. We had some comments.

If you look through the AMPs, the definition of "adverse localized" was somewhat variable between the different AMP versions. We tried to clarify that to be consistent across. So, it didn't change the definition. Actually, we just made it consistent with the AMP definition then throughout the AMPs. So, that's all that really was.

Then another change here was is the way the AMP was originally written up, they called it a sampling technique. In reality, the sampling was you have inaccessible cable and accessible cable. This AMP was designed to look at the accessible cable to make a determination that the inaccessible cable are okay. That's the sample. So, the inaccessible and

accessible are essentially the sampling.

So, removed the sampling criteria technique and all that and said you will just look at all the inaccessible cable within that - whatever environment you found, and you'll make the determination based on that. So, that was the major change there.

There were some definitions and terminology essentially just to make it consistent across all AMPs - across electrical AMPs.

Let's see. Anything else?

And there was one thing I noticed throughout the AMPs, too, the format was changed. We just changed some paragraphs and just editorially. And that's pretty much it for E1.

Are there questions?

MEMBER STETKAR: Did you get much push-back from the industry on expanding the scope on this?

MR. DOUTT: In general, most applicants were already looking at all - so, it wasn't a major - it wasn't a major change in most cases.

MEMBER STETKAR: Okay. Thank you.

MR. DOUTT: That's my understanding of it.

And where are we now? Two. Two didn't have - basically, program description was

consolidated.

MR. GRAMM: Excuse me.

(Off-record comments.)

MR. DOUTT: Sorry about that.

MR. GRAMM: Thanks.

MR. DOUTT: The program description on this one was consolidated. Essentially just, again, adverse localized environment was updated to be consistent.

The only thing that happened in this AMP was just definitions and terminology was just changed to be consistent throughout the AMPs. There was no major change to the AMP as far as what's covered.

For metal enclosed bus, the program description and scope of program were revised. this was essentially to get rid of or to try to eliminate some exceptions.

Normally what an applicant would like to do is put in the external/internal inspections in the electrical AMP. So, we used - we tended to get exceptions to allow that to happen which we would review and approve.

So, the changes here were to add that inspection criteria in the E4 so you now have the option you can either go to the structural monitoring

of the elastomers and do it separately, or do it within the AMP itself.

And we got comments from a work point of view that we're already thinking electrical is doing this, internals, we might as well do the externals at the same time. Can we work the AMP such that that would be possible? So, that's what that change did.

The parameters monitored/inspected changing effects, again this was just consistency between the AMPs just like the others and with the GALL Chapter VI.

There was a change here to revise the line items just from a material point of view. There wasn't a major change in what we were looking at. It just - we added in different environmental, different conditions. So, there is a change in that regard.

We also updated the sampling criterion for this for the - for looking at both the connections. We just - again, it depends on installation, but basically we gave a criteria of 20 percent or 25 based on the type of connection. They would still have to define what that population would be.

And again, yes, definitions/terminology was changed, but nothing major.

E5, fuse holders, no major changes to fuse

holders except we did revise the operating experience to add in a NUREG. The NUREG actually talks about fuses, not necessarily fuse holders, but it has some information in it and it's worth - so, we thought it was worthwhile to add it.

The aging effect and mechanism are consistent with the AMP. We changed those just, again, just across all the electrical.

And the parameter monitored/inspected, that was just materials in basically what you're looking for in aging effects from a visual inspection or if you're doing a thermal inspection. That was just revised to be consistent across the GALL and across the AMP, but there was no major change in scope or anything like that.

And the last one, E6, which is Electrical Cable Connections Not Subject to 50.49, the major change here was just to incorporate the ISG which provides now for onetime testing which is a relaxation from what it was before.

And, again, to do the onetime testing, there is some discussion of sampling criteria which is also new.

We also clarified, again, definitions and some discussion of what, again, if you're doing a

visual inspection, what criteria you're looking for, what aspects of aging - what aging mechanisms effects would you look for.

There is a change, too, with the onetime - if you do have - do visual inspection, that would be on a five-year basis. So, it wouldn't be a onetime.

It also - it's one time based on plant operating experience. Industry and the NRC agreed that connection failure is a relatively rare event and one time would be adequate. But, again, on plant-specific situations, you would review to make sure that, in fact, that that's bounding for that plant.

That's it for change. Any questions?

CHAIRMAN BONACA: Just a question I have regarding Page 13.

MR. DOUTT: Page 13.

CHAIRMAN BONACA: Detection of aging effects. Clearly, they have expanded the scope of license renewal going down to 400 volts.

MR. DOUTT: Right.

CHAIRMAN BONACA: And you have increased the frequency of inspection. So, the focus is very much on frequency of inspection.

What about testing?

MR. DOUTT: That's also changed.

Inspection went to one year. Testing was increased.

CHAIRMAN BONACA: Have to understand the relationship between, you know, you do every year for six months an inspection, you find whatever you find -

MR. DOUTT: What would happen -

CHAIRMAN BONACA: - every six years.

MR. DOUTT: Right.

CHAIRMAN BONACA: Or longer than that.

What's the logic?

Maybe it's in 1950, but -

MR. DOUTT: The logic for the one year was essentially based on operating experience and what we had seen. And there have been comments from, you know, our inspections, our audits, actually ACRS comments, concerning the two-year time frame and whether that was - that period was too long.

So, we looked at that and in some cases we found if you were on a two-year and found flooding, reduce it to a year, you could be a significant period of time before you went back to that cable and it would be submerged for a significant period of time.

So, we did two things. We changed it to one year, and we added event driven to try and cover anything that wasn't groundwater or some type of periodic-type inspection if you had some flooding or

anything like that, to try to catch that to minimize the exposure to significant moisture. So, that's why we changed the inspection time frame.

The testing time frame was changed just to try to cover the generic letter failure - I'll say "population," but it was backed up just to cover the - what we've seen - what we've seen is within the six to ten-year time frame, failures are beginning. So , we just backed it up to do that. It seemed to be the appropriate thing to do.

And, really, that input came from Division of Engineering and research work as well. That's where that came from.

CHAIRMAN BONACA: All right.

MR. DOUTT: And, again, that time frame for six years is based also on operating experience and plant-specific - and so is the one year. The one year could be affected by, you know, specific manholes, specific cable conditions. That's essentially a backstop.

CHAIRMAN BONACA: Thank you.

MR. GRAMM: Okay. We are now going to shift and talk about the structural topics. I'll be joined by Hans Ashar from Division of License Renewal and he will present the structural changes.

MR. ASHAR: In general, we had one generic change regarding the structural high-strength bolting - in the structural bolting in general.

What we did was we took all the portion of the structuralized bolting from the Bolting Integrity Program that was in the earlier version and put it into the various structural AMPs.

These structural AMPs affected S1, S3, S6 and S7. These four AMPs are affected by this change. So, we have to incorporate each of those changes.

In S1 in addition to the structural bolting portion, we included parameters monitored and trending, corrective actions revised AMP to incorporate interim staff guidance LR-2006-01 related to monitoring of MK1 drywell corrosion.

This one, we are evaluating it by this particular ISG, but now we incorporated that ISG into the programs.

Detection of aging effects revised to augment IWE requirement to include surface examination to detect cracking in SS penetration sleeves, dissimilar metal welds consistent with AMR line item in 2005 GALL report.

So, actually what we did was we took out something that was to be evaluated in AMR line item

into the AMP. So, in AMR line item we say that no further evaluation needed because they are going to address that particular part as part of AMP.

And the advantage of having it in the AMP is that when everything goes to the site, if it's in the AMP, they review it quite closely compared to in AMR line items.

So, it is an advantage. So, we made the transfer for a number of items. Not just one item, but a number of other items.

Associated AMR line items, new line added as a result of operating experience for torus shell exposed to air-indoor uncontrolled or treated water and loss of material due to corrosion.

MEMBER ARMIJO: What kind of cracking are you looking for in these sleeves?

MR. ASHAR: In the sleeves?

MEMBER ARMIJO: Yes, they kind of operate at low temperature, pretty mild environment compared to -

MR. ASHAR: Yes, it is a milder environment, but the whole thing is that this examination for cracking in SS penetration was there always in ASME 1992 edition and 1995 edition. But in Regulation 10 CFR 50.55, we made it optional.

I don't know why we did that or whatever we did, but then in Division of License Renewal framework we introduce that as a part of aging management program that they are to look at it.

Now, if they do have a dissimilar matter in the stainless steel penetration, we don't have any experience of any kind of a problem with those components. But because it is we are extending from 40 to 60, we wanted to have it in as a part of aging management program.

MEMBER ARMIJO: And also for consistency with the code, is that your main reason?

MR. ASHAR: Well, what happen after 1992 edition and `95 edition, the ASME in 1998 edition and later, they took out that provision. Because we made it optional, so they took out that provision.

MEMBER ARMIJO: Well, you know, the reason I'm asking it is this based on operational experience that indicates there's a problem or not because it's a pretty mild environment for these kinds of steels and I just wonder why you put it back in if, you know, if you're inspecting a torus in any case, it's probably just as easy to look at that as well.

But I just can't - I just wanted to know whether you're worried about a fatigue cracking or

maybe something like chloride stress corrosion cracking or something that is of concern at low temperatures. Because otherwise, these steels shouldn't really be affected at all by that.

MR. ASHAR: Well, only operating experience we have is regarding the cracking of bellows which are inside the penetrations. Okay. And that happen because of a certain chloride contamination.

MEMBER ARMIJO: Yes. So, it's a contamination related -

MR. ASHAR: It can happen in some plants, and we wanted to make sure there is cover if it has happened. Otherwise, they can just so know - they can say in the AMR line items, no harm.

MEMBER ARMIJO: Okay. Thank you.

MR. ASHAR: The next one is IWL, which is a concrete surface examination and a system examination.

Parameters monitored revised to include additional monitoring of tendons when containment cutout is needed to facilitate replacement of steam generator or reactor vessel head, which has happened a number of times so far.

And what happened was in - we have some provisional requirements - I will say recommendation

rather than requirement, in one of the safety evaluation report we wrote.

But in 2004 edition of the code, this became a requirement because they provided the table as to how many special tendons had to be de-tensioned and how to go about doing the cutout portion.

So, there is much - very well described in 2004 edition of the ASME code. So, we just incorporated that portion into the - so, there is a change.

And for S3, S3 is component supports. Parameters monitored in that one address the supports, sliding support, spring - sliding supports, spring and constant load supports.

We're always being asked - it was always in AMR line items. We did not put them into AMP earlier. So, now we have it in the AMPs, and structural bolting.

Now, we had asked a number of questions on sliding surfaces, for example, because people are using Lubrite and other kind of surfaces. Only thing they can do, they can look at the function from the point of view that they can go and see if there's any dirt or something that might hinder the actual sliding of the particular connection.

Detection of aging effects clarified to include aging effects for structural bolting, sliding surfaces, elastometric vibration isolator and - yes, this we are always reviewing, but it was not - it was not in the AMP before.

Appendix J in detection of aging effects, we emphasized the particular concept that hey, the integrity of containment is maintained by two things. One thing is an insulation inspection requirement, which are in the IWL, and the performance monitoring by leak rate testing.

So, they worked in combination to maintain the containment integrity. So, that's why we just clarified that portion.

Updated the references to NEI 94-01 Rev 2-A. Now, NEI 94-01 I should explain a little. It is a position the staff took when the industry came and said that hey, all the risk assessment that we have done shows that we can increase the interval for integrated leak rate testing from ten years to 15 years. And they provided a lot of data on the particular items. And NEI 94-01 incorporated what they should do in order to use that particular provision and we wrote this safety evaluation report with number of exceptions in it and said that yes, it

is acceptable provided this, this, this, this.

Associated - revised to separate those components where AMP XI.S4 by itself is applicable like the seals and gaskets. They are being always by performance monitoring. That when you pump up the - either the penetration or isolation wall for the whole containment in Type A testing, then it will be sealing some gaskets which will be tested that they are not leaking.

On masonry walls, we clarified fire barrier masonry walls covered by Fire Protection. As a matter of fact, most applicants that I have reviewed recently, they always have both the programs working for masonry walls.

There are different people who might be working on this particular item, but they always have to be correlated. There are some walls which may not be fire-resistance-related, and then we just partition wall or the barrier or something. In that case, they look for the same thing. Cracking or - cracking or deterioration of the masonry wall or the joints.

Clarified parameters monitored for cracking, separation or shrinkage. Associated AMR line items, added new AMR lines for masonry walls exposed to air-outdoors.

MEMBER STETKAR: Hans?

MR. ASHAR: Yes.

MEMBER STETKAR: The masonry walls inspection program basically establishes a five-year inspection interval.

MR. ASHAR: That is correct. Not to exceed five years.

MEMBER STETKAR: Not to exceed five years?

MR. ASHAR: Right.

MEMBER STETKAR: Do licensees typically categorize a particular wall as either inspected under this program or under the fire protection program, but not both, or do they inspect them under both programs?

MR. ASHAR: Well, for the in-scope masonry walls, the applicants can separately examine it under two programs, the fire protection program and the structural monitoring program.

MEMBER STETKAR: Okay.

MR. ASHAR: Or S5 program. But what I was seeing in the applications, is that whenever there is a common thing that that particular wall is in scope as well as it is a fire protection barrier, in that case, that is being examined by fire protection program.

MEMBER STETKAR: I guess the source of my

question is under the fire protection program, the inspection requirements say to examine not less than ten percent of each type of fire barrier at a frequency that's consistent with the plant's plant-specific fire protection program.

Now, I don't know what those inspection frequencies are. Used to be specified once a refueling outage. So, let's say it's ten percent once every - I'll use a couple-of-years sort of frequency.

So, a particular masonry wall that's inspected as a fire barrier might not be inspected very often at all, because I only need to sample ten percent of those, and inspect that ten percent once every couple of - I don't want to say two, because it's a variability.

Are those masonry walls still going to be inspected once every five years under this program?

MR. ASHAR: That is the way we have written and that is the way -

MEMBER STETKAR: Okay. I just wanted to make sure there wasn't some walls that would slip through a crack because somebody was -

MR. ASHAR: It's not the ten percent, 20 percent -

MEMBER STETKAR: - characterizing them as

a fire barrier.

MR. ASHAR: In masonry wall, we have not partitioned them into ten percent, 20 percent or anything like that.

MEMBER STETKAR: Okay. Okay. So, regardless of -

MR. ASHAR: Regardless of -

MEMBER STETKAR: They'll be done every five years. Thank you.

MR. ASHAR: Structures monitoring, scope of program revised to clarify when the applicant has the option to include masonry walls and water control structures within the scope of the program.

Now, what is happening here is that there are two programs which could be addressed into S6 like the masonry wall program and the water control structures program.

Now, the applicants have elected to include them because it might be a part of the way they would inspect certain things and it will be easier for them to group them out and have the crew or the qualified people going around for both the things together.

So, it might help them out. So, we allowed them to do that. And so far, all the elements

of the S5 and S7 program are incorporated into S6 program.

So, we allow them to do that. As a matter of fact, the last application I looked at, they had the S5 program, S7 program, and still they said that they would be incorporating those into S6 program. They are just separately or just both of them. So, there's more than enough for us to review there.

Revised to clarify parameters to be monitored for concrete, steel, structural bolting, structural sealants, elastomeric vibration isolators, groundwater chemistry and settlement monitoring.

Another one in detection of aging effects, in-scope structures stipulated in the ACI-349-3R. Now, this is the document which talks about acceptance criteria for concrete structures. And it also provides operational frequency at which you should examine the structure.

And it is generally five years, but there are certain structures with a benign environment that can go as much as ten years.

For example, inaccessibility of the concrete structures like below the grade areas. They can go up to ten years. But if there's an opportunistic inspection in between, then they will do

that too as a part of the program.

Settlement monitoring is a plant-specific parameter which based on their experience the tank is settling after 30 to 40 years of operation. And then they decide whether they are to continue.

As far as we know, there's not a single plant that we know which had the settlement monitoring program in effect because what is going to happen, had happened in ten to 20 years and it was being recorded.

Groundwater chemistry not to exceed five years.

Water-control structures inspection claim that dam inspection is not in scope. Now, the dam inspection is generally being covered by Federal Energy Regulatory Commission and the Corps of Engineers. They are the two agencies which takes care of the dam whether power plant related or non-power plant.

The scope of program clarified to include sluice gates and trash racks. This article we had earlier in the line items, but now we put it into the - into the AMPs.

Associated line items, added new line for wooden sheet piles in air-outdoor or water flowing or standing or groundwater or soil. So, this one we

added because we found that some people are using wooden sheet piling.

S8 is Protective Coating Monitoring and Maintenance program. In this one, we updated the ASTM standards which are relevant to the coating. There are new standards for acceptance.

Clarified importance of coating assessment for ECCS performance.

Scope of program clarified to include coating on concrete so that the coating in containments are completely addressed. Steel, as well as the concrete area. If there's any kind of abrasion or defect or something that might jeopardize the ECCS functioning, then they are covered, examined for corrective actions.

MEMBER ARMIJO: Does that include the coatings on the metal liners?

MR. ASHAR: Yes.

MEMBER ARMIJO: Okay.

MR. ASHAR: Only thing we added is the concrete now. We didn't have the concrete before.

MEMBER ARMIJO: Okay. You always had the liners.

MR. ASHAR: Liner we always had, yes.

Revised reference to RG 1.54, Rev 2. Rev

2 is a very recently issued revision of 1.54. As a matter of fact, Bob will have to do some juggling to get it in, in the new program now.

New ARM line item added in Chapters II and III for loss of coating integrity due to blistering, cracking, flaking, etcetera.

This concludes my presentation.

MR. GRAMM: Thank you, Hans.

We're a little bit ahead of schedule. We can proceed with mechanical topics or take a break at your discretion.

CHAIRMAN BONACA: Well, we have this mission that is going to come and see us at some point. Probably we should stay on schedule that we have submitted.

Could we go for 15 minutes and then take a break at 10:00?

MR. GRAMM: Let's do that.

CHAIRMAN BONACA: Actually, I have a question I would like to ask now. This was regarding Slide Number 10.

You were pointing out there that one thing you have done is to have a combination of, for example, in this case, an example of water chemistry and onetime inspection program. And this - if you

have both of them this way as you prescribed, there is no need for an enhancement of the problem itself. Okay.

The question I have is, is this prescriptive this way or can the licensee still go with a combination of water chemistry and something else?

MR. PATEL: The applicant has to do a verification of the effectiveness of water chemistry. So, they have to do some kind of an inspection. Some kind of sampling inspection.

CHAIRMAN BONACA: I understand.

MR. PATEL: The application that you had up to now have usually used the onetime inspection program as identified in the GALL report.

They could use their own plant-specific program, in which case they may have to provide information on the application that we're going to use water chemistry, and here's the program we're going to use to inspect for effectiveness of the water chemistry program.

CHAIRMAN BONACA: But before you offered them to have an enhancement, and now you are prescribing what the enhancement should be, and you really don't have a default program that is to be

provided to the licensee.

I mean, how would you handle that?

Assume the licensee proposed something different from this as an enhancement.

MR. PATEL: Enhancement to the water chemistry program?

CHAIR BONACA: No.

MR. MEDOFF: Erach, may I chime in here?

This is Jim Medoff of the staff. Let me chime in here.

The - as Erach said, there are certain AMR examples in the GALL report where a couple of, you know, water chemistry is the primary program. They use a preventative or a mitigative program like water chemistry to manage the aging effect and they couple it to an inspection. Mostly - usually the applicants use onetime inspection to verify the effectiveness of the water chemistry program. There are a couple of others like fuel oil chemistry where they may have similar combinations.

So, it's typically where they're using an inspection program for verification of a preventative program where it relies on chemistry monitoring for management of the aging effect, and that's the primary program.

In the old GALL report, we coupled that with a further evaluation item. When we - over the years when we review the applications, they would come in very consistent with those recommendations. So, there was no reason to treat this as a further evaluation. I mean, there's nothing special about it anymore.

CHAIRMAN BONACA: So, let me ask it this way: During the workshops, do you find that the licensees typically support this approach which you have proposed?

MR. MEDOFF: Say that again one more time.

CHAIRMAN BONACA: Did you find that the licensees support the approach you propose here?

MR. MEDOFF: Yes.

CHAIRMAN BONACA: Which is the one on the prescribed enhancement and -

MR. MEDOFF: Right. So, we didn't - there was no need to treat it like - every time there's a further evaluation, they have to add a tech section to the LRA and discuss how they address that further evaluation recommendation.

So, there was nothing special about it anymore. So, we removed it from the recommendation.

CHAIRMAN BONACA: All right.

MR. DOZIER: And this was primarily what they were doing all along, you know. We had an aging management review line item that had, you know, chemistry and onetime inspection with further evaluation.

We enhanced both the chemistry procedure - the chemistry AMP and the onetime inspection AMP where now they could do this, be consistent with GALL, and so it made it easier for the applicant. As far as what is actually being performed, there's really no change.

MR. MEDOFF: And let me make one other clarification for you asked could they do something different for the verification of the preventative program. And the answer is yes, but there's an NEI format in the AMR line item that they follow for that. It comes under Footnote E.

So, in my line item if I'm going to use a different inspection program for preventative program verification, they should put a footnote in their line item under that case. And Julie Keys is nodding her head yes. So, that's the way we handled it.

CHAIRMAN BONACA: Okay. All right. Thank you.

MEMBER STETKAR: As long as you brought it

up and since we're ahead of the -

CHAIRMAN BONACA: Sure.

MEMBER STETKAR: - schedule, I had the question on the onetime inspection, but I've seen it a couple of places in this revision of the GALL report.

The onetime inspection program specifies a sample size of 20 percent of the population, the susceptible population, or a maximum of 25 components. And I was curious what the basis for the maximum of 25 as just a simple scale or quantity regardless of what the population of potentially vulnerable components, what's the basis for that maximum of 25?

If I've got 10,000 components, the difference between 2,000 and 25 is a rather large difference.

MR. GRAMM: Dave Alley from the staff is going to comment on that.

MEMBER STETKAR: I just did a quick word search. That same qualification didn't seem to exist in Rev 1 of the GALL. I might have missed it, but this seems to be a kind of fundamental change in the concept of sampling.

MR. ALLEY: This is Dave Alley from the staff. It is a bit of a change from Rev 1. The rationale for the maximum number of components is

based on the statistical analysis of 90/90.

And when we do that, we find that there -

MEMBER STETKAR: Now, wait a minute. Doesn't that depend on the size of the population?

MR. ALLEY: It does, but it maximizes out at around 25 to 27 samples for essentially an infinite population.

The sample is a curve at that point so that when you have a very small sample size, the number of samples has to be relatively close to the full population size.

As you increase the full population size, the size of the sample in order to achieve 90/90 gets much, much, much smaller than the population size.

MEMBER STETKAR: Right. No, I understand that. I was just curious why 25 was a one size fits all regardless of -

MR. ALLEY: That's about -

MEMBER STETKAR: - any population.

MR. ALLEY: Right. That's about where the plateau begins on the 90/90 sample criteria.

MEMBER STETKAR: Okay. Thank you.

CHAIRMAN BONACA: Okay. Well, I think that we should take a break now. It's already five of 10:00. No point in interrupting.

Let's take a break and we can start again at 20 after.

MEMBER STETKAR: 20 after?

CHAIRMAN BONACA: Yes.

(Whereupon, the above-entitled matter went off the record at 9:55 a.m. and resumed at 10:21 a.m.)

CHAIRMAN BONACA: Let's get back into session. Before we start with the representation, I would like to make an announcement.

We are pleased to be joined today by members of the IAEA Integrated Regulatory Review Service, IRRS, mission who are here to conduct a review of the NRC. And you already - some of you have met because they were present on the floor for the past half an hour.

The team leader of the mission is Dr. Laaksonen from Finland, representing team leader is Dr. Soda from Japan, and other members here today include Dr. Gustavo Caruso from Spain. Welcome and -

(Off-record comments.)

CHAIRMAN BONACA: We are going to resume the meeting now and we are at mechanical AMPs.

MR. GRAMM: Thank you. And Erach Patel is going to walk through some general changes we made to the mechanical AMPs, and then we'll probe in a couple

specific more-focused areas following Erach's opening presentation.

MR. PATEL: In the mechanical AMPs, we added three new AMPs. One of them PWR vessel internals, which will be covered later as part of the specific AMP changes. The other one was M40 on neutron-absorbing materials other than Boraflex. And this AMP incorporates ISG 2009-01 and includes that as part of the AMP.

And the third AMP that we revised - or that's a new AMP, is on buried and underground piping and tanks. And, again, that will be addressed separately as a specific change.

There were two AMPs that were deleted. These AMPs had not been used at all in any of the applications. So, due to relevance we deleted these two AMPs as not being applicable.

We eliminated three AMPs because we subsumed them in some of the existing AMPs. For example, the AMP on cast austenitic stainless steel thermal aging and neutron irradiation embrittlement is now subsumed in the PWR internals for M9, and in the new PWR vessel internals M16A. So, we didn't need to have a separate AMP to cover that.

The same thing - we had two separate AMPs

for buried piping, which we had before. One was surveillance, and one was for inspection. Those two AMPs are deleted because now the new AMP that we created, M41, takes into account everything that we need to put in the backup.

We made changes to various AMPs. One of the changes we made was to 11B, which is on this cracking of nickel-alloy components. In the past, we used to have a licensing commitment that the applicant was making. 10 CFR 50.55 now has included code cases 722 and 729, and those have now been incorporated into 11B.

Closed treated water systems was a change because we have more closed cycle cooling water stuff included in there. More than just what we had before. So, it's a change that we made.

Reactor vessel surveillance, the AMP in 2005 was not in the ten-element format. So, we revised M31 to now include that as a ten-element format to put that in there.

Onetime inspection of ASME Code Class 1 small bore piping was changed to include socket welds and sampling sizes and things like that.

MEMBER SHACK: Isn't it sort of a misnomer now to call it the onetime inspection since depending

on plant history it could be periodic?

MR. PATEL: I will address that under M32.

MEMBER SHACK: Okay.

MR. PATEL: In the case of external surface monitoring of mechanical components and inspection of internal surfaces, those two AMPs previously only addressed steel components. These AMPs have now been revised to include other metals and also elastomers and PVC and polymers and things like that.

So, we included detection of aging effects and parameters monitored, etcetera, so that this AMP can now be used for elastomers in mechanical - in mechanical systems.

I don't have the onetime inspection, M32, but M32 was revised. And we have in M32 under program description, we added that this program cannot be used for structures of components with known age-related degradation mechanism. In this case, periodic inspection should be performed in this case.

If a plant already knows that we have an existing cracking in small-bore piping, for example, or in onetime inspection, you cannot use that.

So, for example, if you use onetime inspection for verification of chemistry, but the plant already knows we do have cracking, then they

cannot use this program. They got to go for periodic inspection.

CHAIRMAN BONACA: I mean, onetime inspection is always - we use the concept for aging that we don't believe is going to happen. It's just a confirmation that the aging effect is not taking place.

So, for example, Chapter XI.M35 you're showing onetime inspection of ASME Code Class 1 small-bore piping.

Why would you call this onetime inspection?

MR. DOZIER: That's a very good question because, as you said, if they have experienced the problem, we do require periodic -

CHAIRMAN BONACA: Thank you. And, in fact, I mean, I believe you have now a new program, right?

MR. DOZIER: Dr. Hiser.

DR. HISER: Hi. Allen Hiser from NRC staff.

Yes, if they have had cracking and they - the onetime inspection is not appropriate for them. I don't remember if the AMP is specific to one time or if it's more general, actually, to a periodic program as well. I think it is specific to one time.

MEMBER SHACK: No, it's more general,

Allen. If you look at the last paragraph on Page X35 1, M35 1, it points out that if you had experienced cracking, it's periodic.

DR. HISER: We may need to take a look at the title of that.

MEMBER SHACK: That's why I thought there was sort of a misnomer in the name. I'd just make it inspection of Class 1 piping.

MR. GRAMM: Well, in actuality to clarify, the AMP is only on a onetime basis. And if that - if they haven't rectified the situation, they need a plant-specific periodic program which kicks you entirely out of M35.

MEMBER SHACK: Okay.

MEMBER STETKAR: As long as we're -

MR. GRAMM: Are you satisfied, Bill?

MEMBER SHACK: Yes.

MEMBER STETKAR: As long as we're talking about this, I didn't see M35 in any of your slide material.

MR. DOZIER: We will cover M35.

MEMBER STETKAR: You will? Okay.

MR. DOZIER: Yes.

MEMBER STETKAR: I'll wait until then.

MR. DOZIER: It is - you're correct. It's

not in your package. However, we have a backup slide based on -

MEMBER STETKAR: As long as you're planning to cover it, I'll wait until then so you can -

MR. DOZIER: Dr. Allen Hiser will be presenting that.

MEMBER STETKAR: Okay. Thank you.

MR. GRAMM: Thank you, Erach.

I'd like to be joined now by Dave Alley. And Dave is going to walk through the extensive changes that were made as part of introducing the new AMP M41 for buried piping and underground tanks.

MR. ALLEY: As we start to discuss buried and underground piping and tanks, I want to preliminarily say that we'll talk about some objectives, some definitions, the philosophy of the AMP, preventive actions, inspections, and then I will attempt to summarize the AMP at that point.

We'll start with the objective. The primary purpose of the AMP is to manage the aging of buried piping and tanks, which is a good thing because that's the title of the AMP.

The primary focus of the AMP is on external corrosion. There are some issues in the AMP that may deal with internal corrosion, but the primary

focus is external corrosion.

There are a few definitions which are critical to the AMP that we keep straight. The two most important are of course "buried" and "underground."

Buried piping is that piping which is in direct contact with soil or concrete. Buried piping can be cathodically protected.

Underground piping is below-grade piping. It has limited access. It's in contact in general with air, humidity. Those sorts of things go along with that. For example, it is piping that occurs in trenches or vaults. Underground piping cannot be cathodically protected.

MEMBER ARMIJO: Can it be periodically exposed to water?

MR. ALLEY: It can be -

MEMBER ARMIJO: Actually liquid water in a trench?

MR. ALLEY: It can be periodically exposed to humidity, condensation, potentially standing water, but it's a - primarily we're looking at a wet air environment.

MEMBER ARMIJO: Okay.

MR. ALLEY: Some philosophical tenets upon

which the AMP are based, the first one is that preventive actions are the best approach to managing the aging of buried and underground piping and tanks.

Some inspections are still required. More inspections are of course required if the preventive actions are not, shall we say, excellent.

The second philosophical point is to concentrate your efforts on high-risk piping. Now, risk in this case refers to the general industry - or the general industrial definitions of risk, probability of failure times the consequences of failure. It has nothing to do with core damage frequency as is commonly used at the NRC.

So, as we use "risk" here, we're talking about a qualitative determination of risk.

MEMBER STETKAR: You said probability of failure times the consequences of failure.

What's the measure of merit for the consequence then?

MR. ALLEY: In general industrial terms, it can be any liability that may be incurred. It may be the cost of damage of the equipment, it may be the cost of damage of the cleanup, it may be the cost of the public relations nightmare that could occur, for example, in an oil spill.

It can be - risk - consequences of failure in the terms of buried piping can include a wide variety of issues that all, for the industry, have a cost associated with them. It's not specifically limited to safety issues as the NRC would see them.

MEMBER STETKAR: Well, I guess I'm trying to - I'm trying to understand that because if an applicant is doing some type of risk-informed - and I'll use the word "risk" in a generic sense right now - risk-informed sampling process where they're identifying higher risk items to populate their samples, I would hope that we're not simply focusing on what shows up on the evening news as a higher-ranking criterion than, for example, a leak that might compromise the cooling water capability for long-term heat removal.

And from what I heard you say, it sounds like there might be a danger if standard industrial and public relations factors are strong influences on determining what are the most significant consequences.

MR. ALLEY: There are potential influences, but certainly not the only influence, and certainly not the strongest influences.

Safety as far as the NRC is concerned, is and always will be the primary concern, and we're ensuring that that remains the case.

MEMBER STETKAR: Is there any - I didn't read anything in the guidance in the NUREG that sort of emphasizes that this concept of - it's noted that risk is indeed based - susceptibility of corrosion and - of both piping materials and particular locations at the site where they might be subject to a more aggressive environment, were certainly highlighted in the NUREG as factors in there.

MR. ALLEY: Correct.

MEMBER STETKAR: But that's sort of the front end. That's the frequency part of the risk equation if you -

MR. ALLEY: Absolutely. Right.

MEMBER STETKAR: The NUREG is basically silent on - in terms of things to think about versus the consequences. And I - that's why I was a little, I guess, taken aback at your answer in terms of what criteria you would expect people to use.

MR. ALLEY: Well, what I tried -

MR. HOLIAN: This is Brian Holian, Dave.

I think just to add, you know, I think the industry initiative adds onto risk and maybe we can

use some of those.

I know we've been close to NEI, you know. They put in the industry initiative on this. They've commented on this AMP. So, maybe we can, you know, hit it with that thought that we're not trying to - the groundwater initiative, I know, is what's in the back of your mind. That's separately, you know, could we all be influenced?

And including license renewal if the groundwater initiative, though that's separately being handled on a separate time frame, comes out with including all tritiated water into the scope of license renewal, well -

MEMBER STETKAR: And I'm not trying to downplay that. Certainly, you know, releases of - unmonitored releases of radioactivity to the environment is something that we should be concerned about, but -

MR. HOLIAN: And I think Dave, what Dave Alley is just making sure, he's been at most of these meetings that wants to make sure you're aware of that ongoing groundwater issue when he uses risk in that fashion.

But for this discussion, we use it the way NEI is using it or the way these in-house plants are

using it. Hey, we want to go dig up the higher risk - reactor risk type pipes first especially to make sure. And that's how we're using it here.

MEMBER STETKAR: Okay. Thank you.

MR. ALLEY: And as we go forward, I think that we'll be able to allay your fears a little bit in that we specifically look at code class and safety-related piping, and we specifically look at the hazmat piping. And that's where I feel certain that we will not fall into the trap that you are afraid we're falling into.

MEMBER STETKAR: That's good. That helps a lot. It's just because this concept of risk will be used to sort of define what those samples are -

MR. ALLEY: Right.

MEMBER STETKAR: - we want to make sure that we're not -

MR. ALLEY: We make absolutely certain that we are looking at both -

MEMBER STETKAR: Okay.

MR. ALLEY: - safety significant and these other nontraditional NRC safety issue pipes.

MEMBER SIEBER: It may be, though, that even if you all in this room understand what you're going to need to look at the words again to - the

words express what it is that we're talking about as far as scope is concerned.

MEMBER STETKAR: Thank you.

MR. ALLEY: The point is noted.

Okay. We're at concentrating on the high-risk pipes, and certainly the higher probability of corrosion is a place to look at. And as we mentioned, we're going to look at both traditional safety issue pipes, the code class, the safety-related pipes, and we're going to look at what we're calling hazmat pipes which are those which contain radioactive materials, diesel fuel, biocides, anything that happens to be buried and, of course, in scope for license renewal.

The third design - or the third philosophical point is that we want to design our preventive actions and inspections to prevent the adverse affects from leakage from each type of piping that we're considering.

So, for code class and safety-related piping, we're concentrating on ensuring that there is sufficient water flow through that pipe to accomplish its safety-related function.

For the hazmat piping, we're concentrating on ensuring that groundwater contamination does not occur as a result of those leaks.

So, we have separate objectives and separate methods from getting to the - for getting to those points.

The next philosophical point that we took into consideration as we designed the AMP, was that excavations can damage pipe. We can whack the pipe with the backhoe and bad things may happen down the road because we've now damaged the coating. Even if we attempt to repair the coating at that point, we may have problems there.

And, therefore, the AMP contains alternatives to excavation and visual inspection that can be used whenever possible or whenever it makes sense to the applicant.

These include hydrotests, internal inspections and monitoring active equipment such as jockey pumps for fire protection or fire maintenance.

MEMBER ARMIJO: What sort of internal inspections are you talking about in this case?

Would you do some volumetric inspection to get wall thickness information or what?

MR. ALLEY: That's of course the first one that comes to mind. There are intelligent pigs that are used in pipeline inspections very, very frequently, very commonly that can do ultrasonic

testing of wall thicknesses and identify the precise location of the pig at any given time.

The problem with using those in nuclear power plants is that in general in the past, they needed to have pig-launching stations and they haven't been able to handle short-radius elbows.

MEMBER ARMIJO: Yes.

MR. ALLEY: Those two problems are in the process of being resolved. There are now pigs that can be launched and retrieved with much less access to the pipe, and there are pigs that will handle standard-radius elbows.

So, if an applicant can demonstrate that they are capable of measuring wall thicknesses of pipes through internal inspections, that would certainly be of interest to us.

Okay. We'll switch gears a little bit and we'll talk about preventive actions that are included in the AMP. Preventive actions apply to all the piping, except the fire main piping.

Fire main piping is installed in accordance with NFPA 24. That standard in and of itself has certain requirements for preventive actions and we are not in a position where we're going to impose preventive actions on existing piping that were

not in place when it was installed.

There are separate recommendations for preventive actions for buried piping and tanks and for underground piping and tanks. We spell them out differently hopefully so that no one will get confused as to which set of recommendations we're talking about.

The preventive actions are based on the materials of construction, and they concern the coatings that are present, the backfill that's used and the presence or absence of cathodic protection.

MEMBER ARMIJO: Dave, before you go too far, could you tell me what a super austenitic stainless steel is?

MR. ALLEY: Those are six molybdenum stainless steel such as AL-6XN or - oh, I'm forgetting one of the other - 625 MO. Depends on the manufacturer, but they have a little bit higher chrome, a little bit higher nickel than common 300 series stainless steels, and they generally are high in molybdenum. They have a very high pitting resistance or PREN number and are relatively - in the environments that we are going to be seeing in the buried world, are relatively inert to that environment.

MEMBER ARMIJO: Okay. So, it's about two to three times the normal molybdenum content of -

MR. ALLEY: Yes.

MEMBER ARMIJO: - the 316?

MR. ALLEY: Yes.

MEMBER ARMIJO: And I've never heard of it before, and is it used?

MR. ALLEY: There are a few places where I've heard it being used, yes, sometimes associated with saltwater piping.

MEMBER SHACK: Also, 6XN is good for nick-type resistance.

MR. ALLEY: That's true as well.

MEMBER SHACK: I mean, it's like, you know, it's 20 chrome, 24 nickel, six moly.

MEMBER ARMIJO: Okay. Thank you.

MR. ALLEY: When you don't use those kind of numbers on a daily basis, they tend to escape your brain.

But in any case, super austenitic stainless steel is a stainless steel, and it's just significantly more corrosion resistant than the standard 300 series that we're used to dealing with.

So, anyway, what we see on this chart is that we have materials down the left-hand column, we

have coatings in the next column, cathodic protection in the middle one and backfill quality in the last.

There's a bunch of footnotes. Most of those footnotes are relatively self-explanatory. The ones that we may need to deal with is Footnote 3 for stainless steel and cementitious material as far as the coatings go. That means that whether or not a coating is recommended depends on the environment that the material would be placed in.

Certainly if you had soils with high chloride content, you'd want to coat your stainless steel.

Cathodic protection is recommended of course for steel, copper and aluminum. Those are the materials that are included in the NACE standard for external corrosion control, which is basically cathodic protection standard, and that's why they're there.

Footnote 5 which shows up again for stainless steel and cementitious materials, has to again do with the concept that if coatings are not required, then we don't care as much about the backfill - or that's Footnote 7. Excuse me.

Footnote 5 and 6 address the size of the aggregate material in the backfill. So, what we're

looking for is to make sure that there are no large rocks when we're dealing with coatings. And we're looking when we're dealing with polymeric materials, to ensure that the backfill is very fine so that we don't have slow mechanic growth in polymeric materials.

We'll shift from preventive actions, which is a separate category, everybody needs to address their preventive actions, into inspections, which is again another separate category.

There is some interaction between the two, but we want to make sure that everybody looks at these two in their entirety somewhat separate from each other.

Anyway, going into inspections, the categories considered are buried pipe, underground pipe, buried tanks and underground tanks. Again, we wanted to spell out all the conditions for each of these categories separately so that there would be no confusion, hopefully, on the part of the user as to which criteria apply to which situation.

These apply to code class or safety-related material or safety-related components, or hazmat components. Again, we're drawing the distinction between traditional safety functions and

between groundwater contamination issues.

There may be some in-scope piping that doesn't fall into either of these categories. And at least initially, that piping is not inspected. However, there are criteria in the AMP that talk about adverse findings and the expansion of the scope of inspection, and then you could wind up expanding the scope of the inspection to cover all the in-scope piping.

MEMBER ARMIJO: Okay. All in scope.

MR. ALLEY: All in-scope piping.

We clearly here have a regulatory definition for what license renewal can and should look at, and everything that's addressed in this AMP is in scope for license renewal. We make no attempt to expand beyond the regulatory basis on which the AMP was created.

MEMBER ARMIJO: Okay.

MR. ALLEY: The inspections that are specified in the tables, and we'll get to those in just a minute, are designed to accommodate the possibility that you may have poor preventive actions initially in years 30 to 40 when you're doing your first inspections. But they expect that in subsequent inspections that you'll have good preventive actions,

and we'll see how that relates.

The next table you probably can't read. We'll get to a piece of that in just a second, but this is the inspection table for buried piping. There are equivalent tables for underground piping, for buried tanks and for underground tanks. They're not quite as complex as this, but they exist.

Now, if we could move to the next slide, this shows just the inspections for buried steel piping. And what we're going to see here is that we've got materials, we've got preventive actions, we have inspections. And those inspections are differentiated between code class and safety-related material, and hazmat material.

And, again, that is to ensure that we're appropriately addressing the potential for leaks that could cause groundwater contamination, and leaks which could cause safety issues.

So, we're trying to address both sides of the picture and ensure that we're doing that in a reasonable manner that will provide relative assurance of - or reasonable assurance of maintenance of intended function.

MEMBER STETKAR: The frequency of these inspections begins -

MR. ALLEY: Once in ten years.

MEMBER STETKAR: Once every ten years starting within -

MR. ALLEY: The ten years prior.

MEMBER STETKAR: - ten years prior. Okay.

MR. ALLEY: So, there's really three inspection periods that the AMP is covering for this license renewal. 30 to 40, 40 to 50, 50 to 60.

The preventive actions column has C, D, E and F, and of course you can't tell anything about that at this point.

C refers to piping that's cathodically protected and that the availability of the cathodic protection has been good over time.

D refers to cathodic protection, but -

MEMBER BROWN: By availability, you mean ability to assess it being still in place?

MR. ALLEY: It's been installed for a relatively long period of time, and it's been plugged in, and people have been watching it and know that it works well.

MEMBER BROWN: Okay. That's fine. All right. Thank you.

MEMBER ARMIJO: Do you have kind of a number that you could assign like 90 percent of the

time?

MR. ALLEY: 90 percent is the number.

MEMBER ARMIJO: Okay.

MR. ALLEY: Let me go and I will read to you - I figured that this question might come.

C taken directly out of the AMP says, "External corrosion control is provided in accordance with NACE SPO169-2007. Each cathodic protection system was; one, installed at least five years prior to the period of extended operation and was operational for 90 percent of the time during that five-year period, or; two, was operational for 90 percent of the time since the last inspection conducted under this program.

So, we have lots of nice words that don't translate very well in a presentation, but they are in fact there. And 90 percent is the sort of magic number that we're using as far as availability in a time sequence.

We expect - cathodic protection system may have numerous rectifiers and numerous inspection points. We expect all of them to be working, but certain one of those we understand may find a fault at any given period fo time, and we want to ensure that adequate time for repair can be made without undue

penalty to the applicant.

MEMBER BROWN: Does the 90 percent, does it encompass a fixed - I mean, a monitoring schedule?

In other words, do you have something -

MR. ALLEY: Yes.

MEMBER BROWN: So, somebody is required or there's an automatic recording or alarms are given and a time check is done so there's an actual metric of times?

MR. ALLEY: This -

MEMBER BROWN: Jack's shaking his head one way, and you're saying yes.

MR. ALLEY: The NACE standard says that you will look at your rectifiers at least every other month. And the NACE standard also -

MEMBER BROWN: When you say look at them, I mean, I can go look at a rectifier. Yeah, it's there. It's a hunk of silicon with wires sticking out of it.

MR. ALLEY: Well, it's got a nice little green light on it that says it's working.

MEMBER BROWN: Okay. So, there's a visual way of knowing that it's actually performing its function.

MR. ALLEY: There's a visual way to know that electricity is going in and electricity is going

out.

MEMBER BROWN: That's what I was looking for.

MR. ALLEY: Now, once a year the NACE standard also requires that you conduct a survey to ensure that all the pieces of pipe that are being protected have the appropriate voltage on a minus 850 millivolts in order to - that's for steel, mind you - in order to ensure that it's being properly protected.

Copper and aluminum have different standards and there are a hundred millivolts difference between when it's turned on and when it's turned off.

MEMBER BROWN: Okay.

MR. ALLEY: So, the concept is that there are in the NACE standard, but not specifically in the AMP, requirements to look at the system and to evaluate its performance. And that's what we're relying on here.

We're trying to stay as close to industry standards as we can with the AMP.

MEMBER BROWN: Is it an operating monitoring or is there actually an alarm or something that annunciates if you go inside or outside the bands of the current that's required to be there?

MR. ALLEY: There is no requirement in the standard to have an alarm system. And, therefore, the AMP does not require one.

Now, I'm sure that some plants have more sophisticated monitoring equipment than others, but there's no requirement in the AMP to -

MEMBER BROWN: My question is related to if somebody is wandering by and saying oh, the light's on and he only does it every once a week, then it's kind of hard to say - come up with a metric of 90 percent. That's -

MR. ALLEY: Over the long haul, and we're talking a ten-year interval here -

MEMBER BROWN: Okay.

MR. ALLEY: - you can still make your 90 percent.

MEMBER BROWN: All right. So, if you miss it for a week over a - okay. I got it.

MR. ALLEY: Let's face it. The corrosion rate on buried pipe might be 20 mills per year. If you lose the cathodic protection system for a month, it's not - the world is not going to end.

MEMBER BROWN: I got it. I just wanted to understand what the metric was that you were using.

MR. ALLEY: Yes, the world won't end if you

have a short outage.

MEMBER BROWN: Okay. Thank you.

MR. ALLEY: C is cathodic protection that's really good. D is cathodic protection with lower availability. E is no cathodic protection, but good coatings and backfill. And F is life is not so good.

And what we've done is in the code class, these are individual inspections. Each inspection has to be a hole that's ten feet long. For the hazmat, that's percentages of piping.

So, we're trying to ensure that we're looking at the right amount of pipe in each class to get a good idea of whether there is the potential for leaks to occur.

We do provide alternatives of course to visual inspections. For fire mains, we flow test either at one-year intervals or we can monitor the jockey pump activity. That of course is an instantaneous readout of the health of the system.

For any type of pipe, we permit hydrostatic testing or internal inspections if you can demonstrate that your internal inspection technique is adequate to do what it needs to do.

So in summary, the intent is to manage aging. It is best accomplished through preventive

actions. The necessary preventive actions depend on the material and the environment involved.

Look at the high-priority piping. Be consistent in the way that you manage that with the industry guidelines.

So, we look at the oil and gas pipelines. They rely a significant amount on NACE SPO169. Critical component to managing aging.

Concentrate on the important piping. Hazmat piping, code class piping, do both. Neither one is good in and of itself. The level of inspection should differ.

Inspections are necessary. The level of inspection depends on the material and the preventive actions in place. Good preventive actions are anticipated in the AMP by the second inspection, and alternates to visual inspections have been provided.

I think the last thing that I want to leave with you is a comment on the importance of preventive actions, and that was provided by the folks at Duane Arnold in their presentation before the full committee a couple of weeks ago.

They said we had no problems with buried pipes where we have cathodic protection. But where we don't have cathodic protection, we have had problems.

And that concludes my remarks.

MEMBER BROWN: If I could, you made a comment - I think you made the comment earlier and I didn't interrupt at that time, that there were some circumstances of buried piping where - and I'm talking about the three classes that you can use cathodic in the steel, copper and aluminum.

MR. ALLEY: Right.

MEMBER BROWN: The underground piping that you could not use cathodic protection.

Did I misunderstand that statement or -

MR. ALLEY: I hope I didn't say that.

MEMBER BROWN: That's the way I read the statement that there was some underground piping that could not be cathodically protected.

If it was a materials issue, I was just trying to -

MR. ALLEY: It's not a materials issue. Steel piping can always be cathodically protected as - when it's in soil, can be protected.

Now, there are certain problems in nuclear power plants, in oil refineries, in pumping stations where you have an interwoven network of piping where it can become more difficult to protect the piping because you may have stray currents or currents

running between one pipe and another.

Unless that system is fully designed for cathodic protection, you can have certain difficulties.

You can also have certain difficulties in measuring the effectiveness of the cathodic protection because the pipes talk to each other. And so when you make the measurement of what the pipe is protected at, what its voltage is, you may or may not be under - you may or may not know what the particular pipe that you're looking at is, because it may be influenced by the pipe next door.

So, there are certain limitations in nuclear power plants for cathodic protection. Most of them are related to the measurement of the effectiveness, but all it means is that you have to be careful as you implement a cathodic protection system or as you monitor a cathodic protection system and that you have the appropriately trained people doing it.

MEMBER BROWN: So, proximity matters.

MR. ALLEY: Proximity matters a lot.

MEMBER BROWN: I can imagine that.

Are there any rules for putting these systems in initially that they don't have proximity so

that you can actually get the protection you want?

MR. ALLEY: If you start getting into a close proximity scenario, you have to be careful how you interconnect those pipes and how you ground them.

MEMBER BROWN: Okay.

MEMBER ARMIJO: Those are the NACE standards, the National Corrosion Engineer Guides.

MEMBER BROWN: On ships, we didn't worry. I mean, you just hooked them on there. That's why I'm asking questions.

MR. ALLEY: It's a little bit more complicated with buried pipes. And if you have a light rail system, electric trains running next door, it gets a little complicated.

MEMBER BROWN: You drive ships in saltwater.

MEMBER ARMIJO: You had a good electrolyte, Charlie.

MR. ALLEY: Yes, there are certain issues and the interconnection and grounding of piping below grade and above grade starts to interact.

MEMBER BROWN: All right.

MR. ALLEY: But if there are additional questions, I think maybe we can handle them later.

MEMBER BROWN: That's fine.

MEMBER SIEBER: Have you ever seen any interaction between the station's grounding mat and buried piping?

MR. ALLEY: Absolutely. That is one of the issues that is of interest as you attempt to either install or to monitor your cathodic protection system. In some places, they isolate between above-ground piping and below-ground piping, and you have to make sure that those isolations are good as well.

MEMBER SIEBER: You can get five to ten bolts differential between the grounding mat and building steel or grounded machinery which is - really gives you a lot of corrosion.

MR. ALLEY: Absolutely. There are reasons that you want to have knowledgeable professionals doing this kind of work.

MEMBER SIEBER: Well, I've experienced some of those kinds of problems.

(Laughter.)

MR. ALLEY: Yes, I have no doubt.

MEMBER STETKAR: Dave, I had a question. The table for C, the buried tanks table -

MR. ALLEY: Yes.

MEMBER STETKAR: - basically tells me that for - and I'll stick to the steel, copper and aluminum

- that I only inspect those tanks if I have essentially no protection whatsoever.

In other words as I read that table, it has - it has the C, D and E classifications particularly focused on cathodic protection, and C - similar definitions to what you -

MR. ALLEY: Right. Correct.

MEMBER STETKAR: - told us for the buried piping. But where the X appears in that table, is only under the condition where I have no cathodic protection regardless of whether it was reliable or -

MR. ALLEY: Correct.

MEMBER STETKAR: - installed or anything.

MR. ALLEY: Correct.

MEMBER STETKAR: Is there a fundamental basis for that difference?

In the steel piping, you have this sort of graded inspection program based on the quality of your prevention. And on the tanks, it basically says the only time I need to inspect them is if I have no protection whatsoever.

MR. ALLEY: Correct. And that was intentional.

One of the thought processes that went into that was that many of the tanks have an AMP that

applies to the inside of the tank. The fuel oil tanks are addressed - the inside of the fuel oil tanks are addressed by the fuel oil AMP. And one of the requirements of that AMP is a periodic inspection of the tank from the inside to ensure that you haven't lost too much wall thickness.

So, to some extent, it's not explicitly stated here, but to some extent we're relying on other AMPs -

MEMBER STETKAR: Thanks.

MR. ALLEY: - to help us -

MEMBER STETKAR: I didn't appreciate that because, you know, contrary to what I might say here, I did not read all the AMPs. So, I didn't try to think about how the different tank AMPs were talking to one another.

MR. ALLEY: Yes.

MEMBER STETKAR: Thanks.

MR. ALLEY: They do talk to each other and we are relying to some extent -

MEMBER STETKAR: Thanks.

MR. ALLEY: - on that.

CHAIRMAN BONACA: Okay. Thank you. That was very informative.

MR. GRAMM: Barry Elliot from the staff is

going to come up now to talk about a new aging management program for PWR internals. This program was based on industry efforts, particularly EPRI, with the material reliabilities program. And Barry is going to talk about how that fed into the aging management program that you saw in the GALL report.

MR. ELLIOT: Okay. I look around the table and I see some familiar faces and some new faces, and I heard Bill Shack's voice.

I'm going to start off with I just want to give a brief background on how this program developed so everybody gets on board.

The license renewal process, the first couple of years we reviewed on the order of five plants from - PWRs from 1999 to 2002. We also had for PWR internals, a Westinghouse and a Babcock and Wilcox program.

After we reviewed the first five programs and reviewed the individual Westinghouse and B&W programs, we decided, and the industry decided, that we really needed a comprehensive program to manage the aging effects for all the PWR internals.

So, in 2002 EPRI began a program, a comprehensive evaluation of all PWR internals per operating reactors. This culminated in MRP-227. It

was submitted for staff review in 2009.

MRP-227 identifies PWR internal components and inspections required to ensure the aging effects are adequately managed for the period of extended operation. MRP-228 identifies requirements for inspection and qualification of non-destructive examination for PWR internals.

To implement MRP-227 and MRP-228, GALL has an aging management program as described in AMP 16A and a whole series of aging management line items.

The aging management program described in 16A just follows the ten elements in SRP Appendix A1 and it implements actually the recommendations and requirements in MRP-227 and MRP-228 within those guidelines.

MRP-227 Rev 0 is currently being reviewed by the staff. Its draft is - the draft safety evaluation is expected to be issued December 31st of this year. Final SER is to be issued - scheduled to be issued in March of next year.

The next slide.

MEMBER ARMIJO: Just how much - to what extent does the PWR vessel internals program compare to the BWR?

MR. ELLIOT: There's an -

MEMBER ARMIJO: Same kind of issues?

Same type -

MR. ELLIOT: Well -

MEMBER ARMIJO: Or is it something really different?

MR. ELLIOT: It's much different.

BWRs have a lot of cracking, irradiation-assisted stress corrosion cracking. That's the primary - a lot of the emphasis.

MEMBER ARMIJO: Yes, I know that.

MR. ELLIOT: This is - looks at all kinds of aging effects and it's much more, you know, it's, I think, more comprehensive in that sense.

MEMBER ARMIJO: Primarily mechanical issues, radiation damage -

MR. ELLIOT: It looks at aging effects - want to go into a lot of detail, the aging effects that it looks at, looks at cracking in the mechanisms that - the mechanisms that are evaluated as part of cracking are stress corrosion cracking, PWSCC, irradiation-assisted stress corrosion cracking and fatigue. Also looked at our loss of material due to wear. Loss of fracture toughness due to thermal aging or neutron embrittlement. Change in dimension due to void swelling and loss of pre-load due to thermal and

irradiation-enhanced stress relaxation.

Those are the effects that the MRP-227 looks at -

MEMBER ARMIJO: Thank you.

MR. ELLIOT: - and is intent on managing.

And the AMR line items are also a part of the program. MRP submitted proposed AMR line items for Westinghouse, Combustion Engineering and Babcock and Wilcox designed vessels all based on Rev MRP-227.

We're going to get back to that in a few minutes. We need to make some changes to that. I wanted to highlight one of the differences between GALL 2005 and 2010.

GALL 2005 recommended applicants to commit to participate, evaluate and implement an industry program for vessel internals and to provide an inspection plan no less than 24 months before entering the period of extended operation.

It was the intent of the inspection plan as a way of the NRC reviewing the program that each individual licensee was going to propose to make sure it was consistent with our MRP-227, as well as any line-specific action items result from the safety evaluation.

Since we now have a program and we will

have a safety evaluation, we don't have to wait 24 months anymore for submittal of - the 24-month requirement is not necessary. So, now we are recommending that they submit the inspection plan for vessel internals for NRC review and approval with the application for license renewal in the future.

CHAIRMAN BONACA: Is this plan that they will use complete and cover the basis?

What I mean is that -

MR. ELLIOT: The -

CHAIRMAN BONACA: - we have had a number of instances where -

MR. ELLIOT: The safety evaluation is not complete. We will complete a draft safety evaluation this year, the end of this year. But in our aging management program, we include within the scope of the program plant-specific action items that - as a general highlight that applicants must implement the plant-specific action items.

CHAIRMAN BONACA: The reason why I'm asking the question is that for the boilers we got a number of applications that were set in locations which were inaccessible. And the answer was the area is inaccessible, so we would not inspect it until the industry has developed the tool and while you already

are doing that, I believe that there are still a number of commitments or a measure in some of the past -

MR. ELLIOT: I'm going to - as far as this presentation, one of the other slides talks about inaccessible, and I'll talk about inaccessible at that time.

CHAIRMAN BONACA: Yes, I would like to know if this also has this kind of commitments that are open ended.

MR. ELLIOT: Is what -

CHAIRMAN BONACA: What I'm saying is commitments which are open ended in the sense that the item isn't inspectible because it is not accessible. Okay. And will be inspected when the technique will be available.

MR. ELLIOT: This program, we discuss inaccessible and what to do about inaccessible as part of the program.

CHAIRMAN BONACA: Okay.

MR. ELLIOT: And I'll discuss it on another slide.

Do you want me to go to that slide now?

CHAIRMAN BONACA: No, that's okay. When you get there, you can tell me about it.

MR. ELLIOT: Okay. These are the modifications the NRC made to the AMR line items. As I told you before, there were - the mechanisms were cracking, loss of material, etcetera, etcetera.

And for the cracking mechanisms, we decided that the applicable aging management programs was water chemistry and the PWR vessel internals program. All the other aging effects that needed to be managed, we didn't need the water chemistry program. We just needed a vessel internals program.

A little more background. The AMR line items identify for each component that we included in GALL, the aging effect that needs to be managed and the program that needs to be implemented to manage that aging effect.

Now, as part of the MRP-227 program, they went through a process and they classified each component that has an aging effect that needs to be managed during the license renewal program as a primary component, an expansion component, an existing component or a no additional measures component.

Now, as part of generating our AMR line items, each component that is within the GALL document is classified as either a primary component, an expansion component or an existing component within

the scope of MRP-227.

Each primary and expansion component is cross-referenced so that if you find problems in the primary component, you know to go to the expansion component to look for additional inspections.

Next slide. All the aging effects and components, there are two parts of the - I just want to go through the report MRP-227 real quick.

Section 3 of the report has the aging effects, and Section 4 has the aging management program that is needed to manage those aging effects.

We saw some discrepancy between the tables in Section 3 and Section 4 and that's being alleviated by the MRP now, but all of our GALL line items include only aging effects that are in Section 3.

We also have a line item that's called components that are - no additional measures. There are over a hundred Westinghouse and Babcock and Wilcox components in PWR internals, and about 80 in combustion engineering. There are only like 15 percent of the components that are being inspected as part of this program.

So, this is - the no additional measures is just that there is - there are other components. Many of these components are core support structures

and they are examined in accordance with AMP XI.M1 as part of the ASME Code Core Support Structure program.

Next. Okay. Now, we get to inaccessible locations. The AMR line item, we have an additional AMR line item which is for further evaluation for inaccessible locations.

Some of the inspections we have done in the past and we know where the inaccessible locations are, some of the inspections are brand new, and we will find out that - we might find out that there are still inaccessible - other inaccessible locations.

The inaccessible locations are going to be evaluated on a plant-specific basis. So, we're going to need a way in this program commitment that as they go along, to tell us what they find out, where the inaccessible locations are and how they're going to manage those effects.

Currently, there are two locations that I know of that are in the program that are inaccessible, but they're both in expansion components. So, they become an issue only after we find a defect in the primary component.

If we find a defect in those primary components, then the licensee has to, according to AMR line item, provide us a plant-specific reason for

that, you know, you could still either evaluate or you would have to repair or replace those components.

Two components are not - the two PWR internals are not evaluated. They don't have a program. the Westinghouse guide tube support pin in the control guide tube assemblies, and the combustion engineering lower incore instrumentation thimble tubes do not have a program in this MRP-227. So, those will be plant-specific and they are identified for further evaluation.

MEMBER SIEBER: Yes, let me ask about that.

The slip pin problem was a 1980s problem where the fingers on the split pins would break off. And a lot of Westinghouse plants replaced those pins at that time. And it was blamed on the metallurgy of the pin itself and - which the replacement pins corrected that - supposedly corrected that issue.

Since the 1980s, has there been additional split pin breakage and malfunctions that give rise to additional surveillance?

MR. ELLIOT: Well, I don't have it.

Tim, do you have - Tim is here from the -

MR. WELLS: Yes, I'm here representing MRP.

The reason we didn't address split pins in 227 is because of a replacement campaign where the

split pins were replaced. All the split pins have been replaced of the original X750D, some have been replaced in the second campaign stainless steel, but it's all on a plant-specific schedule, you know, time to run when they did it.

We didn't feel we could write generic guidance other than to say that you need to have a - you need to address this item.

We put it in the text, not in the requirements table of 227. It's not really an inspection as much as it is a replacement campaign at the appropriate time and -

(Simultaneous speaking.)

MR. WELLS: - at a particular plant.

MEMBER SIEBER: Let me ask another question. Another issue that arose around that time was failures of baffle bolts.

MR. ELLIOT: Baffle components?

MEMBER SIEBER: Baffle bolts.

MR. ELLIOT: Baffle bolts.

MEMBER SIEBER: You know, the baffles are bolted together. When the bolts break, you end up with a gap. The gap gives what they call baffle jetting to the fuel assemblies which causes vibration, excessive wear and fuel failures on peripheral

assemblies.

I didn't see any mention of baffle bolt inspections or -

MR. ELLIOT: Okay. Baffle bolt inspections are on AMR line items. And it is at a primary component, I believe, isn't it?

It's a primary component. So, the baffle bolts, you know, would be a first inspection. It would have an inspection immediately when they implement this program.

MEMBER SIEBER: Okay. Now, the inspections are very difficult because of the location. You have to go down between the thermal shield and the baffle to get to them and shoot a right angle beam through the bolt to see if it's continuous. I think most plants have done that already too.

Would this be a periodic inspection?

MR. ELLIOT: Yes, it's a periodic inspection. Primary inspections are periodic. It's a ten-year period though.

MEMBER SIEBER: Yes. Okay. Okay. Thank you.

MEMBER ARMIJO: I just want to make sure I understand your terminology.

You have components that are inaccessible

or in inaccessible locations, but they are replaceable and repairable.

MR. ELLIOT: Right.

MEMBER ARMIJO: So, you're talking in terms of some sort of inspection equipment that would be - well, there is no inspection equipment available to inspect those. So, how do you know they need to be repaired or replaced?

MR. ELLIOT: If it's inaccessible, there is no inspection.

MEMBER ARMIJO: Right.

MR. ELLIOT: You're going to have to justify -

MEMBER ARMIJO: But if you can repair it or replace it, it's got to be accessible.

MR. ELLIOT: Right.

MEMBER ARMIJO: So, I don't understand your -

MR. WELLS: Really, what we mean by inaccessible for the most part, is inaccessible without disassembly.

MEMBER ARMIJO: Right. It's very inconvenient.

MR. WELLS: Well, that's right. That's why you would have to justify not disassembly, or you

could go ahead and disassemble either to inspect or do a replacement campaign.

MEMBER ARMIJO: But what that means is that the only way you know if something is wrong is if it breaks.

MR. WELLS: I'm sorry. I -

MEMBER ARMIJO: The only way you might know that something is going wrong if you can't inspect it, is it loses its function. It breaks and gives you some other indication that something's gone wrong, or it breaks and there is no indication.

MR. WELLS: But we reviewed the primary exams to be a pre-trip for -

MR. ELLIOT: For the two components that so far have been identified as inaccessible, they're expansion components. They are primary components that are the surrogate for it and its being inspected. And those components are more susceptible to the aging effects than are the inaccessible component.

MEMBER ARMIJO: So, you're saying if those aren't cracking, then the expansions are less likely to be cracking?

MR. ELLIOT: If those aren't cracking, then the expansion component doesn't have to be inspected. But if they are cracking, then you have to either

take it apart and inspect it or you're going to have to repair and replace those components.

It's up to the licensee to decide what path they want to take.

MEMBER ARMIJO: It's sort of canary in a coal mine type thing.

MR. ELLIOT: Sometimes it's easier probably to repair and replace than it is to -

MEMBER ARMIJO: Inspect.

MR. ELLIOT: - inspect it, yes.

Another area for further evaluation is reduction in ductility for fracture toughness due to neutron irradiation for Babcock & Wilcox reactor vessel internals. And this is the TLAA for that.

Do we have anymore for that?

(Off-record comments.)

MEMBER REMPE: How do you do that?

Do you take samples?

MR. ELLIOT: For what?

MEMBER REMPE: For reduction in ductility.

MR. ELLIOT: No. What they're going to do is since it's an analysis, they know how much ductility is lost over - how much neutron irradiation the vessel internals get. And it was originally done for 40 years, and now they've got to expand the

analysis to 60 years.

They have curves that determine how much ductility is lost.

MEMBER REMPE: Don't they benchmark it with irradiation samples, coupons or something?

MR. ELLIOT: No, this is not a benchmark program.

MEMBER REMPE: All right.

MEMBER BROWN: How do you get away with that?

MR. ELLIOT: The benchmark program is for the vessel itself.

MEMBER BROWN: No, I know, but I mean for the -

MR. ELLIOT: Not for the vessel internal.

MEMBER BROWN: I'm just - I have no idea. Okay. I'm not a materials person.

My question is how do you extrapolate the reduction in ductility if you don't have some data points?

MR. ELLIOT: Oh, we have -

MEMBER BROWN: Are you extrapolating as opposed to -

MR. ELLIOT: We have test data for irradiation.

MEMBER BROWN: That's what she was asking.

MEMBER REMPE: That's what I was asking.

MR. ELLIOT: Okay. We don't have it in the vessel.

MEMBER BROWN: That's fine.

MR. ELLIOT: We have test data -

MEMBER REMPE: From other samples.

MR. ELLIOT: Yes, from other samples. We don't have it in the vessel -

MEMBER BROWN: Okay.

MR. ELLIOT: - but we do have it in the vessel for the - reactor pressure vessel. This one, we do not.

MEMBER BROWN: So, it's based on other test reactor type data, and then the equivalent testing that you do after it's been irradiated, etcetera -

MR. ELLIOT: Right.

MEMBER BROWN: - and temperature wise. Okay. Thank you.

MR. GRAMM: Thank you, Barry.

MEMBER BROWN: Before you leave, I'm going to pull - if I can find the page, there was one curious word that I had to ask you about back on Slide 44.

I mean, here we're doing life extensions

and you use the words GALL 2005 recommended that applicants commit. And then 2010 it's recommended that they submit an inspection.

What if they don't?

MR. ELLIOT: What if they don't?

MEMBER BROWN: Yes. I mean, you recommend that they inspect it, but you don't - it's not required, it sounds like.

MR. ELLIOT: You mean, is that required that they submit it?

MEMBER BROWN: Well, your words -

MR. ELLIOT: We have commitment from them that they will do it.

MEMBER BROWN: You recommend -

MR. ELLIOT: You can only recommend. We can't -

MEMBER BROWN: Well, that's what you -

MR. ELLIOT: We can't -

MEMBER BROWN: Well, but then you reject their license - you reject their -

MR. ELLIOT: We could do a lot of things.

(Simultaneous speaking.)

MR. ELLIOT: I mean, we can't twist anybody's arm.

MEMBER BROWN: Well, I mean, yes, you can.

I mean, you've got the ultimate point. I mean, nobody in the - I don't want to use those - that's too strong a word, but to me it would -

MEMBER STETKAR: Charlie, a NUREG is not law.

MEMBER BROWN: I understand that.

MR. ELLIOT: This is a recommended program from the NRC.

MEMBER BROWN: All right.

MR. ELLIOT: If they could do an alternative program, they could do something else and we'd have to review it.

MEMBER BROWN: Okay. All right.

MR. HOLIAN: This is Brian Holian. This is worth - I'm glad you brought that point up, recommended. I almost wanted to say that again. I know at the last ACRS meeting where we just gave an overview of license renewal aspects, I do have to remind it seems not only me, I need to be reminded myself, but my management, my staff and the industry on GALL is one way of doing it.

I run into troubles when sometimes the industry will say well, I satisfied GALL. And we continue to say well, on your plan and with your specific operating experience, we need more than GALL.

So, that's one area I just wanted to bring up earlier. And then in this case once again, the industry can come in with something else if they're smarter or have a plant-specific application that they think is better.

MEMBER BROWN: It's just the point is GALL has some pretty specific, you know, very highly -

MR. HOLIAN: Prescriptive like a -

MEMBER BROWN: It's got the real programs that actually allow you to draw a conclusion that everything is okay.

If they came in with something else, I imagine now you're going to pull us to a different wicket.

MR. HOLIAN: It does. It takes longer.

MEMBER BROWN: Which it seems like it would be very difficult to do that.

MR. HOLIAN: It is.

MEMBER BROWN: So, in fact, you have a very strong hammer.

MR. HOLIAN: We do, and it's supposed to be an efficiency tool.

(Off-record comments.)

CHAIRMAN BONACA: Okay. Let's go to fatigue.

MR. GRAMM: We have two more topics to cover in the mechanical area. The first is Plan 1 for fatigue, and Erach Patel and Allen Hiser are going to come to the table to deal with that.

And then we'll have a backup presentation. Allen will stick around to talk about AMP M35 and so we'll run through some small bore piping.

MR. PATEL: This is a program in the TLAA section of the GALL report, which is Chapter 10. It's the fatigue monitoring program. The initial title of this was Metal Fatigue for Reactor Coolant Pressure Boundary. However, with this program, AMP compresses more than just reactor coolant pressure boundary. So, we renamed the program to Fatigue Monitoring.

Some of the basic changes we made are we just updated the program description, etcetera, to make sure that we had proper background basis, assumptions, and basis for environmental fatigue calculation is properly called out.

We updated and provided specific guidance for how you calculate environmentally-adjusted cumulative usage factor for carbon and low alloy steels, austenitic stainless steels and for nickel alloys. We provided the NUREG and how you combine them.

We clarified the scope to very clearly establish that this includes locations identified in NUREG/CR-6260 as a minimum which we ordered that, and additional plant-specific component locations that they may be more limiting than those considered in NUREG/CR-6260.

And we provided some clear basis on how the tracking of the cycles can be used to ensure the validity of current designs. In other words in monitoring and training, make sure that the CUF remains below the design limit minimizing the fatigue of the components.

And the understanding is that cracking is assumed to have started when CUF reaches a value of 1.0. If you're monitoring and planning it and you're planning towards that, then it gives indication of what additional steps to take to ensure that it remain below 1.0.

This TLAA then brings into the SRP-LR Section 4.3, which is Metal Fatigue. Again, the TLAA usually is dispositioned in three categories. What we call Category 1, 2 and 3.

One will be that it remains valid for the period of extended operation. Two being we projected it to the end of extended cycle. And Three being that

we're going to manage it.

In the 2005 version, this was not very clearly established in all of the different subsections that we had. So, this primarily clarified and made sure that all those three categories were clearly established for all of the different subsections that we had in there.

We also consolidate - we had separate section for 31.1 components and separate for Code Class 2 and 3. The concerns are those two together because there would be some components, 31.1 components of Code Class 2 and 3 that may have been designed to Section III requirements. In which case they would fall under this particular TLAA program.

And we added section that we didn't have before that may be applicable to BWR vessel internal components. And another section for potential fatigue flaw growth analyses. And the environmental fatigue cumulative factor section that we addressed in M1 as to which NUREG to use for carbon low alloy, etcetera, were carried forward into Section 4.3.

CHAIRMAN BONACA: Good.

MEMBER STETKAR: We don't have these, do we?

MR. GRAMM: Unfortunately, no.

MEMBER STETKAR: Bill, for your edification, this is the blank slide in your package. It's page 48A.

MR. GRAMM: You did receive a slide very, very similar to this as part of - this was - we actually presented this at the May workshop. And so you have the material. It just wasn't included in the package with the slides for today.

DR. HISER: Since we have a blank slide for Bill, I'll just sort of read through real quickly and maybe we'll get to some questions.

Program description of M35, onetime inspection of ASME Code Class 1 small bore piping, program description was revised to explicitly identify that socket welds are included.

There was a significant ambiguity in the AMP in the way applicants interpreted and, in all honesty, in the way that staff had implemented it. So, we wanted to make it clear that socket welds are a part of this program.

We clarified the program applicability to plants that have not experienced cracking or have effectively mitigated cracking from vibratory loading through design changes.

And I think we discussed that somewhat in

some of the recent subcommittee and maybe even full committee meetings where if one has a vibratory loading in a specific location and has a failure, goes back and makes design changes and positively identifies that there have been no more failures, then that would enable the applicant to continue to use a onetime program.

If there have been failures that have not been mitigated through design changes, then - or the design changes were not adequate if they continue to have failures, then a plant-specific periodic inspection program is needed by that applicant.

In terms of detection of aging effects, the AMP was revised to clearly identify that for socket welds, that an applicant can perform an opportunistic destructive examination as an alternative to volumetric examinations. The word "opportunistic" is important. We don't want to direct destructive examinations. But if an applicant is making design changes to the plant, is doing some replacement that would involve replacement of socket welds, then that opportunity to do a destructive examination is credited within this program.

The AMP was also revised to clarify that for full penetration welds, that only volumetric

examination is recommended. The geometry here lends itself more readily to a volumetric exam than would a socket weld.

In addition, we clarified that the volumetric examinations in particular for the socket welds are to be - or can be performed using demonstrated techniques.

And this is where we, again, had some clarification issues with the industry. The word "qualified," I think, was in there previously and it was interpreted by the industry to mean a performance demonstration initiative, sort of a qualification. And we wanted to clearly indicate that this is a technique that the applicant has demonstrated in the tech, the types of degradation that they're looking for.

So, it becomes more of a go/no-go inspection. If you - since it's a onetime exam, you're looking for degradation. If you find it, then you've become a periodic program because now you have identified cracking.

The qualification really relates more to depth sizing and characterization of a flaw. This program really cares that you - if you have a flaw or not.

If you need to characterize it, that really falls under a repair, a replacement or accept sort of an evaluation. And that really is not a part of this program specifically.

Clearly, it's important to the applicant that they need to be able to characterize the flaw, but it doesn't - it isn't necessary for this program.

That's all that I have, if you have questions.

CHAIR BONACA: If you inspect, okay, and find the plant at 40 years of operation or 35, does not have any welds failed, okay, now you're committing not to inspect anymore until the end of life, 60 years.

DR. HISER: That's correct. This program is mainly looking at environmental effects. It is coupled to a water chemistry program and it's really - this onetime inspection is principally looking at verification that the water chemistry program has been effective in -

CHAIRMAN BONACA: Let me continue my thought process.

Then we are seeing other plants coming up with welds cracked, okay, and now this is becoming a more common phenomenon.

Now, how far do you have to go looking at the old plants, to conclude that all of them should have a program of inspection?

I mean, at some point it came out, you know, I don't know what the criteria could be, but you conclude that you have to be - should have inspection in all the plants.

DR. HISER: Yes, that falls back into the back-fit discussion that I know we've addressed several times at subcommittee meetings. And we do not have at this time, I believe, a specific activity that would enable us to go back and back-fit each plant through a very formal process.

I think as Brian has spoken, there are other indirect ways that we are looking to try to see how applicants who have already been approved for license renewal through our inspection process in particular, to see how they have picked up on industry OpE and how they have implemented that within their program.

So, I think there is an expectation that they at least need to be cognizant of the OpE and assess the significance of it to their plant. But we do not have right now a mechanism that we can go in and force the 59 plants that already have renewed

licenses, to implement a socket weld inspection program.

MR. DOZIER: Yes, and let me interject a little on that. Realize that these are the inspections for the onetime inspection program, but these also - they do get as part of their Part 50, they do get BT2 examinations also.

So, they - I almost heard - I think I heard your question as they wasn't being looked at at all. The truth is they are being looked at as BT2.

Now, we have added things based on their - what type of failure mechanism that we are seeing. We have added some specific things.

DR. HISER: Yes.

MR. DOZIER: You know, for example, in high-cycle fatigue, you know, we see that as a vibration issue. And so we want to look - and that vibration issue is from the inside of the weld. And so we can't see that from visual detection. And also it would have to totally break before we could see it through the BT2 examination. So, that's why we have this additional volumetric inspection for the small bore piping.

Similarly with stress growth and also we saw with different sample sizes in some of these

presentations, sometimes what was recognized was stress corrosion cracking. It could be more of bad chemistry or, you know, increase in chloride content, things of that nature.

And so it wasn't a vibration issue that was kind of isolated to a system. It was all over the place because the chemistry program goes into all of those valves.

Did that kind of address that question?

CHAIRMAN BONACA: I think so. I mean, I'm not going to - I'm only saying that many of this aging mechanism if you look at the performance today at 35 years of age, is not really a problem. Is that you will not have a problem in the next 25 years of age because, I mean, components age and probably things will get worse.

And I think that at some point as you're doing your cracking issues, you're making sure that they - you have the proper actions responding to that.

DR. HISER: Now, another thing that I think we'll clearly use in the future is plants do these inspections. If they start to find cracking, then that may change the way that the NRC deals with that issue.

CHAIRMAN BONACA: Yes.

DR. HISER: But at this point, that's speculative. We will have more information from those inspections.

CHAIRMAN BONACA: As you did for the buried piping. I mean, because five years ago we didn't have a problem with that, and now we do.

DR. HISER: Yes.

MR. DOZIER: Actually, even in this particular case in the case of stress corrosion cracking, we had a lot of problems actually in the `80s if you look at the operating experience. And industry at that time, was proactive in making several design changes to increase their thing.

Now, we're going one step further, though, in that we're looking to see that hey, you know, if you fixed your stress corrosion cracking problem, you know, that's, you know, through a design change, we can understand that.

But if you're seeing stress corrosion cracking, say, in 2004 like we actually saw in one plant, then we expect more.

CHAIRMAN BONACA: Thank you.

MEMBER STETKAR: Allen?

DR. HISER: Yes.

MEMBER STETKAR: I hope you anticipated

this one. I was kind of disappointed because I was over the last several license renewal applications that we've gone through, I've asked about what sort of basis does the staff use for establishing a reasonable sample size for these inspections. And I was told, well, when we see Rev 2 of the GALL, you'll be satisfied.

I'll read the quote just to get it on the record. "This inspection should be performed at a sufficient number of locations to ensure an adequate sample."

I certainly can't argue with that statement. Indeed, that sounds reasonable.

"This number or sample size is based on susceptibility, inspectibility, dose considerations, operating experience and limiting locations of the total population of ASME Code Class 1 small bore piping locations."

In many other areas of Rev 2 of the GALL report, you've taken care to specify things like ten percent of the population, 20 percent of the population with a maximum of 25, the maximum of 25 being some assurance of 90 percent confidence of 90 percent detection.

Here, it's entirely silent. So, this

seems to leave us back to a applicant-to-applicant negotiated number of samples based on some indeterminate set of criteria.

So, I'd like you to comment on that because I was expecting to see more explicit guidance on how I determine what that sample size is.

And especially considering that you've been very explicit and tried to be very explicit in other areas so there isn't this variability so the industry knows what to expect.

DR. HISER: Let me tackle one thing first. This is a onetime inspection, but there are numerous plants that we've reviewed applications for recently that have found cracking previously and they are doing periodic.

So, this is - this AMP doesn't cover all plants necessarily, which is -

MEMBER STETKAR: Okay. So, I'm one that hasn't. Tell me how many -

DR. HISER: So, you're one that hasn't.

Many of the good words in that citation are the kinds of things that we considered. If a plant has had a problem with maybe high-cycle fatigue or other things like that where they made design changes, the number of welds within the plant - I'll

cut to the chase. Many plants have proposed to inspect ten percent of the welds.

MEMBER STETKAR: Okay. But I'm looking at - we had a very good presentation on buried piping inspection where based on different criteria, different sample sizes were proposed.

DR. HISER: Right.

MEMBER STETKAR: And here, yet, this is completely silent. There is - it sounds like a negotiated amount.

I don't care whether - some people have proposed ten percent. That's been accepted. Some people have proposed a total of three, you know, out of a population of several hundred, and that's been accepted in the past. And it sounds like we're just perpetuating that process here.

MR. DOZIER: For saving frequencies and for selecting sample sizes, okay, for small bore piping we had - Dave Alley when he gave the presentation on small bore piping, he said we have a philosophy. He used the term "philosophy."

Okay. And basically realize that if you read the GALL AMP, it's not totally prescriptive. We have to have very experienced - and the people that you saw today, we, you know, very experienced.

Our reviewers are very experienced. We go out for thousands - we spend thousands of man-hours writing hundreds of RAIs and actually making these tough decisions. That's why we use the people that we do.

We've got, you know, recognized industry experts that goes on these things to make those determinations that the effects of aging are being managed, but we're also careful in not being too prescriptive. But especially in a case, say, for small bore piping where it's a little more complicated.

MEMBER STETKAR: Well, I'll come back to - I understand you don't want to be too prescriptive, but I don't - can't find the slide here and we're running short on time, but those large tables for buried piping are pretty doggone explicit. They're very explicit.

And I'm just trying to understand from an applicant's perspective going in to submit my license renewal application and identifying the fact that I have to implement M35 to some extent, I'm going to propose some type of sampling scheme and I'm not - and I'm probably going to go in and propose - Jack says I'm going to start with one weld, and at which point I

guess we start negotiations.

And I recognize you have experience, but I'm wondering whether or not there should - whether there could or should be -

DR. HISER: Yes.

MEMBER STETKAR: - more sort of performance-based guidance here --

MEMBER ARMIJO: I don't think --

MEMBER STETKAR: - in the same sense as some other areas.

MEMBER ARMIJO: I think I understand the staff's philosophy and their approach based on an understanding of the mechanisms that are causing these failures, based on the inspections that have been done, the operational experience on a given plant.

But, you know, it would be nice to have some number just so there's a minimum number of inspections that you would expect whether they're BT or volumetric or whatever, just for the convenience of the applicant to know what the starting number is going to be.

And the number, in some cases, even though they could negotiate you down to zero if they had a basis.

MEMBER STETKAR: With adequate

justification. That's right.

MEMBER SIEBER: There should be a technical justification. And the application of that should be consistent across licensees.

MR. DOZIER: And actually on that -

MEMBER ARMIJO: We've seen two good examples in license renewals recently on small bore piping. One with very good experience and they understood the root cause, they fixed it and the problem is solved. So, they should not be forced to go through extensive inspection.

The other one had some problems and hadn't quite resolved them yet and your - so, it all looks fine to me. It's just your starting point. There ought to be a number for a minimum, and you show us why that's -

DR. HISER: Well, I think if you look at some of the more recent applications, I mean, I think a number of ten percent is one that shows up very frequently.

I know in some cases plants have done an examination of their piping and have identified areas that they say are the most susceptible. And so they have committed a focus on those areas. And I think in some of those cases may be where the numbers are less

than ten percent.

MEMBER STETKAR: But again, Allen, that's no different philosophically from that large table -

MEMBER SIEBER: For buried piping.

MEMBER STETKAR: - for buried piping. The same type of philosophy folds into that guidance. Better protection, a susceptibility. The term "risk" was used. A risk-based informed ranking of how I select a sample, a sample size determined based on estimation of essentially susceptibility, vulnerability based on, in that case, different levels of protection.

I'm not sure why a similar type of guidance, perhaps not quite as involved, couldn't be developed here just to ensure some -

DR. HISER: I understand the committee's concern and maybe we'll go back and take a look at it, see if we can add some additional guidance to this.

I think philosophically I think we do have a philosophy we have used in this and I think it is - maybe isn't numerically consistent plant to plant from a numbers perspective. But I think in terms of the reasonable assurance that each plant's program provides to us, I think there is - that's where the commonality occurs.

So, we will look.

MR. DOZIER: On that note, we have been monitoring ourselves to make sure that we're, you know, for example, the ten percent number, we know that we use that at Duane Arnold and Palo Verde because of - because of bad experience -

MS. GALLOWAY: Jerry and Allen, we'll just go back and we will take a look at what we can do to provide better definition in the GALL.

MR. DOZIER: Okay.

MR. MOW: Jerry, could I - this is Mike Mow (phonetic) with Constellation Energy. To alleviate some of John's concern vis-a-vis the plant that only had to do - committed to do three volumetric inspections, they had done 12 destructive examinations.

MEMBER STETKAR: I understand that. And my only point is looking forward to the remaining applicants that come in, can there be some documented set of guidance?

The staff has said there's a philosophy. Well, if there is a philosophy, perhaps it could be tabulated or something because there's certainly definitely a philosophy with respect to, for example, the buried piping.

MS. GALLOWAY: Yes, we fully understand your point and your comparison to what we've done in buried piping, and that AMP is a good one. And we will take another look.

MR. DOZIER: And, actually, that same type of topic will be - I'm doing kind of a special presentation after the end of this to address those concerns.

MEMBER STETKAR: Okay.

MR. GRAMM: And this is our summary slide for the GALL update documents. Again, we believe we've taken a pretty thorough look at the intervening time frame from Revision 1 and factored in a lot of lessons learned, operating experience, results, insights and the constructive input from external stakeholders. And we've made enhancements to the documents which are going to enhance their usefulness to the industry in terms of framing their applications that come in for the future.

And just to let you know, we do have a requested waiver of CRGR review pending. That was waived for the two - both Revision 0 and Revision 1, and we believe we'll receive the same treatment.

So, no need for a CRGR review because there's no back-fit considerations in these types of

documents.

Okay. Jerry has two slides that he's going to talk about for considerations of Revision 2 changes on current applications that are in-house.

MR. DOZIER: Okay. Actually, the small bore piping AMP that we just talked about segues perfectly into this portion of the presentation.

This is separate because this portion of the presentation will address an earlier ACRS question in licensing space regarding how the staff considers Revision 2 changes on current license renewal applications.

We have provided the information about the update. Now, we'll talk about some aspects of the implementation. So, that's why this is different.

In the first bullet, using experienced personnel, public and industry comments, operating experience and lessons learned over the past five years have resulted in improved information in the GALL report Revision 2 aging management programs which we've all seen today.

In the matter of experienced personnel, I did want to also address that there were several of these people that have been involved in the review of the applications, as well as all of these updates.

For example, Hans Ashar, Dr. Amy Hull, Erach Patel, Barry Elliot, Allen Hiser, and also we had input from over 120 members. And these members are not only the ones that were a lot of them that actually provided the update, they are the reviewers.

So, this philosophy of review and the update is a very important point that I wanted to make.

Also in that, you know, we talk about public and industry comments. We had comments from the public that was very, very helpful to us especially in the area of small bore piping - I mean buried piping. I'm sorry.

And we also participated with the industry things to - industry people to make it more implementable.

And the last thing is on lessons learned, we've been writing requests for additional information. You've seen the hundreds of requests for additional information that we've done on each application to get to the right solution to make sure that we have a reasonable assurance that the effects of aging will be managed in the experience period.

Okay. The second bullet. We're reviewing the Revision 2 changes to identify significant issues

that warrant review in the current in-house applications. This is a formal process that we're going through.

We're taking the big picture changes of each one of the changes to see if there is a significant change that warrants us going back and looking at the in-house applications.

MEMBER ARMIJO: So, these are people who have submitted based on GALL 2005.

MR. DOZIER: Revision 1. That's right.

And so of course, you know, they're not - Revision 2 hadn't been issued yet. We're being proactive in going ahead and looking at this.

Okay. So, in the - so, we're reviewing those in-house applications. The next thing we're doing is we're making sure as Dr. Stetkar had asked, you know, are we being - are we considering the things that we do in the update on our in-house applications.

We have already been proactive in doing that in buried piping. You've seen it in small bore piping. The steam generator divider plate was another one of the issues, low-voltage cable. Some of those in-house applications, we're already sending them RAIs to see what they did.

We're going to evaluate that information.

And the last bullet here, the RAIs are commitments to make sure they have reasonable assurance that the effects of aging are being managed.

I'm in a hurry, and so I'm stuttering. I don't want to take this too far out. But I do want to make a point, though, that as we said before in this last bullet, you know, for those very significant things that were changed, we're going to look at our philosophy to see if we were - we're making sure that aging effects were being managed appropriately.

But I do want to tell you that we have very high, you know, and basically in our reviewers, they're very experienced reviewers. They have - each one - each time they go out to do their reviews, they look at, you know, of course these AMPs.

I want to go a little bit to the side. These AMPs, they're only about two or three pages long. When we go and review at the site, we look through volumes of information to make the determination that we're being - that we're meeting the intent of this GALL program.

So, that's why we spend those multiple hours, we write those hundreds of RAIs and we scrutinize each application to make those decisions on is this good enough for us to move forward.

With that, we'll go to the second slide.

MR. HOLIAN: I don't know if we need to go into - it's up to the committee on - this is some of the philosophy that we wanted to answer really with a consistency look at the in-house 15 plants that are in here and we're applying GALL Rev 2.

We are - may be spending our time on small bore piping on those applications, and maybe we forgot to go back and get a little detail in on the small bore piping in the GALL which was written back about six months ago.

So, I don't know if we need to go through the flowchart unless -

MR. DOZIER: Maybe not in any details, but I do want to bring out an important point about, let's say, changes in staff position.

Okay. We do typically do that through our RAI process. We catch that during the update process to try to get rid of those RAIs. And that's what you've really seen in this update. That's very important.

The right-hand side - this right-hand side about the future, you know, we want to develop ISGs, we want to update our guidance to do the right thing.

On the left-hand side though, we want to

emphasize that fact on the RAIs and that in the end, will ensure that the aging effects are being managed.

So, without going into much details, that's the high level of that - of what we're doing. And I could go in detail if you'd like.

CHAIRMAN BONACA: I don't think so. First of all, I want to thank you for the presentation which was very good, very informative. I think we got a real understanding of the basis for the change. We can talk about NUREG 1950. And you made a statement before that I think should be made in front of the committee.

MR. DOZIER: Yes, the NUREG - the GALL report and the standard review plan are standalone documents. These are the documents our reviewers rely on. These are the documents that our reviewers use. And these are the documents that the committee is familiar with seeing and has given us some very good advice on.

Throughout our applications, you guys have given us very good advice to help us to update these documents. And you even made the recommendation for us to update them.

NUREG 1950, however, is a tool that we have that we're using for knowledge transfer. So, the

next time these are updated, I know that the basis document that we did in 2005 was helpful for us in this update.

We want to have a good knowledge management program, and this document is good for that. So - and we're asking the ACRS Committee for endorsement of the GALL report and the standard review plan. And we'll be glad to provide a draft of this document to you guys.

CHAIRMAN BONACA: Okay.

MS. GALLOWAY: Just to emphasize what Jerry is saying, 1800 and 1801 are applicable and useable on their own. They do not need 1950 for any utility.

Also, to reinforce our view of the difference between 1800 and 1801 as guidance documents and 1950 as not, 1950 is able to be signed out at a lower organizational level, at the division level, than 1800 and 1801, again, reinforcing the consistency of how we view the difference between those documents.

CHAIRMAN BONACA: I would like to have a copy of the last slide on the small bore piping.

I think at this stage we are going to go around the table just to get feedback from members, and then we will adjourn.

Jack, I'll start with you.

MEMBER SIEBER: I guess I have nothing, no additional comments beyond those that have already been made during the subcommittee meeting. Thank you.

CHAIRMAN BONACA: John.

MEMBER STETKAR: I'd like to thank the staff. By the way, I think the staff is doing a really good job on these license renewal inspections and things. I've actually been really impressed and I can see how that experience has fed into this Rev 2 of the GALL report.

I think it's a substantial improvement, it clarifies a lot of things, but I just wanted to say that. I think you guys are doing really well.

And other than, you know, the comments that I made already, I don't have anything else to add. Thank you.

MEMBER ARMIJO: Yes, same position. The initial GALL report, I believe, was a landmark document and I think you've improved it. You brought it up to date.

And I think as far as the applications that are in-house right now, everyone in the industry knew what was coming. The issues of buried piping, the issues of cables and all of these things people are aware of and need to manage it, and so I think

it's just an evolutionary process.

It's good to have stable guidance. Okay. But at the same time, you can't ignore what's actually happening in the field. So, I think it's a really good job. Appreciate the presentation.

MEMBER RYAN: Well, I second the comments of my colleagues. It's, I think, impressive to me that you seem to have a very effective self-assessment activity going on concurrent with using the documents and that's hard to do. But in this case, it looks very successful and you've really improved the documents as a result of that.

So, congratulations and thank you.

MEMBER BROWN: Again, I'm going to echo - sound like an echo chamber here. There were some good comments. It was a good presentation. I think I got a lot out of the buried piping part. I've heard a lot of it in several of the plant license review renewals and this is a very good, detailed look at how that's going to be managed and how you've taken lessons learned.

So, I thought was good from my viewpoint. So, thanks.

CHAIRMAN BONACA: Joy.

MEMBER REMPE: I don't have any additional

comments, but I wanted to add my thanks too. I found the information very informative.

CHAIRMAN BONACA: Yes, I would like to say that I was impressed by the changes made. In particular when we did the first revision 2005, we put a recommendation in the letter that said that the staff should consider updating the GALL document periodically. And then at that time, of course the staff had misgivings in part because it is a big workload, a big effort.

And, yet, clearly from reading the document now, their date, number two, you can see how much has changed between 2005 and 2010. I mean, so many things have come of age and we have to put them inside the GALL. And the GALL has become, I think, a much better document than it was before.

MEMBER SHACK: Mario, if I could just make a couple comments?

CHAIRMAN BONACA: Yes. I'm sorry.

MEMBER SHACK: We focused in the presentation, on the certain new guidance that was in the GALL. One of the things that have impressed me was how many changes you made in things where the basic guidance really hadn't changed, but you had done so much clarification, you know.

Sort of just reading through on a sampling basis, I looked at the flow-assisted corrosion section on Checkmate and it really just reads a whole lot better. It's a lot more informative. It's just an impressive amount of work that you've done in cleaning up the whole document, as well as adding the new updated guidance.

CHAIRMAN BONACA: Yes, that's true. So, anyway, my comment is that it's a valuable effort. If we write a letter, I'm sure we will write one, there may be still recommendation there that periodically you should update the GALL.

Okay. With that, is there any other comments from the members or the public?

Hearing none, this meeting is adjourned.

(Whereupon, the meeting was adjourned at 12:11 p.m.)

ACRS SUBCOMMITTEE MEETING UPDATED LICENSE RENEWAL GUIDANCE DOCUMENTS

Division of License Renewal, NRR

10/22/10

Bob Gramm
NRR/DLR/Aging Management Reactor Systems and Guidance Updates (RARB)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

License Renewal Guidance Document Update Presentation - Agenda

United States Nuclear Regulatory Commission
Protecting People and the Environment

- Background (Bob Gramm/NRR)
- Overview of Standard Review Plan - LR changes (Bob Gramm/NRR)
- Overview of GALL Report changes (Erach Patel/ATL)
- Overview of draft NUREG-1950, technical bases and public comment disposition (Amy Hull/RES)
- Overview changes to electrical aging management programs (Matt McConnell and Cliff Doutt/NRR)
- Overview of changes to structural aging management programs (Hans Ashar/NRR)
- Overview of changes to mechanical aging management programs/TLAAs – (Dave Alley and Barry Elliot/NRR and Erach Patel/ATL)

License Renewal Guidance Document Update: Participants

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Involvement of over 90 staff/managers from NRR Div. Of License Renewal, NRR technical divisions, RES, regional staff, and contractors
- 38 staff and managers from NRR/Div. of License Renewal
- 30 staff and branch chiefs from other NRR divisions
  - Including Divisions of: Component Integrity, Engineering, Safety Systems, Inspection and Regional Support, and Risk Assessment
- 16 staff and branch chiefs from multiple RES branches
- 2 Region I staff
- 11 contractors (Advanced Technologies and Laboratories – ATL)
- Expert panels comprised of subject matter experts

License Renewal Guidance Document Update: Stakeholder Interactions

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Extensive interaction with external stakeholders (industry and public)
  - Several NEI comment letters on AMPs and Aging Management Review (AMR) line items in 2009
  - Public workshops in January and May 2010
  - Formal 45 day public comment period in 2010
  - External stakeholder comment letters in 2010
  - Public meetings in 2010, several related to buried piping AMP

License Renewal Guidance Document Update: Background

United States Nuclear Regulatory Commission
Protecting People and the Environment

Focus on Aging Management Program (AMP) content

Items considered for integration into Revision 2:

- Domestic and foreign operating experience (2004-2009)
- Lessons learned from recent LR applications/SERs
- NEI/industry and other external stakeholder comments on GALL Report and SRP-LR
- Material Reliability Program (MRP) 227 input on PWR internals
- Interim Staff Guidance
- New industry guidance and change of regulations

General changes to the Standard Review Plan-LR

United States Nuclear Regulatory Commission
Protecting People and the Environment

General revisions made to SRP-LR

- Revised Appendix A, Section A.1.2.3, AMP Template Elements
- Clarified TLAA Tables 4.1-2 and 4.1-3

Specific revisions to SRP-LR to conform with GALL changes

- Further evaluation sections aligned with GALL Report
- Tables aligned with AMR item changes

Changes to the GALL Report

- Consolidated two volumes of GALL Report into a single volume; all pertinent information was moved into GALL Report and SRP-LR
- Revised Chapter I for application of the ASME Code:
  - AMPs are based on the 2004 Edition of the Code; other editions and addenda are allowed as per the footnote in the GALL Report AMP
  - Clarified use of Code Cases and Relief Requests

Changes to GALL Report - continued

United States Nuclear Regulatory Commission
Protecting People and the Environment

Generic Changes to GALL AMPs

- Added relevant Operational Experience post-GALL 2005
- Updated References to reflect changes post-GALL 2005
- Aligned AMP content with 10-element template for AMPs in the SRP-LR, Appendix A.1
- Added relevant information from recent license renewal applications (LRAs) and precedents
- Updated to ASME Code 2004 Edition and added a footnote
- Preamble added to Chapter XI to provide guidance on the use of later editions/revisions of various industry documents, and to aid applicants in the development of their LRAs

Changes to GALL Report - continued

- Added Chapter VII.E5 for Waste Water System to include liquid waste systems, such as
  - liquid radioactive waste
  - oily waste
  - floor drainage
  - chemical waste water
  - secondary waste water

Changes to GALL Report - continued

A number of AMR Item recommendations for Further Evaluation were changed from "Yes" to "No" based on augmentation of AMP and/or experience. For example:

- Combination of Water Chemistry & One-Time Inspection programs

A number of AMR Items were revised from being managed by a plant-specific AMP to a GALL AMP. For example:

- Neutron absorbing materials other than Boraflex are now managed by AMP XI.M40

NUREG-1950: Disposition of Public Comments and Technical Bases for Revision to LRGDs

- Provides comprehensive bases for revision of NUREG-1800 and NUREG-1801 and disposition of public comments in one volume
- Explains overview of global, generic, or systematic changes
- Analyzes findings from review of operating experience
- Contains NRC staff analysis of public comments received on Rev. 2 drafts
  - Documents disposition of comments accepted by NRC staff and used as basis for instituting a change to either GALL or SRP-LR.
  - Presents technical basis for the staff's disagreement with, and disposition of, those public comments that did not result in a change

Changes to 'Bases Document'

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- NUREG 1950 consolidates information comparable to that found earlier in:
  - NUREG-1832, *Analysis of Public Comments on the Revised License Renewal Guidance Documents*, 658 pp, September 2005.
  - NUREG-1833, *Technical Bases for Revision to the License Renewal Guidance Documents*, 718 pp, October 2005.
- Information for public comment disposition and technical bases contained in same document because of closely related content
- More direct linkage between analysis and disposition of public comments (ch. IV) and resulting revisions in GALL(ch. II) and SRP-LR (ch. III)
- More detailed focus on revision of existing AMPs and generation of new AMPS
- Appendix A cross-walks between Rev. 0, Rev. 1, and Rev. 2

AMP XI.E3, Inaccessible Power Cables not Subject to 10 CFR 50.49 EQ Requirements

Significant changes to XI.E3 are based on plant specific and industry operating experience (IN 2002-12), responses to the GL 2007-01, LR inspections and audits, and Division of Engineering and Office of Research input and include:

- *Scope of Work*
  - revised to include all inaccessible or underground power cables greater than or equal to 400 Volts (typically 480 V) within the scope of license renewal subjected to significant moisture
  - revised to include energized and de-energized cables
- *Detection of Aging Effects*
  - revised cable testing frequency not to exceed 6 years
  - revised inspection frequency of water collection is based on plant-specific operating experience, but not to exceed one year
  - event driven water accumulation inspections - such as rain or flood.

AMP XI.E1, Insulation Material for Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements

- *Program Description* clarified definition for “adverse localized environment,” and its identification
- Removed references to sampling - all accessible cables in adverse localized environments will be inspected
- Clarified definitions/terminology for consistency within AMP and with other electrical AMPs

AMP XI.E2, Insulation Material for Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Used in Instrumentation Circuits

- *Program Description* consolidated including an updated “adverse localized environment” definition and discussion
- Clarified definitions/terminology for consistency within AMP and with other electrical AMPs

AMP XI.E4, Metal Enclosed Bus

- *Program Description* and *Scope of Program* revised to include MEB external surfaces and elastomers in AMP XI.E4 with an option to inspect under XI.S6 or XI.M38 as applicable
- *Parameters Monitored/Inspected* and *Detection of Aging Effects* revised for consistency within AMP and with GALL Chapter VI
- *Detection of Aging Effects* updated sampling criterion
- Clarified definitions/terminology for consistency within AMP and with other electrical AMPs

AMP XI.E5, Fuse Holders

- Revised the aging effect and aging mechanisms for consistency within AMP and with other electrical AMPs
- *Parameters Monitored/Inspected* and *Detection of Aging Effects* revised for consistency within AMP and with GALL Chapter VI
- *Operating Experience* revised to include NUREG -1760 operating experience

AMP XI.E6, Electrical Cable Connections Not Subject to 10 CFR 50.49 EQ Requirements

- Incorporated Final License Renewal Interim Staff Guidance LR-ISG-2007-02, which provides for one-time testing
- *Detection of Aging Effects* added sampling criteria
- Clarified definitions/terminology for consistency within AMP and with other electrical AMPs

STRUCTURAL AMPs

- Generic changes for Structural AMPs
  - Structural and high-strength structural bolting moved from Bolting Integrity Program into various structural AMPs
  - AMR line items for structural and high-strength structural bolting now managed by various structural AMPs

AMP XI.S1, ASME Section XI, Subsection IWE

- *Parameters Monitored, Monitoring and Trending,* and *Corrective Actions* revised AMP to incorporate interim staff guidance (LR-ISG-2006-01) related to monitoring the MK1 drywell corrosion
- *Detection of Aging Effects* revised to augment IWE requirement to include surface examination to detect cracking in SS penetration sleeves, dissimilar metal welds consistent with AMR line item of 2005 GALL Report

Associated AMR line items

- New line added as a result of operating experience for torus shell exposed to air-indoor uncontrolled or treated water with loss of material due to corrosion

XI.S2, ASME Section XI, Subsection IWL and XI.S3, ASME Section XI, Subsection IWF

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XI.S2

- *Parameters Monitored* revised to include additional monitoring of tendons when containment cutout is needed to facilitate replacement of steam generator or reactor vessel head

XI.S3

- *Parameters Monitored* clarified to address supports, sliding supports, spring and constant load supports and structural bolting
- *Detection of aging effects* clarified to include aging effects for structural bolting, sliding surfaces, elastomeric vibration isolator elements, and recommend volumetric examination to detect stress corrosion cracking in high strength bolts

AMP XI.S4, 10 CFR 50, Appendix J

- *Detection of Aging Effects* clarified that detection of aging would be achieved with the additional implementation of an acceptable containment inservice inspection program as described in ASME Section XI, Subsection IWE and ASME Section XI, Subsection IWL
- Updated the references to NEI 94-01 Rev 2-A (and associated EPRI Report).

Associated AMR line items

- Revised to separate those components where AMP XI.S4 by itself is applicable (e.g. gaskets not in scope of XI.S1), and components where AMPs XI.S1 and XI.S4 are both applicable

XI.S5, Masonry Walls

- Clarified fire barrier masonry walls covered by Fire Protection
- Added inspection frequency of once every 5 years, or more frequently in areas where significant cracking is observed as defined in ACI-349-3R, edition 1996
- Clarified parameters monitored for cracking, separation, and shrinkage

Associated AMR line items

- Added new AMR line for masonry walls exposed to air-outdoor

XI.S6, Structures Monitoring

- *Scope of Program* revised to:
  - clarify when the applicant has the option to include Masonry Walls and Water Control Structures within the scope of this program
  - include periodic groundwater chemistry (pH, chlorides, and sulfates)
- *Parameters Monitored* revised to clarify parameters to be monitored for concrete, steel, structural bolting, structural sealants, elastomeric vibration isolators, groundwater chemistry, and settlement monitoring
- *Detection of Aging Effects* revised recommended inspection frequency:
  - In-scope structures – stipulated in ACI-349-3R, edition 1996
  - Settlement monitoring – plant specific operating experience
  - Groundwater chemistry – not to exceed five years

XI.S7, RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants

- *Program Description* clarified that dam inspection is not in scope
- *Scope of Program* clarified to include sluice gates and trash racks
- *Detection of Aging Effects* added provisions to address aging effects based on groundwater chemistry

Associated AMR line items

- Added new line for wooden piles in air-outdoor or water flowing or standing, or groundwater/soil

XI.S8 Protective Coating Monitoring and Maintenance

- Updated ASTM Standards
- Clarified importance of coating assessments for ECCS performance
- *Scope of Program* clarified to include coatings on concrete so that all coatings in containment are addressed
- Revised reference to RG 1.54, Revision 2
- New AMR line added in Chapters II and III for loss of coating integrity due to blistering, cracking, flaking, peeling, physical damage

MECHANICAL AMPs

- Added three new AMPs
  - Chapter XI.M16A, “PWR Vessel Internals”
  - Chapter XI.M40, “Monitoring of Neutron-Absorbing Materials Other than Boraflex”
  - Chapter XI.M41, “Buried and Underground Piping and Tanks”
- Deleted two AMPs due to lack of relevance
  - Chapter XI.M14, “Loose Part Monitoring”
  - Chapter XI.M15, “ Neutron Noise Monitoring”

MECHANICAL AMPs

- Eliminated three AMPs because they were subsumed by others
  - Chapter XI.M13, “Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS),” is subsumed by Chapter XI.M9, “BWR Vessel Internals” and the new Chapter XI.M16A, “PWR Vessel Internals”
  - Chapter XI.M28, “Buried Piping and Tanks Surveillance,” and Chapter XI.M34, “Buried Piping and Tanks Inspection,” are subsumed by the new Chapter XI.M41, “Buried and Underground Piping and Tanks”

MECHANICAL AMPs

- **Changes to various AMPs including:**
  - Chapter XI.M11B, “Cracking of Nickel-Alloy Components and Loss of Material Due to Boric Acid-Induced Corrosion in Reactor Coolant Pressure Boundary Components (PWRs Only)”
  - Chapter XI.M21A, “Closed Treated Water Systems”
  - Chapter XI.M31, “Reactor Vessel Surveillance”
  - Chapter XI.M35, “One-Time Inspection of ASME Code Class 1 Small-Bore Piping”
  - Chapter XI.M36, “External Surfaces Monitoring of Mechanical Components”
  - Chapter XI.M38, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

AMP XI.M41
Buried and Underground Piping and Tanks

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Objective

- Manage aging of buried and underground piping and tanks
  - Primary issue is external corrosion

AMP XI.M41
Buried and Underground Piping and Tanks

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Definitions

- Buried
  - In direct contact with soil or concrete
- Underground
  - Below grade
  - Limited access
  - In contact with air
    - e.g. pipes in trenches or vaults

AMP XI.M41
Buried and Underground Piping and Tanks

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Philosophy

- Preventive actions are the best approach to aging management
  - Some inspections still required
  - More inspections required if prevention is less than perfect
- Concentrate efforts on high “risk” pipe
  - Higher probability of corrosion
  - Code Class or safety related
  - Hazmat
    - Radiation, diesel fuel etc.

AMP XI.M41
Buried and Underground Piping and Tanks

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Philosophy, contd.

- Design preventive actions and inspections to prevent adverse effects
  - Code class/safety related
    - Must have sufficient water flow
  - Hazmat
    - Must not contaminate groundwater
- Excavations can damage pipe
  - Permit alternatives to excavations whenever possible
    - Hydrotests
    - Internal inspections
    - Monitor active equipment (jockey pumps)

AMP XI.M41
Buried and Underground Piping and Tanks

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Preventative Actions

- Applies to all piping except for fire mains
- Separate recommendations for
  - Buried piping and tanks
  - Underground piping and tanks
- Based on material of construction
- Recommendations concerning
  - Coating
  - Backfill
  - Cathodic protection

AMP XI.M41
Buried and Underground Piping and Tanks

Preventative Actions, contd.

Material[1]	Coating[2]	Cathodic Protection[4]	Backfill Quality
Titanium			
Super Austenitic Stainless[8]			
Stainless Steel	X[3]		X[5, 7]
Steel	X	X	X[5]
Copper	X	X	X[5]
Aluminum	X	X	X[5]
Cementitious or Concrete	X[3]		X[5, 7]
Polymer			X[6]

AMP XI.M41
Buried and Underground Piping and Tanks

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Inspections

- Categories considered
  - Buried pipe
  - Underground pipe
  - Buried tanks
  - Underground tanks
- Each category addressed separately
- Apply to
  - Code Class/safety related
  - Hazmat
- Expand to
  - All piping

AMP XI.M41
Buried and Underground Piping and Tanks

Inspections, contd.

- Designed to accommodate
  - Poor prevention in first inspection (yrs 30-40)
- Expect
  - Good prevention in remaining inspections

AMP XI.M41
Buried and Underground Piping and Tanks

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Inspections, contd.

Material[1]	Preventive Actions[2]	Inspections[3]	
		Code Class Safety Related[4]	Hazmat[5]
Titanium			
Super Austenitic Stainless[7]			
Stainless Steel		1[6]	1[6]
HDPE[8]	A B	1[6] 2	1[6] 1%
Other Polymer[9]	A B	1[6] 2	1[6] 1%
Cementitious or Concrete		1[6]	1[6]
Steel	C D E F	1[6] 1 4 8	1[6] 2% 5% 10%
Copper	C D E F	1[6] 1 1 2	1[6] 1% 2% 5%
Aluminum	C D E F	1[6] 1 1 2	1[6] 2% 5% 10%

AMP XI.M41
Buried and Underground Piping and Tanks

Inspections, contd.

Material[1]	Preventive Actions[2]	Inspections[3]	
		Code Class Safety Related[4]	Hazmat[5]
Steel	C D E F	1[6] 1 4 8	1[6] 2% 5% 10%

AMP XI.M41
Buried and Underground Piping and Tanks

Inspections, contd.

- Alternatives
  - Fire mains
    - Flow tested at 1 year intervals
    - Monitor jockey pump activity
  - All pipe
    - Hydrostatic tests
    - Internal inspections

AMP XI.M41
Buried and Underground Piping and Tanks

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Summary

- Intent is to manage aging
  - Best accomplished through preventive actions
  - Necessary preventive actions depend on material and environment
- Intent is to be consistent with the way other high priority buried pipe is managed
  - Oil and gas pipelines
  - NACE SP0169-2007 critical component
- Concentrate on important piping
  - Code Class/safety related
  - Hazmat
  - Level of inspection differs

AMP XI.M41
Buried and Underground Piping and Tanks

Summary, contd.

- Inspections necessary
  - Level depends on material and prevention
  - Good prevention by second inspection
  - Alternatives to visual inspections provided

AMP XI.M16A, PWR Vessel Internals

- AMP is based on guidelines for examination of vessel internals in EPRI report, “Materials Reliability Program (MRP): Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)” and “MRP: Inspection Standard for PWR Internals (MRP-228)”
- MRP-227-Rev.0 is currently being reviewed by the NRC staff

AMP XI.M16A, PWR Vessel Internals - continued

- MRP submitted proposed AMR line items for Westinghouse, Combustion Engineering, and Babcock and Wilcox designed vessel internals, based on MRP-227-Rev.0
- GALL 2005 did not contain a generic AMP for PWR vessel internals:
  - GALL 2005 recommended applicants to commit to participate, evaluate and implement an industry program for vessel internals and to provide an inspection plan no less than 24 months before entering the period of extended operation
  - GALL 2010 recommended applicants submit an inspection plan for vessel internals to the NRC for review and approval with the application for license renewal

AMP XI.M16A, PWR Vessel Internals - continued

- NRC staff modifications to the proposed MRP AMR line items:
  - Cracking to be managed by AMPs XI.M2, “Water Chemistry,” and XI.M16A, “PWR Vessel Internals”
  - All other aging effects to be managed by AMP XI.M16A, “PWR Vessel Internals”
  - Each component that is classified as a primary component, expansion component, or an existing program component in accordance with MRP-227-Rev.0 to be included in GALL
  - Cross reference primary and expansion component in accordance with MRP-227-Rev.0

AMP XI.M16A, PWR Vessel Internals - continued

- NRC staff modifications to the proposed MRP AMR line items (contd.):
  - All aging effects and components identified as primary, expansion, or existing program components in Table 3-1 through 3-3 of MRP-227-Rev.0 are identified as AMR line items in GALL – staff observed discrepancies between tables in section 3 and section 4 of MRP 227
  - Components that are identified as “no additional measures” components are not uniquely identified in the GALL tables
  - Core support structures will be examined in accordance with AMP Chapter XI.M1, “ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD”

AMP XI.M16A, PWR Vessel Internals - continued

- NRC staff modifications to the proposed MRP AMR line items (contd.):
  - Further evaluation of inaccessible locations if cross referenced accessible primary, expansion or existing program components have aging effects that need aging management
  - Further evaluation of Westinghouse guide tube support pins in control rod guide tube assemblies and Combustion Engineering lower incore instrumentation (ICI) thimble tubes
  - TLAA for further evaluation is identified for reduction in ductility and fracture toughness due to neutron irradiation for Babcock & Wilcox reactor vessel internals

Chapter X.M1, "Fatigue Monitoring"

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- Updated relative to background basis, assumptions, background information on how the program is applied, and basis for environmental fatigue calculations
- Update provides specific guidance for calculating environmentally-adjusted cumulative usage factor for carbon and low alloy steels, austenitic stainless steels, and nickel alloys
- Clarifies that scope includes locations identified in NUREG/CR-6260 as a minimum, and additional plant-specific component locations if they may be more limiting than those considered in NUREG/CR-6260
- Clarifies to provide a clear basis on how the tracking of the cycles (the preventive parameter) can be used to ensure the validity of current design basis CUF fatigue analysis values

TLAAs - SRP-LR Section 4.3, "Metal Fatigue"

- Clarified 10 CFR 54.21(c)(1)(i), (ii), and (iii) acceptance criteria and review procedure criteria for all Section 4.3 subsections
- Consolidated recommendations for implicit fatigue analyses that are applicable to ANSI B31.1 components and ASME Code Class 2 and 3 components designed to Section III requirements
- Added sections for SRP-LR review acceptance criteria and review procedures for metal fatigue TLAAs that may be applicable to BWR vessel internal components and for potential fatigue flaw growth analyses

License Renewal Guidance Document Update: Summary

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- Involvement of NRC subject matter experts from multiple organizations
- Extensive interaction with, and incorporated comments from external stakeholders
- Changes made based on operating experience
- Incorporation of many lessons learned from license renewal applications and associated staff reviews
- Enhancements made to the GALL Report and SRP-LR that will improve their usefulness by staff and industry
- Guidance documents will provide appropriate framework for applicant's to develop programs that will continue to provide reasonable assurance to manage aging effects
- Requested waiver of CRGR review pending

AMP XI.M35, One-time Inspection of ASME Code Class 1 Small Bore Piping

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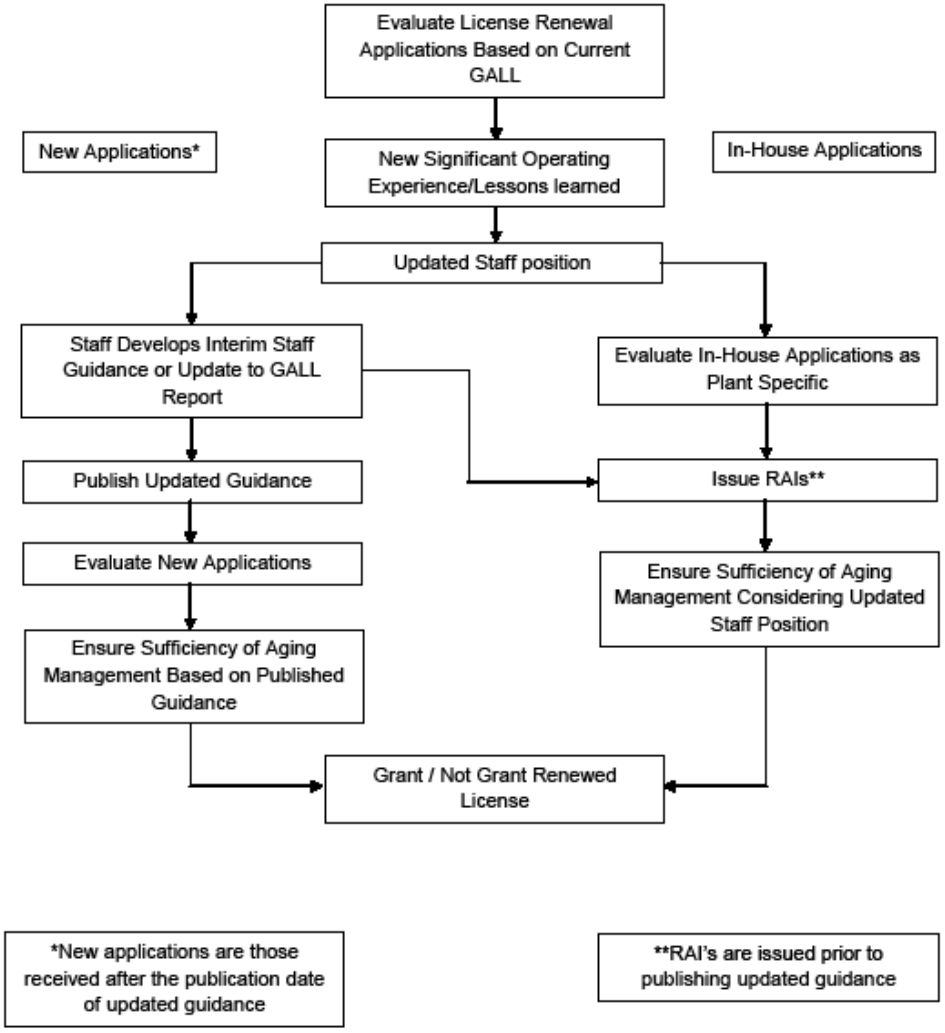
- *Program Description:*
  - explicitly identify that socket welds are included
  - clarified program applicability to plants that have not experienced cracking or have effectively mitigated cracking from vibratory loading through design changes – otherwise a plant specific periodic inspection program is needed
- *Detection of Aging Effects:*
  - revised for socket welds to perform an opportunistic destructive examination as an alternative to volumetric examinations.
  - clarified for full penetration welds that only volumetric examination is recommended
  - clarified that volumetric examinations are performed using demonstrated techniques

Consideration of Revision 2 Changes on Current Applications

- Using experienced personnel, public and industry comments, operating experience, and lessons learned over the past 5 years have resulted in improved information in the GALL Report Revision 2 aging management programs.
- The staff is reviewing the Revision 2 changes to identify significant issues that warrant review in the current in-house applications.
- Where applications do not have the information needed, the staff is asking Requests for Additional Information (RAIs).
- The staff will review the applicants' information, RAIs, and/or commitments to make reasonable assurance determinations that the effects of aging will be managed in the extended period.


Evaluate License Renewal Applications Based on Current GALL
New Applications*
New Significant Operating Experience/Lessons learned
In-House Applications
Updated Staff position
Staff Develops Interim Staff Guidance or Update to GALL Report
Evaluate In-House Applications as Plant Specific
Publish Updated Guidance
Issue RAIs**
Evaluate New Applications
Ensure Sufficiency of Aging Management Considering Updated Staff Position
Ensure Sufficiency of Aging Management Based on Published Guidance
Grant / Not Grant Renewed License
*New applications are those received after the publication date of updated guidance
**RAI's are issued prior to publishing updated guidance