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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

499th MEETING, DAY 2

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THURSDAY, FEBRUARY 6, 2003

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ROCKVILLE, MARYLAND

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The Committee met at the NRC, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Dr. Mario V. Bonaca, Chairman, presiding.

COMMITTEE MEMBERS PRESENT:

MARIO V. BONACA	Chairman
GEORGE E. APOSTOLAKIS	Member
F. PETER FORD	Member
THOMAS S. KRESS	Member
GRAHAM M. LEITCH	Member
DANA A. POWERS	Member
VICTOR H RANSOM	Member
STEPHEN L. ROSEN	Member
WILLIAM J. SHACK	Member
JOHN D. SIEBER	Member
GRAHAM B. WALLIS	Member

ACRS STAFF PRESENT:

JOHN T. LARKINS	Director
SHER BAHADUR	Associate Director
SAM DURAISWAMY	Technical Assistant
HOWARD J. LARSON	Special Assistant
TIMOTHY KOBETZ	

ALSO PRESENT:

CHRISTINA E. ANTONESCU
RALPH E. ARCHITZEL
MARK CUNNNINGHAM
RANI FRANOVICH
ROBERT L. GILL, JR.
ED HACKETT
GARY M. HOLAHAN
BP JAIN
ALAN KOLACZKOWSKI
KOFI KORSAH
PT KUO
JOHN LEHNING
GREGORY D. ROBISON
NATHAN SIU
SUNIL WEERAKKODY
RICHARD T. WOOD

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

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

(8:32 a.m.)

CHAIRMAN BONACA: The meeting will come to order.

This is the first day of the 499th meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the committee will consider the following: Catawba-McGuire license renewal application; draft regulatory guide DG-1107; water sources for long-term recirculation cooling following a loss of coolant accident; and draft generic letter 2003-XX, related to the resolution of GSI-191; assessment of debris accumulation on PWR sump performance.

Three, PTS reevaluation project; technical basis for potential revision to PTS screening criterion; draft final version of regulatory guide DG-1077, guidelines for environmental qualification of microprocessor based equipment important to safety in nuclear power plants.

And finally, proposed ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal

Advisory Committee Act. Dr. Larkins is the designated federal official for the initial portion of the meeting.

We have received written comments from Mr. William Horin of Winston & Strawn, counsel to Nuclear Utility Group on equipment qualification regarding draft regulatory guide DG-1077.

We have received no requests for time to make oral statements from members of the public regarding today's sessions.

A transcript of portions of the meeting is being kept, and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

We do not have in front of us any item of interest yet. So I'll announce that when we get that.

With that, we will start with the first presentations on our agenda. That's the Catawba and McGuire license renewal application.

We met as a subcommittee for this license renewal application on October 8, 2002. At that time the SER came to us with the 41 open items, and by the time we got into the meeting, I believe

the open items were reduced to only 11.

Since that time, those open items have been resolved. The final SER with all closed items came to us on January 6th, 2003, and I believe we are ready to hear from the staff and the applicant.

And so I will turn to Dr. PT Kuo for the presentation.

I would like to just be aware of the time restrictions. We have many items on our agendas. You have time scheduled until 10:15 a.m., and I believe the applicant is pretty anxious to go to the presentation and beat the snow storm.

(Laughter.)

CHAIRMAN BONACA: So that would be an incentive for us to stay on schedule.

MEMBER POWERS: So we can really ask a lot of questions here and stretch this one out a little bit for these guys.

CHAIRMAN BONACA: All right, okay.

MEMBER SIEBER: Mr. Chairman, I'd like to point out that I must recuse myself due to conflict of interest from the Duke Energy situation.

PARTICIPANT: Thank you.

CHAIRMAN BONACA: So noted.

With that, Dr. Kuo.

DR. KUO: Thank you.

Good morning. We will try to keep the schedule as much as we can.

CHAIRMAN BONACA: Yes, sure.

DR. KUO: The presentation will be pretty brief.

My name is PT Kuo, the Program Director for the License Renewal and Environmental Impacts Program. With me on my right is Rani Franovich. She is the Safety Project Manager for the review of the McGuire-Catawba license renewal application. She will be leading the staff presentation today, with the support from the technical reviewers.

In addition to those who will be sitting in from at the table with her, we will also have the key tech. reviewers sitting in the audience and ready to answer any questions you may have.

As, Dr. Bonaca, you pointed out, at the last subcommittee meeting we had about 11 open items, and since we have resolved all the open items, and Ms. Franovich will be briefing the committee on most of these open items.

I would also want to point out that in response to your comment in previous meetings on the commitment list, Duke has submitted a commitment

list to the staff for review. The staff has since reviewed, verified, and included the list in the SER.

In the previous meetings I have also informed the committee that the staff was in the process of finalizing inspection procedure post renewal inspection procedure. That is IPE 71003.

We have since finalized the issue, dated December 9th, 2002. I believe you all have a copy in front of you.

With that, if you don't have any questions, I will turn the briefing over to Duke followed by the staff presentation.

CHAIRMAN BONACA: One thing I would like to just note, that in fact the commitment list attached to the SER, it's the first time we've seen that. That's extremely useful.

DR. KUO: Great.

CHAIRMAN BONACA: And I think it would be desirable to see that in every SER to follow.

DR. KUO: Thank you.

CHAIRMAN BONACA: Thank you.

MR. ROBISON: Good morning. Thank you, first, for the opportunity to come and speak this morning.

My name is Greg Robison. I'm the Project Manager for License Renewal at Duke Energy. With me today is Bob Gill, our licensing lead for license renewal. Bob and I have been doing this a long time, and we're very glad to get to this day and glad to be back with you again.

Later this morning, as Rani presents detailed technical information about several of the open items, we'll have a chance to dialogue on those items. What we thought we would do for the Duke presentation is do a small bit of background and then tell you where we're going in the future and give you a little bit of a feel for how we plan to manage the commitments you just spoke of into the future and how we're preparing for those things today so that we'll be ready for them tomorrow.

I begin with my typical pictures of our power plants. It's always good for visual folks to realize these are on beautiful lakes there in the Carolinas. On the left side is McGuire. It's north of Charlotte, North Carolina, on Lake Norman. Lake Catawba is on the right, and it's on Lake Wylie south Charlotte.

The next page for those who like details is a little bit of the stats of the plant. They are

four sister units, four Westinghouse plants, construction finished in the '80s, employ about 2,200 people combined between the two sites. So we're real pleased with the plants. They're running very well, and I'm glad we can take them through license renewal.

Go on to five.

All right. I guess the first thing to point out on the application background, and Dr. Powers and I were talking about this just a moment ago, is we took the same team that we used out of Oconee and we continued them on into McGuire-Catawba. So we had a good, solid core of experience as we began the McGuire and Catawba license renewal process.

We did ask for and receive approval of an exemption request for the 20 year requirements because Catawba -- McGuire Unit 2 and Catawba 1 and 2 were younger than 20 years, and collectively, again, the four sister units, we felt like we had a good operating experience and could proceed with renewal.

We submitted the application June of 2001. The site supplemental environmental impact statements were issued December of 2002. SER, as

was mentioned, was issued in January of 2003, and the safety and environmental reviews, the details of them in themselves covered a review period of 60 years.

Going forward, we had planned to go ahead and implement the UFSAR supplement at the next UFSAR update, go ahead an incorporate it. It is Chapter 18 of our UFSAR. We've trained the site, both sites completely on this. They're aware that it's there. They're aware of their responsibilities.

We wanted to make it as normal a part of the UFSAR, nothing extraordinary, nothing that would be out of the norm. So it's right there in the book or right there in the electronic file with the other parts of the UFSAR.

Currently we have completed our training. We're going through the process of marking up procedures and implementing things in the plant. We'll take a good portion of the remainder of this year post approval to complete those procedure updates, and then we will be up and running and be able to manage the commitments from there.

We have put in place plans to evaluate

plant changes as time goes on, and Bob is going to present the details of some of that.

And then as to the future, we'll maintain the records to support future assessments by our in-house team and also any further NRC inspections that may come along in order to validate the commitments that are being managed or the one-times that are being taken care of as we move into the renewal period.

So that's a little bit of background on where we are, how we got to today, and Bob is going to give you the next level of detail from here.

MEMBER LEITCH: Greg, you mentioned training. Could you say just a word about the scope of the training necessitated by this license renewal effort?

MR. ROBISON: Well, there are really two levels for the training. The first was to create an awareness that this new commitment set was there. We've spent about ten years at Duke creating an awareness that aging management is important. It's not just creating a program that a bunch of specialists run, but creating an understanding by the whole work force that as the plant ages we're all responsible for managing aging.

Well, the license renewal led to a set of specific commitments. So the training was to help them understand now we've gone publicly and committed to certain activities and details of those activities, and we wanted to train them on that.

In addition, we wanted to train them on the process that we had put in place or were putting in place to maintain those commitments.

So we packaged all of that in a -- how long was the training program, Bob?

MR. GILL: Several months last summer.

MR. ROBISON: Hours?

MR. GILL: A couple hours.

MR. ROBISON: And we took all of the key staff at both of the sites and our general office through this training.

MEMBER LEITCH: Okay. Thank you.

MR. GILL: Okay. I'm going to go into a little bit more detail on what Greg has mentioned.

Early this last month I, in fact, sent the FSAR supplements to each site so that we'd start getting in the process to make an amendment or an update to the FSAR. Each FSAR is updated periodically six months after the Unit 2 outage, not to exceed two years.

So within the next couple of years we'll have updates with Chapter 18 already in the SAR.

So the plants are going through their formal review process to assure that all of the owners of those sections are aware what the commitments are and start taking ownership of the programs we have.

We've created several documents, and I'm going to go through these to help implement the commitments in the plant. The first one is this plant specific turnover specification, or Spec 16, and that specifically identifies the detailed changes to each and every procedure that is needed to implement the commitments. These could be plant procedures, inspection modules, surveillance procedures, that type of things, maintenance work orders, work orders where a craftsperson would go down and perhaps look at a strainer or the inside of a pump or something along those lines.

Certain hardware, aging management programs, such as the flow accelerated corrosion program or the fluid leak management. Each one is going to be annotated to indicate that it is now a license renewal commitment to do that.

There's also other documents we had

called engineering support programs which will also indicate that this is a license renewal related item.

The Spec 16 also includes something that we call inspection monitoring plans for future inspection activities, and if you'll turn in your handouts, you'll see a copy of the page. I don't have it as an overhead, but this is a copy of the page that we have for the pressurizer spray head examination.

This is right out of Spec 16. This is the typical format for each and every one of the programs that we've credited, and it has a title. It lists all of the references that we have for it, including the FSAR section where it is further described in detail, and in this case it's 18.2.20. It refers to the SER section. It will refer to where it came from in the application, and in this case it was really a response to a request for additional information from the staff.

There's also a Spec 05 which has even more detail in programs and inspection activities. So we have a reference there, and then any other piece of correspondence that we might have. In this case it was response to a particular open item.

This is something that the plant --

CHAIRMAN BONACA: I thought you had that changed for VT-1 inspections.

MR. GILL: Yes, this was the one to go from VT-3 to VT-1. So that was an open item we had. So you're exactly right, Dr. Bonaca.

CHAIRMAN BONACA: Okay.

MR. GILL: So there's a brief description of what the program is, the activity, and then you see we have internal milestones.

Dr. Kress?

MEMBER KRESS: I didn't want to dwell on the details of this, but I was just reading it, and if you go in with a visual inspection, how do you find thermal embrittlement?

MR. GILL: You find the results of that which could be cracking, and that's why --

MEMBER KRESS: You're looking for cracks?

MR. GILL: You're looking for cracks really.

MEMBER SHACK: Well, why does it say initially VT-3 and then you do a VT-1?

MR. GILL: Well, a VT-3 is just a little further away. It should be a VT-1. I think if you

go down further we've got a VT-1.

MEMBER SHACK: That's what caught my eye.

MR. GILL: Yeah. We'll fix that in the next revision.

CHAIRMAN BONACA: Originally it was VT-3.

MR. GILL: It was VT-3.

CHAIRMAN BONACA: -- to a VT-1 because of the --

MR. GILL: And this may be -- one of the reasons that is uncontrolled is it's still in review, and we'll make sure that change gets in before the next revision comes out.

The main point here is you see the milestones in the future, and we've incorporated the fact that we've committed to look at Unit 1 specifically, and then if necessary look at Unit 2, and then from there possibly Catawba, and Catawba would have a similar chart on that.

So there is a synergy between the two Westinghouse plants.

I also want to point out we've already committed to look at the Oconee pressurizer spray heads, which will occur much earlier than this, and

so there may be some lessons learned as we have there. It's the same type of material, but it's a different design.

So we're not quite sure what we're going to find when we go in there, but I had --

CHAIRMAN BONACA: At Oconee you're looking only at Oconee 1 or all repressurized? I can't remember.

MR. GILL: I think it's just Oconee 1, and then from there we decide.

CHAIRMAN BONACA: Oconee 1, okay.

MR. GILL: It's a spray head design, and so it's got fine holes. It's spherical shape. I asked the question at McGuire when I was doing some management training, information exchange, and nobody at the site today has ever seen what the pressurizer spray head looks like. They've never looked into it.

MR. ROBISON: We actually talked to the manufacturer in the process of digging out this information. It's got an interesting design to it that's different than the Oconee design, and of course, this brings up a good point about the one time inspections.

They were never geared to go find aging

that we thought was occurring.

CHAIRMAN BONACA: Right.

MR. ROBISON: They were geared to deal with those doubts when we did not really feel like we had an aging problem. We just absolutely couldn't be sure. So we wanted to go look again. We want to be conservative as we look to run the units many more years.

So this was another one of those opportunities to take a look.

MR. GILL: But it is cast all in stainless steel and certainly thermal embrittlement with the temperatures and cycles and all of that.

So anyway, that's typically what a Spec 16 program description would be. They are signed off by all of the program owners and who created it. So there is some ownership that would occur there, and this is what we have in the interim used to get all of our plants' procedures going.

This one has no current plant procedures, but I'll get into what we do for preparing for long-term inspections in the next set of overheads.

Anymore questions on this phase?

CHAIRMAN BONACA: And the last

commitment --

MR. GILL: This is more sort term.

CHAIRMAN BONACA: The last commitment you have is develop dramatic oversight. So prior to entering the renewal period --

MR. GILL: That's correct.

CHAIRMAN BONACA: -- you will have it.

MR. GILL: If there's a need for periodic inspections --

CHAIRMAN BONACA: Exactly.

MR. GILL: -- or whatever, we would have that in place prior to entering the period of extended operation.

CHAIRMAN BONACA: Okay. Good.

MR. GILL: That's correct.

We feel that commitments made for license renewal must be maintained obviously, particularly pursuant to 5437(b), and that changes to the FSAR commitments are going to be made by the existing 5059 program.

The concern is how do you make sure that happens in the future when you have new people perhaps 15 or 20 years from now trying to manage these commitments that one has.

What we're created are we did a lot of

brainstorming over the past couple of years of how can you actually change the plant and perhaps impact a commitment you've made for license renewal, and through a lot of iterative processes we came down to you can physically modify the plant to add or delete something that might change the commitment. You can make operational changes to the plant that may change ambient conditions that are worked there. It may change a flow path, a few open valves that were isolated for some reason.

In fact, we had that at Oconee where some heat exchangers were valved in when we had them valved out when we did the initial review.

You can also have current licensing bases changed by bulletins, generic letters, regulations. Perhaps some more will come out on the control rod drive mechanisms that will supersede what we've already committed to.

So there are numerous ways you have to do that. So you have to look at your existing internal processes to see how best that can be accomplished and how do you make sure that if something does change you don't undo a commitment that we've already made for license renewal.

Site engineering is the key in these

areas, and they were heavily involved in the training that we did last summer at all three stations in this area, and what we've come up with is an engineering oversight document that's corporately owned, and it's a common process for all three sites.

I think Greg briefly alluded to this at our last meeting we had in October, and it's the process for maintaining the license renewal scope, an aging management of components within the license renewal scope. It's an overall. It's a very high level process document that actually has a flow chart in it, and I have copies of it.

I don't have an overhead I can show you, but it basically takes those three sources of changes that you could have, plant modifications, operational changes or CLB changes and works them through a process of will it do this, can it do this, do you have to make a change, are you within the bounds of what you've already analyzed.

If you're replacing a carbon steel component with another carbon steel component, perhaps there's no change at all. You know, these are one out of 1,000 items that get changed and they cause a change to the commitments one has made.

If you change your reactor vessel head, do you need to change now your CRDM nozzle inspection program? That would have to be looked at to see what would the appropriate change be. That would manifest itself in perhaps a change to the FSAR supplement.

It certainly defines the specific responsibilities in establishing the aging management SPOC. I think at the last meeting someone called it "Dr. SPOC."

Well, those are all three established now, one at each site. They're in training. They, in fact, meet periodically. There is a corporate sponsor that helps facilitate the communications amongst the three sites. They share lessons learned as they start doing some of these reviews, and it provides the method to make sure that we do the reviews when we need to have the reviews done and that we make the right decisions on what additional programs might be needed or changes to existing programs or whatever.

MEMBER KRESS: Is SPOC an acronym for something?

MR. GILL: Single point of contact.

MEMBER KRESS: Single?

MR. GILL: Site point of contact, and that person has been introduced to the site personnel at McGuire. She has a sponsor in the engineering area, and the engineering manager is a middle manager, and that person talks to everybody else.

So there's a lot of communication and dialogue to make sure that they know who the person is. There's a lot of responsibility on the front line. Modification engineers who are making plant mods to make decisions and only if they need to do they go to the SPOC.

Hopefully, there will be a self-sufficient, and when you go through a mod checklist to see what documents you need to change, you've answered the question of am I changing something with EQ, am I changing something with fire protection, am I making a new safety related system adding a new piece of paper or whatever.

That's covered in the mod process, and only if you really get something different like titanium versus stainless steel would you go to the SPOC to see what to do.

MEMBER KRESS: If I could have seen the slide, I would have known it was an acronym, but --

MR. GILL: We try to do that, Dr. Kress.

MEMBER KRESS: Yeah.

MR. GILL: Spell it out the first time.

MEMBER KRESS: What does that third bullet mean, specially the "should they be required" part?

MR. GILL: If you put in a new material and --

MEMBER KRESS: Oh, if you do something on this page that could impact your commitments?

MR. GILL: Yeah. Say you put Alloy 690 in instead of Alloy 600.

MEMBER KRESS: Yeah.

MR. GILL: Perhaps you'd have to do a new review for that because you hadn't completed it or titanium or some other material that may not have been used in that system before. You would do a review to make sure.

MR. ROBISON: We were concerned that we had the expertise, of course, to do the aging management reviews for renewal, but we needed to leave that process somewhere so that --

MEMBER KRESS: You need to pass it on as corporate memory.

MR. ROBISON: Right.

MR. GILL: That's right.

MR. ROBISON: And so what we've done is created this 229 document that sort of embodies all of that, gotten a number of people to own it, plugged it back into the site. So hopefully there will be enough people around as time moves on. There will be a general awareness of how to do this and at least know where the resources are should they want to do a new material selection and go through this review process.

MEMBER KRESS: About to have a loss of power accident.

MR. GILL: Active/passive component here.

CHAIRMAN BONACA: I hesitate to ask.

MEMBER POWERS: Where's the back-up generator?

MEMBER KRESS: Do you have a diesel for that?

MEMBER POWERS: Let me ask you this question. Who does the SPOC report to?

MR. ROBISON: The SPOC reports to the civil mechanical manager inside of the engineering department at each of the three sites.

MEMBER POWERS: Is that too far down the

line of management to be effective?

MR. ROBISON: I don't know.

MEMBER POWERS: I mean, how do you look at that?

MR. ROBISON: The civil mechanical managers supervise the majority of the program office.

MEMBER POWERS: I know they do, but the question is SPOC is in the business of making work for people. Most people kind of resent that.

MR. ROBISON: You're right. I haven't really given that a lot of thought.

MEMBER POWERS: I want to give some thought to it because both for optics and for the ability to impose new requirements on people that they're not going to like.

MR. ROBISON: It's a good suggestion. Thank you.

MR. GILL: A good point.

Anymore questions on the previous slide? We're up to Slide 11 now.

EDM 229 defines the aging management of SPOC duties. It's the site technical point of contact for this program. Again, there's one at each site plus a corporate sponsor. So they share

the lessons learned amongst all three sites and are not on an island by themselves.

They can provide any guidance for the aging management reviews that are done by other engineers. They also are independent checkers of the Chapter 18 program changes that may occur so that again we don't undo something.

And I expect Greg and I will be in a role of consulting over the next year or two as people try to make even more changes that they want to now that they're finally reading the document in detail, and we've already had some of that.

MEMBER POWERS: Screech.

MR. GILL: Screech. We're committed to do what?

(Laughter.)

DR. LEITCH: Is operating experience at other plants fed into the SPOC somehow or how does that information get in?

MR. GILL: That would be under the CLB type changes that might occur, any operating experience that might occur that rises to the level of a notice or some other generic communication coming down.

MR. ROBISON: It really feeds in at two

places. It feeds into the program owners who are there and as part of their program keep up with industry operating experience, and it feeds to the SPOC, and that's where that sort of independent review role comes in for them.

At least that was what we envisioned. This has obviously not been up and running that long, but that would be our thought. It would create several people who would be interested in a topic and a good dialogue to start at their own site.

MR. GILL: Particularly the control rod drive, the head issue. Certainly the program owner of that is well versed in what's going on with the other units in the country, their inspection results and all of that, and that's the program owner. That's why on those program summaries we had them sign to make sure they knew what the commitments were, and they would maintain ownership as long as they had that position and for the duration.

An additional tool we have is the license renewal handbook, and this is Spec 017. This was developed as an aid to the aging management SPOCs in evaluating the impact of plant changes on license renewal programs and scope. It contains a

lot of information, license renewal scope definitions, smart charts, the implementation plans we noted earlier.

In some cases it has drawings to help clarify when something is in scope, and it will be a living document to be updated as changes that might occur in the future.

The next slide in your handout, the next overhead page in your handout is a copy of the smart chart from Spec 17. This is McGuire, and this is the auxiliary feedwater system. And what we have done is collapsed all of the aging management reviews that we did for this system down onto one page. So instead of having multiple pages of tables like we had in the application, in fact, we have more information here because the mechanisms are listed.

But you can see for the aux. feedwater system -- and this is it for the aux. feedwater system, just this one page. You can have carbon steel and stainless steel. The external environments would be reactor building and sheltered and then treated water is the internal environment.

And then you see the programs that we actually credited for that, what the type of aging

effects were, what the aging mechanisms were, and then a summary listing of the component types that are included in that part of the system and what the functions are.

So this allows engineers in the future to help decide if I'm making a plant change to the aux. feedwater system and I'm using carbon steel or stainless steel, I can see that all of these reviews have already been done, and I know that I don't have to go in and change any of these particular programs.

If I come in with some new material that's not covered here, then I would have to do the aging management review, and this has been repeated for every system at the site, and this is true at McGuire, Catawba, and Oconee, and it's what we call a smart chart. It's real simple to use.

MR. ROBISON: An example of how the operating experience may fit, for example, in the middle of the page where the words "lubricating oil" are mentioned, suppose an aging phenomenon for lubricating oil came via operating experience. This gives you very quick reference to say where have we credited lubricating oil and what did we do with it.

Well, there was no aging effects and no

program was required. Operating experience may change that in the future. This would then be a quick reminder of where that's supplied, and then we could proceed from there to make the changes.

CHAIRMAN BONACA: Now, for the auxiliary, for the other system you have made a commitment to internal inspection, one internal inspection, right?

MR. ROBISON: I'm sorry?

CHAIRMAN BONACA: As part of the -- as inclusion of an open item, I think you made a commitment to inspect the internals of this.

MR. GILL: Right.

MR. ROBISON: Yes.

CHAIRMAN BONACA: So that would be under one of these programs here, right?

MR. GILL: Well, it's a separate commitment that's contained separately. It's more to gain information to demonstrate that the chemistry program was okay.

CHAIRMAN BONACA: Okay.

MR. GILL: So that's a separate -- it's not --

CHAIRMAN BONACA: All right.

MR. GILL: It's a commitment to do

inspections. It's not really an aging management program.

MR. ROBISON: These are more the ongoing programmatic.

CHAIRMAN BONACA: Okay.

MR. ROBISON: The individual commitments that may have just a single action to be taken, we have a separate section in the UFSAR and track them separately.

MR. GILL: We have a separate appendix. It would be Appendix B that has all of those committed actions.

CHAIRMAN BONACA: Yeah, I understand that. I just was -- I thought that I would find it here under aging management even if it is one time inspection.

MR. GILL: Right.

CHAIRMAN BONACA: You wouldn't include it here.

MR. GILL: No.

The last slide I have is on our maintenance of records. Once we go through all of these review processes, we will document the answers by the 5059, by the mod process, by operating experience review determinations. All of this will

effectively manage whatever the license renewal commitments are. So what we have today and any changes that might occur over the future, we should have the records available for whenever an assessment occurs internally, and we do plan to do those over the next several years, as well as the NRC inspection that Dr. Kuo mentioned, some time late in the initial 40 year license.

So we will have the records available. We may or may not have the same people available. People do change jobs and all of that, but we should have the records for all of the changes that have been made. We know where we started. We know what the changes are, and we should be in compliance through the 40 year period and the plus 20 years.

Any questions?

CHAIRMAN BONACA: I appreciate the presentation. I think it gives us a feeling for, you know, what you have to do to track it, and of course, it gives us also -- I mean, this is 20 years to go before you get into this license period. A lot of people will have retired by that time, and now we've got to see how the NRC is going to be able to track it.

But I guess if you have this kind of

structured program, it should be easier to verify the commitments.

MR. GILL: There should be more efficient inspection, we would think. I've been through those, and a lot of the preparation for team inspections is gathering up the records that have occurred.

CHAIRMAN BONACA: Sure.

MR. GILL: And if you've got, like you said, ten, 15, 20 years' worth of records, that's a lot of information to go back and track through.

Another point we were trying to make when I was talking to McGuire management was there may be opportunities over the next few years to go in and look at the pressurizer. If you're there for some other reason, you need to put that in the planning schedule, and if they have scaffolding built and they're already climbing all over the pressurizer for in-service inspection perhaps, maybe that's the time to go in and look at the pressurizer spray head and to start formulating the plans.

You don't have to wait until the last outage at year 39 to do these inspections. There may be more appropriate, opportune times over the next five or ten years perhaps that one can do those

inspections.

CHAIRMAN BONACA: Now, as you explained before, you know, in 20 years the plant will look quite different from what it is today in materials, in changes. There will be a lot of things happening there.

You do have a process that you have established to track of those changes.

MR. GILL: To keep track of those, right.

CHAIRMAN BONACA: Now, I'm trying to understand how the NRC will come in with an inspection and interpret all the changes or verify commitments to all of those changes. It's going to be a challenging thing.

MR. GILL: I think it will be a challenge. I think if you break the inspection into two parts, one of have you completed your inspection commitments, the one time inspections, if you will, and how have you maintained the changes that might have occurred over time, and that will be a challenge because we're updating the FSAR every two years or so or in some plants maybe doing it annually.

That's a lot of changes, a lot of plant

mods to go through.

CHAIRMAN BONACA: If you change a component with a different material, the basis for the commitments that you have given the NRC will change.

MR. GILL: Right.

CHAIRMAN BONACA: You will make decisions on your own that say, well, now we change, you know, 600 to 690. Therefore, we don't have to do this anymore.

MR. GILL: Right.

CHAIRMAN BONACA: Now, you don't know if the NRC will agree with that assessment.

MR. GILL: That's correct.

CHAIRMAN BONACA: Is it going to be a surprise for the inspection team of the NRC to come in and find that you do not perform a certain committed function because you have replaced the material? But you haven't gone back to the NRC to see if it's okay with them.

MR. GILL: Right. It may be a challenge because of the time lag from the time you made that change until the inspection actually occurs. If it changes the FSAR summary description, that would be part of the update that's periodically sent into the

staff and then reviewed by the staff.

It is a concern though, I think, if a lot of that occurs in trying to reconstruct history well down the pike when none of us are around.

CHAIRMAN BONACA: Well, this tells me that probably before you enter the renewal period and if you have an inspection, there may be another iteration of the SER with additional open items coming in and a debate on what else you need to do

MR. GILL: Yeah, I don't know that --

DR. KUO: Dr. Bonaca, if I may comment on these changes, generally when they make a change according to 5059, the changes will have to be subject to three tests, whether the changes will affect the previous calculation in terms of risk, in terms of mode of failure and all of that.

So if, say, for instance, you talk about the change of materials, certainly it will change the failure mode and all of that. So in that case, my thought is that it probably will have to submit it to the staff for review.

It's their determination whether it will change the accident sequence or not, but if you do have a material change, that's a major change in my view.

CHAIRMAN BONACA: Yeah. No, I recognize there are processes in place, including 5059 that would allow to track that. I'm thinking about there are probably 40 or 50 plants in the period of six or seven years will go into renewal, and that's going to be a heck of a challenge for the staff to track.

DR. KUO: It will be a challenge, yes.

CHAIRMAN BONACA: Because this is a major resource, the demand for the Commission.

DR. KUO: Yeah, it will be a challenge for sure, but the mechanism is there.

CHAIRMAN BONACA: Okay. Thank you.

DR. KUO: Rani Franovich will make the staff presentation.

MS. FRANOVICH: Good morning. I'm Rani Franovich. I was the Project Manager for the staff's safety review of the Catawba-McGuire license renewal application.

And to my right I have Jim Medoff, who is a reviewer in the Division of Engineering. He managed the contractor who performed the staff's review of the aging management of reactor coolant system and associated components.

To my left is Tanya Eaton, who performed the scoping and screening review for the staff of

fire protection equipment.

Before I proceed with my presentation, I'd like to talk a little bit about my background. I've been with the NRC for about 12 years; spent eight years in Region II, where I certified as a reactor or resident inspector, and McGuire was my reference plant for certification; spent six years at Catawba as a resident inspector. So it was a good segue to come in and manage this license renewal project, and it has been a pleasure to manage.

MEMBER POWERS: So you know these plants.

MS. FRANOVICH: I know these plants.

So with that, I'll go on and get started.

When we last met, I think there may have actually been, Dr. Bonaca, 13 SER open items and then one extra one that we added that was not documented in the SER, and I'd like to go over the ones that I think are of most interest to the members.

When we last met, we were in a disagreement with Duke as to whether or not fan and damper housings met the scoping criteria for license

renewal. The staff believed they did. Duke believed that they did not, but ultimately Duke did identify fan and damper housings associated with ventilation systems within the scope of license renewal, provided the aging management reviewers results for those components. The staff completed its review of the AMR results, and that resolved the open item.

In fact, there were two open items on these two issues.

Another issue had to do with building sealant, structural sealants, especially for those structures where ventilation systems either maintained a positive pressure or processed potentially radioactive gases from the buildings.

And Duke identified an aging management program that was satisfactory to the staff for these structural sealants. It involves a one time inspection of structure sealants to insure that there's no cracking or other degradation associated with aging, and the staff found that to be acceptable.

MEMBER WALLIS: Let's look at, say, damper housing. Damper housings apparently are in scope because they do not move, and the damper that

moves is not in scope.

MS. FRANOVICH: Correct.

MEMBER WALLIS: It seems a little bit bizarre to make the distinction, but I realize this is the way it's done. It just seems rather strange.

MS. FRANOVICH: Yeah.

MEMBER WALLIS: The operation of the damper depends upon both of these things functioning right, and it doesn't move very often presumably.

MS. FRANOVICH: Right. If you look at it as kind of like pump casings or valve bodies, it's really a pressure boundary function that we're interested in.

MEMBER WALLIS: I see. That's what you're interested in.

MS. FRANOVICH: Exactly.

CHAIRMAN BONACA: And the interesting thing is that Duke took the position that the failure of these components would be identified by the functional failure of the component itself. I mean, if you have failure of pressure boundary, you would see it, the same way in which you would have a failure of the active component.

MS. FRANOVICH: Correct.

CHAIRMAN BONACA: But you took the more

strict consistency with award of the rule and the example of the pump casing. And during the subcommittee meeting we discussed this, but the feeling was that it doesn't harm to do a visual inspection of the passive component anyway, and so we felt that there was consistency with the letter of the law and also it was beneficial to have a walk-down and just look at these components for physical conditions.

MS. FRANOVICH: Correct, and the staff felt that a minor breach in the pressure boundary may not reveal itself in a fan surveillance test failure or a damper failure.

And when these systems conveyed potentially hazardous gases, that's important. So Duke brought them in scope. Duke disagreed with the staff, but brought them in scope nonetheless, and provided aging management results, and it resolved the open item.

MEMBER WALLIS: Well, presumably these dampers are in some sort of a pipe work or ducting and everything. That's in scope presumably.

MS. FRANOVICH: Correct. The ducting is in scope.

MEMBER WALLIS: So it would be rational

to have the whole encasement in scope, wouldn't it?

MS. FRANOVICH: That's the way the staff felt.

MEMBER SHACK: But, I mean, this is an issue that seems to come up quite frequently in license renewal space.

MS. FRANOVICH: Yeah.

MEMBER SHACK: You would think that we have, you know, provided guidance to sort of settle this issue by this time.

MS. FRANOVICH: Yes. We have issued an interim staff guidance document on this issue, and I believe that the status of the document is not yet final. So once it is final, then we will feed that guidance back into our GALL report and standard review plan.

PT, did you want to comment on that ISG?

DR. KUO: You are correct that we have issued a draft position to the industry. We have had meetings, but it hasn't been finalized yet, but as soon as it's finalized, we will incorporate that guidance into the GALL and SRP in the next revision.

MS. FRANOVICH: Any other questions on these open items?

Okay.

MEMBER WALLIS: Well, just that they seem so trivial compared with all of those other things that matter in the whole system.

MS. FRANOVICH: Okay. Thank you.

Another area where there was a lot of disagreement between the staff and the applicant had to do with scoping and screening of fire protection equipment.

When we last met, Duke had brought everything into the scope of license renewal that the staff took issue with, with the exception of jockey pumps, which maintain pressure of the fire water system, and manual suppression equipment for certain areas that the staff felt were potential fire exposure areas.

To resolve these two open items, Duke disagreed with the staff on both of them, but nonetheless brought into the scope of license renewal an entire pressure maintenance system for both McGuire and Catawba, which included not only the jockey pumps, but associated piping. There were some tanks; there were some strainers for the jockey pumps, and other miscellaneous equipment.

So they gave us a very full response to that SER open item to resolve it.

When it came to the manual suppression and potential fire exposure areas, the staff was interested in two areas, in particular. One area was in the yard, and the other areas was in the turbine building.

And the staff and applicant got together and discussed these two areas and the applicant was able to demonstrate that there weren't any fire exposure areas in the yard that required manual suppression to meet the requirements of 10 CFR 5048. So that was resolved, and the staff accepted their position.

However, with respect to the turbine building, the staff felt strongly that manual suppression capability was necessary to insure that you could mitigate the effects of a fire even though the applicant took credit for a three hour barrier in addition to that to prevent the spread of the fire.

The staff felt that the fire barrier really wasn't sufficient alone to meet the requirements of 5048, and they also needed to put the fire out. So Duke again disagreed with the staff, but identified those hose racks within the scope of license renewal, providing the aging

management review results and an aging management program for those components, and that resolved that open item.

Any other questions on any of these open items?

MEMBER SHACK: The jockey pumps seem like another familiar topic in license renewal. Do we have an ISG for those?

MS. FRANOVICH: Well, actually I'm the lucky person to have written that ISG as a result of a request from our Region II license renewal inspector, Caudle Julian, who leads the license renewal inspection teams in Region II, indicated that this does come up often. It's not just jockey pumps, although that's a popular topic of debate, but a lot of other fire protection equipment as well.

So I've written an interim staff guidance document on that, with the help of Tanya and her group. It is out for comment, public comment, from stakeholders, NEI, Union of Concerned Scientists, and we haven't gotten those comments yet. So we're embarking upon dialogue with the industry on this ISG.

DR. KUO: In fact, this subject will be

the discussion of a meeting with the industry on February the 13th.

MEMBER SHACK: Just sort of a general, you know. How many ISGs are in play at the moment?

DR. KUO: We have a total of 14 ISG right now, but the four of them have already been finalized. So ten is in active discussion or development.

MR. ROSEN: And the fact of an ISG is ultimately to be incorporated into the GALL report --

DR. KUO: That is correct.

MR. ROSEN: -- and deleted.

MS. FRANOVICH: Correct.

MR. ROSEN: The ISG, once it is incorporated in the Gall report, goes away.

DR. KUO: That's correct.

MS. FRANOVICH: Okay. We had an open item on volumetric examination of Class 1 small bore pipe. Duke uses a risk informed approach to identifying the piping that they perform in-service inspection of.

The staff does not have a problem with the risk informed inspection approach. However, the staff felt that there was no guarantee that in their

risk informed identification of piping, small bore piping would be included in the sample of the population for inspection.

So Duke has specifically committed to identifying a sample of small bore pipe based on the potential for degradation, considering a number of degradation mechanisms, and the staff found that to be satisfactory, and that resolved that open item.

CHAIRMAN BONACA: Is the one time inspection?

MS. FRANOVICH: That is -- I'm sorry. In the past the staff, I think, has found one time inspection acceptable, but Duke is actually doing this as part of their interim.

MR. ROBISON: We have already incorporated risk informed techniques, particularly in our McGuire ISI plant, and have already identified small bore locations and have that ongoing today.

CHAIRMAN BONACA: Okay.

MR. ROBISON: So it will be an ongoing part of our ISI plan in the future.

CHAIRMAN BONACA: Okay, and these are acceptable locations, not necessarily risk significant locations, but the most acceptable ones.

MR. ROBISON: Right, yes.

Greg Robison from Duke Energy.

MS. FRANOVICH: Thank you, Greg.

The other open item had to do with a rubber expansion joint in the circulating water system, the condenser circulating water system that was brought into scope by a request for additional information and response to that request, but no aging effects were identified for this component, this expansion joint.

The staff asked the applicant to consider the effects of ultraviolet radiation since the expansion joint is located in the yard outside the turbine building, and the applicant came back and indicated that there was no operating experience to indicate that -- I apologize. That's not really what they said.

They said that these expansion joints were located 30 feet down in a pit where the circulating water pumps are, and that they really didn't -- they weren't exposed to much UV radiation.

However, the staff felt that there were other aging effects that could cause degradation over time and it didn't seem like this expansion joint could last for 60 years without any

degradation.

So the applicant identified aging effects for this component and proposed a one time visual inspection of the component to verify that aging effects are not causing degradation of the component, and that was acceptable to the staff and resolved the open item.

Any questions on this slide?

MEMBER WALLIS: This was a one time inspection?

MS. FRANOVICH: It's a one time inspection, and the reason --

MEMBER WALLIS: Just don't these things deteriorate over a period of five or ten years rather than --

MS. FRANOVICH: Well, there are two components that the staff looked at. One is the expansion joints in the condenser seals or the condenser seals themselves which are exposed to somewhat higher temperatures of condensed steam and circulating water.

But the expansion joints that were in question for this open item are actually just in the condenser circulating water system itself out in the yard.

MEMBER WALLIS: Cold.

MS. FRANOVICH: It can get cold, sure. Oh, I'm sorry. You're talking about the water itself. Right, it's temperature is typically below 100 degrees from what I understand.

MEMBER WALLIS: It doesn't fluctuate very much.

MS. FRANOVICH: Correct, correct. So there really isn't much experience, much operating experience to indicate that these things have failed, and without that operating experience we didn't feel like more than one time was warranted, but it will at least verify that there is no degradation that could be occurring.

MEMBER WALLIS: And presumably if it does degrade, it will leak and then this will be detected and it will be fixed. It's not as if it's --

MS. FRANOVICH: One would expect so, correct. It's not a very high pressure system, correct.

MEMBER SHACK: And, again, what's the timing of the one time inspection? It's before the end of the license, but obviously you'd sooner wait a reasonable amount of time to do it.

MS. FRANOVICH: I agree, and it's really up to Duke. The only thing they're required to do is have that inspection completed before the period of extended operation begins.

But you're absolutely correct. It would be more prudent to give it more opportunity to reveal itself before you inspect it.

So with that, I'll turn it over to Duke and you can indicate, Greg.

MR. ROBISON: This is Greg Robison, Duke Energy.

I think the example we used this morning, the pressurizer spray where the dates are included in your handout, is an example of the time frame we would do these inspections on.

As Bob Gill mentioned, we will find an appropriate point in time somewhere toward the end of the initial four year period. It could be two years short, five years short, just when we happen to be there, and we'll go in and do these types of things, but it will be toward the end of the initial --

PARTICIPANT: Twenty years.

MR. ROBISON: -- will not.

And one other point. I think this is

Catawba only, and these things are -- physically you're looking at a component that's about a foot in length, 42 inches in diameter. So it's not a huge mechanical component. It's a rather small component, very much in the bottom of a pump pit out in the yard.

So that was the basis of our it doesn't see a lot of sunlight, because it's hard to get the sun to shine that deep into the pump pit.

MR. ROSEN: As I recall, there has been a failure of those components in an operating nuclear plant, and the results are quite interesting. It's an amazing amount of water can come out of those things into the basement, turbine building basement.

MS. FRANOVICH: Then maybe we need to go back and look at that. Okay. Thank you.

Any other questions on this slide?

(No response.)

MS. FRANOVICH: Okay. We had a couple of other open items that are related. They had to do with aging effects and aging management of concrete structures and structural components that are not exposed to a harsh environment. Duke's position was that there are no aging effects, and

the staff's position was that there are and that they need to be monitored.

So Duke ultimately disagreed with the staff. Nonetheless they specified an aging management program to monitor concrete structures that are not located in a harsh environment, and a couple of those concrete components involve accessible portions of concrete components in the ice condenser, which they also specified in the aging management program for. That resolved those open items.

MEMBER POWERS: Can you tell me more about that one?

MS. FRANOVICH: What would you like to know?

MEMBER POWERS: Where it is, how it's going to be managed, how it's going to be monitored.

MS. FRANOVICH: Sure. The aging management program that they specified is the civil structures inspection or -- I'm sorry -- the inspection program for civil structures and components, I believe. It's a visual inspection program.

MEMBER POWERS: -- accessible?

MS. FRANOVICH: For the accessible

concrete, yes.

MEMBER POWERS: When I look at the concrete, it's not the concrete we're interested in.

MS. FRANOVICH: Can you repeat your question?

MEMBER POWERS: Well, the issue is the inaccessible concrete structures.

MS. FRANOVICH: The inaccessible concrete structures. Are you talking about those that are below grade?

MEMBER POWERS: I'm talking about the ones that are in the bullet two on your slide.

CHAIRMAN BONACA: Yeah, you have inaccessible concrete.

MS. FRANOVICH: Right. The open item had to do with concrete components that the staff believed were inaccessible in the ice condenser. As it turned out in the RAI response, the applicant indicated that this concrete is accessible from other areas. I think one of the structures was the -- was it the structural wall that you could see form the other side? I'm not real familiar with the details, but --

MEMBER POWERS: Maybe Duke can help.

MS. FRANOVICH: Do you want to take it,

concrete, yes.

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Greg?

MR. ROBISON: Greg Robison, Duke Energy.

You're correct. We can access several of the ice condenser structures from the other side to do an inspection there. One other point is the philosophy here for inaccessible concrete structural areas would be when we did our aging management evaluation, we looked for environments that were different from accessible areas, and if we found one, then we had to make provision to get to that inaccessible, unique environment somehow.

We didn't find any unique, inaccessible environments. We found out environments of our exposed concrete similar to our environments of our inaccessible concrete. So feel good that we can do our inspections and sampling over in the accessible area and apply that to all of the concrete.

MS. FRANOVICH: Right, but I think I understand Dr. --

MEMBER POWERS: The last time we got together we discussed a lot about water chemistry.

MS. FRANOVICH: Oh, yeah.

MEMBER POWERS: A little bit about water chemistry and the issue of whether you had sulfates and phosphates and the groundwater.

Here you had looked at, as I recall, the sulfate contents and concluded that they were low enough concentration they were benign. You had not looked at the phosphate contents.

MS. FRANOVICH: Let me see. The last time we met, we had looked at pH, chlorides, and sulfates. Phosphates were not included in that list. You're absolutely right.

I don't know if David Jeng would like to address this or if we may have addressed it in the last meeting, but we did not look at phosphates.

David.

MR. JENG: I'm David Jeng of the Division of Engineering.

During the last subcommittee meeting, questions were raised whether phosphate was a concern. The staff position, based on the expert, having the main concern are the sulfate, chlorides and the pH vary. So each of the three parameters we decided to measure with acceptance criteria, and phosphate was not particularly of concern based on our expert evaluation.

MEMBER POWERS: Oh, that's great. What was your expert valuation?

MR. JENG: It's --

MEMBER POWERS: Apatites don't form. I mean is that what you're telling me?

MR. JENG: I am not a chemical --

MEMBER POWERS: But you never get the chemical expert. We only get the reference that the chemical experts tell us that this is not important, but he never shows up. Where is this guy? I mean, he's the guy that believes that apatite doesn't form. He has no teeth. I know this. I will recognize this guy because he has no teeth.

MEMBER WALLIS: Excuse me. Appetite?

MEMBER POWERS: Yeah. It's calcium phosphate.

MEMBER WALLIS: But it's spelled like "appetite"??

MEMBER POWERS: And it's spelled like "apatite."

MEMBER WALLIS: Thank you.

MR. JENG: I would like to take back your very important question and come up with additional supplemental information.

MEMBER POWERS: That's what I heard last time. I'd like to see it some day.

MEMBER FORD: The question was also asked last time about corrosion of the rebar and

whether that would necessarily be detected by a visual inspection of the outside of the concrete. Obviously the concrete spalls off and you see it, but the damage is done before that occurs.

What was the resolution of that?

MS. FRANOVICH: I seem to recall, and I could be wrong, and I may need to rely on my staff or Duke to chime in, that with the staff's feeling that the groundwater was not aggressive, that the concrete would be able to prevent the seepage of water into the rebar, but I'm not sure if that's the correct recollection or not.

If Duke or the staff wants to chime in. David?

DR. KUO: Let me just comment on that. A long time ago, about ten years ago the industry had submitted to the staff for review what's called an industry report, and that included the containment, office buildings, and all of that concrete, other Class 1 concrete structures.

During the review of these industry reports, we had a roomful of concrete experts together and discussed this subject, and that is how that limit that Rani just read to the committee -- you know, that limit was set during those meetings,

and it really reflects the knowledge in this field.

I don't know if that satisfied Dr. Powers' question or not.

MEMBER POWERS: Dr. Powers will be satisfied when he sees solubility relations and concentrations and aqua solutions. I mean, having someone say, "Gee, I've never heard of calcium phosphate. Therefore it can't be important," is not a persuasive case.

DR. KUO: No. I think what we have concluded in those meetings, that we never saw an operating experience in that fashion. That is basically what the conclusion was from those meetings.

MEMBER POWERS: There are two reasons that one never sees something. It doesn't occur and you haven't looked. Okay?

Now, there has to be some basis for concluding that it's not important. That's what I want to see.

DR. KUO: Yes. Well, like Mr. Jeng said, we will come back to you on that.

MEMBER FORD: Could you call us or get back to us on the rebar corrosion aspect?

MS. FRANOVICH: Sure.

MEMBER FORD: In this industry rebar corrosion is a big item.

MS. FRANOVICH: Even if --

DR. KUO: I understand that, Dr. Ford. For that to happen, of course, the concrete has to crack, and we have several cases like that of, for instance --

MEMBER FORD: The concrete is really porous, and all you have to do is get water to the rebar.

MS. FRANOVICH: It does degrade.

MEMBER FORD: And it's not water any longer. It's a fairly complex environment once it hits the rebar.

MS. FRANOVICH: Okay. We have an action item to get back to you both on these two items, and I'll make sure that the staff gets something to you.

But, Dr. Powers, I understand your question on my slide because I did characterize it as inaccessible. It turns out that there are accessible portions of these components. So I apologize for that confusion.

Any other questions on this slide?

(No response.)

MS. FRANOVICH: We had an open item on

the aging management program proposed by the applicant to monitor insulation degradation of electrical cables, in particular neutron monitoring and radiation monitoring cables.

And the staff's feeling was that a visual inspection of the insulation looking for deterioration was really not sufficient to insure that there was no degradation of these cables before loop accuracy could be effected.

The staff has previously accepted a loop calibration procedure which is a common surveillance procedure that is already being performed at most of the nuclear power plants. It ultimately proposed a combination of surveillance requirements that would fulfill the loop calibration, aging management program, and that resolved the open item.

Any questions on this item?

(No response.)

MS. FRANOVICH: That concludes my presentation of the SER open items. If there are any other open items that I did not discuss that anyone has a question on, feel free to ask.

MEMBER RANSOM: I had a question on hydrogen mitigation and the power for those in the event of station blackout. It was mentioned in some

of the discussion, but is any of that an issue with these plants?

MS. FRANOVICH: Well, it's a timely topic to bring up because we're involved in some legal proceedings where that is a concern of one of our petitioners, and the generic safety issue, I think it's 189, which involved combustible gas mitigation with igniters.

This is really a current operating issue of a current concern that the staff is addressing through the generic safety issue process. Nonetheless, we did have some contentions that were proffered by intervenor groups that were admitted into the proceeding for hearing.

The contentions have since been rendered moot by some staff RAIs, requests for additional information, and responses from the applicant that consider information in aa Sandia report on direct containment heating that touches on this very topic.

So the status of that legal proceeding is that the contention has been rendered moot. Nonetheless there are eight late filed contentions that are associated with that contention that we are going to engage in oral argument on in a couple of weeks here.

So the legal proceedings are still ongoing. When we first started out, there was also a contention on the potential use of MOX at Catawba-McGuire. That contention also was admitted by the ASLB, but subsequently appealed by Duke and the staff and reversed by the Commission.

There was another contention that was certified to the Commission on the potential for terrorism at these two plants, and the Commission advised the Board not to consider that contention for the license renewal proceeding.

So where we are right now is there are some eight late filed contentions that are related to that very issue, and we're still going through that process.

CHAIRMAN BONACA: My understanding, for example, for the severe accident mitigation analysis is that it's not that it's not an issue. It's an issue being dealt with under the current license basis.

So, therefore, it was taken out from the license renewal proceedings because it was an issue that affects actual operations right now in the covered licensing basis.

So it's not that it's not being dealt

with. It's begin dealt under a different kind of process.

MS. FRANOVICH: Correct.,

CHAIRMAN BONACA: Okay.

MS. FRANOVICH: Thank you, Mr. Bonaca.

MEMBER POWERS: Am I correct in my recollection that one of the plants -- I think it was Catawba -- had an important flooding hazard in its IPEEE.

MS. FRANOVICH: Yes.

MEMBER POWERS: And that it has agreed to mitigate that?

MS. FRANOVICH: Yes, sir, I think it agreed to build flood barriers for these auxiliary transformers located in the basement of its turbine buildings, correct.

MR. ROSEN: Where the condenser seals are.

MS. FRANOVICH: Pardon?

MR. ROSEN: Adjacent to the condenser seals like we talked about earlier.

MS. FRANOVICH: No. Actually those condenser seals are outside the turbine building.

MR. ROSEN: Oh, okay. I have one concern that comes up. It's really more generic,

not specifically about Catawba or McGuire, and that isi that we talked to PT about 14 ISGs that are open that have come up as a result of this and prior license extension requests.

MS. FRANOVICH: Correct.

MR. ROSEN: And that those are moving it through a process to become aspects of the GALL report, and my question is given that we're learning things and putting them into ISGs and ultimately into the GALL, what about the plants that have previously had their licenses extended? Are they subject to these new or is there any process for going back and thinking about the plants that have previously had their license extended?

DR. KUO: Dr. Rosen, it's a real good question. Yes, we are thinking about it, and we are dealing with it. Actually for those plants to had renewal licenses we are considering whether we should backfit them or not.

This is really a -- now that once they got the renewal license, they are in the operating reactor space. We have to follow the backfitting rule. So we are in the process of developing a procedure to deal with that.

MS. FRANOVICH: In fact, I think that

when we develop new ISGs now, we consider the implications for backfit, and it's part of the process for developing the ISG.

MEMBER POWERS: Let me ask you about that. It seems like a real good route to assure there's no -- to inhibit the evolution of our understanding, you're saying, "Gee, before I develop an ISG, I have to think about everything that I've done before," and even though it's a good idea, it may not pass the backfit rule in those plants that have license extensions. It's still a good idea.

Are you really condemning yourself to mediocrity in everything that goes forward because you're wedded to your past sins?

DR. KUO: No, it is not. Yes, we will consider the backfit, but backfit, it doesn't necessarily mean that we have to ask those plants to do anything. This is going to become compliance backfit because of a Part 50 rule.

So in the space of a compliance backfit, there is some consideration as to whether this is, indeed warranted or not.

So in case like, Dr. Powers, you said, maybe it's a good idea to do it now and later maybe we really don't have to backfit all the others.

It's not an inhibitor for the staff to raise any ISGs because, you know, in this consideration of a compliance backfit we do have that -- what do we say? -- the consideration whether we need, we do need to backfit or not.

So if an issue is a really good idea for today, for the future applicants --

MR. ROSEN: Good enough to get into the GALL report.

DR. KUO: Right, but really it doesn't warrant any additional action for those plants who have renewed their license. We wouldn't do that, but the thing that we were talking about is at the time of identifying this ISC, must give consideration of whether there is the backfit needed or not.

For instance, we have four --

MEMBER POWERS: That's the part that I find really troubling. I'm sitting there, and I said, gee, this is a really good idea, but if I think about it a little bit, it will never pass the backfit on those other plants. So I'm not going to bring this thing up.

MS. FRANOVICH: Yeah. I think Bob mentioned that --

MEMBER POWERS: I think you've got to separate these things.

MS. FRANOVICH: Yeah, when I mentioned that we consider the implications for backfit, some of what we put into ISGs don't involve that potential at all, and so we indicate that when we issue the ISG, that we've reviewed it and there are no backfit implications.

For others we just indicate that there are, and that's the kind of review that we do. It's not a consideration as to whether or not we issue the ISG or develop the ISG. It's that we indicate up front whether or not it has those implications.

MR. ROSEN: Well, I think the ones that you say have backfit implications will ultimately fail the backfit test, substantial additional protection, 5109 cost-benefit test.

So I think Dr. Powers is exactly right. We are condemned to basically not being able to use new insights in plants that have previously licensed. As a process what that means is that we're not going to do a better and better and better job.

MEMBER POWERS: That's right.

MR. ROSEN: We're just kind of stuck

where we are. Whatever kind of insight right now when you're getting ready to relicense, for example, Catawba, that's all the benefit that the regulatory system is going to be able to give. Future understandings and insights, it will be up to Duke to decide whether they want to put them in or not because the regulatory system simply won't be able to pass the 5109 backfit test, unless -- unless the staff decides to take a harder line on compliance backfitting.

Now, there you'd have to make the case, I think that there's some compliance issue under the relicensing rule brought up by a given ISG. That's such a revelation that, gee, we wish we really had thought about it for all of those other plants, but you know, we're going to go back to the previous X number of plants that have previously had their license extended and order them to include it in their licenses.

MS. FRANOVICH: Right.

CHAIRMAN BONACA: One aspect is, however, that many of these issues are really border line. That's why they've been open until now. They've been debated, and this is not necessarily the one for which a hard decision was easy to reach

because it was more like issues were there on the fence between, for example, the functionality test, that you have a passive component in a housing where, you know, the perspective of the licensee here, it's pretty valid, too. I mean, you could rely on the failure.

So I'm saying these are issues that have been debated for a long time, and I don't think they're so significant to the safety of those plants.

MR. ROSEN: I think you're right that a lot of them are borderline, but I think there are a number of them that are not, and I'll take the jockey pumps as one, speaking for the Fire Protection Subcommittee of the ACRS. You know, there are some issues that are very plain that ought to be, to me, that ought to be included in the scope and treated as with an aging management program properly, and that's something that I feel badly about, for the plants that have already had their licenses extended, have no requirement on their jockey pumps.

MS. FRANOVICH: Well, it's interesting that you bring up this particular ISG because this is one that we feel a backfit is not implicated. I

think that the staff supplied the same review for all previous plants, applicants, and it's a battle every time, but the staff has gotten those things in scope that it felt should be in scope or applicants have already identified them.

This ISG was really written at the request of our inspector to preclude expenditure of tremendous resources during the inspections, fighting these issues out. We wanted to get our guidance out to future applicants to make sure that they understand that if they don't apply some of their current licensing basis documents in their review, there's going to be bumps in the road.

So this is one where I think we've always applied the same standards. We're just getting the ISG out to avoid unnecessary debate with future applicants.

CHAIRMAN BONACA: Yeah. We do have a commitment to the Commission to report to them in the springtime, spring to summer, on potential improvements to the license renewal process, and I think it will be interesting to hear from the staff at one of the upcoming meetings for license renewal what the issues are and the potential impact for those plants which have been licensed before, and

they have a different position than those recommended now by the staff.

So that we can have a sense of whether or not we should have a recommendation for the Commission.

DR. KUO: If I may, Dr. Bonaca, I just want to make one additional comment. Out of the four IC I said that we have completed, only one that we are considering backfit. That's the station blackout. The other three are not being backfitted.

MEMBER SHACK: Yeah, but are you not considering a backfit because they've always been included? I mean the fan housings have always been, you know, a contentious thing. You've always insisted they go in. I just sort of figured by now people would stop fighting the battle.

I mean it seemed like a waste of resources. It didn't really change the requirements. They were always there.

DR. KUO: Correct.

MEMBER SHACK: And so are these like that? I mean, they're asking for things that have been asked in every license renewal. You're just codifying the guidance.

CHAIRMAN BONACA: By the way, jockey

pumps have been previously included even at Oconee.

MS. FRANOVICH: Right.

CHAIRMAN BONACA: That was a disputed issue, but I remember that you verified it, and then for Oconee they were put in the license renewal.

MS. FRANOVICH: Right.

CHAIRMAN BONACA: Anyway, I think we have an opportunity at one of the upcoming meetings to hear about what these issues are, what the exposure would be to the previous licensees for not doing that. In many cases it may not be exposure at all because they are already committed to, and so we have a sense as a committee if we should see this issue as a recommendation to the Commission.

MS. FRANOVICH: What can we do to help? I mean would you --

CHAIRMAN BONACA: Just simply bring a list of those --

MS. FRANOVICH: A list?

CHAIRMAN BONACA: -- how do you call it, ISGs?

MS. FRANOVICH: ISGs?

CHAIRMAN BONACA: And then, you know, maybe tell us if previous applications, in fact, did not have these commitments in.

MS. FRANOVICH: Okay.

MEMBER SHACK: Do 14 ISGs include the one that the industry submitted on environmental fatigue?

DR. KUO: That is correct. That is correct. The ROIC process actually made it very clear that anybody, including the public, can propose an IC. In this case the industry proposed an IC on the fatigue, involvement to assist fatigue.

And let me go back to also the 5109 process. There are two kinds of backfits. One kind is adequate protection, and Dr. Rosen was right. Some of these ISGs cannot really pass backfit test there, but there is also this compliance backfit just simply because the rule requires that. Okay?

That in some cases may be less of a requirement than adequate protection.

MR. ROSEN: Well, when you come back you can tell us the status of the 14 ISGs and the ones that you think need to be backfitted, whether they fit the 5109 test or whether they would rise to a compliance backfit as PT has suggested.

DR. KUO: Right. We will come back with that as a generic topic.

CHAIRMAN BONACA: Okay. Good.

MS. FRANOVICH: Okay. Any other questions on my presentation?

DR. KUO: Thank you, Rani.

And as a result of this presentation, I have two take-back actions. One is to provide the additional information to Dr. Powers on the inaccessible concrete, and the other is the --

CHAIRMAN BONACA: Specifically on the issue of phosphates?

DR. KUO: Yeah, and also the rebar corrosion.

CHAIRMAN BONACA: Oh, the rebar.

DR. KUO: And also, Dr. Rosen, you mentioned that there was some operating experience. I'm sorry. Dr. Rosen was talking about the operating experience related to the seal, the pump seal.

MR. ROSEN: I will talk to you off line about that.

DR. KUO: Okay, okay. And if you can just hold a moment and let me check, maybe Mr. Hans Asher here would say something about concrete.

Hans, the question is: how do you deal with the aging management of an inaccessible area concrete? The fact that we had some limit, but --

yeah. Go ahead.

MR. ASHER: Well, the way we approach in GALL, the issue of inaccessible area, for containment, for example, they are supposed to look at just by the rule, regulation requires them to -- applicant's licensees to look at the area, inaccessible area when there's some finding or there's some symptoms of degradation or corrosion in certain areas in containment surface. So they are to look into it. Regard the number of licensees have done that historically, and I get so many reports on this kind of a thing, like the junction of liner plate and the concrete interface. There's always corrosion there, and they are investigating throughout.

Now, for the other areas, for example, which are in the basement areas, which are normally emitted by soil, by another structure or something, and so in that area what we did in GALL was to establish some safe limits for certain contaminants which could degrade concrete competence.

There are three items that we felt and NEI, NUMARC at that time, agree with those three items and therefore limited the SEC (phonetic). Three items are the chlorides, the sulfates, and the

pH level of the soil, water which is surrounding that particular concrete item.

For chloride I think we set 500 ppm as the limit. For sulfate, we set at 1,500 ppm, and for pH where we said anything lower than 5.5 pH level would be something that we would have to further evaluate and see what is the degradation or what they plan to monitor those areas.

This is what we have right now on the license renewal context.

MEMBER POWERS: Is there a hint of a reason for choosing 500 ppm for chloride instead of 650 ppm?

MR. ASHER: Please?

MEMBER POWERS: Why 500 ppm instead of 650?

MR. ASHER: Yeah, okay. That is a value that we picked up from American Concrete Institute's direct reports in American Concrete Institute. One is ACI 222, which is simply related to the corrosion related event for reinforcing bars mainly in concrete.

And secondly is ACI 318. After 1980, ACI 318 established certain requirements for chloride even in fresh concrete, not in the concrete

which is hardened concrete, but in the fresh concrete also, and based on what we understood and what we knew about, I think we felt that 400 ppm is a safe limit.

Industry and we had dialogue of this particular item for a long time in the 1993 to 1995, 1996, before it became a part of NUMARC document. What is it technically we're using? Understanding industry report.

So that is where it was established for inaccessible areas.

MS. FRANOVICH: I just wanted to add to that that the last time we met the staff had a slide, and I still have it with me. I can put it up on the overhead projector, of the data that Duke had collected over the last 20-plus years. These are lake water data that indicate what the pH, chloride and sulfate levels have been.

And the staff's basis for determining that the groundwater was not aggressive is based on these data. So if you would like to see them, I can put them up. I have them right here.

MEMBER POWERS: Well, I mean, you did show them to us before.

MS. FRANOVICH: Yeah.

MEMBER POWERS: And they elicited exactly the same response. There's no phosphate indication there. It is not a useful thing to take lake water and then infer that is what groundwater is. The two are just not the same. Okay? Because if nothing else, the groundwater goes through the ground.

The acceptance of 500 ppm for chloride and 1,500 ppm is always referred to ACI 318. ACI 318 does not tell you why they took those values. So you haven't got a clue why the staff is doing things. Okay?

I give in on ACI 318. You're accepting an industry standard there, and the Commission says. It's not consistent with what we expect from the staff, which is a good science based understanding of what it's requiring, but okay. There's a point where you give up and say, "Okay. We'll take it."

But now we raise this issue of phosphate, and all we hear is the experts say it's not important. We know positively that appetites do form, that they're volumetrically large, that they cause spallation in the intragranular, interaggregate spaces, and for the same reason that gypsum formation causes concrete spallation. So why

shouldn't they be considered?

I mean, I never get an answer to that, except the experts say it's not important. The experts could well be right. I just don't understand why.

MS. FRANOVICH: Perhaps what we need to do is take a look at the same references that you're familiar with and see if we can --

MEMBER POWERS: Well, you're looking at ACI 318. I mean, it's kind of a little button on concrete placement and maintenance. Okay?

DR. KUO: Dr. Powers, I guess, you know, this is really not the forum of the discussion, and I will take this back and come back to the committee.

MEMBER POWERS: Yeah. I'll just simply say I've heard that before.

DR. KUO: Okay. If there are no other questions, that concludes the staff's presentation on the SER for McGuire and Catawba license renewals.

Thank you.

DR. KUO: And, Dr. Bonaca, this concludes the staff's presentation.

CHAIRMAN BONACA: Thank you.

I would like to go around the table here

and see if any of the members have additional questions for the staff or for the licensee.

Insofar as this information on having to look for additional information on the issue of concrete.

DR. KUO: Right.

CHAIRMAN BONACA: Okay, and --

DR. KUO: I will come back and arrange with the ACRS staff and see.

CHAIRMAN BONACA: Yeah. Please speak with me and se can set up a time.

DR. KUO: Certainly.

MEMBER APOSTOLAKIS: So can we write a letter then?

CHAIRMAN BONACA: Could you also include the rebar?

MEMBER APOSTOLAKIS: I think first we should write a letter.

CHAIRMAN BONACA: I'm sorry.

MEMBER APOSTOLAKIS: Aren't we supposed to write a letter this time?

CHAIRMAN BONACA: Yes, but hopefully we can hear something before.

MEMBER APOSTOLAKIS: Huh?

CHAIRMAN BONACA: We can hear maybe

something from the staff before we get to that.

MEMBER APOSTOLAKIS: Oh, before.

CHAIRMAN BONACA: And then we will look at that.

MR. ROSEN: And we have an issue that maybe we don't address in the McGuire and Catawba letter, but we address in our opportunity to talk to the Commission about improvements to the license renewal process about previously relicensed plants no being able to gain the benefit of new GALL provisions.

CHAIRMAN BONACA: That's right. So we will handle it that way under that umbrella.

Okay. If there are no further questions on this issue, I will thank the staff for the presentation. I think that the SER was, in general, a very quality document. So I commend you for that.

And with that we'll take a break. Since we're ahead of time, we'll start the meeting at 10:20.

(Whereupon, the foregoing matter went off the record at 10:04 a.m. and went back ion the record at 10:31 a.m.)

CHAIRMAN BONACA: Let's resume the meeting.

The next item on the agenda is the draft regulatory guide, the G-1107, "Water Sources for Long-Term Recirculation Cooling Following a Loss of Coolant Accident," and Draft Generic Letter 2003-XX, related to the resolution of GSI 191, "Assessment of Debris Accumulation on PWR Sump Performance."

And Dr. Wallis will guide us through this presentation.

MEMBER WALLIS: Thank you, Mr. Chairman.

We heard about this issue in 2001. It concerns the debris which is released into a containment building during a LOCA, for instance, and it falls or it is transported in the building. It may reach the region of the strainers for the pumps which are relied upon for long-term cooling by recirculation.

And the question is: what is the effect of this debris on the functioning of that system?

We wrote one of the shortest letters we've ever written in September, on September 14, 2001, where we said the NRC staff should expeditiously resolve GSI 191, and we stated if plant specific analyses are required, guidance for performing these analyses should be developed.

The staff has now prepared a generic

letter, which is their answer to resolving the issue, and they have, along with that generic letter, prepared a draft guide, a reg guide which will provide this guidance for performing the analysis which the licensees will be asked to do.

And so things are moving along. The Thermal Hydraulic Subcommittee heard about this a couple of days ago, and the staff is here today to present to the full committee. I think Gary Holahan is going to start us off.

Please do so, Gary.

MR. HOLAHAN: Thank you.

My name is Gary Holahan. I'm the Director of the Division of Systems Safety and Analysis at NRR.

The NRR and the research staff will go through and present you the details of the generic letter and where we're going on this issue. I just wanted to make a few introductory remarks to remind the committee that there was a research study that we're basing our actions on, and basically the conclusions of that research study was that PWR sump concerns were credible, but that we couldn't really address them without more plant specific information, and that's what led us to the path of

going out and getting more information, involving licensees and also developing technical guidelines by which we can judge the status of individual plants and what sorts of corrective actions might be needed and whether those corrective actions were, in fact, sufficient. And you'll hear about that in our presentations today.

The reason we're here with the committee is because this activity involves both the resolution of a generic safety issue for which the ACRS' role is important, and it also involves generic communication for which both the CRGR and the ACRS have roles.

And I think although it is sort of voluntary for the ACRS to involve itself in a generic letter, I think it makes sense in this context since it's an important one and also because it really is the key resolution path to the generic safety issue itself.

May I have the second viewgraph?

One thing I wanted to make clear, and you won't hear this too much later on in the presentation because most of what we're talking about is forward looking in how we're going to resolve the issue, but to remember that we always

ask ourselves the safety questions.

Why is it okay to continue operation, if that's appropriate?

How long would that be appropriate? We recognize there are a lot of issues that can't be resolved on a short term basis. It requires information.

So when a generic safety issue is first identified, we have to ask ourselves: why is it okay to allow plant operation while we're studying it?

We also have to ask that question on a sort of continuing basis. Whether a generic letter or a bulletin or an order or whatever action we take, there are some time frames involved and implied, and we have to ask ourselves, again, are we comfortable with the information and the state of the plants so that we can in this case take the time to develop guidance, to send out a generic letter, in this case even send it out in a draft form for public comment.

And so we're just going to remind the committee that we do such things, that we consider things such as the probability of meeting the sump, what compensatory actions are possible, the

advantage one has from a leak-before-break point of view, the fact that there are some additional margins which because we didn't do plant specific analyses may be available as you'll hear in the discussions.

What we really looked at was areas and concerns about losing net positive suction head to the recirculation or containment spray pumps. But, in fact, there's some margin in that approach. There's more margin than just the design margins, and we don't give credit for containment over pressure and those sorts of issues.

We also are --

MEMBER POWERS: Gary, is that a universality? I think you do give credit for containment over pressure in some cases.

MR. HOLAHAN: For the boiling water reactors.

MR. ARCHITZEL: There are a couple PWRs where over pressure, very few, but as part of this process, we are recognizing that over pressure that we're carrying, and that's part of the regulatory guide changes. Our practices are incorporated into the reg guide that's in front of you, and it is the minimal possible. You do a different analysis.

There are very few PWRs, more BWRs, but there are some that have over credit pressure, not total, but partial.

MR. HOLAHAN: In addition to that, we are aware and have been working with the industry on some interim actions they're taking even before we issue the generic letter. They've been, I think, rather proactive in responding directly as a result of the research study before waiting for our generic letter to go out.

And so a number of plants have been following a guidance from generic program developed through NEI of looking at maybe not the issue in all of its ramifications, but at least looking at where they are with their particular sump; certainly doing walk-downs in containment and looking at cleanliness and related issues.

And there are at least two PWRs that have decided already to make improvements to their sumps. So the combination of these things together gives us enough comfort for moving ahead on a schedule that we've proposed. These considerations don't make the issue go away. They don't completely resolve the issue. We think it's still an important issue and it needs to be, you know, driven to an

appropriate conclusion.

But at least there's a certain comfort level that we're going to maintain safety in the interim.

If I could have the fourth viewgraph.

MEMBER WALLIS: This is somewhat vague, the word "a certain comfort level." It would be nice if you had a more specific measure of this comfort about maintaining safety.

MR. HOLAHAN: Well, part of the difficulty is the nature of this issue. The fact that we have to go out and get plant specific information leaves us in a condition where we can't definitively say how much margin there is at any given plant. So part of the imperative for getting the generic letter out is so that we are more informed, but I think --

MEMBER WALLIS: So you don't know enough to make this assessment that I want more specific. The information isn't there.

MR. HOLAHAN: That's correct, and I think if it were, perhaps we'd be approaching the issue a little differently. So if we knew that there were three plants that had very little or no margin, then we'd deal with that differently.

MEMBER WALLIS: I think we determined at the subcommittee meeting this is what you are going to do. You're going to find out this information.

MR. HOLAHAN: that's right.

MEMBER WALLIS: Then it may be clear what specific actions you need to take.

MR. HOLAHAN: Yes, indeed.

And what information? I mean, we may very well accelerate our activities on a few plants that are problems and may be more tolerant of plants that have only minor issues.

MEMBER WALLIS: Okay.

MR. HOLAHAN: The three major activities that are going on really have to do with a draft regulatory guide, which is really a revision to Regulatory Guide 1.82.

An industry initiative activity, which is developing specific technical guidance that can be used by individual plants to test where they are with respect to this issue and what they need to do and the generic letter itself, which is our regulatory tool for kicking off that activity.

At the bottom of the viewgraph you see basically the closeout activities are after the generic letter goes out we'll get responses from

each plant. We'll review those. Hopefully in a short order, because of the guidance available, we think maybe this can be an efficient review; come to closure on what actions we think need to be taken and on what time frame.

Where there are some difficult or technical issues, we may do sample audits or independent calculations as we did for the case of the BWR sump strainers, and in the normal course of action, we would issue a temporary instruction, which is an instruction to our resident inspectors to see that appropriate closeout activities are taken.

So that's a general overview of where we are and how the program works, and what we're going to do today is kind of walk you through the structure and the technical expectations in the generic letter.

John Lehning, are you going to do that for us? Ralph.

MR. ARCHITZEL: Well, I'll try and go through quickly. My name is Ralph Architzel. I'm with Plant Systems Branch at NRR. I'll try and quickly go through some of my slides from the other day.

Can I have the next slide, John?

First, I'd like to note that Generic Safety Issue 191 is related to the Regulation 5046 and Criterion 35 for long-term recirculation. It's sort of critical. We consider this a compliance issue in some instances, and those are the regulations involved.

As Gary has mentioned, the reblockage may prevent the injection of water into the reactor core or containment spray operation.

Of note, USI A-43 did examine this. It was principally focused on vortex formation, along with debris blockage by fibrous insulation. It was closed in 1985 with a recommendation going forward that mechanistic analyses be performed by licensees as they changed out insulation, et cetera.

A specific decision was made not to backfit at that that time as it wasn't cost beneficial, but forward looking plants had to do deterministic analyses, and the current fleet of plants should consider that when they changed out insulation because of the expenses involved.

So GSI-191 was opened in 1996 because of events that happened at the BWRs and also because of new information during the BWR resolution that was

identified, such as the thin bed effect and other aspects of that. So we reexamined USI A-43 and resultant GSI-191 being initiated. Research completed their technical assessment, concluding that there was a sufficient basis to conclude it's a credible concern, and we're in the process of developing regulations.

The current generic letter you have in front of you today is based on a -- has actions that require us to consider this a compliance backfit. So now we're reversing that position at least in the draft staff position and considering this to be a compliance backfit issue associated with the generic letter.

We realize this is a pre-decisional document. We still have to go through the CRGR. At the moment it is a compliance backfit.

MEMBER APOSTOLAKIS: What is it that -- let's go back. What is it that USI A-43 missed when you closed it?

MR. ARCHITZEL: The principal concern was the new information. I mean it didn't miss that much. It did say we have a 50 percent criteria on blockage of some screen that we put out with not a good, sound basis way back in the beginning. It

identified that as being faulted. It picked that up.

What it didn't pick up, the large blankets and the transport of large fiberglass break-up, and it finds that new transport, et cetera, generation should be considered mechanistically. It didn't have effects like the thin bed effect where you have a very fine fibrous in the suppression pool at the boilers that resulted in those events, and then you have the particulate debris that goes along with that and can result in some clogging at much different configurations that were assessed at the time of USI A-43, some of the paint chips, you know, different particulates.

There was more information that was identified after that point in time that would change the balance of a cost-benefit.

MEMBER APOSTOLAKIS: And this information came from where?

MR. ARCHITZEL: Well, the Barseback event, or a lot of research that has been done since then, the transport mechanisms, how the debris is -- I mean, we had a presentation the other day by Los Alamos about a lot of the testing they've done, and there is a lot more information today than there was

then.

MEMBER POWERS: I have, quite frankly, lost track of the experimental bases for a lot of these discussions. I guess I'm familiar with some of the Los Alamos sponsored experiments on beds and things like that affecting the screen.

It seems to me that when Los Alamos was before us, there was quite a lot of discussion about uncertainties in the analyses of, one, what kind of debris was formed during a break, what range of it of area was affected, and the subsequent transport of that debris from whence it was formed to the sump itself.

Could you give us a thumbnail sketch of what the experimental support there is for those aspects of the analyses?

MR. ARCHITZEL: Are you talking about the uncertainties? I'm not -- I mean, if I went into the parametric and looked at how you took all of the parametric cases and --

MEMBER POWERS: I'm not so concerned about the analysis itself. I'm trying to recall what the experimental data base is.

MR. ARCHITZEL: It wasn't just the work Los Alamos did. It also was based on the work that

was done for the boiling water reactors and the foreign experience in testing.

For the generation transport, like the steam air jet test, there is a tremendous history of testing associated with this issue, and still uncertainties, too, as you --

MEMBER POWERS: Oh, sure, and there always will be. I guess what I'm asking really is do we have reasonable qualitative understanding of the phenomena associated with first the formation of the debris and the subsequent transport of it.

I mean, you try to calculate transport of debris particles, and you're going to run into serious problems knowing what drag coefficients are used and flow pathways and things like that. I wonder do we have large scale tests that give us some confidence that these models that Los Alamos was using are roughly correct.

DR. WEERAKKODY: This is Sunil Weerakkody. I'm the Section Chief in the Plant Systems Branch.

I can try. I am not familiar about the historical aspects of this issue, but I have visited the experimental facilities both at LANL and also at University of New Mexico which were constructed just

for this purpose.

MEMBER POWERS: Incidentally, the folks at University of New Mexico just before Christmas invited me down to visit their experimental facilities, and so I'm reasonably familiar with what they've done there, and quite frankly, their work puts a perspective on this that you might not derive from just looking at the raw paper work.

MR. ARCHITZEL: March 4th there's another meeting coming up at New Mexico, and the French are coming to that meeting also.

MEMBER POWERS: This committee is not.

DR. WEERAKKODY: Well, I can try to answer some of the parameters to the limited knowledge I have that Los Alamos did look at. One of the parameters they looked at in the University of New Mexico facility is how the velocity of -- I don't know the exact term -- the velocity of water that approaches the sump, how that affects the transport of different natures of debris because you have debris like RMI, and I'm sure you have seen, you know, that's metallic and what kind of velocities are necessary to transport that type of debris up to the screen where it is transporting things like fiber. What type of velocities are

needed to transport that type?

So that was one parameter I know for a fact that they did look at. Then when I think of the facility at Los Alamos, you said you have seen that. In all of there they construct an apparatus where they have a pump and the screens, and then they introduce, you know, debris that they would think would be the type of debris that could be created during the loss of coolant accidents and missile delta Ps.

So there was real hard data that were generated to support this issue. I'm not sure I answered fully all of your questions, but --

MEMBER POWERS: Well, I'm sure that a fool can generate questions that a wise man would take a lifetime to answer, and so I'll play the fool here a little bit.

MR. ARCHITZEL: And let me just clarify one thing. If there's a lot of detailed information, and BP will talk about, second, there's some knowledge based documents and final preparation. It's a fairly thick document, but it's a track record back to the other experimental. You can go in there and you can go to the other NUREGs and the other historical aspects.

MEMBER POWERS: I think that's the news I wanted to hear.

MR. ARCHITZEL: And that document will be useful for industry in resolving this as well, and BP should be talking about this versus me, but that's the key document. We've been reviewing that.

MEMBER POWERS: So eventually we'll have a nice handbook that says here's all that we know about this issue from an experimental point of view.

DR. WEERAKKODY: Absolutely right.

MEMBER POWERS: I think that's a -- you guys deserve big credit for pulling that all together. I hope you do a great job on that because that would be of historical value. It will be of value to people designing new reactors. I mean, do a good job on that one. That's great.

MEMBER WALLIS: Dr. Powers, we had a presentation from Los Alamos at the subcommittee meeting, and there was quite an extensive give-and-take, and talked about their ways of approaching the generation of debris, the way in which they defined the area in which the insulation was destroyed and essentially broken up into small particles of various sizes and fibers and so on, and they essentially said that for a large LOCA, the material

within that region was disbursed throughout containment and the velocities and so on.

MEMBER POWERS: Well, I know that's what they say. The question is is that true.

MEMBER WALLIS: Well, again, that is a question. I think one would have to -- someone has to peer review that and so on, but then that is to say that they were addressing the questions of transport in the water with CFD and all of that.

So we did have a look at that, and I guess you're right to say how far do you have to go to verify that the models are okay.

The way this is evolving is that the ball is very much in industry's court, that generic letter says you will analyze these things for your plant because each plant is different, and not only is it in industry's court, but NEI has promised to provide the guidance on the matters that you've been asking questions about.

So the success of this process depends very much on the response of industry and NEI, and I think the Los Alamos work has been very, very useful in establishing some of the things one needs to worry about. It's ongoing, and I hope it results in the document that you're suggesting, but the process

here is to get the letter out and get information back from industry and get them to get NEI to develop this, industry to develop the methods for analyzing individual plants.

MEMBER POWERS: Well, I guess I agree with you that the strategy that the staff has approached here seems appropriate. They've done their analyses enough to see that they have a real issue here, and then they've said, well, but the issue really belongs to the industry and now they're turning it over.

I still think that this data document that you're putting together is just a great idea.

DR. WEERAKKODY: There is going to be a data document. I'd like to add one caveat to what Dr. Wallis said, which is we have made it clear to the industry that whenever they develop guidance, we review them, review our comments. We don't do safety value in some of them, but even in our generic letter, we make it clear in that that if we feel that they're not going in the right direction, then we would come back and say, 'No. That's not the first direction. So, you know, we try to the extent possible work with them, but at the same time, given the significance of this issue, we keep

an eye on what, you know, is happening on all aspects.

MEMBER LEITCH: Ralph, a few minutes ago you used the term "compliance backfit." Could you explain the implications of that?

MR. ARCHITZEL: When you do a backfit like was done with -- the regulatory analysis guidelines have changed somewhat since '85. They allow now for compliance backfits. When you do a compliance backfit, a simplified cost-benefit, it still needs to be a significant issue, but you don't need to show a positive cost-benefit.

If we had to do a cost-benefit even today with an industry program and the way the regulatory analysis guidelines are set up, you have to factor in that program. You have to do best estimate with the program, without the program, and then you do the cost benefit, and that's a regulatory analysis without a compliance backfit basis.

It would be very hard probably even still to pass such a program with an industry program in place, but we can still, even if we didn't do compliance backfit, we can choose to do a backfit on that basis. We'd have to do that and

then show a net benefit would go up. That's noncompliance backfit.

Okay. So we could still do that, but it's unlikely at this stage with an industry program to pass muster. A compliance backfit says that considering the way we've established the guidelines, we don't believe the ECCS system is in compliance with what we're looking for for long-term recirculation, those regulations I quoted. Therefore you need to change your analysis, mechanistically evaluate that phenomenon, and that's what we're imposing, is actions in the draft generic letter.

That is pre-decisional. We haven't gone through the CRGR yet. So we could come back with this, an information generic letter that wouldn't have any compliance aspects to it. It has the same impact, but it's not quite as hard an action as the compliance backfit generic letter.

MEMBER LEITCH: So the main difference is that a cost-benefit analysis does not have to be done or has that --

MR. ARCHITZEL: A simplified one has to be done for a compliance backfit, but not a rigorous one. We still need to do some type of -- and the

one we're referring to now is the one that was done two years ago by research. You had it in the package, but it's not a rigorous regulatory analysis. It would be a different one if we had to do one today.

MEMBER WALLIS: This is really compliance. I mean, the LOCA system has to work, and if the debris prevents the system, the mitigated system, from working, then this is not mitigating the LOCA.

MR. ARCHITZEL: But from a compliance backfit standpoint, we're changing the way you say it works. We said 50 percent clean screens or 50 percent blocked is the guidance, and we agreed to that and we accepted that, and that's how these plants were designed and operated.

So they're in compliance today until we take an action to say different.

MEMBER LEITCH: Okay. Thank you.

MEMBER APOSTOLAKIS: So, I mean, this is telling us what Los Alamos did, but what did they find? I mean, address testing or knowledge based uncertainties. Can you tell us in one or two sentences what the conclusion there was?

MR. ARCHITZEL: I've got a back-up. Let

me just give you the typical numbers. Whether those are actually the numbers, we've had numbers portrayed, how many plants, good, bad, et cetera. The bottom line was there was a significant additional core damage frequency projected by the Los Alamos work.

MEMBER APOSTOLAKIS: Okay.

MR. ARCHITZEL: For the current condition it was less of a core damage frequency if you assume large break LOCA initiating events, and then if you factor in operator actions, one of the things in my slide here, to evaluate the potential recovery actions. We're finishing up with a report on that right now.

Then, for example, in a large break LOCA case, it might be an increase in CDF on the average of two, without operator action, it might be like 17. There's numbers like that out there.

MEMBER WALLIS: Would you tell him the number that Los Alamos gave us?

MR. ARCHITZEL: Yeah, these are -- I've got the studies.

MEMBER WALLIS: Well, we heard a number 170.

MR. ARCHITZEL: Well, that's without --

that number should have been 140.

MEMBER WALLIS: It's still a big number without these other operator actions and so on.

MR. ARCHITZEL: But whether that's a best estimate PRA, you know, there's some question. We've got -- that's what Los Alamos did for us to evaluate this associated with the --

MEMBER APOSTOLAKIS: And how were the operator recovery actions evaluated?

MR. ARCHITZEL: On the same basis of -- do you mean how many operator?

MEMBER APOSTOLAKIS: Presumably they put some probabilities there.

MR. ARCHITZEL: Oh, yes.

MEMBER APOSTOLAKIS: How?

MR. ARCHITZEL: Like the operator availability of taking the water storage tank and getting another source into the refueling water, to keep the ECS running and whether the operator turns off the pump and starts it again and can -- if that would be effective in clearing the insulation.

MEMBER APOSTOLAKIS: Do you happen to recall what model they used for these things?

MR. ARCHITZEL: Well, I've got it here if you're interested. I guess we could give it to

you.

MEMBER APOSTOLAKIS: I am interested.

MR. ARCHITZEL: It's a draft though.

DR. WEERAKKODY: We can provide it to you later.

MR. ARCHITZEL: We can provide it to you.

DR. WEERAKKODY: I don't have the answer.

MEMBER SHACK: MEMBER APOSTOLAKIS: Are we writing a letter on this today? No.

MEMBER WALLIS: Do you want to talk about that now or do you wish to talk about it later?

MEMBER APOSTOLAKIS: Oh, it's up in the air.

DR. WEERAKKODY: But one thing I wanted to add to what Carl said, Dr. Apostolakis, is in terms of the knowledge base uncertainty, it's not just the core damage frequency numbers that the Los Alamos contributed. If you look at the history of this issue, for boilers the agency could take a much more rigorous approach because of events where the screen was blocked.

So in terms of uncertainty, there's

quite a bit of certainty that this is a problem, and the agency issued a bulletin, then a letter, and had the boilers -- initiate the boilers to address that.

When it came to pressurized water reactors, we have never had an actual case where sump recirc. was actually demanded. All of the small LOCA events we had in the industry were mitigated before proceeding with the sump. recirc. stage. So it was a case of zero demands and zero failures.

In a situation like that, now you need some original experimental data to establish the credibility of what you postulate, and I think the Los Alamos study significantly contributed to the issue so that we can engage the industry with strength in saying, "Look. We did the experiments. We think there's a potential issue here." So we all should pay attention and resolve this.

So I think if I summarize the knowledge base uncertainty that LANL contributed, that's that. In terms of the recovery actions, you know, we would provide you the numbers and the basis that they gave us, but I just want to tell you that the type of operator actions, the operators can take in situations like this, we don't normally assign. I

don't think they can assign very high failure probabilities.

So whatever are the CDF numbers that we came with were not --

MEMBER APOSTOLAKIS: Now, why is that?

DR. WEERAKKODY: Because, again, you run into situation of limited demands and limited failures. If you look at the type of operator actions the operators must take in a scenario like this, one of the things you talk about is refilling the RWST, and this has to be done. First there should be a water source available. Cross-ties have to be made, and this kind of action has to be done within a short time frame under stressful conditions.

A second operator action, again --

MEMBER APOSTOLAKIS: So wait a minute.

DR. WEERAKKODY: Yeah.

MEMBER APOSTOLAKIS: Maybe I didn't understand what you said. You said you cannot assign verified probabilities of failure?

DR. WEERAKKODY: You cannot assign -- oh, well, maybe I used the wrong word.

MEMBER APOSTOLAKIS: Because your argument is you --

DR. WEERAKKODY: Yes, yes.

PARTICIPANT: Low probability.

MEMBER APOSTOLAKIS: A low probability, but what is a low probability of failure?

DR. WEERAKKODY: When you look at operator actions and the failure probabilities, you see numbers like .001, .5 and --

MEMBER APOSTOLAKIS: For failure?

DR. WEERAKKODY: For failure, yes. So you wouldn't see failure probabilities such as .001 in a situation like this. Again, what I would --

MEMBER WALLIS: I'm confused. You will see big numbers like .5. Is that what you're saying?

DR. WEERAKKODY: Yes.

MEMBER WALLIS: If it's .5, it doesn't matter whether it's failure or success, does it?

MEMBER APOSTOLAKIS: But didn't se just hear that without recovery actions the delta CDF was very high and then with recovery went down?

MR. ARCHITZEL: About an order of magnitude.

MEMBER APOSTOLAKIS: About an order of magnitude. How do you go down by an order of magnitude if the failure probability of the

operators is .5?

DR. WEERAKKODY: Because it's a combination of operator actions. You know, again, what I would rather do is give you a copy of the report we have because right now I'm speaking from the overall knowledge I have rather than the specific numbers that are in this report.

But the short answer to your question would be it is not just one operator action. If you have a couple of operator actions, such as another action I know that the operators can take is stopping and restarting the pumps, and I don't know how that has been factored into the support because we just got the report a couple of days ago.

MEMBER APOSTOLAKIS: From where?

DR. WEERAKKODY: From Los Alamos.

MR. ARCHITZEL: But it's delayed recirculation by not having both trains working, you know, delayed if you can avoid the containment spray starting. There's different things that can be done, and they are factored in there, and they are analyzed on that analysis.

MEMBER APOSTOLAKIS: Yeah, I'd like to see that.

MEMBER LEITCH: Is it not also a factor

that even if the operator does all of the things that this procedure prescribes that it may not be successful?

MR. ARCHITZEL: Right.

MEMBER LEITCH: Is that factored into the issue? In other words --

MR. ARCHITZEL: Sure.

MEMBER LEITCH: -- I presume the procedures could prescribe some remedial operator actions, but they may not be successful at removing the debris from the --

MEMBER APOSTOLAKIS: That's right.

MEMBER LEITCH: So is that -- when you talk about the success of operator actions, are you talking about the faithfulness with which he does them versus whether those actions are successful or not? Are both of those factors included?

MR. ROSEN: You fraction for both. You have an event tree.

MEMBER LEITCH: Right.

MR. ROSEN: You fraction for both.

DR. WEERAKKODY: What you say is correct, yes.

MEMBER LEITCH: Okay.

MEMBER WALLIS: The probability of

clearing the screens by playing with the pumps is probably pretty small.

CHAIRMAN BONACA: We are back in session, and we have now a presentation on the PTS and evaluation project, technical basis for potential revision to PTS clinical materials, and Dr. Kress will take us through that presentation.

MEMBER KRESS: No, Dr. Shack will.

CHAIRMAN BONACA: Dr. Shack. Okay. I guess your initials have been changed.

MEMBER SHACK: They have been changed, right. We had a presentation to the subcommittee on --

MEMBER WALLIS: Are these your regulatory initials, or your real initials?

MEMBER SHACK: Add 60 degrees to --

CHAIRMAN BONACA: Well, that is the reason for the change. Okay.

MEMBER SHACK: We had a subcommittee meeting where we went over this in some detail, and the staff will now have the difficult task of distilling a days worth of discussion down to their allotted time, whatever that is. Nathan, are you going to lead off, or Mark?

MR. CUNNINGHAM: Good afternoon. Mark

Cunningham from the Office of Research, and Ed Hackett and Nathan Sunil from the Office as well here, as well as Alan Kolaczkowski, and David Bessette will be making the presentation in some sort of fashion this afternoon.

First off, Mark Kirk was here yesterday making a lot of the presentations, and something came up today and he couldn't be here, and so Ed is -- just think of Ed as Mark today.

MEMBER KRESS: Is that his regulatory name, or is that --

MEMBER SHACK: And will he mess up the power point?

MR. HACKETT: We have already done that. We have already taken care of that one.

MR. CUNNINGHAM: Just by way of a short introduction --

MEMBER WALLIS: This sounds a little bit since he couldn't be here like the Politburo, where one of our members isn't here today, and you wonder what has happened.

MR. CUNNINGHAM: After the savage beating that Mike Mayfield administered --

MEMBER ROSEN: They beamed him up.

MR. CUNNINGHAM: Something like that.

Not quite though. By way of introduction the committee has been involved with listening to us and talking with us over several years now on the PTS work that we have had underway.

We are kind of in an transition period right now, where we are moving from a state of having a technical basis for possible rule changes, and making a transition into considerations by our colleagues at NRR about real rule changes.

What you will hear today is kind of a summary of where we are with respect to the technical basis. You have been provided a document or two and those are summaries of where we are so far. So you are getting in a sense a summary of a summary today.

Again, the big point is that we are in a transition, and NRR will be coming back, I'm sure, and have lots of opportunities to talk to you or with you as well about the proposed rule as they get into that.

We will be back with them to help them discuss technical issues associated with it, and so --

MEMBER APOSTOLAKIS: Is there a request for a letter today?

MR. HACKETT: There is a request. Thanks, Mark.

MR. CUNNINGHAM: Go ahead. Mark will continue from here.

MR. HACKETT: A couple of other items here. There are also with us Roy Woods, and Roy, if you want to raise your hand; and Donnie Whitehead is over on the wall there, too. Matt Mitchell, representing NRR, in the back, and so if there are any hard questions on the regulatory aspects, we will go to Matt.

And Terry Dickson is here also from the Oak Ridge National Laboratory. And James Chang from Maryland is here, too. Sorry about that. Mark emphasized the fact that this is not our final product, and I think that is where we didn't quite lead off the day real well yesterday.

So this will not be the committee's final crack at this. There is quite a road ahead of us ultimately.

MEMBER APOSTOLAKIS: It this is not the final product, then what kind of letter are we supposed to write?

MR. HACKETT: Where we are, and I will try and set the stage for that, as Mark indicated,

what we have right now is a draft technical basis that the team here feels supports a revision to the PTS rule. But it is exactly that.

It is a draft and there is some more work to be done. We took some very good comments yesterday on the report itself and the structure, and the content, and some things that we need to address there.

So really what we are looking for from the committee at this point is a thumbs up that the committee feels that they are on the same page, and that this is something that at least merits going ahead and considering rule making at some point.

And that is not to say that that is even going to get engaged this year or even next. I mean, that is a decision for NRR, and we are here just to discuss the technical basis. That said, I guess I will go to the next slide if I can do that without Mark.

I think I basically already said most of what is on here. We did spend a full day yesterday, where we went through a lot of this in detail, and we can go through as much or as little of that as the committee needs hopefully, but we do have obviously reduced time.

We have only about a 16 or 17 slide presentation today, compared to probably about 50 or 60 yesterday. And we plan on going through all the things that you see here.

MEMBER WALLIS: You said 50 or 60? There was 150.

MR. HACKETT: That was Mark's presentation, that's right. And unfortunately Mark could not be with us today as Mark Cunningham pointed out, and that is certainly a deficiency for us in several respects.

And also most notably with respect to power point, and I don't think that any of us here at the table is equivalent in that regard. With regard to the rule, and maybe this is one that I could stand up for if you guys can still hear me, the basis was documented for the rule a long time ago now, in 1982 SECY-82-465.

What you are really looking at is a methodology construct to protect the reactor vessel in the event of an over cooling event, and it really boils down to as simple as two things; having a materials metric, which is here on the X-axis, and which was the subject of much debate yesterday in the way of RTNDTs, versus a screening criterion, or

rather an acceptability when run through a wall cracking.

When that was all put together, basically you ended up with a criterion, acceptability criterion for through wall cracking frequency 5 times 10 to the 6th, minus 6.

And then a metric and RTNDT space at either 270 or 300, depending on the exact material consideration that you were looking at. And that just sets the construct for 10 CFR 50.61, which is the upper bullet that you see there.

If necessary, people could employe flux reduction measures to keep the flux down, and keep the embrittlement down for the plant in particular for the future.

And then if necessary perform plant specific analyses for Reg Guide 1.154 to justify continued operation if that particular trip wire was lauNched, and that happened --

MEMBER WALLIS: Wait a minute now. Is this your old basis?

MR. HACKETT: This is the old basis. All I was doing here was just revisiting what is currently today.

MEMBER WALLIS: So this is the current

basis?

MEMBER APOSTOLAKIS: Yes. So it is 210 from there, plus 60.

MR. HACKETT: That was the fix that we put on, and the other part that we covered yesterday, and I know that Professor Apostolakis wasn't here. We did receive some feedback from Dr. Shack and Dr. Wallis about the incorrectness of this, and the way that it is shown in your draft report is not correct.

It was really keyed to 210, and the margins were -- I don't know if we want to get into all of that.

MEMBER APOSTOLAKIS: Now, wait a minute. Wait a minute. The current screening criteria is 270?

MR. HACKETT: That's correct.

MEMBER APOSTOLAKIS: This is consistent with that?

MR. HACKETT: Yes, it is.

MEMBER APOSTOLAKIS: So it is wrong.

MR. HACKETT: I am trying to think of the

right --

MEMBER APOSTOLAKIS: It is not the

figure that is wrong. It is the criterion that is wrong, because if you move to the right, you are increasing the frequency.

MEMBER SHACK: The number that they report, the 270, is this number to which they have sort of been told to add 60 degrees. So they correspond. The 210 is sort of the real embrittlement, and the 270 is the regulatory embrittlement.

MEMBER APOSTOLAKIS: But I don't understand that. Why do you add 60 degrees?

MEMBER SHACK: Because the reg guide tells you to do that.

MEMBER KRESS: Because that is more conservative when it comes down to trying to decide --

MEMBER APOSTOLAKIS: Well, that is what I am saying, these are more conservative.

MEMBER APOSTOLAKIS: Well, you move to the right and so you go up and the frequency is now less and the failure is higher, right?

MEMBER SHACK: The average value of an RTNDT is still 210. Whether the number that they report, because of the way that they are told to compute it, corresponds to an average of 210.

They report the average, plus the 60 degrees, the 270, but they are equivalent in terms of this plot.

MEMBER APOSTOLAKIS: This screening criterion is 270?

MEMBER SHACK: Yes.

MEMBER APOSTOLAKIS: So 60 degrees have been added to this number here from the curve to produce a screening --

MEMBER SHACK: No, to get this number from the reported number, you subject 60 degrees.

MR. HACKETT: Right.

MEMBER SHACK: The reported number computed according to Reg Guide 199, Rev. 2.

MEMBER APOSTOLAKIS: Okay. So the utility calculates

MEMBER SHACK: 270, and that really corresponds to 210 on this plot.

MEMBER WALLIS: Why does it really correspond?

MEMBER APOSTOLAKIS: I don't understand that. How does it do that?

MR. HACKETT: There is probably no better way to explain that than the way that Bill just did.

MEMBER APOSTOLAKIS: When you develop screening criteria don't you try to be conservative?

MR. HACKETT: Absolutely.

MEMBER APOSTOLAKIS: Right. And so here the conservative thing to do would be to say 210 from the curve, minus 60.

MEMBER SHACK: No, the 210 is conservative here because of all of the conservatisms in the analysis. In 1982, and I am not sure that I can reconstruct the argument, but I would guess that they said, Jesus, we did all sorts of conservative things to get to this 210, and we are not going to then add 60 more degrees of margin to cover it.

Everything else that we did to get to the 210 number was already conservative.

MEMBER WALLIS: So what is the 210 now? I mean --

MEMBER SHACK: Because for other reasons, you report a number from Reg Guide 1.99, Rev. 2, that is told to compute it. So you don't want to have two numbers around it.

MEMBER WALLIS: Well, why not --

MEMBER APOSTOLAKIS: What does a utility do?

MR. HACKETT: They do just what Bill said. They do the regulatory thing, which is --

MEMBER APOSTOLAKIS: They follow the regulatory guide ?

MR. HACKETT: They follow 1.99, and they compare it to the 270.

MEMBER APOSTOLAKIS: So the number is 280 that they calculate?

MEMBER SHACK: Let's not.

MEMBER APOSTOLAKIS: Let's say it is, and then what happens?

MR. HACKETT: Well, then actually you would have gone to that second bullet well before then, and if necessary, you would have gone down here.

MEMBER APOSTOLAKIS: But wouldn't it be more logical to say that you calculate your number to 80, and then subtract 60? Wouldn't that be the logical thing to do?

MR. HACKETT: You could say it that way, too.

MEMBER WALLIS: So why didn't you do that?

MEMBER APOSTOLAKIS: So under 60 degrees, the subjective estimate is -- well, I am

trying to give you a way out.

MEMBER WALLIS: There is no way out.

MEMBER APOSTOLAKIS: There is no easy way out, but our judgment is that this low curve is too conservative, and so the screening criterion is moving up.

MEMBER KRESS: You guys are arguing about (inaudible) and the Rule is in the new one.

MR. HACKETT: That is what we are hoping.

MEMBER APOSTOLAKIS: It is important to understand where the --

MEMBER SHACK: The important thing to understand is that the current is not unconservative.

MR. HACKETT: It is actually very conservative, at least that is what we think. Anyway, maybe we will see if we --

MEMBER WALLIS: You are sort of lucky that by you understanding it in terms of that it is very conservative. If you try to argue with George on the basis of this figure, you will probably be in deep water for a long time.

MEMBER APOSTOLAKIS: Well, tell me why not? I mean, we need to learn.

MEMBER SHACK: Because they have always used -- if you computed the number the way they computed this number, they have always used 210. The number that they happen to report is computed slightly differently, but it is equivalent to the 210 number.

MR. HACKETT: I think that Matt Mitchell is here from the NRR, and Matt has got some comments.

MR. MITCHELL: Yes, I am Matt Mitchell, from NRR, and we are the folks that are responsible for this on the NRR side of the house. I will try to sort of repeat Bill's explanation as to how this figure fits together with what is in 50.61.

There could be a limit in 50.61 that says or would set a screening criteria of 210 degrees based Upon this nominal mean RTNDT value. What has been done, and what was done in SECY.82.465.

To the best of my understanding is that there were 60 degrees added to the 210 value, and in recognition of uncertainties which were involved in the probablistic calculations which were used to develop the screening criteria.

And that same 60 degrees in effect was

added to the other side of the equation when a licensee calculates the RTPTS value. If you were comparing to 210 and you looked at Reg. Guide 1.99 methodology, you would take the initial RTNDT value and you would add the shift.

And you would stop at that point. To compare to 270, you would take the methodology which is the initial property, the shift, plus the margin turn from Reg Guide 1.99 Rev. 2.

So what in effect has been done is that 60 degrees has been added to each side of the equation. I agree completely that it is confusing and is not clear. But if you look at it as sort of a balancing of the scales, you have essentially put 60 degrees on both sides.

MEMBER APOSTOLAKIS: So you need at least 210.

MEMBER WALLIS: No.

MEMBER KRESS: If you use this mean --

MR. MITCHELL: The number is 270 in regulation.

MEMBER APOSTOLAKIS: Sure, but that has already been --

MR. SIU: And it is related to a mean of 210.

MEMBER SHACK: The criterion it consistent with this graph.

MEMBER APOSTOLAKIS: But is it also consistent with 1.1?

MEMBER SHACK: No, 1.1 is wrong.

MR. MITCHELL: 1.1 is wrong.

MEMBER APOSTOLAKIS: And then why is 1.1 wrong?

MEMBER SHACK: Because they pretend that the 60 degrees is margin. If we could get margin that way, we would just add 120 degrees, and we could walk out of here real fast. It would be more conservative and everybody could meet it. It is just wrong, and just forget it.

MEMBER WALLIS: The 60 degrees cannot be justified, but the 56 degrees, which is the margin in 1.99, is put on because of uncertainties. So you calculate your RTNDT and then you add 56 degrees for uncertainties.

MEMBER APOSTOLAKIS: In your calculation, or in your --

MEMBER WALLIS: In the calculation, and then it is all taken away again by the 60 degrees.

MEMBER APOSTOLAKIS: Right.

MR. MITCHELL: In the calculation of

RTPTS, the actual material property value for a licensee's vessel, Dr. Wallis is correct that nominally it is about 56. There are some nuances in the reg guide which allow margin terms to be -- the so-called margin term to be modified, but nominally correct.

And it was believed that was sufficiently close to the 60 that was added to the other side of the equation, the 210 plus 60 to arrive at 270, and that it was essentially equivalent.

MEMBER APOSTOLAKIS: Do you at least agree that this is an odd way of doing business?

MR. MITCHELL: Absolutely. Without doubt, and we would certainly hope that as a result of any changes to the regulations which might result from the work that the Office of Research has done that we can clarify it and make it much more simpler, and much more straightforward.

CHAIRMAN BONACA: I hope that the licensee will who submit this data for license renewal will understand the nuances of all this, and do the proper numbers compared to the right numbers.

MR. HACKETT: I think they are painfully aware of that and have been for a long time, as I

completely concur with Matt, and it is confusing, and it is a construct that we are hoping to be able to improve upon.

However, as we go through, we see that we have some more complexity to add before we get there. At any rate the first one out of the box that got tested for this -- and of course the committee probably remembers this, or maybe certain members maybe do with Yankee Rowe, which tripped the screening criteria and got into the Reg Guide 1.154 analysis --

MEMBER APOSTOLAKIS: I can't wait to make a copy of this and give it to Andy Kadac at MIT.

MR. HACKETT: The plant attempted to make this case with the NRC and one of their problems in doing that is that they felt that the guidance was not clear is probably an understatement in 1.154 and it led to a fairly protracted debate with the NRC staff which ultimately ended up in the shut down of Yankee Rowe.

They decided that they were not going to be able to prosecute that case effectively because of the lack of clarify of the guidance. The upshot for this presentation is that because of that, as

part of the NRC's lessons learned activities, the Commission directed the staff to address this in 1991.

Here we are over 12 years later trying to still do that effectively, but sometimes these things take that long. In terms of other motivations, that is one primary motivation. Other motivations are listed here in terms of technical improvements that have been made over many years.

This is a slide that I know that we shared with the committee, and we spent a lot of time on this yesterday. We have been asked about the magnitude of these arrows.

The green arrows are indicating where you might expect improvement, and the red arrows are cases where we might have actually seen things that have acted in a non-conservative manner.

With the ultimate or the bottom line here being that we are looking at something that is pointing towards burden reduction and an extension of the screening criteria.

But in terms of that magnitude, a couple of things on here I think -- and the team can correct me if I am wrong here, but I think we are seeing a fairly large down arrow on more refined

binning in the use of the probabilistic risk assessment methodology.

And in particular in probabilistic fracture mechanics, we have a significant conservative bias that has been eliminated in the model, and which I will talk a bit more about later, because it unfortunately gets back to RTNDT and a new version of RTNDT.

MEMBER WALLIS: Yes, but it is a bias of -- well, it is something like a hundred degrees, compared with all the arguments that we have had previously about maybe 60 degrees. So it overwhelms that 60 degrees right there.

MR. HACKETT: It does. It does. There is also spatial variations in the fluence, and maybe somewhere between these two the flaw distribution is a major element for the material aspects of this task, in that when it was done previously in 82.465, it was a Marshall distribution that was used, which came from the U.K., and wa the best that folks could do at that time, but it didn't actually involve looking at flaws from reactor vessels for the most part.

We have been able to do a lot of work in that area since most of it has been sponsored by the

NRC, and it has really shown as a bottom line that we see flaws in vessel welds, but they are very small and largely do not participate as being problematic in a PTS transient.

MR. KOLACZKOWSKI: And if I highlight the bottom red arrow, because that changes the whole reason why meeting a large break LOCA is considered, because that changes the whole reason why certain sequences are important, the fact that we have added that.

Whereas, the original analysis back in the '80s did not include medium and large LOCAs, and we talked to the subcommittee at length about that.

MEMBER APOSTOLAKIS: They ignored them or they lumped them?

MR. KOLACZKOWSKI: Basically, they ignored them.

MEMBER ROSEN: I thought what you told us was that you thought this was an undercooling transient driven process, and undercooling because of what happened in the secondary side, and is not a primary side issue.

MEMBER WALLIS: They thought that the pressure vessel needs to be the pressure from a PTS event, rather than just pure thermal shock, and then

they realized that the pure thermal shock could be significant and so LOCAs had to be considered.

Once the vessel is depressurized it is no longer under stress from the pressure, but you can still have thermal shock.

MEMBER ROSEN: All right. So at the end of the day what you find out is that this pressurized thermal shock problem is really a little pea-big pea shock problem. Little pressure, large thermal stresses, and that is what you worry about.

MR. HACKETT: That is what we are seeing now, and indeed Terry Dickson went back and ran an older version of the code that was applicable at around the time of Yankee Row, and it was exactly that. These just were not addressed previously, and when you do address them, even with the older version of the code, it looks like that has always been the case. That it is much more of a thermal driven --

MEMBER ROSEN: With that understanding, George says that is why large LOCAs are important, because those are depressurized events.

MEMBER APOSTOLAKIS: Yes.

MEMBER ROSEN: And before we didn't think that was important to this problem.

MEMBER APOSTOLAKIS: Okay.

MEMBER ROSEN: Because they were not pressurized, and as it turns out it is the thermal shock that is important.

MEMBER APOSTOLAKIS: Are you going to discuss the acts of commission that are considered? I mean, did you quantify those things?

MEMBER ROSEN: We are prepared to discuss that, and we could do that now, or we could wait until the appropriate point. But Alan is available to do that.

MR. KOLACZKOWSKI: Yes, George, in this shortened version, we don't have any specific slides on that. But I guess at the appropriate point that we could certainly address whatever --

MEMBER APOSTOLAKIS: What method should you use to quantify those?

MR. KOLACZKOWSKI: Well, as was explained in previous presentations, the use of the ATHEANA at least qualitatively was sort of the basis behind all of the human errors that we analyzed, whether they were errors of omission or errors of co-mission.

And in terms of coming up with the probabilities, again as we have explained before,

that was an expert elicitation process, and a very systematic process, where we tried to figure out what are the issues that could effect this particular error.

And through the expert elicitation process, using people both at the utilities either in a review role, or actually in a participation role and in a collaborative arrangement as we did with Palisades, we had trainers, EOP writers, actual crew members, along with the NRC contractors, essentially putting the HRA numbers --

MEMBER ROSEN: With due consideration of the works of Apostolakis, et al?

MR. KOLACZKOWSKI: Yes, absolutely.

MEMBER APOSTOLAKIS: I mean, it is a side remark, but this morning also we had a presentation on the accumulation of debris in the sump, and they also considered human errors, and they took upper bounds and the probabilities, and in fact pretty high numbers.

And which now raises the question is there really a need for the agency to develop a model for human reliability performance, or human reliability? I mean, people seem to be happy that they are using what is available.