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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

515th MEETING

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THURSDAY,

SEPTEMBER 9, 2004

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ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

MARIO V. BONACA, Chairman

GRAHAM B. WALLIS, Vice Chairman

GEORGE E. APOSTOLAKIS, Member

F. PETER FORD, Member

THOMAS S. KRESS, Member

GRAHAM M. LEITCH, Consultant

DANA A. POWERS, Member

VICTOR H RANSOM, Member

COMMITTEE MEMBERS: (cont.)

STEPHEN L. ROSEN, Member

WILLIAM J. SHACK, Member

JOHN D. SIEBER, Member

ACRS STAFF PRESENT:

JOHN T. LARKINS, Executive Director

SAM DURAISWAMY

MARVIN D. SYKES

NRC STAFF PRESENT:

BILL BATEMAN, NRR

FRANK GILLESPIE, NRR

T.J. KIM, NRR

PT KUO, NRR

LOUISE LUND, NRR

EMMETT MURPHY, NRR

JIMI T. YEROKUN, RES

ALSO PRESENT:

WILLIAM H. BOHLKE, Exelon

ELLIOTT FLICK, Exelon

FRED POLASKI, Exelon

JIM RILEY, NEI

ROB STACHNIAK, Exelon

I-N-D-E-X

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

8:29 a.m.

CHAIRMAN BONACA: Good morning. The meeting will now come to order. This is the first day of the 515th Meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following: final review of the license renewal application for the Dresden and Quad Cities nuclear plants, proposed changes to the license renewal program, proposed technical specifications related to steam generator tube integrity, safeguards and security matters, and preparation of the CRS reports.

A portion of this meeting will be closed to discuss safeguards and security matters. This meeting is being conducted in accordance with the Federal Advisory Committee Act. Dr. John Larkins is the Designated Federal Official for the initial portion of the meeting. We have received no written comments or requests for time to make oral statements from members of the public regarding today's session.

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

readily heard.

I will begin with some items of current interest. You have in front of you items-of-interest package with a pink cover. And in it, you'll see that there is a SECY. It has to do with safety-conscious work environment. We have been talking about certain culture, and this is interesting. This is a good document to review. There is a speech from Chairman Diaz and then other information. You may note among the U.S. news that Admiral Bowman that we worked with for the Virginia Class submarine is now the President and CEO of NEI.

MEMBER SIEBER: (Speaking off mic.)

CHAIRMAN BONACA: Right. Among the other announcements I would like to make is Ms. Mugeh Afshar-Tous has been with the CRS since July 12th of this year. She's a permanent employee. She started her federal employment at the Department of the Navy in 1991. She worked as a computer programmer for Naval Sea Systems Command for six years and transferred to the Navy Shore Installations, where she worked as a program analyst for seven-and-a-half years. She holds a Master's degree in information systems technology and a second Master's degree in public administration, and she is a senior program

analyst for Operations Support Branch. Welcome aboard.

I also would like to welcome Richard Bright. He's a new employee for the CRS staff. He has been with the CRS and CNW since July 26th of this year. In 2002, he graduated from the University of Maryland, Baltimore County, with a Bachelor's degree in information systems. His background in the application development, where he worked as an intern for Ameritrade as an Oracle developer for the Windermere Group. He's currently working on his Master's degree in business administration. He is the IT specialist for the CRS and CNW office. Welcome aboard, too.

Okay. So with that, we will move to the first -- unless there are any questions or comments, we'll move to the first item on the agenda, and it has to do with the final review of the license renewal application for the Dresden and Quad Cities nuclear plants. For that, I will turn to Mr. Kuo.

DR. KUO: Thank you. Dr. Bonaca, and good morning. For the record, I'm PT Kuo, the program Director for the License Renewal and Environmental Impacts Program. To my right, Frank Gillespie, the Deputy Director for the Division of the Regulatory

Improvement Programs. And to my far right is T.J. Kim, the former project manager for Dresden Quad Cities license renewal.

Today, we have a two-part presentation for the Committee. The first part is Dresden Quad Cities license renewal project, and the second part is our process improvement self assessment. And after break, we will do that.

The staff has completed the safety evaluation for Dresden Quad Cities license renewal application, and T.J. will lead the staff presentation on the result of the evaluation today. T.J., as I said, is a former project manager, who, after the last ACRS Subcommittee meeting, and since then he has been selected to serve in the EDO office. But he has gracefully agreed to come back and to make this presentation for the reason of continuity. We greatly appreciate the effort for maintaining that continuity.

During the last ACRS Subcommittee meeting, there were five open items in the SER. And since the last subcommittee meeting, we have resolved all the five items. There's no open items outstanding anymore.

During the committee meeting last time, the staff also committed to provide the committee some

additional information for a few issues. And we have provided this additional information to the committee last month, and I believe you have a copy in front of you.

And our tech staff, the experts are all sitting in the audience and will answer any questions you might have with regard to the issues. So with that, I will first turn the presentation over to Exelon and then followed by T.J.'s presentation.

CHAIRMAN BONACA: Thank you.

MR. BOHLKE: Mr. Chairman, members of the ACRS, good morning. I'm Bill Bohlke, Senior Vice President of Exelon Nuclear, and I'm joined by key members of the project team, which has prepared the license renewal application for Dresden Quad Cities, which we are discussing this morning. I'd like to introduce the speaker who will follow me. Fred Polaski to my immediate left is the manager of license renewal for Exelon, and Rob Stachniak to my right is the project leader for the Dresden Quad Cities license renewal application.

CHAIRMAN BONACA: Could I interrupt for just a second? I forgot to mention that in attendance we have today Mr. Graham Leitch. He's now a member of the CRS. He joined just about a month ago, but he's

a consultant to the CRS, particularly in the license renewal process or applications, and he's sitting here as a consultant for us. So he will participate in the proceedings, and he may have questions or comments.

MR. BOHLKE: Yes. We remember Mr. Leitch from our subcommittee presentation.

CHAIRMAN BONACA: And in fact he led those presentations, so we wanted to maintain continuity in this application. Sorry for interruption.

MR. BOHLKE: That's fine. Second slide is the agenda, which I will not read. You can see that we're hitting the very highest points of our rather detailed license renewal application.

Next slide. Just a summary of the plant description. The four units are early BWR-3s from GE. All four units have Mark I containments. Dresden has the isolation condenser, Dresden being the original BWR-3, and that constitutes the most prominent difference among the four units.

Both stations are freshwater-cooled. Quad Cities from the Mississippi River. Dresden is a closed-cycle cooling system with a lake for the predominant months of the year. From mid-June until mid-September, it runs through the lake, taking suction from the Kankakee and discharging to the

Illinois River.

All four units are licensed at a power level of 2957 megawatts thermal. Dresden's licenses expire in 2009 and 2011. Quad Cities licenses expire in 2012.

We have previously presented to you our extended power upgrade applications, and the power upgrades were achieved in 2001 at Dresden 2, in 2002 at Dresden 3, and Quad Cities Units 2 and 1 respectively. Just as an aside but related to our application, Dresden Unit 1 continues its safe store condition. However, a portion of the Unit 1 fire protection system supports Unit 2 and 3. And as such, that system and its components have been subsumed into the Dresden 2 and 3 maintenance rule activities and is in scope for license renewal.

Next slide. I'd like to spend a minute talking about the recent operating from a regulatory context for the Dresden and Quad Cities stations. All units are green with respect to all of the reactor oversight performance indicators. The Dresden units are white, except for the two exceptions that I'll cite below.

Dresden 3 is white for high-pressure coolant injection system unavailability. That relates

to a water hammer event from July 2001 and the subsequent recovery from that event, so it went white in the late third quarter of 2001. Since that time, all the corrective actions have been achieved. The system is meeting its performance indicators. Should that performance sustain to the end of the month, we expect that indicator to return to green.

MEMBER POWERS: How does the condition probability change for the unavailability of high pressure cooling reduction?

MR. BOHLKE: High pressure is a main contributor in BWRs. However, Dresden, with its isolation condenser system, has an added advantage, which makes the contribution from that somewhat smaller than you would expect from other comparable BWRs. I don't have a quantitative answer to that.

Early this year, Dresden Unit 2 entered a white condition for unplanned scrams, and that is a result of having a number of scrams within a pre-defined period of time. The Dresden station and Exelon Nuclear corporate staff did extensive work to understand the root causes for each of the scrams and did a common-cause analysis for not only the Dresden Unit 2 scrams but also any scrams on Dresden Unit 3. And as a result of that, we've taken some steps to

strengthen our processes in our organizations to attempt to mitigate those. With respect to any material condition deficiencies, those have been worked through.

MEMBER POWERS: What were the specific causes for the unplanned scrams?

MR. BOHLKE: There were four, and I'm not going to, I'm going to let Elliott Flick, who is the system engineering manager from Dresden, address in a high-level summary what the four incidents were.

MR. FLICK: Hi. I'm Elliott Flick, the plant engineering manager at Dresden. There were actually three, Bill, common causes. The main cause was associated with operational decision-making. And the way that we termed it, it impacts the decisions not fully evaluated with contingency measures being put in place. So in other words, if you had a situation where we were going to go out and perform a test, it could be that that test put us into maybe a half-trip situation, but there would be other maintenance going on in the plant, which could affect the --

MEMBER POWERS: This is the kind of error or planning that leads to things like the Chernobyl accident?

MR. FLICK: I don't believe so in this case, but --

MEMBER POWERS: I mean, it's a test that wasn't fully thought out.

MR. FLICK: So I'm talking situations where operational decisions can be made in the way that you schedule maintenance. You can put yourself into a situation where you could potentially have another piece of equipment trip out of service as a result of the maintenance. So what we've done is we've put in place processes that we are strengthening our operational decision-making practices by evaluating all of the maintenance that's taking place at the plant and emergent maintenance.

MEMBER POWERS: I mean, wouldn't this have occurred a long time ago by the maintenance rule?

MR. BOHLKE: Dr. Powers, we're talking about the conduct of regularly-scheduled surveillance activities while there may be another hardware prone going on. And certainly those are evaluated using ORAM and SENTINEL and risk base, but there are ways of configuring the plan or scheduling activities that can even mitigate things that are nominally acceptable. And I think that's what we're talking about, a more thorough and in-depth evaluation to make sure we've

truly considered all of the contingent issues that might affect the conduct of those activities.

MR. FLICK: The second issue had to do with testing and monitoring program weaknesses in terms of troubleshooting, and it's related to the first issue, where we may be doing troubleshooting on a component, but we hadn't gone through an operational decision-making process to make sure that we understood fully what are all the other configurations in the station.

And the third one had to do with root-cause analysis being narrow in scope. So while we got to the root-cause analysis of each of the individual things that we may have been doing a root-cause analysis on, for instance any of the scrams that led to this particular white indicator, we weren't really looking for, oddly enough, what are the other management-related issues and other things that are out there. So we went right for the heart of it instead of being very broad-stroked and making sure that we were addressing other broader issues. So we've taken action to correct all three of those at the station.

MEMBER APOSTOLAKIS: Do you have a risk monitor in the plant?

MR. BOHLKE: We use ORAM and SENTINEL.

MEMBER APOSTOLAKIS: Sorry?

MR. BOHLKE: ORAM and SENTINEL.

MEMBER APOSTOLAKIS: Well, that's not a risk monitor, is it?

MR. BOHLKE: That's what we use for maintenance rule assessments.

MEMBER POWERS: Well, I mean, there's a reason for asking these questions, and that is: now you're going to embark on some expanded programs for aging management, which is even going to complicate your life further. How do you handle this?

MR. FLICK: Well, all of the license renewal programs that are being implemented are being integrated fully into our action-tracking program and into our maintenance processes. So they will be evaluated through all of the same programs that Mr. Bohlke just described.

MEMBER POWERS: I mean, you can see where my trouble is. 5065 has been around, or the maintenance rule has been around since the dawn of time here. And that's not fully integrated apparently, and now you're going to add some more programs. And you tell me that's fully integrated. I mean, how do I know that this is fully integrated

and you're not going to end up with the same kind of problem here?

MR. BOHLKE: The answer is that we're continuing to progress and continuously to improve in how we handle our processes and integrate them. What we're talking about here is really where are we with respect to the standard of true excellence. And while we may consider ourselves good, and in some cases very good, we know that we're not as robust in all areas that we need to be. The results of the common-cause analyses that Elliott described pointed to places where the organization needed to strengthen, not necessarily individual skills need to be strengthened or individual process needed to be improved but how they all fit together.

Now, the maintenance process and the governing work control process, which schedules the maintenance, have been made very robust over time. And we believe that the additional programmatic requirements of the maintenance rule, while perhaps extensive in some context, are not so sophisticated and confusing that they can't be handled by that process. In fact, I think they fit in quite well because they're all a result of a procedural framework and structure that we use to conduct these activities.

We don't really have apprehensions along those lines, Dr. Powers.

MEMBER POWERS: Damn it, I do. I'm just looking at the brute force face of things and saying how do I know? I'll take you at your word. You learned from your mistakes and you're better. Just recognize now you've got to get a whole lot better because you're taking on more and more activities.

MEMBER APOSTOLAKIS: I have a root-cause analysis of one of the scrams. You said that it was not as complete as it should have been because it didn't get into organizational issues. How did you decide that it was incomplete, that you had to get into these things? What is it that prompted you to say, "Well, gee, we didn't go deeply enough?"

MR. FLICK: Well, when we went back and took a look at each of -- for instance, we went back for each of the scrams for the last year on both units and took a look at the root-cause analysis associated with those and looked for commonalties among them. And when we saw that we had an organizational weakness in regard to operational decision-making but that that hadn't specifically come out of any one of the individual root-cause analysis, we recognized that we weren't doing as well as we should with regard to

looking more broadly at what are some of the organizational type of impacts that could have contributed to the root cause. So maybe there was an equipment failure that caused the plant to trip offline, and we nailed the root cause for why the equipment failed and took care of fixing that, but maybe there were management-related things about the way that we did different things that didn't show up in the write-up, that the team wasn't even really chartered to look more broadly.

So what we've done now is we're assigning a senior station manager to every one of any root cause that gets done at the plant, and a charter is being set up such that it's much more broad than we would have done that in the past. So we're looking for organizational weaknesses, as well as what is the thing that caused the problem.

CHAIRMAN BONACA: It surprises me. I mean, if you're talking about a root cause, you know, itself, that the commission should be broad. It should look for the root cause.

MR. FLICK: Right.

CHAIRMAN BONACA: And I don't understand how you have a narrow root cause versus a broad root cause. I mean, well, I have a question regarding

this, and it has to do with did this testing and monitoring have to be done at power, or is it some testing and monitoring that you used to do during shutdown and now you're doing a power because you're using, you know, what you're allowed to do, if you evaluate the risks associated with that?

MR. FLICK: Well, I would use the example of we did some troubleshooting on a controller for the Stator Water System because we recognized that there was erratic behavior of the controller causing one of the valves to oscillate. So we were doing troubleshooting on the valve without fully understanding what's the worst-case thing that can happen to that valve while we're doing troubleshooting on it. As it turned out, the worst-case thing did happen, which was the valve closed in this instance, and we ended up having a run-back on the turbine. So that's an example.

MEMBER LEITCH: This is Graham Leitch. I had a question about troubleshooting. You've mentioned a couple of times that some of these problems occurring during troubleshooting. My question is, basically, do you have a rigorous troubleshooting procedure, particularly one that defines the boundaries of the troubleshooting?

Because, in my experience, I've found that oftentimes during troubleshooting, it's easy to go a little beyond the people that are trying to find the problem. Troubleshooting, by its very nature, you don't know exactly what's wrong, and people are trying to find the problem, and they're often tempted to go, "Well, let's just check this one more thing," which is beyond the bounds of a clearly-defined procedure. And I guess my question is do you have a troubleshooting procedure and does it clearly define the boundaries of that troubleshooting and what one must do if, in order to properly troubleshoot, you find you have to exceed the bounds of that procedure?

MR. FLICK: Yes, we do have a corporate-wide across Exelon troubleshooting process, and it's basically based on using Kepner-Tregoe type analysis for getting through what are the possible things that could be the problem. We integrate that into our maintenance processes, so any of the steps that are going to be done for troubleshooting are reviewed against maintenance rule and risk. And then, further, what we are doing now is, before we go and actually execute any troubleshooting, in addition, we're using our operational decision-making to really understand, okay, what is the worst-case thing that can happen,

what are the contingencies we need to have in place to make sure we have a full understanding of what exactly is it that's going to take place step-by-step for the people that are going to do it and, you know, are they ready to go. Everything like that to make sure that we're fully ready to go before we do that.

MR. BOHLKE: Okay. To conclude on this area, the period at which this number of unplanned scrams exceeds the threshold will expire at the end of December. And should the performance again sustain, we'd expect this indicator also to return to green in the fourth quarter of this year.

MEMBER APOSTOLAKIS: So the inspections have not found anything? It was just performance indicators other than green regions?

MR. BOHLKE: The inspection activities have basically confirmed the things that we found from our analyses of the root causes and the common causes. There was no other evidence found that would cause us to come to a different conclusion or go in a different direction.

Let's talk about steam dryers. You have heard previously and we discussed somewhat in subcommittee about our difficulties with the steam dryers principally at Quad Cities. We are in the

process of designing and fabricating replacement steam dryers for the Quad Cities unit, and the current plans are to replace them in 2005 at both units. This new design will address some of the significant contributors, we believe, to the situations that are out there. First of all, configurationally, we're talking at Dresden Quad Cities about some of the oldest steam dryers in the BWR-3 regime, and that particular configuration called a square-hood design has been shown not to be as robust as the new curved-hood design that's been used on the BWR-6 and ABWR units. So our design will be the latest configurationally.

In addition, we're paying a lot of attention to where the strength of the dryer is and what the load paths are for the dryer. So the re-design of the dryer will significantly reduce some of the stress concentration points that those old dryers were subject to. We're going to have dryers that are more robust because the plate thickness is going to be bigger and we'll be moving the stresses away from some of the weak points in the wells and distributing them more evenly through the steam dryer.

VICE CHAIRMAN WALLIS: You mean that the maximum stress occurs further away from the welds?

MR. BOHLKE: Yes.

VICE CHAIRMAN WALLIS: You don't really transfer stress?

MR. BOHLKE: Yes, okay, correct. Thank you.

VICE CHAIRMAN WALLIS: But the reason that the dryers were in trouble, it seems to me, was structure and direction. And all the other slide addresses is making these things stronger. But if they then resonate more than they did before with the fluid, they might be worse off. So we want to bring the fluid into this story somehow.

MR. BOHLKE: I need to finish the story. So we have, of course, field operating data, which have been historically collected on first-of-a-class dryers. The more recent examples of that are the dryers at 1-F-1 over in Japan, dryers at Susquehanna here, and then dryers at KK-6 and 7 in Japan. So we've got more data that we're able to apply to the design.

We have put together a scale model testing rig out at San Jose, and we've been able to test that at equivalent to full EP flow, and that's been useful in pointing out some areas that simply don't pop out at you from first principles or thinking about it. So

we've been able to make the dryers more robust.

And then, finally, we have been exploring quite aggressively this acoustic coupling that we think we have within the main steam leads going out to the steam chest and back, which appears to be a major contributor to the flow-induced vibration loads and the fatigue loads that the dryer, in fact, sees. So we're using --

VICE CHAIRMAN WALLIS: The acoustics of the steam line transfer all the way back through all of this body --

MR. BOHLKE: Apparently.

VICE CHAIRMAN WALLIS: All the way back to the place where it breaks?

MR. BOHLKE: As difficult as that appears to be, the answer also appears to be yes. There is a contribution there that's present in the particular configuration we have at Quad Cities coupled with the configuration of the dryers inside the reactor vessel.

MEMBER ROSEN: Is that something you found in the testing?

MR. BOHLKE: We have been instrumenting the main steam leads at Quad Cities over the past year or so to try to get insights. I don't have the specific data to talk about. We don't really have the

steam dryer designers to talk about it either. But we're using all of the data that we have been able to collect and formulating that as inputs to the models, confirming them in the scale model testing, and also trying to replicate those in this acoustic model.

MEMBER ROSEN: There's two kinds of testing you're doing. One is the in-plant testing you just described with the steam lines, and then this scale model testing that I assume you did back, that GE did in San Jose?

MR. BOHLKE: Yes.

MEMBER ROSEN: And I was trying to find out whether which of those efforts detected this acoustic coupling. The question goes well beyond Quad Cities, though, because we're thinking about dryers in general for other plants, as well. Do you have any insight on that, Bill?

MR. BOHLKE: The way I want to answer that, Mr. Rosen, is that we began to conclude that there must be some other drivers in there, and this acoustic phenomenon was a principal suspect, and we had been pursuing it aggressively. And the experts in that regard can show, through modeling, and that there can be some appreciable loads transmitted back and forth in the system, and we're using the results of

that as part of the inputs to the design of the dryers. And when we start up, we'll have a big instrumentation kit on these dryers, analogous to what dryers had when they first passed dryers, so we will have a full cycle of operating data on it, which will really be indicative of what's going on in there and help us make better models and confirm load paths.

MEMBER ROSEN: So you'll have a fully-instrumented dryer, but you'll also have an instrument to steam lines?

MR. BOHLKE: Yes.

MEMBER ROSEN: So you might get quite a bit of information from --

MR. BOHLKE: And then we couple that with a full inspection, full visual and, in some cases, volumetric inspection of the dryer after its first operating cycle, and that ought to give us a pretty good set of information to say yes, you've bounded the loads and your dryer is going to be good to go. In fact, that's what the next slide is all about.

CHAIRMAN BONACA: Yes, I was looking at that.

MR. BOHLKE: So we expect that's going to be the case. We expect that with the configuration of the dryer, with the better distribution of loads in

the dryer with the more robust material that this dryer is going to be a good performer, and we'll confirm that after the first cycle.

CHAIRMAN BONACA: What gives you, however, the confidence to say that, after you do instrumentation and, you know, this new dryer, so they may be able to go a longer way but not necessarily for the whole time. What gives you the confidence that leads you to the last bullet? You either want to include it in the license renewal.

Let me just give you my thought process here. You really don't know yet what the actual root cause of the failure is. You know, you have a number of theories, and you're going to test them. You're going to do some testing for a cycle. You may not have yet the failure of the dryer caused by that. We know that, for the current dryers, you have pieces going through some safety-related equipment, and, therefore, the dryers seem to, you know, if they are to fail and to fall into pieces, seem to fall into categories of components that are not safety-related but they could cause the failure of safety-related components. So that seems to be, you know, to be long in the scope of license renewal. What gives you the confidence to say that they will not, in fact, break

in the future as they have done in the past, and, therefore, you don't want to put them in the scope? I don't understand why you have that confidence.

MR. BOHLKE: Well, for two reasons. First of all, we'll be able to demonstrate that it's far more robust. I think we'll be able to provide a better quantification of the loads that the dryer has seen when we get all the data and put it all together. So that's one.

The second thing is we look at the dryers every time we take them out and, in fact, BWRVIP is developing a steam dryer inspection guideline, which will be completed and submitted for staff review and will be applied because, of course, we apply all of the guidelines that the BWRVIP issues.

CHAIRMAN BONACA: Yes.

MR. BOHLKE: But that will be the best program of all.

CHAIRMAN BONACA: But it seems to me that, you know, what you have to think about is the guideline may say something for a dryer that is operating at the original power level and it may say something else later on in time whenever we learn more about what is happening about the dryer that is now running with a much higher flow rate, steam-flow rate.

And it may say, for example, that you have to do more frequent inspections, or you may say that, you know -- what I'm trying to say is that there is a connection that I see here with aging of components, license renewal and commitments. I don't see this as a painful commitment. You're telling me that you're looking at the dryer every time you open up the plant, so I don't understand why it should be in the scope of license renewal.

MR. BOHLKE: The VIP commitments are current-term commitments, and this will become a VIP commitment and kept in that context, as opposed to something that is a specific application for the license renewal period. So I don't think we're arguing about anything substantial, just the labels we're putting on it. If we're doing the inspections that the guidelines suggest, that should provide reasonable assurance that we know what the condition of the dryer is, which is what we're looking for.

CHAIRMAN BONACA: But, you know, again, I want to look at that commitment. And then I was looking at the BWR, all those group presentations of August 18th on power upgrades, and you're familiar as I am with that presentation, I'm sure. And it talks about a lot of more understanding we have about the

effect of extended power upgrades on plants. It talks about 17 component failures identified that relate to power upgrades. It talks about potential for decreasing time between failures. It talks about other known issues not identified by BWR survey, but they have been after the survey, electromatic relief valve actuator, limiter valve. These are failures that are solved because of power upgrade.

It talks about an unexpected increase in component wear. It talks about 52 events to which power upgrades directly or indirectly contributed. I mean, there is a different operating experience here that comes up that relates to power upgrades that's not reflected in your application. And to me, the steam dryers fall in the same category. Your application doesn't reflect experience of the extended power upgrade. It reflects only the experience of the regular power.

So I'm trying to understand, you know, how come you're sure that none of these issues should cascade into a commitment for license renewal? For example, a change in a plan, frequency of inspection, particularly when you're talking about accelerated wear of components. I don't know if you have an answer to that.

MR. BOHLKE: My only answer, Dr. Bonaca, is that we have to deal with them today and now, irrespective of the license renewal period. They're part of our maintenance and engineering and, in some cases, operational activities. And that, in our mind at least, distinguishes them from commitments that are made solely because the license is being extended for 20 years.

So it's sort of a legalistic thing, but I don't mean to try to depend on that. What I would prefer to do is give you the assurances that we're going to be appropriately rigorous in trying to make sure that the material condition of the dryers will support each cycle that we start operating on and continue that indefinitely until the plants cease to operate.

CHAIRMAN BONACA: Again, you know, we're focusing on the dryer, but I opened it up because, I mean, this report I think is a very good report. I think it's an honest presentation that shows that there is focus and attention of the consequences. So we're learning about extended power upgrades and, you know, I will expect four or five years from now there will be substantial information there gathered by, you know, let us continue the effort of the BWROG. And I

would expect that you'll see some impact maybe on some of the reports. Something says that, you know, if you went to an extended power upgrade, you have to do something else. Maybe you have to change your problem that inspects something and so on and so forth. Particularly this issue of reduced time between failures, it has to do with the frequency of inspections and how far you test and so on and so forth.

Right now, we don't have this information. I mean, this is the first presentation we've ever seen with this kind of information here. Wouldn't it be a problem, for example, you know, if you get approval for a power upgrade for license renewal that, before you walk into it, you do an evaluation of what you know at that time and see if your problems should be changed or adjusted somewhat?

MR. STACHNIAK: Dr. Bonaca, this is Rob Stachniak. Our position has been that if the dryer is designed properly, there will be no failure, and that is what we are working on right now: designing a dryer for Quad Cities that will not fail at all. What we've said is that we're going to replace them, instrument them, gather all this information, and we will make the determination. And if we're convinced that we

have a structurally-sound dryer and all of the data supports that, we will keep them out of license renewal. However, if we can't reach that conclusion, we've agreed we will put them and apply the appropriate aging management. So I don't think we're really disagreeing with your position.

CHAIRMAN BONACA: First of all, I opened up the issue, the broader issue right now. I mean, I'm sure you participated in this because your plants are quoted here as participating in the survey, so I'm interested in the feedback in a broader sense. There are other issues there, many components. Graham, you were looking, you had some observation on some of the components.

MEMBER LEITCH: Yes. I don't recall the likelihood of failure being a criteria for whether an item should be included in the scope or not. The criteria is basically could this failure result in a failure of a safety-related component? And I think in this case the answer is yes. Is it passive? And I think in this case the answer is yes. And is it long-lived? And I think in this case the answer is yes. So I would think, regardless of what the likelihood of failure is, the dryers should be included in the scope.

Now, the likelihood of failure may impact the frequency of inspections, but I don't think it goes to the criteria of whether the dryer is or is not in scope. I think it should be in scope.

MR. BOHLKE: Okay, thank you. That completes my portion of the presentation, and now I'll turn it over to Rob Stachniak.

MR. STACHNIAK: Good morning. Exelon was requested to provide the ACRS with some general information concerning major equipment replaces. Slide number seven includes some of the major equipment replacements that have occurred at both sites.

MEMBER LEITCH: Excuse me. Just before we leave the dryer issue, you talked about dryer replacement at Quad, but what's the plan at Dresden? I know the problem has not been as serious there and perhaps of a different nature than Quad, but are you planning to replace the Dresden dryers, as well?

MR. BOHLKE: At the present time, we do not plan to replace the Dresden dryers. However, we're building a third dryer as a spare, so we have the capability to do that. For reasons that are not yet completely understood, the loads experienced by the dryers at Dresden appear to be lower and, in some

cases, substantially lower. And we hope to get a better understanding of that before we make a final --

VICE CHAIRMAN WALLIS: Are they the same design, or are they substantially different? They're the same design, Dresden and Quad Cities' dryers?

MR. BOHLKE: The dryers are the same design.

VICE CHAIRMAN WALLIS: The same design and, yet, the experience is quite different? It doesn't make any sense, does it? Same power, same --

MEMBER SIEBER: Well, the steam leads are a different diameter between the points.

MR. BOHLKE: The steam leads are different.

VICE CHAIRMAN WALLIS: That big an effect?

MR. BOHLKE: We are having a tough time finding any other differences.

MEMBER SIEBER: It's probably why you want to embrace the conclusion that you've got an acoustic coupling.

MR. BOHLKE: Yes, that's what led us to that. The thermohydraulics inside the vessels are fundamentally identical.

MEMBER LEITCH: But when you operate Quad Cities at 100-percent power, I know that you're not

there now, but when you do, are the turbine control valves rock solid? Do we know the answer to that question?

MR. BOHLKE: Bill Porter from our design engineering management at Quad Cities is sitting immediately to your right, and he's going to take a shot at answering that.

MR. PORTER: Actually, we haven't seen that much difference in our control operation. The steam leads, when you're looking at the differences in the physical arrangement and physical geometry of the steam leads, there are some minor differences on how we come up with some lines at the equalizing header, which is what we call the D-ring, and we have seen evidence that it's a possibility that the pressure oscillations and feedback are affected by very small changes in length, which are well within construction tolerances when you look at the overall length of the steam lines.

So we have looked at control valves, oscillations and movements and so forth, and we don't see a loaded gun there, if you will, that solves this problem. We're still doing some testing. And the other thing that's in here on this acoustic coupling, as we're doing analytical acoustic analysis with some

of the input that we're doing, so we've still got to find the absolute answer to that. And part of the information from the dryer instrumentation should help discern that.

MR. STACHNIAK: Slide seven --

VICE CHAIRMAN WALLIS: It makes it difficult to design a dryer, and you're sure you can design a dryer which won't break, but if you don't really know why it breaks and you can't explain the difference between these two plants, you're not on very sure footing.

MR. STACHNIAK: That is why we are instrumenting the first dryer that goes in.

MR. BOHLKE: We have back-engineered the loads that must have been present to cause the failures that we saw for all of the dryers, which helps us get a feel for their magnitude. That has been helpful. So it's not a complete absence of knowledge, but it's a real understanding of how the dryers vary with the different geometric configurations or construction idiosyncrasies that might be present in the plant. That's the confounding part of this.

VICE CHAIRMAN WALLIS: Well, how do we know this isn't your problem? How do we know how

another plant with the same dryer would behave, since we've now got two prototypes that's very different? How do I make a judgment about a third plant which has a similar dryer?

MR. BOHLKE: Well, it's not just the dryer, it's how it sits in the head of the vessel and how the size of the steam leads and the routing of the steam leads and the position of the steam chest with respect -- there's a long --

VICE CHAIRMAN WALLIS: So you've got a big organ pipe up there?

MR. BOHLKE: Yes, that's one way of putting it. Exactly.

VICE CHAIRMAN WALLIS: Right, okay.

MR. STACHNIAK: And to conclude on this particular topic, while I understand why you would believe that the dryer should be in scope, literally every dryer design across the country is non-safety-related and documented on the design basis. So further position of why we've taken the position we have --

MEMBER LEITCH: But safety-related is not the only criteria. It's safety-related or non-safety-related items whose failure could impact the operation of safety-related equipment. It's that second

criteria that makes me believe that the dryer should be in scope.

CHAIRMAN BONACA: I don't think there was ever expectation that they would come apart.

MR. STACHNIAK: Okay. On to slide seven. Slide seven does contain some of the major equipment replacements that have occurred at both sites. For example, reactor water clean-up piping at both sites was replaced with pipe resistant to intergranular stress corrosion cracking. At Quad Cities, the RHR service water piping was replaced due to an installation error that occurred during original construction. The reactor water clean-up piping on Dresden Unit 3 was replaced in 1987. I'm sorry, recirc piping, I'm sorry, due to ISGSCC.

The main power transformers have been replaced on three --

MEMBER POWERS: You leave me hungry for information. Why didn't you, I mean why just Dresden Unit 3?

MR. STACHNIAK: Because we ended up doing weld stress improvements on the other three units and found it to be just as effective at reducing --

MEMBER POWERS: Okay. So you found another way to do it that wasn't quite as expensive?

MR. STACHNIAK: Yes.

MEMBER POWERS: That's as effective.

MEMBER LEITCH: So the other three units still have 304 stainless recirc piping?

MR. STACHNIAK: I believe that is true.

MEMBER LEITCH: And Dresden 3 has the 316 nuclear-grade recirc pipe?

MR. STACHNIAK: Yes.

MEMBER SHACK: And which stress improvement process did you use on the others?

MR. STACHNIAK: Both the induced-heat stress and the mechanical stress improvement. And there have been follow-up assessments to verify their effectiveness.

Carrying on, main power transformers have been replaced on three of the units. The fourth unit at Quad Cities is scheduled for replacement in the spring of 2007. Dresden Unit 1 fire main piping was replaced because the original piping could not pass required friction-flow testing. We have installed and are using hydrogen water chemistry zinc injection and noble metal injections on all four units.

MEMBER FORD: Could I ask a question? Apparently, you're using the of what chemistry guidelines?

MR. STACHNIAK: Yes.

MEMBER FORD: Which does not require corrosion-potential measurements in that document. However, you are applying --

MR. STACHNIAK: Yes, we are.

MEMBER FORD: What commitment do you have to continuing using corrosion-potential measurements?

MR. STACHNIAK: The staff brought this question up quite a long time ago, and we have committed to continuing on with that particular commitment. Our procedures are annotated clearly that this is a license renewal regulatory commitment that we keep this activity sustained.

MEMBER FORD: Thank you.

VICE CHAIRMAN WALLIS: Can I ask about this piping replacement? You said it couldn't stand some friction testing.

MR. STACHNIAK: Yes. The original piping that was installed in the fire main for Dresden Unit 1 was originally made of an asbestos-cement type of pipe that was commonly used at the time. NFPA codes do require friction-flow testing, and this section of piping was not able to pass the testing, so the decision was made to replace the header. And when replacing the header, they found that the piping that

had been installed originally was undersized. However, it's been replaced with the proper size.

VICE CHAIRMAN WALLIS: So they put the wrong pipe in. It wasn't a case of where or --

MR. STACHNIAK: Correct.

VICE CHAIRMAN WALLIS: Okay.

MR. STACHNIAK: That is correct.

VICE CHAIRMAN WALLIS: So it took all this time to find out they put in the wrong pipe?

MR. STACHNIAK: Well, as the testing requirements became more stringent, it became obvious yes.

And then, finally, core shroud hardware was installed on all four units because of ISGSCC tracking. Which brings me to slide number eight. During the ACRS subcommittee meeting held in April of this year, the subcommittee questioned whether the repairs made to the core shroud hardware were temporary in nature. The repairs are permanent and final. The shroud repairs were installed within the years of 1995 through '97 on all four units to structurally replace the horizontal core shroud welds. The repair hardware is designed for 40 years of life, which will extend beyond the extended period of operation.

The materials of fabrication, which are austenitic alloys, INCONEL, and low-carbon type stainless steels were all chosen because of their resistance to IGSCC and the irradiation-assisted stress corrosion cracking.

MEMBER SHACK: What data do you have that shows these are resistant to IASCC?

MR. STACHNIAK: There was a considerable amount of proprietary testing that General Electric did. At staff's request, we did try to get copies of it, which we were not able to get. However, the materials were evaluated by the staff and the SERs associated with the BWRVIPs for these repairs. And that's about all the information I have.

MEMBER FORD: I was about to jump in when they finished the list. Carry on.

MEMBER SHACK: When you say it's designed for a 40-year life, what are the design criterias? Is this a fluence design level? You're saying it doesn't get the 5 times 10 to the 20 in 40 years?

MR. STACHNIAK: Yes. That's what we were told, yes.

MEMBER SHACK: But the 5 times 10 to the 20 is sort of a pseudo threshold for austenitic stainless steels. You've got materials here with

yield stresses that are probably at least twice those of the austenitics. What makes you believe you have the same fluence threshold?

MR. STACHNIAK: I believe the design for these was, again, 10 to the 20. Our end-of-life fluence is projected conservatively to not exceed 10 to the 19^{th,} for one reason. Another, again, is the test data which we were not able to get for proprietary reasons, and I do not know to what extent information was shared with staff when the designs were approved in the SER. I'm afraid that's all the information I do have.

MEMBER FORD: As far as my recollection is concerned, I'm just jumping to your final and we see that these materials and XM-19, etcetera, resistance to IGSCC and, more significantly, IASCC. As far as I know, there are no data on XM-19 under irradiation conditions. Certainly, type 316L has cracked incores, as we know only too well. And INCONEL X-750 uses springs that crack. So I'm puzzled as to why you should say that they are resistant to those two loads and especially over the 14-year extended period from now until the end of your extended license period. So I'm puzzled as to why you're saying that.

My deeper concern is that, when you look

at the inspection criteria for the horizontal weld, you're looking to inspect the horizontal welds, as I understand it.

MR. STACHNIAK: Correct.

MEMBER FORD: So you have no idea what the underlying structure is degrading. Should these rods fail, you have no idea what the back-up is in terms of structure integrity because you're not monitoring the failure of the horizontal, are you?

MR. STACHNIAK: But the repairs, the repair hardware structurally replaces those welds.

MEMBER FORD: Yes, but suppose that fails?

MR. STACHNIAK: What's that?

MEMBER FORD: Suppose the tie rods fail?

MR. STACHNIAK: Well, the tie rods are included in --

MR. BOHLKE: I don't think we can really defend the design here today. I mean, we've got design reports which address failure loads, address lifetime, address loads. And the conclusion of those design reports is that, for each shroud with the hardware installed to provide the vertical strength across the horizontal weld, that they are adequate for 40 years of operation under the fluence conditions that they experience.

MEMBER FORD: I understand what you're saying, but my concern is these tie rods were originally put in as a short-term fix, and there's a good engineering fix for the short-term. Now we hear that it is now good for 60 years or 40 years from now. And, yet, we look down that list of reasons, and you can pick holes in it left, right, and center. I just pointed out I don't know the data for XM-19, and the other two I know it will fail. Now, you may have beefed it up. You may not have the stress levels, you may not have the fluence levels, but these are all ifs. I'm not sure what their rationale is, but I have some problems.

MR. BOHLKE: The bottom line is that whatever our misgivings may be, and I understand that there may be some professional differences of opinion, there is an inspection crew which is designed to monitor the conditions of those to detect and circumvent defects so that mitigating actions can be taken or corrective actions can be taken.

MEMBER FORD: We should have shot across their barriers to start with so they knew. Inspection monitoring program is visual. It's not 100 percent. It's taken off the first cycle, when you wouldn't expect to have any fluence degradation, related

degradation of these components. And the next one is ten years. What are the assurance that we have that nothing is going to happen in ten years? And if it does, what's the consequence? You've already got a cracked core shroud underneath.

MR. STACHNIAK: Well, first of all, the irradiation levels.

MR. BOHLKE: I don't think we can answer that question.

MEMBER FORD: As I said, it's a question for the staff.

MR. STACHNIAK: Okay. Moving on to slide nine, Exelon does have the long-term asset management plan in place that is updated yearly. It include all Exelon nuclear plants and compliments our routine preventative maintenance and performance-centered maintenance. Slide number nine does contain some of the examples of the type of items that are covered in the Exelon long-term asset management plan. These are preemptive replacements based on condition monitoring data and trends.

Are there any questions? Then I would like to turn the presentation over to Fred Polaski, who will discuss commitment management.

MR. POLASKI: This is Fred Polaski. The

reason we're talking about commitment management is the question has come up in the past about what's with the new licenses in place, and we have committed to do a lot of aging management in the future. How is that going to be implemented? And the question often comes up, well, how are you going to make sure that these aren't forgotten or missed in the future over 20 - 30 years of operation?

The choice that we've made within Exelon is that all of these commitments we've made for aging management as part of license renewal are going to be part of our commitment tracking system, our commitment management system within Exelon. That is a process controlled by our control procedures, which are consistent with the NEI "Guideline for Managing NRC Commitments," which has been endorsed by the NRC.

So all of these commitments will go into that program. Any changes to any of the commitments in the future would require a formal review and evaluation and could go as far as, in some cases, requiring prior NRC approval before we actually change the commitment.

Going on to slide 11, for each plant, we've got about 48 aging management programs that we've credited in the license renewal application.

Each of those has been assigned a unique commitment tracking number and the tracking item, which has a lot of information included in it that people in the future will have readily available to them and includes information such as what are the aging effects that are concerned, how do we monitor those, how do we detect it, what are the inspection criteria, so that the information that we use to develop our aging management program reviews as part of the application submitted to the NRC has been moved from the license renewal documentation into these commitment tracking items.

The actual aging management programs are implemented through maintenance procedures, other kinds of procedures, work requests, ongoing surveillance programs. And as part of our process, all of the steps in those procedures and surveillances that constitute the commitment we've made to the NRC are annotated with references to the commitment items, maybe the entire procedure, maybe particular steps in the procedure, so it's all documented there.

In slide 12, the project team is going to have all those commitments in place by December of this year, so before the project team dissolves itself and goes away, they've completed all those commitments

and will be in the procedures.

CHAIRMAN BONACA: You mean the implementation is going to be done by the end of the year?

MR. POLASKI: No. The inspections won't be done but --

CHAIRMAN BONACA: I understand that.

MR. POLASKI: -- but all of the procedures will have been either revised or annotated to indicate what are commitments. New procedures will be written and put in place, or we will have commitments in place to write those procedures in the future with the information there. So the whole process will be set up so that, when Rob and his team go off to other jobs, they will all be there.

All supporting information will be available to people, but they won't need to go to it. It will be in the commitment process. So if somebody wants to look at a maintenance work order, preventative maintenance activity, and makes a decision, "Do I defer this work, or do I not do it?" will look at it and it will be a commitment, and it will be annotated. It says, "This is a license renewal commitment." They'll need to, by procedure, go back and review the bases for that and go through the

change process to make that decision, "Do I do this or not? Do I do this one-time inspection? Can I defer it to later?" so it will be there to make sure that they stay in that process.

CHAIRMAN BONACA: Yes. We have encouraged other applicants before to implement commitments well before we get to license renewal just because, you know, the NRC will have a lot of this license renewal application going to place by the same time.

MR. POLASKI: And in reality, if you look at the programs that we've committed to do, Dr. Powers was raising the question earlier about a lot of this additional inspections we're going to do. We haven't exactly quantified the number, but I believe it's probably like 98 percent of all of the inspections, we're going to do somewhere in that range, or already things we're doing now. We may have enhanced them to beef them up somewhat. There are very few new ones. There are one-time inspections to confirm water chemistry. There's a couple of new programs for cable monitoring. But for the large part, most of what we're doing, what we're committing to for license renewal is already there.

So there will be new activities, but most of those will be done when the equipment is taken out

of service for other reasons. So we're not like we're going to be doing a whole lot of new things for inspections or taking the equipment out of service just for license renewal inspections.

And I guess the last point is we've got all these in place. Region III performed their final follow-up inspection and looked at a significant number of our action tracking items and reviewed them to make sure that all the information was in there, and they agreed that we had everything we needed, and all of them were satisfied with that.

So we believe we've got everything in place to put this in place long-term. What we're doing with Dresden is somewhat what we did on Peach Bottom. It's just rolling from plant to plant.

MEMBER POWERS: I guess what I'm struggling with a little bit here is how do you know that this is going to be adequate? You know, some of it I don't quite understand. I mean, a unique tracking number doesn't really impress me. What does impress me is this detailed information that you provide, apparently, with each one of these items. Do you have an example of that? I mean, did the subcommittee have a chance to look at an example of that?

MR. POLASKI: Yes. The subcommittee had about eight pages of presentations.

MEMBER POWERS: Sure, sure.

MR. POLASKI: Bill wouldn't let me show them again today.

MEMBER POWERS: Ah, come on, Bill. Good. Because that impresses me. The unique tracking number, you know . . .

MR. POLASKI: The write-up, when you put up the description on aging management programs, it can be several pages long with all the detailed information that's in there, and that's all readily available to people in the plant right through passport computer system. They can go in and pull that right up on the computer and look at all that information.

MEMBER POWERS: And what you've said is you've done this before with Peach Bottom, so you know something about it. But still the question is how do you know it works? How do you know that, despite all this, that things can get dropped and forgotten?

MR. POLASKI: This is part of a program that handles all of our commitments to the NRC. So when we make commitments as a result of an LER or response to generic correspondence, it goes into the

system, and it's monitored by people who are responsible for the commitment tracking process to make sure that we're actually implementing things. If there's changes that need to be made, there are procedural requirements about how you know you can go ahead and do that. So I don't see these as any different than any other commitments we make and that we need to do. And the NRC is going to be inspecting us. I mean, in the SER, there's a long list of commitments we've made, and they'll be inspecting it before we ever get to the period of extended operation.

MR. BOHLKE: And we'll be looking at it from an oversight standpoint internal to Exelon to make sure that we're meeting our commitments. So there's barriers that help us ensure that we're doing what we --

MEMBER POWERS: I guess what I'm asking for is what's the data on the system? Have you ever forgotten a commitment to the NRC before?

MR. BOHLKE: Have we ever forgotten a commitment to the NRC? In recent memory, no.

MR. GILLESPIE: Dana, how long do you maintain a grudge?

MEMBER POWERS: Forever. I'm like an

elephant, I never forget.

MR. BOHLKE: Mr. Chairman, that concludes our presentation. As usual, it's been interesting. We think we've put together a very robust program for these four units at the Dresden and Quad Cities stations. We recognize that there have been some interesting challenges posed here today, and we look forward to the resolution of those. Thank you.

MEMBER ROSEN: I have one question. I'm not sure it's to Commonwealth, Exelon, or the staff. There were a number of questions requiring further evaluation, a dozen of them as a matter of fact. When will the answer to those be covered?

DR. KUO: Well, when T.J. Kim goes there. If you have any questions on the information we already sent to you, that's the time to ask the question.

MEMBER ROSEN: Okay. I'll have a chance later on with T.J.

CHAIRMAN BONACA: Okay. With that, let's move then to Mr. Kim.

DR. KUO: When T.J. makes the presentation, we will have the staff also discuss this issue that we just had discussions.

MR. KIM: While we're getting set up, let

me go ahead and get started. My name is T.J. Kim, and, Mr. Chairman and the members of the Committee, I'm really honored to be here this morning to present to you the conclusions over the Dresden and Quad Cities license renewal application. A lot of the stuff that's covered on the slide has already been talked about during Exelon's presentation, so I don't see anything new on here. The application was submitted January 3rd, 2003, and it's a single application covering both sites.

Let's go the next slide, please. The only thing here that I want to mention, I guess, is Dresden. You may have already noticed, but Dresden and Quad Cities' application represents, I believe, fifth application that's modeled after GALL process following Fort Calhoun, Robinson, Ginna, and Summer plants. Let's go to the next slide.

MEMBER LEITCH: On that first slide --

MR. KIM: Yes, sir.

MEMBER LEITCH: -- it appears to indicate that the electrical generation at Dresden and Quad Cities are significantly different with the same thermal power rating. Why is that? Is that a mix-up?

MEMBER SHACK: The first slide.

MEMBER LEITCH: How come you have 120

megawatts' difference with the same thermal power?

MR. BOHLKE: I believe that's possibly showing that the Quad Cities' units are currently derated as --

MEMBER LEITCH: Oh, I understand. Okay. So that represents the original 100-percent power at Quad Cities?

MR. KIM: Yes. Quad Cities, both units are limited to 85 percent of the operating power level, so I believe those numbers are --

MEMBER LEITCH: Yes, that slide is not quite clear. If you're using that for any other purposes, I think you should clarify that bullet.

MR. KIM: All right. I'm on slide number 4. This slide highlights all of the NRC audits and inspection activities associated with Dresden and Quad Cities license renewal application review.

Headquarters staff has conducted a scoping and screening audit at the Exelon engineering facilities, and Region III conducted an inspection of scoping and screening, and then followed by the headquarters staff conducting an audit of the aging management program. And the purpose of that audit was to compare the licensee's aging management program against the GALL program to make sure those programs

are consistent.

And Region III conducted an aging management review and an aging management program inspection, one week at Dresden and one week at Quad Cities. And the focus of those inspections were to look at the implementation aspects of the proposed aging management programs at both sites.

MEMBER KRESS: What's the difference between an audit and an inspection?

MR. KIM: Okay. Audit -- we focused more on the program description themselves. As I said before, our purpose of the audit was to make sure the proposed aging management program at Exelon is consistent with the GALL aging management program, which had already been accepted --

MEMBER KRESS: Right.

MR. KIM: -- by the staff. So that's the audit.

The inspection focused more on the implementation part, making sure the procedures are in place, so that either the maintenance worker or an engineer can -- you know, has enough detailed instructions and procedures in hand to go and actually implement the program.

MEMBER KRESS: Thank you.

MR. KIM: And then, Region III conducted an optional third inspection to focus on the commitment tracking system. And I believe Region III has also conducted a follow-on inspection back in May of this year.

By the way, Laura Kozak, who led the Region III inspection, is -- she is on the phone tied in by the telecon, if you have any questions on the inspection aspects.

Let's go to the next slide, please.

Okay. This slide highlights the aging management program audit activity, which I already talked about. One thing I might mention is that three aging management -- as a result of the audit, Exelon enhanced three aging management programs to make those more consistent with GALL. And those three aging management programs are a selective leaching program, a fire protection aging management program, and one-time inspection program.

Let's go to the next slide.

MEMBER POWERS: Well, let me ask you a question.

MR. KIM: Sure.

MEMBER POWERS: You concluded down there that you found them acceptable. That doesn't tell me

a whole lot, but I'm going to assume that they covered everything you could think of and so you found them acceptable.

MR. KIM: Yes. Again, the focus of the audit was to ensure Exelon's aging management programs were consistent in all aspects.

MEMBER APOSTOLAKIS: With what? With system --

MR. KIM: With all programs. You know, those 10-element programs. So that's what we mean when we say we found them acceptable.

MEMBER POWERS: That's kind of what you've done in the past.

What I'm struggling with are two things. One is: how do you know that's enough? Okay? And the second one is: suppose the program is incompletely implemented or executed? That is, it's not everything. How do you know it's robust enough that it still performs its function? In other words, I'm asking you, what's the defense-in-depth and what's the redundancy and diversity here in these programs?

MR. KIM: Let me see if I can --

MEMBER POWERS: And do you look for that sort of stuff?

MR. KIM: Let me see if I can try to

answer that. Your first part of the question is: how do we know the program is good enough? And I think the answer is that the staff has already reviewed and accepted aging management programs that are contained in the GALL report. Okay?

So as long as the applicant's proposed aging management programs are consistent with the GALL program, then that gives the basis for the staff to say, "Yes, these programs are acceptable" or managing aging for license renewal. Period.

MEMBER POWERS: I mean, that's a procedural base, then. I guess what I'm asking you is an absolute thing. What leads you to the conclusion that this program is adequate? And I think the answer is nothing. You don't have a database that you can compare program against results and say, "Yes, this program works, and this other kind of program doesn't work."

DR. KUO: Dr. Powers, if I may --

MEMBER POWERS: Sure.

DR. KUO: -- in reviewing the programs for GALL, to include the GALL -- already include the GALL, we review the program against the 10 elements there. One of the elements in there is the operating experience. We want to make sure that this program

works, just like you said, based on the operating experience.

If there was something that happened before, what actions they have taken, the corrective actions they have taken, to make the program better, or -- so they -- in this program that -- to address the 10 elements, they have to address what the operating experience has been with this program. That's how we judge the --

MEMBER POWERS: Well, that must have been a very interesting discussion in light of what we opened this meeting with on the white findings where we find things get -- not all things are done especially well. I mean, how does that square up with finding them acceptable?

DR. KUO: Well, I submit that there is really no 100 percent perfect program. And we kind of expect that from time to time the program may have some flaws there. But earlier in this program evaluation is another element which says corrective action, and then commitment to control the -- and achieve control of the program. Make sure that the feedback -- that the experience gets fed back to the program itself.

MEMBER POWERS: Okay. You're trying to

address the second part of my question.

MR. KIM: Dr. Powers, if I may add to what Dr. Kuo was just talking about. As you are aware, the GALL report was based on I believe almost 20 years of -- 20 years worth of operating history for nuclear reactors, both domestic and foreign. And we have a program in place that is to update the GALL based on more recent operating experience from all plants.

So GALL is -- by no means it's a one-time deal. It's going to be a living document that's going to be constantly updated and provide new information.

MEMBER POWERS: That's fine. But does that, then, lead ipso facto to a change in all these programs as you update the GALL? I think not.

MR. KIM: Well, then, what we have is an ISG process where if they -- if new information comes in that warrants additional requirements, then we have interim step guidance process that allows us to look at that and do a backfit analysis. And if the cost/benefit turns out favorably, then we can require licensees to adopt additional requirements in terms of aging management program.

MEMBER POWERS: A process based on historical evidence is, at best, slow.

MR. KIM: That I can't really --

MR. GILLESPIE: Dana, let me correct that one point. Actually, the ISG process in Part 54 -- Part 54 has a paragraph in it which exempts new information on aging management from backfit, but does require every licensee to reevaluate the new information in the context of its extended license. So, in fact, backfit doesn't apply to the aging management aspects of Part 54. It's specifically excluded.

And we about six months ago, PT, maybe a little longer, sent out some communications to the industry to this effect. And it was the ISG on ISGs, and how do you deal with plants like Calvert Cliffs, etcetera, who have already been approved when you have new information coming in? So we can get you a copy of what we sent out. At the time, we had gone over it with the committee.

So there is, you might say, a regulatory process in place to get the new information out and cause licensees to have to evaluate it.

Now, it's not perfect, because, you know, then we have to follow up with inspections. Did they carry out the requirement to evaluate it?

DR. KUO: And if you recall, we did make that presentation to the committee on our IC process.

What Frank just mentioned was that if there's some new information, there is a provision in the Part 54 rule -- 54.37(b) -- that asks the renewed licensee -- I mean, the licensees with a renewed licensed to look at the new information and make an annual update to their FSAR.

MEMBER POWERS: I'm glad you pointed that out. I had completely forgotten that clause and --

DR. KUO: Yes. There is one provision there.

MR. GILLESPIE: Licensees tried to, too, but we -- we periodically have to review --

(Laughter.)

MEMBER POWERS: You have no idea how impressed I am that you guys could pull this out of the top of your head.

(Laughter.)

MR. GILLESPIE: We think about it a lot.

(Laughter.)

MEMBER POWERS: I shall be diligent and go look myself.

(Laughter.)

MR. GILLESPIE: There is a good question, and Mario asked it also. Power uprates and GALL and extension are becoming more and more inexplicably

linked. And we are entering a new regime where I think the collection of operating --

MEMBER POWERS: It's not inexplicably; it's inextricably.

MR. GILLESPIE: Inextricably. But one goes with the other, and whether they're before or after, we do recognize that GALL is going to have to evolve as we get new operating data in a new regime of pressures, temperatures, and flows.

CHAIRMAN BONACA: Do you want to talk about that now or --

MR. GILLESPIE: No, I was just going to let you -- it's not forgotten, and I think when we come back and review our next GALL update with you we'll be ready to say how -- we've at least given some thought that we do need to now consider that. And how you collect the information is an interesting quandary.

CHAIRMAN BONACA: Well, I mean, I think what concerns me is that in the rule for license renewal, you know, there is a very specific requirement that operating experience be brought to bear, and, in fact, there is a specific requirement that you shouldn't apply for a license renewal application before 20 years of experience have gone

by.

Now, the question is: how much do you have to increase your power before you have a new plant? That's really the resulting question. Now, you know, these are big uprates, and we heard that nothing matters. I mean, we've had questions -- the possible connection between license renewal and power uprates for years now, and we've been told that no issue.

Then, we have the steam dryers. Now, the steam dryers were never supposed to fall apart, fall to pieces. That's why we never thought that there would be a cascading effect, and that would possibly become part of that group of license renewal that says, "No safety-related data may affect the -- you know, impact the safety-related systems." And yet it happened.

As we look at that, then we have this presentation that BWR Owners Group had done to you. With this kind of information, I mean, this is -- a lot of this information says there could be impact on license renewal programs resulting from what we see there. And, you know, yet we are approving now license renewal without addressing the specifics in the operating experience.

There are ways this could be done. You know, one way could be that before they enter the license renewal period, an applicant that has not had experience at the extended power uprate, performs a review of its operating experience and says, "Yes, there is no impact on the programs I committed to." Or, "Yes, there is a need for it, and now we have to change Program X, Y, and Z." That's one possibility to address it.

But, you know, with this kind of information coming, I think this kind of information begs for it to be considered in the applications.

DR. KUO: Well, I guess I would have to say that, like Frank just mentioned, that, you know, all these issues that you're talking about, yes, they are real issues, and we are thinking about it. The vehicle that we are going to discuss it is when we have our guidance document updated. That's where we collect all the operating information.

CHAIRMAN BONACA: Well, once you provide an approval, I mean, what is the hook to go back to a licensee and say, you know, "I mean, you have to look at your commitments that you gave me three years ago and make sure they still apply." You really have no leverage, no hook, to do that.

DR. KUO: Yes. Yes. The provision I just mentioned, 54.37(b). We could go back, ask them to make an annual evaluation. If there is new information, they have to check and make an evaluation.

MR. KIM: And the ISG process that we mentioned earlier.

CHAIRMAN BONACA: That's the one you mention on slide number 8?

MR. KIM: Yes.

CHAIRMAN BONACA: Do you want to go to that slide? Let's talk about that. Because it talks about steam dryers, and it talks about this issue of other mechanisms that we have not experienced.

MR. KIM: Yes. Let me start out by a discussion that's, I want to say, at a 50,000-foot level. As you mentioned earlier, Dr. Bonaca, there has been a lot of recent operating experience -- steam dryer issue being one of them -- associated with extended power uprates. But as you know, EPUs are fairly recent phenomena.

CHAIRMAN BONACA: Right.

MR. KIM: I think the first EPU that the staff has approved was back in 2000. So both the industry and the NRC staff have a relatively limited

amount of experience to date.

CHAIRMAN BONACA: Correct.

MR. KIM: And I'm sure you're well aware the staff has really reinforced, if you will, our operating experience gathering capabilities, specifically to look at the experiences from extended power uprates. And we're incorporating those experience to reviewing future EPU applications or the applications that are in-house right now -- Vermont Yankee being one -- to make sure all of those lessons learned are being addressed.

And we're also looking at the operating experience from extended power uprates to see if there is any aging components that can be -- that can affect license renewal for long-term operation of the plants. So we're also looking at that, too. So it's -- I think it's best to describe its ongoing effort, and on many of these issues the jury is still out.

So we're -- the staff is still evaluating a lot of these issues, and we're working very -- the staff is working very closely with the BWR Owners Group and GE to address these issues. And when we finalize our reviews on these issues, a number of things can result. One we already talked about.

We can -- especially in the license

renewal space, we can look at the ISG, use the ISG process to see if we can -- if we need to require additional -- impose additional requirements to the applicants who have already received renewed licenses, or invoke 54.37(b) clause, as PT mentioned earlier, to have the licensees come up with additional aging management programs to address new aging effects that hadn't been reviewed before.

CHAIRMAN BONACA: I understand. Now, let's talk about the steam dryers.

MR. KIM: Okay.

CHAIRMAN BONACA: I don't know from these slides where you're going with that, you know. We -- at least I have -- and Mr. Leitch proposed that the --

MR. KIM: At the moment, the staff has concluded that the steam dryer issue in particular should be best handled as a current operating issue. And we're closely monitoring Exelon's activities. As they mentioned, they are planning to --

CHAIRMAN BONACA: But isn't it true that this is a passive component?

MR. KIM: Yes, it is a passive component.

CHAIRMAN BONACA: Isn't this also a long-lived component?

MR. KIM: Yes, it is.

CHAIRMAN BONACA: And we have experience from it that pieces of it went through safety-related equipment. So, therefore, it could have an impact on safety-related components.

MR. KIM: Right now it's just --

CHAIRMAN BONACA: It's a component whose failure could have an impact on safety-related components. So it fits up to a tee the definition of what is in the scope of license renewal.

MR. KIM: We may defer on that point. PT, do you want to address some --

DR. KUO: If I may. For this issue, actually, the staff considers this is really an operating issue, and this is also a generic issue, which was Dr. Powers' observation before. So staff is evaluating the issue right now.

As a matter of fact, recently they made a trip to GE to look at it -- this type of thing. So as soon as we complete this review, I would expect -- and I actually can -- can commit the staff to it, to come to the ACRS Committee and make a presentation to you all.

CHAIRMAN BONACA: Okay. Now, assume that you agree with us, just to make an example, and you decided to ask the licensee to put it in scope of

license renewal. Okay? You will have leverage now, because you haven't given the license renewal yet. So you have come to an agreement with that.

Now, let me ask you: if this didn't happen then, and you have to rely on 10 CFR 54.37(b) to do that, what leverage would you have? You could say --

DR. KUO: Well, in the SER -- in the SER for this particular issue --

CHAIRMAN BONACA: Now I'm talking about all the other issues that may come up. I'm saying, what leverage does 54.37(b) provide you with to -- if the licensee disagrees with you? If you contend that some item is -- should be in license renewal and they're saying, "No, it shouldn't be. So, therefore, I'm not updating my FSAR." You have no leverage to do that.

MR. GILLESPIE: The burden then becomes a compliance issue with the staff, and then they're found in non-compliance for inadequately considering the information, and we go through the normal ROP process.

DR. KUO: Yes.

MR. GILLESPIE: Now, the burden is on the staff to make the judgment that what they're doing is

inadequate based on the staff's judgment of what should be done. So there's a shift in burden clearly. It's --

DR. KUO: In terms of meeting the Part 54 rule, okay, this is going to be a non-compliance issue, and we can use 54.37(b) as the licensee with renewed license to -- to do the review.

MEMBER ROSEN: Have we ever had a non-compliance issue like that, Frank?

MR. GILLESPIE: No. We've never had a citation against Part -- a compliance issue against Part 54. You know, I have to say, I mean, we can postulate that we get at odds like that, but I think the resolution to the dryer issue, or if there's another significant flow issue that comes up, will be done the way we've done other issues.

And I can't picture one licensee, if we do it back and forth with the industry as we generally do for generic issues, one licensee being an outlier is highly unlikely. But we do have the compliance vehicle if we need it.

I think that, Mario, the bigger question is -- this is an interesting one -- is if you get a power uprate after you have a renewed license, the power uprate piece has to address the aging management

parts of this. And if you get the power uprate before you get the renewed license, you're actually only reviewed for your original 40-year term. And then we would have to catch it here.

So this actually impacts some plants that we've already given renewed licenses to. The power -- the staff now has to review to a slightly different history, and I don't think our review guideline actually addresses 60 years of operation for power uprates. It's generally a 40-year guideline.

MEMBER POWERS: Let me ask you a question. And it's going to be based on memory, and I've already demonstrated my memory is faulty, since I didn't remember 54.37(b).

(Laughter.)

Feel free to correct my failing memory. My memory and the extended uprate for these plants was Dr. Ford interrogating people at length about possible damage to the steam dryers, and what not, and that he was assured, in no uncertain terms, that an extensive and comprehensive analysis had been taken and that everything was fine.

Now we are presented with a discussion of the dryers that subsequently failed, and, say, an extensive and obviously very detailed analysis with

scale models and what not are being done to design dryers that will stand up to this formidable flow that's necessary for the power uprate. And that the staff will have a chance to examine those, just as they had examined the previous thorough and comprehensive analysis of the steam dryers.

What is it that the staff does when they're presented with these what will obviously be an extremely complicated and extremely detailed analysis on the design of the dryers? What do you -- at what point do you say, "This is so detailed I'm going to have to get help to look at this."

MR. GILLESPIE: Yes. I'd like to be able to look at the audience and look for the person who could answer that question, because I can't. But honestly, our program is very dependent upon the findings on topical reports, and so the best I can do is probably promise that we'll get with the appropriate people and come back and chat with --

MEMBER POWERS: Yes. I mean, this obviously has implications far beyond this.

MR. GILLESPIE: Oh, yes, it does.

MEMBER POWERS: I'm trying to --

MR. GILLESPIE: This is beyond steam -- as I said, we're in a new flow regime, temperatures,

pressures that we --

CHAIRMAN BONACA: By all means.

MR. GILLESPIE: -- steam systems. I mean, the Japanese incident says even condensate systems can pose a problem.

CHAIRMAN BONACA: And the --

MEMBER POWERS: Not earthshaking news, but dramatically demonstrated.

MR. GILLESPIE: Dramatically demonstrated.

(Laughter.)

So I can only say that we're going to have to -- we'd have to bring the right technical staff who is responsible for the topical reports.

MEMBER POWERS: Well, understand what the question is. I mean --

MR. GILLESPIE: It's a fair question.

MEMBER POWERS: You have a choice. You can review what's presented to you, or you can go through and independently analyze. And clearly, when things get very complicated, you've got to make a decision between those two. I'm trying to understand how you make that decision.

MR. GILLESPIE: And I would have to agree. When I heard Exelon's explanation of the acoustic coupling and the instrumentation, I'm out of my realm

of background. It's a lot of readings, and it certainly sounds more detailed than we had before.

MEMBER POWERS: Which was thorough and comprehensive, but it --

(Laughter.)

MR. GILLESPIE: I can only commit that we'll get with the staff and get on the ACRS schedule, and come back and potentially address steam dryers and where we're at. And then we have to think about -- this raises a different regime.

CHAIRMAN BONACA: Let me ask a question, though. Okay. You have new information that is forming. This is the first time we are confronted with this information from the BWR Owners Group.

Now, I would say in a few years we'll know pretty well what to expect, and that the effect will be already reflected in GALL. Right now we don't. You know, now, the first plant from Exelon that goes into license renewal is going to be probably eight years from now, eight/nine years from now.

MR. KIM: Actually, six years or something like that.

CHAIRMAN BONACA: Six years?

MR. KIM: Yes.

CHAIRMAN BONACA: What if -- what would be

wrong, say, you know, a year before getting into license renewal for that plant? They would review their operating experience and perform an evaluation -- a simple evaluation that says we have looked at them, and we should change these two programs and the rest is okay, and you would review that. You know, will it be a better way to address this issue of operating experience that is not really right now reflected in the application?

DR. KUO: Well, if I may, like I said before, when I came to this meeting I talked to Gene Imbro, who is the Branch Chief for the Mechanical and Structural Engineering Branch. And what he had told me was that the staff is reviewing it. And we recently made a visit to GE, and we will do a comprehensive review. As soon as we complete it, we'll go to the committee and make a report to the committee. So right now we really don't have a whole lot of information.

CHAIRMAN BONACA: Okay.

DR. KUO: For license renewal, in our SER we actually had to -- the applicant made a commitment. The commitment reads that if -- if plans to maintain the integrity of the Dresden and Quad Cities steam dryers during extended power uprate conditions should

be unsuccessful, the applicant has committed to include the dryers within the scope of license renewal.

CHAIRMAN BONACA: Well, that's only the dryers, and I'm saying there is a lot of other stuff now, many other components that have shown to fail, be impacted. It's a different experience. And, you know, here we have it in front of us, and we have to do something about that.

Okay. Let's --

VICE CHAIRMAN WALLIS: Can I put my oar in here? My colleague was asking --

CHAIRMAN BONACA: Please.

VICE CHAIRMAN WALLIS: -- about this complicated, thorough analysis that's going to be done. He was asking how the staff assures that it's being done right. Let us not have a situation where it comes to the ACRS, and the ACRS finds out it's not being done right, and it is passed through all your filters. Let us not run into that situation that we have sometimes seen.

CHAIRMAN BONACA: Why don't we just move on and --

MR. KIM: Okay. I'm on slide number 9 -- slide number 10, rather.

MEMBER SIEBER: Moving right along.

DR. KUO: T.J.?

MR. KIM: Yes.

DR. KUO: Before you get into that, can I have a staff member who is here to answer the question -- the previous question on the core shroud?

MR. KIM: Oh, sure. Sure.

DR. KUO: So that, you know --

MR. ELLIOT: Barry Elliot, Materials and Chemical Engineering Branch.

The issues raised up during the previous discussion was about the core shroud repair, and how do we ensure its integrity. The two issues raised I thought were the intergranular stress corrosion cracking and irradiation-assisted stress corrosion cracking.

With respect to the intergranular stress corrosion cracking, the materials we have chosen are not susceptible -- not significantly susceptible. The INCONEL 750 is heat-treated to produce microstructure. That would not make them susceptible to our IGSCC XM-19 stainless steel solution-annealed and low carbon content, and that's used on the tie rods.

And then the 316L is the stainless steel, has a maximum carbon content of .02 percent for the

remainder of the assembly. There are no welds on this structure, so I don't think it would be susceptible to IGSCC, and that's how we drew that conclusion.

With respect to the IASCC issue, austenitic stainless steel, we've been using a screening criteria on the order of 5 times 10^{20}. I read the SERs. They don't talk about it. But I would think that that's what -- when they made the conclusion that it wouldn't be susceptible to this mechanism that that's what they had in mind.

With respect to that, we also do inspection. The hardware -- this hardware is -- inspection criteria is contained in BWRVIP-76, and it requires two different types of inspections -- first, a general VT-3 according to the ASME code, and then a more -- what's called a detailed inspection. This would encompass looking for gaps and things that could cause a problem with the materials and the structural integrity of the component.

At the time we wrote the original SER for this it was way back in the late '90s. A lot of time has progressed since then. We are still reviewing -- we haven't finished reviewing the BWRVIP-76 yet. What should be included as far as a detailed review is up to -- at this point has been left to the designer of

the repair.

The staff is going to look into that. We've had enough experience now. The designers have had enough experience, so that we can get a more descriptive program. And we think a detailed examination should be capable of detecting cracks in the tie rod. And that's our -- what we plan to -- assure that there's no IASCC problem.

Any other questions?

MEMBER FORD: The trouble is that this is sort of a complicated subject. Everything you've said as far as the IGSCC is correct. As far as the fluence limit, the 5 times 10^{20} fluence limit is a moveable feast. It can change depending on the other parameters in the system. It's a criteria that has been laid down for a long time and has been proven/ disproven many times, depending on what the other conditions are in the system. So it's not necessarily an absolute.

My comments about the VIP-76 -- it's my understanding that the scope of that inspection is very limited in both volume, degree of accessibility, and after the first cycle is far too soon to be seeing any irradiation-assisted cracking. And the next one, as I understand it, is 10 years out, which is

potentially far too long away.

So what assurance do we have that nothing is going to happen in those intervening nine years? And what's the consequence if you do find cracking? Because you are not inspecting horizontal core shrouds in the meantime. Are they going to continue to crack?

So if the tie rod does fail in that intervening nine years, what's the consequence if the cracks in the underlying core shroud have propagated and you haven't noted it?

MR. ELLIOT: Well, we don't inspect the horizontal welds in the core shroud, because the repair fixture takes the place of those welds.

MEMBER FORD: Yes. But what happens --

MR. ELLIOT: And then we are -- our intent is to ensure the integrity of that structure by doing the inspections. And we've lived with a 10-year cycle, and it's been very successful for the industry.

MEMBER FORD: Oh, gosh.

MR. ELLIOT: And that's what we've been using, and that's what we've been doing. That's our experience.

MEMBER FORD: If we were going to do all our life management in terms of what has happened in the plants, we'd be in deep, deep trouble.

MR. ELLIOT: Let me just say this -- that if we see something different, of course we would change the frequency of inspection. We saw that same thing with IGSCC in the past, and we changed the frequency of inspection there in the VIP -- I think it was 74. If the same thing happens here, we will probably change the frequency of inspection. Again, we need some kind of experience to make this change.

MEMBER FORD: I don't have a problem with what you're saying, except that in the last five, 10 years, we have been embarrassed by a seemingly continual series of materials degradation issues. And they have all been superseded by the statement, "It will never occur" or "it has never occurred." And then, dammit, it occurs, and then we are all embarrassed. And I don't want to go through this again, this embarrassment.

And I'm not hearing any difference in your -- in the way you are tackling this. It essentially is prefaced by, "It has never occurred" or using arguments along those lines. And I just feel very uncomfortable about it.

What would be the consequence if you had a failure of a tie rod because you have not inspected it in a timely manner, i.e. not within nine years, it

fails, you haven't been inspecting the horizontal core shrouds, which can be cracked all the way around to midsection, what would the consequence be?

MEMBER SHACK: If it's only to midsection, nothing.

MEMBER FORD: No? The only thing about the midsection is that you're constrained by the residual stress profiles. But what happens if the residual stress profiles are not what you expected? Which has occurred.

VICE CHAIRMAN WALLIS: Are you asking if it could fall off? Are you asking something --

MEMBER FORD: No. I'm suggesting that maybe there's an accident, you have shear stress, and you could just shear the whole core shroud in half.

VICE CHAIRMAN WALLIS: Then it falls off.

MEMBER FORD: Well, it wouldn't fall off. It would go shear to one side and --

VICE CHAIRMAN WALLIS: Yes.

MEMBER FORD: -- the control rods. It's that sort of thinking I'm asking someone to address. And I haven't -- in all of the license renewals, it's not just Quad Cities, in all of the license renewals when I ask that question everybody says, "Oh, a new problem." And they cite some EPRI document that says

that the core damage frequency change is negligible. I just don't believe it.

And even if that were true, the public confidence, or lack of it, would be astounding. I don't see that being addressed. It's those issues that I'm sensitive to.

And the Exelon -- I mean, do you agree with everything that's said on the Exelon sheet? You don't agree? You saw it up on the screen there. I mean, you could go down it, and you could question every one of those bullets. And I'm assuming that the staff have questioned every one of those bullets.

MR. ELLIOT: We've written SERs for -- on all four units for this repair hardware.

MEMBER FORD: So, in other words, you --

MR. ELLIOT: And we agree with everything that is on this, because this says that -- that's what our SER says. And we reviewed in detail the structural analysis that was made for the component, the aging effects for the component, and we've concluded that considering that it -- I mean, the design, how it's designed and how it's -- the aging effects, which are fatigue and irradiation, that this thing could last for 40 years.

MEMBER FORD: Barry, I can think of at

least two people around this table who disagree with many of those bullets. And I can think of 20 people in the world who disagree with those bullets. And that's my problem. We don't have resolution of these factors.

And what I'm unclear about is: what's our consequence if these things fail? And I haven't heard anyone address that issue. If it's of no consequence, fine, it's an academic debate, which some from Exelon have said. You could go on arguing about this forever. But I haven't heard anyone tell me that it is of no consequence if one of these tie rods fail.

MEMBER FORD: Barry, I --

MR. GILLESPIE: Yes. I think the people -- we don't have the systems and the risk people here who talk to consequences. So our silence doesn't mean we're saying there is great consequence, so don't misinterpret the silence.

But, again, you're -- as with the dryers, you're challenging some findings that were made in SERs and topical reports and things that we don't have the complete staff here to talk about that, that basically the renewal process, in essence, has accepted and not really questioned the previous staff findings on these things.

But again, Mario, it almost sounds like that -- I don't know how long it has been since the staff has come over and talked about material issues in general. But, I mean, this is number two. This is the second big question that has come up, even just this morning, on the same kinds of things.

CHAIRMAN BONACA: No, there's a difference there. I mean, clearly in the license renewal you rely a lot on evaluations that have been done before. So I think that Dr. Ford is opening a question of the adequacy of the evaluation that was done once, and that's an issue that could apply to many other issues.

MR. GILLESPIE: That's what I'm saying, yes. Is that a different presentation that we need to --

CHAIRMAN BONACA: Steam dryers, you know, were not supposed to fail. They failed, they fell into pieces, the pieces went through safety-related equipment, they are not -- some of them are not being found. So, therefore, this is an operating history that -- and the question is: should it be in license renewal or not? That's really the very clear question on that.

MR. GILLESPIE: Yes. So, I mean, essentially we've already committed we come with the

details on the steam dryers and the reexamination that is currently going on. We have to give people time to digest the information and come back. We'll schedule that.

But do we need a more integrated discussion about materials issues like this also? If the ACRS would like it, just ask.

MEMBER FORD: I would like it.

CHAIRMAN BONACA: I think you should handle it under the materials --

MR. GILLESPIE: Under the subcommittee?

CHAIRMAN BONACA: Under the subcommittee. That's who should be looking at it.

MR. GILLESPIE: And we'll be happy to -- it's just that I don't -- we don't have the staff here to go through each of these separate staff reviews that we've accepted.

CHAIRMAN BONACA: No, I understand.

MR. GILLESPIE: Appreciate that.

CHAIRMAN BONACA: All right.

MR. KIM: Okay. Let's go to slide number 9. I think we skipped it.

Okay. One of the open items in the draft SER that we discussed during the subcommittee meeting that was still open at the time was this issue. And

this issue here is that the applicant had initially proposed an inspection scheme for Class MC supports and piping supports that is less rigorous than what's required by the ASME Section 11, as prescribed in the GALL report. And --

VICE CHAIRMAN WALLIS: Does IWF mean anything?

MR. KIM: That's a sub --

VICE CHAIRMAN WALLIS: It's just a subsection?

MR. KIM: It's a subsection that addresses Class MC supports.

VICE CHAIRMAN WALLIS: So it doesn't mean anything.

MEMBER ROSEN: No, it's not an acronym.

VICE CHAIRMAN WALLIS: Okay.

MR. KIM: And the bottom line here is that we -- the staff was able to close this open item based on the licensee's commitment to --

MEMBER ROSEN: Now, this is where I had my question on the 12 subsequent questions. Number 12 of those 12 questions was a question about structural monitoring program, and the question of whether the structural monitoring program to inspect the metal containment supports would include pipes that

penetrate the containment. Was that issue resolved as part of this?

MR. KIM: Yes. That's what we're trying to say here. That issue --

MEMBER ROSEN: See, none of that wording is incorporated. You talk about MC supports and MC piping supports. But you never talk about pipes that penetrate containment. So I -- and I'm still stuck with this number 12, which says in the package we received just prior to the meeting that the staff is still discussing with the applicant the resolution of this open item.

DR. KUO: Let me ask the tech staff. I know that we have addressed that question, because we had discussed that.

MR. ASHAR: I am Hans Ashar with Mechanical Engineering Branch.

MEMBER ROSEN: Pull the microphone down.

MR. ASHAR: Okay. Subsection IWF includes the inspection of all the Class I, Class II, Class III, and MC components, except the Class MC piping.

Now, Class MC piping is something that you would refer to, is the one which is directly passing through containment without any penetrations,

penetration sleeve around it. And they are generally of a lower significance, safety significance, because otherwise there will be a penetration around it, sleeve around it.

So they are being inspected under structural monitoring program in most of the things that I have seen. They are not being included in subsection IWF. So they are inspected under structural monitoring program, and they are -- here is what Exelon proposed in this particular area -- that they will be looking at the supports under structural monitoring program, and they will have a coolant type of a sampling frequency of inspection program.

MEMBER ROSEN: I'm confident that if the pipes that penetrate components without penetration sleeve -- pardon me. I'm confident that those components that are covered by IWF will be properly inspected by the licensee.

MR. ASHAR: Correct.

MEMBER ROSEN: What I'm worried about is the piping that is not covered by IWF, and I don't hear you saying that that's going to be included in the inspection program, nor did the licensee mention it. And we have an open item on that, and it was still open as recently as two weeks ago when we

received the final package to look at.

MR. ASHAR: Well, in the open item, it was mainly focused toward the Class MC piping supports.

MEMBER ROSEN: Yes.

MR. ASHAR: Not piping themselves but piping supports.

MEMBER ROSEN: Right.

MR. ASHAR: Okay. And they didn't result in this particular item. They committed to do -- under structures monitoring program, they will be doing the sampling size frequency, etcetera -- to what they are using prior to --

MEMBER ROSEN: Do you understand you're telling me something I already know?

MR. ASHAR: Yes, right.

MEMBER ROSEN: What I'm asking about is what I don't know about.

MR. ASHAR: Yes. And that's what I said. The MC piping is not -- let me tell you, in the working group on containment, which addressed this IWE and IWL, it is part of MC component. IWE is an MC component, really. Okay? And then we just discussed in last meeting, which was in New Orleans recently, we discussed about including the piping -- MC piping into the core itself. It's not in the core right now.

That's why it is being inspected under the structures monitoring program. You are quite right, it is not being addressed here, and that is a separate question. But it is being -- I want the applicant to confirm this for me, whether MC piping penetrating through the containment will be inspected in a structures monitoring program.

MR. STACHNIAK: This is Rob Stachniak. The piping that penetrates the primary containment has been and is in our code inspection program. Has been and remains. The pipe supports on that piping were not required per 10 CFR 50.55(a) to be inspected. They were, however, included in our structures monitoring program.

As we had agreed with the staff, we will now change the requirements in our structures monitoring program for the MC piping supports and perform inspections per code on those supports.

MEMBER ROSEN: So the piping -- you started off by saying is the piping has already -- is already included in the --

MR. STACHNIAK: Correct.

MEMBER ROSEN: -- monitoring program. So this is an open issue.

MR. STACHNIAK: Yes.

MR. ASHAR: I stand corrected myself.

MEMBER ROSEN: So this open issue has, in fact, been closed.

MR. STACHNIAK: Yes.

MEMBER ROSEN: Okay. That's all I wanted to know. Thank you.

MR. KIM: Okay. Moving on to the next slide. The groundwater sampling results indicate that the below grade environment is pretty benign at both sites at -- you know, at Dresden and Quad Cities. Therefore, a plant-specific program is now required per GALL, and a structure monitoring program -- if the licensee is going to use structural monitoring program to do a periodic inspection of groundwater water chemistry sampling to make sure the water chemistry below grade remains benign throughout the extended period.

MEMBER POWERS: Is it true the GALL report still refuses to acknowledge potential degradation from phosphates?

MR. KIM: Right now, yes, but that's one area I believe the staff is looking at.

MEMBER POWERS: And I presume that the staff -- that the licensee will not, in his groundwater sampling, look for anything he's not

required to look for.

DR. KUO: Dr. Powers, I think the simple answer is yes, GALL is still our standard for reviewing concrete phosphate. But the question that you brought before, I believe previously we had a presentation to the committee from our research staff that this is being done in -- looked at as a research program. So as soon as we have any results from their research program, we will come back to the committee.

MEMBER POWERS: Well, I'll say the same thing I said to the staff. It doesn't take a research program; it takes looking at the literature that's already available. I mean, phosphate compound formation is not new science.

MR. KIM: Okay. Next slide, please.

Appendix G of 10 CFR 50 requires the reactor vessel beltline material have -- use Charpy upper shelf energy values throughout the life of the vessel, no less than 50 foot-pounds throughout the extended operating period. And this chart lays out for each unit what the values are.

And there was a question from the subcommittee meeting about the value of 34 foot-pounds for Quad Cities Unit 2, whether that was an outlier or how the staff and the licensee was treating that. And

the licensee subsequently completed a plant-specific equivalent margin analysis, and they came up with a minimum upper shelf energy value based on that sample of 32.4 foot-pounds, which obviously is less than 34. So that's acceptable by Appendix G of 10 CFR 50.

Okay. Going to the next slide, again, during the subcommittee meeting a question came up relative to that outlier on the capsule upper shelf energy value for Quad Cities Unit 2. One of the subcommittee members -- I believe it was Dr. Rosen who had asked for the entire set of sample values, so --

CHAIRMAN BONACA: Yes, they are.

MR. KIM: -- it's provided here and on the next page.

So when we came to you back in April with the draft safety evaluation report, we had five open items and 16 confirmatory items. And all of those open and confirmatory items have been closed, as reflected in the final safety evaluation report that was provided to you several weeks ago. And the staff concluded, based on audits, table-top reviews, and inspections, that licensee's application, which addresses aging management programs at both Dresden and Quad Cities, meet requirements of Part 54.

And separately we have also looked at the

environmental impacts, or potential environmental impacts I should say, associated with license renewal per Part 51 requirements. And all those requirements have been satisfied.

So that concludes our presentation on this. Are there any questions?

CHAIRMAN BONACA: Any additional questions from members?

MEMBER SHACK: Yes. Now that we have all of this data on the welds, what's different about this electroslide weld? Has it got a particularly high copper content relative to the others?

MR. ELLIOT: Can you put up the slide on upper shelf use, the weld -- it's only one data point, but it fits --

MEMBER SIEBER: Could you use the microphone, please?

MR. ELLIOT: If you look at it statistically, they are all part of one database. It's -- you know, it's not that 95 percent confidence value of 34, but it's close to that lower bound value. So --

MEMBER SHACK: It's just a statistical --

MR. ELLIOT: You know, you get a certain amount of data, you're going to find one that's near

the 95 percent lower confidence value.

MEMBER SHACK: It has a pretty high copper. It's like --

MR. ELLIOT: It has high copper, but there are plenty of welds with this copper. We haven't seen anything like 34 before, so I think this is really a statistical -- you know, if you get enough data, you're going to find one of them is low.

CHAIRMAN BONACA: Okay. Any other questions? If not, I thank the staff and Exelon for their presentations. They were very informative.

We're going to take a break until 10:55.

(Whereupon, the proceedings in the foregoing matter went off the record at 10:36 a.m. and went back on the record at 10:56 a.m.)

CHAIRMAN BONACA: Okay. We are back in session.

We have now a proposed change to the license renewal program, and so I'll turn to Mr. Kuo.

DR. KUO: Yeah. This is the second part of our presentation today. The subject is really our self-assessment, our review process for scoping and screening. But before Jimi Yerokun, who is the presenter -- and by the way, let me say a few words

about Jimi.

Jimi used to be in NRR when he did this work, but since then, he was --

MEMBER ROSEN: I thought that looked like Frank Gillespie.

(Laughter.)

DR. KUO: He was promoted to be a section chief in our research office, but, again, he has gracefully agreed to come back to make this presentation. But before he makes his presentation, Frank Gillespie has something to say in the bigger picture for license renewal.

MR. GILLESPIE: Yeah, fortunately I had asked for two slides and they only gave me one. But I just want to put this in context.

MEMBER POWERS: Does that speak to your effectiveness generally?

MR. GILLESPIE: Well, Sam said we weren't allowed to have too many slides anyway. So actually it worked out very well.

MEMBER ROSEN: We have to make up the schedule. If you hit 500 in the major leagues, you're pretty good.

MR. GILLESPIE: You're pretty good.

I'm just going to say the slide that's up

behind me is kind of an historic and future perspective of license renewal, and actually what we've done is taken on the end the potential for second renewals with some kind of simplifying assumptions that people will come in at the 43rd year for the second renewal if they want it.

I'm putting this up because what I want to do is point out this is when we expect to issue the licenses, not when we expect to get them in. You can see that somewhere around right now we've got about 40 percent of all of the sites, and this is done by site because that's how the applications come in. About 40 percent of all of the sites that have been done are in house, which means any improvements we make in the program can't affect what's been done and can't affect what's already here and, in fact, will have minimal impact on those applications that are already ready to come in in the next six to eight months.

So about half of the industry basically will not be impacted by any improvements and half will, which means what Jimi is going to talk about is one of a number of reviews that we did as a major midpoint correction in this whole program.

And I think you can also see that the program runs until about 2012, and then all of a

sudden we kind of seem to drop off a cliff and go down to about two or three a year, and if we don't get the light blue color coming in, then we'll probably have a different organizational arrangement to deal with the residue.

A couple of things. There was scoping and screening we've talked to the committee about before, which is the review Jimi is going to talk about. It also touches upon the interface a little bit with the regions and scoping and screening inspections.

We've got the pilot program going on where we are now going to be issuing all of those audit reports and SEs, which will give us a point to evaluate, and we just did what I'm going to call a reasonably major assessment of Summer, Robinson and Ginna to baseline ourselves on what the old process cost, how much each task cost in each section so that we have a baseline to know what the effect of our improvements are or if they're not improvements, to back off to the other place.

And also, in looking at the audits, the audits have become kind of a big deal. They are about ten man teams now that go out.

The audits are also connected with the GALL update and we're committed to getting a draft of

the GALL update out in electronic form, and we're thinking of GALL as a database now, not as a document so that people can cross-cut it different ways. It won't have full capability in September. December it will have more volume and capability and will probably double the systems and decisions that GALL covers. It will go from being about 40 percent of aging management programs to closer to 85 to 90 percent of the programs, which fits very well with the audit program we're having relative to the scope of the people doing the audits.

And you'll find DE will be generally focusing on TLAAs only, and that came out of the pilot programs and past precedents in looking back on how many decisions did we make in the past of slight exemptions from GALL. So the GALL update is connected to the audits, is also connected to what the regions do. It's connected to this piece you're going to hear from Jimi.

What we've got now is a backlog of improvements and we can't make them all at once. So we've kind of had to cue them up on maybe which ones would have the most impact combined with the sense of practical to do.

So I just wanted to note Jimi is one piece

of a whole lot bigger list of IOUs that we've got going on. This is one we're going to try something right away with relative to fixing.

And this was kind of interesting. I guessed that we were about midpoint, and chronologically 2006 is about the midpoint, which is basically in a two-year review the applications we currently have in house. So we're chronologically at the midpoint of this program, and there is actually an end in sight.

And, again, that depends on the light blue.

MEMBER ROSEN: That light blue, the first one, which one was that? It would be the first plant that got a license renewal?

MR. GILLESPIE: You know what? I'm going to tell you just from I don't know whether it's joking around or just chatting, but the people from Progress Energy have indicated that they think their team will go through all of their plants and come right back around to Robinson again. so I'm going to guess that Robinson might be one, that they could come in in that time frame.

And then there's Brunswick.

MEMBER KRESS: What, another 20 years?

MR. GILLESPIE: Yeah, for another 20 years on top of the 20 they will have slightly entered their renewal period and will have that decision to make.

CHAIRMAN BONACA: Only 20, huh?

MR. GILLESPIE: Yeah, because the rule is once you're within 20, you can go for another 20.

MEMBER ROSEN: Is there any end to this?

MR. GILLESPIE: No. By the rule there is no end, and you know, I actually have chatted with people and said, you know, what would you do.

And they've said, "You know what? Given the problems with siting a new plant, replacing the vessel is not out of question."

And by the time you replace piping, you replace steam generators, and you rewire the plant, it may be like what is it, before the McDonald's was built across the street that was remodeled from the last restaurant? they left three columns and one I beam in the middle, right?

(Laughter.)

MR. GILLESPIE: And built the restaurant, but that was a remodel. So I have a feeling we're seeing something --

MEMBER POWERS: It's going to be like George Washington's ax.

MR. GILLESPIE: It's not a new plant.

MEMBER KRESS: It's got two new hands and three new handles?

MR. GILLESPIE: Yeah. It's not a new plant. It's just all new pieces.

CHAIRMAN BONACA: I think we will have to have a new license renewal process by that time.

MR. GILLESPIE: And so that far in the future, when you look at this --

MEMBER POWERS: And just think we may actually have even phosphate in the concrete correction by then.

MR. GILLESPIE: For some reason I always thought phosphates were a buffer, but we're doing it. We're doing it. We'll have that phosphate report before the next renewal period.

So with that, let me turn it over to Jimi.

MR. YEROKUN: Good morning.

PARTICIPANTS: Good morning.

MR. YEROKUN: My name is Jimi Yerokun. I'm from the Office of Research as P.T. mentioned.

Previous to that I worked in various capacities in the Office of NRR with license renewal. So I'm very familiar with the program.

What I have today is two activities.

Those two activities were performed to try to improve the effectiveness of the reviews of license renewal application in general, and although Frank and Dr. Kuo have extensively said, you know, Jimi's -- these activities resulted from the efforts of several members of the task team.

I happen to be the lead for the task team. I'm here on implementation. It's as a result of the efforts of several staff members. I just want to point that out.

MEMBER POWERS: Spread the blame.

(Laughter.)

DR. KUO: And plus the region's staff.

MR. GILLESPIE: Right.

MR. YEROKUN: The first item was an assessment of the scoping and screening review progress. Early this year a task team completed an assessment of the NRC's review of the scoping and screening review of license renewal applications.

The objectives of the task was relatively simple: to review the process for duplicative efforts; to look for excessive overlaps and to look at the effectiveness of the guidance documents that exist for review of license renewal applications and in the end to recommend improvements that could be

implemented to make the process more effective. Those are the simple objectives for the task.

The team was composed of staff members that were familiar with the process. We had people involved with the special activities, the safety reviews, and we were part of the audit of the methodologic process for the applications. So the team was purposely composed of staff members that were experienced in the license renewal application review process.

However, there was some constraint imposed on the team. They were also very simple. There were improvements that must insure that we maintain a complete review, and at some point we should be able to define what a complete review is.

The improvements also or the changes that are prescribed must be such that we can present those improvements or changes to the OGC, for example, to the ACRS, and even to the industry. So we are constrained with those, and also obviously whatever changes or proposal we come up with, we must continue to meet the regulations.

So those are the critical constraints we are forced to maintain.

And in conducting the assessment, the team

interacted with audit staff members as well as the industry. So we did get some industry perspective also into the activities of the team.

Here are the assessment results. The team found that the license renewal program was being implemented in accordance with the regulations and with program documents. So that's important.

The team also identified that a complete review involves licensing and inspection activities, which are accomplished through the proper integration of the audit of the methodology, a safety review of the results, and inspection of the implementation.

So there's two activities, lessons learned inspection and those three attributes. All integrate together and constitute what a complete review is.

Nevertheless the team also identified some areas for improvement. Three examples. The team found instances where certain items are reviewed by more than one group in the NRC with no real additional value being added. An example of this is the audit and inspection sample selection.

When the audit team goes out for the methodology audits, they select some sample of systems to verify their audits. When the inspection team goes out for the inspection, they also select systems.

We found instances where the same systems were looked at by the same teams for the same application with no real additional value being added.

Second instance we identified were instances where one group reviewed the same items multiple times. The example of this is with the -- most notable with the safety reviews of 10 CFR 54.4(a)(2), systems, and also some unique plant systems.

With these reviews, there were many examples where there were several interactions with the NRC staff and the applicant, you know, questions upon questions in the form of RAIs on the same area. So this was one of those examples where there was so much duplicative review of the same item.

And in the case where we found examples where weaknesses existed in guidance documents, there were some minor inconsistencies among documents. For example, the standard review plan had some needs that were not consistent with some of the guidance in the NAI document. So we find those inconsistencies.

We also find examples in documents where some updates were necessary, like SRP also, and also some inspection procedures are there. So we find those three areas of weakness.

And the team came up with some recommendations based on these findings. We group the recommendations in these three and two primary areas. The first area, the coordination and communication of activities. I give an example of a weakness where you have the audit group and the inspection team looking at the same sample selection of systems.

So one of the recommendations was that the methodology audit and inspection sample selection should be coordinated so that you don't have the excessive overlaps looking at the same system.

We also recommended that some audit and safety review items could be scoped with inspections, particularly those 10 CFR 54.4(a)(2) systems and the unique plant systems. A lot of those were verified through inspections as opposed to safety reviews. Anything that came out from safety reviews were multiple areas to try to get to the bottom of a physical configuration of those (a)(2) systems.

So we recommended that some of those systems be scoped within the inspections as opposed to the safety reviews.

MEMBER LEITCH: This is Graham Leitch.

Jimi, I think that that's the criteria, that 50.54(a)(2), under which some of us think the

steam dryers in our earlier discussion should be included in the scope. Did you come to an independent conclusion about that? Do you agree with that thinking or is that something that we're missing?

MR. YEROKUN: No.

MEMBER LEITCH: It seems to me that the steam dryer is -- based on my reading of (a)(2), it seems like the steam dryer should be included in the scope.

MR. YEROKUN: You know, whether a system component should be in the scope or not was not actually the focus of the team assessment. What we focused on was the best means to review those systems of competence that were (a)(2), (a)(1) or whatever in scope.

So given the systems that were in scope, what was the best avenue for the NRC to review those systems.

MEMBER LEITCH: I see.

MR. YEROKUN: So that was what we focused on, and what I'm talking about, some of these (a)(2) systems, you know, this is systems where failures could impact the systems. Without looking at the physical configuration, it was sometimes difficult just by review of documents to, you know, know the

complete scope of boundary of those (a)(2) systems. So that's why those are verified through inspections, and not all of them. That's just if these are supposed to be in scope. I mean, that might not be applicable to being, you know, within the inspection here.

I hope that answers that. Okay.

MR. GILLESPIE: Jimi, I'm going to switch to plain English a little bit here. One of the dominant sources for RAIs in the scoping review coming from the staff was the (a)(2) systems, was the systems, not safety systems, which would impact because we were getting things like they were in the same compartment, but they were 150 feet apart. You could not tell that sitting at a desk. Therefore, you generated an RAI. They had to generate an answer, and it was a relatively inefficient process.

So the source of this is there was a lot of work being done on both sides, our part and the applicant's side. Yet with an inspector walked in a compartment, it was intuitively obvious to him what the answer was.

And so that's the genesis of this one particular bullet. It was a problem there that we saw that really did need to get addressed.

MEMBER LEITCH: I see. Thanks, Frank.

MR. YEROKUN: And as part of the recommendations, obviously with the witnesses we identified in the guidance documents, we did recommend that improvements be made on those documents. The ones that need to be updated, you know, should be updated, and the inconsistencies to be resolved.

We also had orders of subsidiary areas that would recommend improvements, and one of them was that the program should look closely at the scoping and screening and the AMP inspections. There are two team inspections to consider maybe those inspections should be combined.

We also recommended that, you know, consideration should be placed on whether an original center of excellence should be established such that the original inspections are going from one original location as opposed from all four regions. That was just something to help to minimize the impact on the ROP for the original offices.

The team recommended that the lessons learned, the ISGs, for example, that there should be some quicker avenue to get those lessons learned out to the reviewers. It was taking an excessive amount of time to get some of those lessons learned out to

help with the sector reviews and activities of the program.

And for the implementation of our recommendations, the team did say that a plan should be developed to carry out the implementation in a systematic manner, and that plan has been developed, and it's currently being implemented.

And the second part of my presentation is on the sampling approach, also for the scoping and screening reviews. In these areas, I tried to accomplish three objectives in my discussion. I tried to explain the limited scope of systems to which this approach would be applicable; explain how the selection of systems for detail review will be made; and also fairly explain how the process is to be implemented.

The sampling approach is to be applied only for auxiliary and steam and power conversion systems. These are systems that are reviewed by the Plan Systems Branch in DSSA and NRR. Of these systems, only those that are 10 CFR 54.4(a)(1) and 54.4(a)(2) systems are included. The 10 CFR 54.4(a)(3) systems are not included in this approach.

So the sampling approach is similar to just those (a)(1) and (a)(2) systems. The sampling

selection will be influenced by the results of the methodology audit such that if the issues identified by the audit in the methods employed by the applicant, then the sample size could be expanded or even reconsidered. Just go back to looking at all of the systems.

And also the sample results will be fed back to the methodology reviewers, and there could be grants for asking applicants to take additional actions. So we try to do the feedback from, you know, up front and post reviews.

MEMBER LEITCH: Jimi, I'm a little confused as to the level at which the sample occurs. Is it a system by system sampling? In other words, there might be some systems that you wouldn't look at --

MR. YEROKUN: Yes.

MEMBER LEITCH: -- or a component by component, system by system?

PARTICIPANT: It's a system level.

MR. YEROKUN: It is system by system.

MEMBER LEITCH: Now, in a case where a plant has a fairly unique system, would you always take a look at that one? I mean, would that be excluded from the sampling process?

I'm thinking about like we just talked about Dresden and Quad Cities, like Dresden has a shutdown cooling system that's not commonly found in an isolation condenser. A few plants have that.

But I mean, would you take -- since those are not more or less common systems, would you take a specific look at those?

MR. YEROKUN: The intent is that those considerations will be imposed on sample selection, and the next slide actually gets into the criteria to be employed for making the selections.

MEMBER LEITCH: Okay.

MR. YEROKUN: So hopefully that will get to that.

MEMBER KRESS: I know I'm familiar with sampling from a population that has random variation to determine some sort of confidence in the variance that one gets for certain properties. How is it you can determine how much of a sample is sufficient for these type of items where you're not really dealing with random variation in particular properties?

How do you decide how much of a sample is sufficient?

MR. YEROKUN: I think the same as this slide also. I think that was touched on. If this

slide doesn't resolve and answer your question and Graham's I'll go back to those questions.

This is the criteria for the sample selection. You know, the program plans to employ a smart sampling approach. It's not just random numbers and move on.

The criteria to be used for the selection of systems for detailed review include the following. Plan to use risk insights. We plan to use experience with previous application reviews and also operational insights.

The selection will be non-random or maybe random, but it's non-random such that the applicants are not able to predict what systems would be reviewed in detail, and the sample size will be at least 50 percent of the auxiliary and steam and power conversion systems, and it could be as high as -- there's no limitations as to how high the sample size could be. That depends on when we impose those criteria I stated up front, experience would have all applications personable in size risk and amenable systems would determine to be included in sample size.

MEMBER POWERS: Let me ask a question.

MR. YEROKUN: That's what we've imposed.

MEMBER POWERS: Let me ask a question

about your third criterion. You look at the experience you've had in the past, and we've now been at this sort of exercise several years. So lots of people doing it today will not have a conversant memory of what happened on the first and second and third of these, and so they're going to rely on the documentation, probably the SERs to gain this experience.

Yet in the documentation, you're basically producing a document that says everything is okay. You're not saying here we had to do all of this work to get everything okay. I mean, it's an incomplete record on that, and it's getting more and more incomplete.

So where is this experience going to be coming from as we approach this 2012 drop-off date?

I mean, what you want to do is select the ones that people hack up. I mean, by now we know to go look at the podium motors because they never put them in scope, and the staff tells them put them in scope, and they eventually give in. But, I mean, there must be dozens of things like that where they don't.

But increasingly those are not recorded anywhere that somebody that was not intimately

conversant with the past would know about it.

MR. YEROKUN: Correct.

MEMBER POWERS: And you're going to retire out all of those guys that are intimately conversant. So we can't go ask them. So how are we going to get this experience?

MR. YEROKUN: Well, you're absolutely correct. It's a fair question. The experience --

MEMBER POWERS: Darn. I was looking for an unfair one.

(Laughter.)

MR. YEROKUN: The experience is not intended to be solely reliant upon documentation because you're right. As you progress, you know, the document gets smaller on those issues that would go through to sort things out, get lost in the process.

MEMBER POWERS: And you --

MR. YEROKUN: The one group that does these I pointed out earlier, the Plant Systems Branch in DSSA. When they go through the reviews of the applications and some issues come out that require several iterations to get resolved, I mean, the intent of the experience is knowledge of those systems that are hatched up or not, you know, well addressed from all the reviews. So it's not to be a combination of

experience from document and also experience from the individuals and who they work in the branch that looks at, you know, this system.

So it's a combination of both.

MEMBER POWERS: Well, now you're going to a system or you're making a recommendation. I don't know that you're going to a system, but you're making a recommendation that says, hey, rather than sorting out every little thing with an RAI, let's just go look, and we'll intuitively see that the question he had was not a useful question to ask, but everything else will get resolved like that as well, and so once again, there's no documented record. Nobody can find out what the history is here.

I mean, you're facing a situation in which so many of your experienced personnel are approaching retirement the oral history is disappearing as well.

MR. YEROKUN: I mean, I understand that, but we're talking systems. You know, we're talking big picture issues. You had a discussion earlier this morning on the steam dryers. If that, for example, was part of scope and license renewal, (a)(2), you know, that's one of those systems that will definitely be part of the selection, and that kind of the experience is out there.

I know the experience will be lost as people retire, but I don't think it will really be completely lost such that the knowledge of what systems that definitely have to be included for that specific reason --

CHAIRMAN BONACA: As a help, could you establish some kind of criterion that says that if you find, you know, disagreements with several items, the sampling can be expanded, some kind of criterion that at least gives you a test that, you know, you go through an evaluation. You're only reviewing a little bit more than 50 percent of the auxiliary system. You look at them and you find that the applicant has not included things that by experience should have been there.

MR. YEROKUN: Right.

CHAIRMAN BONACA: Could you establish that, you know, if that is exceeding a certain percent, you do additional sampling?

MR. YEROKUN: Actually that's part of the consideration. When you select a sample size for review, if the issues, you know, at some threshold with the sample size selection, you definitely -- if the grant is to increase the sample or go back and even do the whole representative look at the systems,

the previous slide kind of touches up on that; that the results would be fed back to the methodologic reviewers and could be grounds for asking the applicant to take additional actions or even reconsider the sample selection for that particular application. So --

CHAIRMAN BONACA: You have some criteria for expanding the sampling if you find that there are problems there.

MR. GILLESPIE: I think the answer to your questions, and I'm going to commit to it here, is that the SRP for the licensing staff and the inspection procedure for the inspection staff has to be thorough enough to give them enough guidance to know what they're looking at.

And when we're writing those, I think we just do have to do that.

Most recently, by the way, it was on Quad Cities. Three months before we ended the review, 26 additional systems were added to the review. I think it was 26. Something like that, PT?

DR. KUO: Yes.

MR. GILLESPIE: It was in groups of ten, and so there is a need to gather these lessons learned both on our side and on the industry side. So we

don't want those last minute surprises, and this was (a)(2) systems.

CHAIRMAN BONACA: The issue that you raise is an important one, particularly because you're also relying on contractors, aren't you?

MR. GILLESPIE: Yes.

CHAIRMAN BONACA: And when you're on contractors, I mean, you have people coming in and out, and you have inexperienced people at times.

DR. KUO: Yeah, this is especially true now that we are doing the audit. For every audit that we write the audit report, a very detailed, comprehensive audit report of what they have looked at, what they found, what issue they or what question they raise and what, it's a very comprehensive audit report, and that, I think, is the kind of documentation that we like to see.

And, by the way, even for this sampling here for the inspection, the region generally will issue the inspection reports after each inspection, and that also documents what the system did look at and what they resolved.

MR. YEROKUN: Okay. The last slide, it's the overall conclusion for the two topics I touched upon. The intention is to improve the effectiveness

and efficiency of the license renewal application review process and also to insure that there's always reasonable assurance that those components that are passive and long-lived and subject to reviews are properly identified.

And that concludes my presentation, and at this point I and the program reps. will be glad to answer any additional questions you might have.

(No response.)

CHAIRMAN BONACA: None. Evidently it was a good presentation. Appreciate the update, and thank you.

Any other questions of members?

MEMBER KRESS: One question. You say you're going to do at least a 50 percent sample regardless.

MR. YEROKUN: Yes.

MEMBER KRESS: So the potential saving in effort is 50 percent review of those particular kinds of systems. I don't have a good notion. Is that a significant savings in time and effort or is it a small saving?

DR. KUO: All systems have a lot of subsystems.

MEMBER KRESS: A lot of subsystems?

DR. KUO: Yeah, a lot of subsystems.

MEMBER KRESS: So it's important in time and effort to look --

MR. GILLESPIE: We're talking about whole FTEs on a review, yes. The dominant place for the RAIs in the systems group in this question is in the aux systems and all of those peripheral systems, and that's kind of why Jimi got the assignment to put together a task group, is we started seeing that the RAIs and the questions were being dominated by this one area.

And then when you looked at the kind of RAIs that you're getting, many of them licensees were saying things weren't in scope because they were a long way away, which is as opposed to saying it is in scope, but we don't have to do anything because it's a long way away. So we're working those issues, which brings things into scope.

And then even if it is in scope, do you have to do anything?

That was really a dominant piece of the reviews.

MEMBER KRESS: Well, how will you address the potential criticism from outside that your review is incomplete because it's just a sample of part of

that?

I mean, that seems to me like a reasonable criticism that somebody might come up with. You need to be able to answer that.

DR. KUO: Yeah. More importantly, we are not only looking for efficiency. We are also here looking for effectiveness. The reason we are trying to do this, especially for 50.4(a)(2), is because this has to do with non-safety related structure over safety related functions.

Sometimes when one staff is sitting in a room, in their office, okay, looking at even drawings may not be effectively identifying any components or structures that really should be within the scope of license renewal. The only better way to do it is to go out to the plant and look at it, identify it.

There is something that you never thought about it. It could be there, and that could impact on safety functions. So that's the kind of thing we've tried to od also.

CHAIRMAN BONACA: Although you would expect that the licensees would be more conscientious with the NSS components and less with the auxiliary systems.

DR. KUO: Yes, right.

CHAIRMAN BONACA: And so you really are cutting back on the scope in the areas where you are more likely to find that they are not doing the job as they should.

DR. KUO: Right. Just like Frank pointed out earlier, you know, on Dresden and Quad Cities, at the last months we had received the input on there are about 30 systems because of this (a)(2) issue.

MR. GILLESPIE: Yeah, I understand your question. The interesting thing is we're sampling what's not included. Really what you're doing, you're taking those drawings that are highlighted in magic markers and crayons, and you're saying, okay, I'm not going to look at what they've put in because I don't have to question that. I have to look at what they haven't included.

And so basically we're saying we'll look at 50 percent of the stuff that's connected that wasn't included, and if we see a problem in that 50 percent, then we're going to look real hard at the other 50 percent because then you're seeing a systemic thing.

If you don't see something that would indicate that it's a carryover or a kind of a mindset question, then I have no problem defending it looking

at 50 percent of what's not included is enough.

And the other aspect is, again, the inspection aspect, which isn't a system. It's a spatial distribution. It's almost like a fire protection inspection. You're going into a compartment and saying what non-safety systems in this compartment could impact the safety systems in the compartment.

And so it's recognizing a slightly different approach when you take the inspection approach and recognizing that you're looking at spatial relationship rather than system relationships then, and that really is best done by looking at the actual relationships.

So those are the two areas we're trying to get at with this.

DR. KUO: And there's also another piece there. The staff also verifies the methodology. We review and approve the methodology for scoping and screening. So this is the whole thing combined together.

Then we thought it would be much better to do a more effective way, is to take a sample, but do a real inspection verification there.

MEMBER LEITCH: Has this process been used

at Farley, or what's the first plant that will see this?

CHAIRMAN BONACA: It was used at Farley, yeah.

DR. KUO: Brunswick.

CHAIRMAN BONACA: I thought that you had to test it at Farley.

MR. GILLESPIE: Different audit. That's what I said. We've got multiple irons in the fire. That's the engineering side. This is the scoping side, and we're asking the same similar questions.

Can you assure effectiveness and thoroughness better on site than sitting in a cubicle on the assessment side? So Jimi is the other half.

MEMBER LEITCH: Okay, but what's the first plant we'll see where you've used this process that Jimi described?

DR. KUO: Most likely at Brunswick, which hasn't come in yet. It will be coming in later this year.

MEMBER LEITCH: And I assume in the SER or someplace it will be annotated somehow so that we'll know when we're reviewing which ones fell within your sample.

DR. KUO: Definitely, they will.

MEMBER KRESS: Yeah, as part of the question, it might be helpful to us and other people for this first one that you're going to test this out. Do it with the sampling process, but then go ahead and do the full sample and see how effective your sampling technique was.

MR. GILLESPIE: A good suggestion.

MEMBER KRESS: You know, only just for the first one at least.

MEMBER ROSEN: You may end up with more work.

MEMBER KRESS: Well, from the first one you'll end up with more, but it's at least some sort of test of -- anyway, it's a thought.

MR. YEROKUN: Well, I think the built in constraints to, you know, the feedback from the methodology audit, the inspection and the results of the sampling, if it's such that it has no great satisfaction that the feedback loops were to expand or even to do the 100 percent, that would be carefully looked at for the first one to be sure that we have that assurance that, you know, it's a good approach.

So you know, I'm sure the program would think about what is suggested, but you know, to take a sample and to do 100 percent, sometimes you can get

a little less effective to be more at the end. That's something that really could be thought of, too.

MEMBER KRESS: Because the 50 percent seems a bit arbitrary, too.

MR. YEROKUN: It's at least 50 percent. You know, we have all of these criteria where you pose all. You select the systems, and if at the end you don't have the number, then you have to really go -- I mean, you know, there's no upper limit to the sample selection size, but there are some things you have to consider, the risk, you know, experience, and all of those things, and if it adds up to 80, 90 percent, that's just your sample.

So that's a driver as opposed to the number. The number is just the minimum constraint.

MR. GILLESPIE: There's also some self-improvement going on here. The industry itself is revising itself, is looking at its format guide with 95.10, and this whole (a)(2) thing has been kind of a running controversy between us and their working group, and they keep trying to do less and we keep saying no, and I think the message has gotten across that non-safety systems and compartments with safety systems are in scope, and then tell us why you don't have to do anything rather than saying they're not in

scope.

So there's other things going on which are actually going to affect the -- it may be 50 percent of a much smaller increment, I hope, than we've had in the past, but in this case the staff has been very consistent, I think, since this first came up on Hatch with its view.

MR. YEROKUN: Okay.

CHAIRMAN BONACA: all right.

MR. YEROKUN: Thank you.

CHAIRMAN BONACA: Thank you.

Before we break for lunch, just a couple of announcements.

One, for the members. One, we do have Graham Leitch now at this time for the last day. So we decided to have a group photo at 12:30.

PARTICIPANT: A what?

CHAIRMAN BONACA: A group picture of the ACRS.

MEMBER POWERS: Oh.

CHAIRMAN BONACA: At 12:30. I believe it's in the other room, right?

MEMBER APOSTOLAKIS: That's where we take all of our pictures.

CHAIRMAN BONACA: Yeah, that's where

normally we take our pictures. So that's the first thing.

Second, we have arranged dinner tonight at the Outback, and I don't know the exact time. I think it's going to be about 7:15, 7:30, something like that, and so we're going to say goodbye to Graham. I think John is --

MEMBER LEITCH: So long.

MEMBER KRESS: Adios.

CHAIRMAN BONACA: Adios. So with that, I think it would be good if whoever is planning to go would tell Noble so that at least he has a count because we're trying to get a reservation there. Normally they don't, but they said that would see to that.

So if you are not coming, just let Noble know.

PARTICIPANT: I assume everybody is coming.

CHAIRMAN BONACA: Yeah.

MEMBER KRESS: yeah.

MEMBER APOSTOLAKIS: Is Mr. Graham still a member?

PARTICIPANT: Mr. Leitch?

MEMBER LEITCH: No.

CHAIRMAN BONACA: Yeah, we should have gone off the record for this, but that's okay.

PARTICIPANT: He's still a special government employee.

CHAIRMAN BONACA: So let me take a recess until 12:45.

(Whereupon, at 11:41 a.m., the meeting was recessed for lunch, to reconvene at 12:45 p.m., the same day.)

CHAIRMAN BONACA: Back into session. And the first item on the agenda is proposed tech specs for ensuring steam generator tube integrity. Dr. Ford.

MEMBER FORD: Thank you, Mr. Chairman. This presentation addresses the staff's evaluation of changes in technical specifications being proposed for steam generator tubes. The changes are in general accordance, as we understand it, with NEI document 9706. And if you remember, we issued a letter in December 2001, in which we concluded that 9706 and the related generic license change package was flexible enough to take into account technical changes. And it also provided an enforceable regulatory structure.

We also concluded in that 2001 letter that there was a need for additional technical

justification to support the industry's position on the inspection for Alloy 600TT and 690TT. Also, understand that this presentation is just for information only. So, Louise, I'll pass it on to you to lead your team through this next one hour.

MS. LUND: Okay.

MEMBER FORD: Thank you.

MS. LUND: Thank you, Dr. Ford. My name is Louise Lund, and I'm the Section Chief for the Steam Generator Integrity and Chemical Engineering Section in the Materials and Chemical Engineering Branch in NRR. We're here to brief you on proposed changes to the steam generator technical specifications and update you on the issues that have been resolved since our last briefing on this topic.

Emmett Murphy of my section will be making a presentation on our safety evaluation, capturing in his review the changes to the steam generator technical specifications. In addition, we're supposed to have some folks from the technical specification section. I don't see them here yet. Kerry Kavanagh, who also reviewed the changes to the steam generator technical specifications.

MEMBER APOSTOLAKIS: What's the purpose of animating it?

MS. LUND: Well, I didn't do that on purpose. Let's see if I've got all the pieces yet.

MEMBER SHACK: The lead plant.

MS. LUND: There you go.

MEMBER KRESS: Is that lead-cooled or lead --

MS. LUND: We'll get into that. As you know, the staff has been working on revising the regulatory framework for steam generators for a significant length of time. The staff worked on a rule making, followed by a generic letter, and ultimately became engaged in considering an industry initiative referred to as NEI 97-06. The technical specification portion of the initiative was submitted to the NRC staff as a generic license change package, but was later submitted for a lead plant through the license amendment process. The original generic package will be revised to reflect what is approved for the lead plant.

During our last briefing of the ACRS on this topic, we discussed the NEI 97-06 program guidelines, the technical specification changes that are contained in the generic license change package, the issues we had left to resolve, and risk considerations. We have completed our review of the

technical specification changes, and we sent the draft safety evaluation to you a few weeks ago.

Since we sent the safety evaluation to you, OGC, the Office of General Counsel, has reviewed it and has no legal objection. And at this point, I'm going to ask Emmett to come in and discuss the details.

MEMBER SHACK: Louise, I thought every plant had already adopted 97-06.

MS. LUND: We're talking about the -- there's three components to NEI 97-06. There's program guideline document that was just the overall guidelines for how to put together a program. There is the technical specification component, which is the part that we're reviewing. Okay. And then there's also the EPRI guidelines, so there's actually three components to that particular regulatory steam generator management framework.

MR. BATEMAN: And, Dr. Shack, just as a point of interest, industry has agreed as a full group to comply with the NEI 97-06, so in that sense they have taken it on.

MEMBER SHACK: Everybody is going to switch to the new tech specs then?

MR. BATEMAN: We're going to get into that

discussion, I think, as part of -- if we don't, ask it at the end. It's a good question.

MR. MURPHY: NEI 97-06, of course, is an industry initiative, all utilities, all PWR utilities have committed to follow that initiative.

VICE CHAIRMAN WALLIS: All three parts to this initiative? His question was have all utilities already activated NEI 97-06, and the answer wasn't clear. Are they activating all three parts of the 97-06?

MR. MURPHY: I missed your explanation of what the three parts were.

MS. LUND: Well, the three parts were the NEI programmatic guidelines, the actual guideline document, and the EPRI guidelines. And then there's the technical specification part. And the technical specification part, of course, is the part that we review of this. And we had a letter -- Jim, help me with the date on that, back in 2002, that committed the industry to following the NEI 97-06 program guidelines.

MR. RILEY: This is Jim Riley, NEI. I'm NEI's Project Manager for steam generator materials issues. There's probably a couple of letters maybe, Louise. I'm not sure which one you're referring to,

but there was a vote called an initiative. Emmett referred to it in 1997, where all the Chief Nuclear Officers agreed to meet the requirements of NEI 97-06 by the first refueling outage after January 1st, 1999. And that has been done, and all the PWRs are following 97-06. And we say that, I mean not only 97-06, but the EPRI guidelines that Louise referred to which are referenced in NEI 97-06, and which provide the details on what ought to be in a steam generator program. So the industry has been following that for a number of years.

What we tried to do with the tech specs is put a regulatory framework to all these requirements. That's what Emmett's going to brief you on, what we've been working on for the past number of years.

A number of years ago, we surveyed the industry to find out whether they intended to follow the lead on generic license change package, and at that time, we had a unanimous agreement that they would follow the GLCP. Now I have to caution you that a survey was done probably three years ago, something like that, and it has -- the GLCP has evolved since then.

I don't have anybody I know of that isn't going to follow the GLCP, and what we're getting

approved here generically through the TSTF process, but I haven't taken a survey to verify that that's the fact recently.

MS. LUND: I think from our perspective, our expectation is is that all the plants will be changing to these new tech specs. We'll discuss that a little bit further in the presentation.

MR. MURPHY: I will be presenting a discussion of the new tech specs for ensuring steam generator tube integrity. Industry has submitted a generic license change package for NRC staff review and approval. This change package is intended to serve as a template for subsequent plant-specific submittals.

The generic license change package proposes a new set of technical specifications incorporating largely performance-based requirements for ensuring steam generator tube integrity. The staff and the industry have reached resolution of all outstanding technical issues and regulatory issues regarding the generic license change package. This isn't working.

MEMBER SHACK: You got a bullet.

MR. MURPHY: Well, I missed --

MEMBER SIEBER: We can read it.

MR. MURPHY: At the bottom of the page, a lead plant tech spec package has been submitted for Farley Units 1 and 2, based on the generic license package and incorporating the above resolutions to the various issues that we're dealing with.

We expect to complete our review of the Farley amendment by September 17th, 2004, and issue a safety evaluation by that date. We conclude that new tech specs modeled on the generic license change package will address the shortcomings of current tech specs, and will ensure good integrity.

The current --

VICE CHAIRMAN WALLIS: Does your slide presentation have anything to do with what was handed out?

MEMBER SHACK: We're missing three pages. They go from 2 to 5.

MR. MURPHY: They're printed on both sides.

VICE CHAIRMAN WALLIS: No, but there are some pages missing.

MEMBER APOSTOLAKIS: I have three and four.

VICE CHAIRMAN WALLIS: I don't have any page three or four.

MR. MURPHY: I'm not sure what happened. Current tech specs specify the scope and frequency of inspection and require that tubes exceeding the tube repair criteria be brought to repair prior to returning the steam generators to service. Thus, operability of the steam generators is tied to completing the SG surveillance requirements.

It's long been recognized by the staff and by the industry that current tech spec requirements for SG inspection and repair are prescriptive and out-of-date. These requirements are not focused on the key objective of ensuring tube integrity for the entire period between in-service inspections.

MEMBER ROSEN: I hear your words, but I don't get a flavor for it. Give me an example.

MR. MURPHY: The current requirements are a cookbook of you inspect so many tubes at such and such a frequency, and all the tubes you find to be defective you plug. And if you do that, it's assumed that you'll be adequately maintaining tube integrity while you're in service. There is no direct assessment of how well you're maintaining tube integrity margins, structural margins, leakage margins during the inspections. There's no direct relationship between the surveillance program and

having a solid pace that you're maintaining tube integrity.

The fact that you're plugging a tube that's defective, that tube although it may not have burst, may not have the sorts of structural margins you are trying to maintain. That may be the result of inadequate inspections or inspection frequencies that are just not frequent enough, so one needs to be aware of how well he's maintained his margins so that he can adjust his program accordingly, such that he is maintaining the desired margins. And I'll be discussing desired margins.

In view of these shortcomings, licensees have taken actions beyond minimum tech spec requirements as necessary to ensure that tube integrity is maintained. There are industry guidelines, including NEI 97-06, and guidelines referenced therein that provide all sorts of guidance to utilities as to how they should design their programs to ensure steam generator tube integrity, not simply comply with existing tech specs.

VICE CHAIRMAN WALLIS: What's the criterion for integrity?

MR. MURPHY: Later on in this presentation, I'll be talking about so-called tube

integrity performance criteria, such if met --

VICE CHAIRMAN WALLIS: You'll get to it.

MR. MURPHY: -- ensures tube integrity. As Louise indicated, we last briefed you on December 1st. At that time, we had some outstanding issues that we identified to you with respect to the generic license change package as it stood at that time.

One of the key issues we identified to you at that time was issues pertaining to inspections, particularly steam generator inspection intervals, and whether or not there should be some limitations on how long an inspection interval might be based on performance-based principles.

Other criteria that have come up since that time include the need to clarify the structural integrity performance criteria with respect to non-pressure type loadings, and I'll be talking about that in the next few minutes.

MEMBER FORD: Emmett, I can see you're just running down the list of focal points here, and are we going to discuss in any technical detail this concern that we had in 2001 about the justification for the inspection intervals?

MR. MURPHY: Yes.

MEMBER FORD: We will be talking about

that later on today?

MR. MURPHY: I'll be discussing what has been done to the tech specs to ensure that inspection intervals will be frequent enough.

MEMBER FORD: Okay. And a justification for those inspection -- the prescriptive formula that was given in 2001 was every ten years or whatever it was, you would inspect so much percentage of the tubes. But there's no technical justification given for those numbers that we could see, and by that first bullet, I'm assuming that you have looked at that, and you are satisfied with it.

MR. MURPHY: I will be explaining the surveillance requirements and the basis for those surveillance requirements.

MEMBER FORD: Good.

MR. MURPHY: Resolution of these issues proved to be a very challenging process involving a lot of give-and-take between us and the industry to help expedite the resolution of these issues. The generic license change package was supplemented or complemented by a lead plant submittal. This put us into a more structured process, regulatory process, including time limits goals for resolving the outstanding issues.

The scope of the proposed technical specifications is nothing less than a total overhaul of the technical specifications as they apply to steam generator tube integrity. The changes include a revised LCO spec for operational leakage, wherein the leakage limit would be reduced from 500 gallons per day, which is the limit at many if not most plants today, to 150 gallons per day per steam generator.

Second, it would include an entirely new LCO spec entitled "Steam Generator Tube Integrity", and I'm going to touch upon that briefly in a moment.

VICE CHAIRMAN WALLIS: Yes, because there's a way in which these things can fail, not having leaked at all.

MR. MURPHY: Yes. And a primary objective of the performance criterion, the performance-based strategy is to make sure the tubes are capable of sustaining accidents --

VICE CHAIRMAN WALLIS: Operational transients and things.

MR. MURPHY: Right. That's where the risk all comes from.

MEMBER SHACK: Emmett, just in my head - I mean, I keep thinking that plants are running at 150 GP per day now, but that's really only for 95-05

plants that have that.

MR. MURPHY: Correct. A few other plants.

MEMBER SHACK: Okay. There would be some sort of alternate repair criteria.

MR. MURPHY: Correct. But unless there was an ARC or something of that kind, then they would have a 500 gallon per day limit. So now everybody will come on board with the 150.

MEMBER ROSEN: Bill, you said that plants are now running with 150 gallon per day. I don't think so. You meant 150 gallon per day limit.

MEMBER SIEBER: Limit.

MR. MURPHY: Okay. We also have a new admin tech spec establishing a largely performance-based steam generator program. This replaces the existing surveillance requirements in the tech specs, and I'll be talking about those in fair detail. Following there are some revised reporting requirements in the tech specs, I'm not going to say any more about in the interest of time.

With respect to the new LCO and steam generator tube integrity, basically what we're doing with this LCO is to tie SG operability directly to maintaining tube integrity, rather than simply tying it to completing a specified inspection program. You

inspect this many tubes at this frequency, plug everything that needs to be plugged, so we're tying operability of the steam generators to actively maintaining tube integrity relative to some performance criteria.

MEMBER APOSTOLAKIS: Surely, though, there must have been a reason why people proposed old rules that you are criticizing in the other slide. There must be -- you have to speak to the microphone even though you're addressing me. I mean, one thing I've learned over the years being on this committee is that there is always something behind the regulations as a reason. You're telling us that the previous inspection program really was not connected to steam generator integrity. I find that hard to believe.

MR. MURPHY: Since I've begun to associate myself with steam generator issues in 1979, it's my experience that utilities have frequently invariably found it necessary to go beyond the minimum requirements of the technical specifications to have reasonable assurance that they are, in fact, maintaining tube integrity. A good example is the minimum sampling requirement of the current technical specifications of 3 percent of the tube population during a given inspection as an initial sample.

Utilities generally sample at a much higher sampling level than that.

MEMBER APOSTOLAKIS: So what I gather then is that operating experience suggested that the previous requirements were not sufficient.

MR. MURPHY: That's correct. And we have -- the steam generator experience is riddled with close to 200 forced outages related to SG leakage, tube ruptures, tens and tens of thousands of tubes plugged through the years, many replacements.

MS. LUND: But isn't it also true, Emmett, that when the tech specs, the old tech specs were developed wastage was a predominant degradation mechanism. And over time, as we learned different mechanisms, then I think that our knowledge-base increased and that led to a lot of the additional things that licensees had to do in order to maintain steam generator tube integrity. Would that be a fair statement?

MR. MURPHY: Yes.

MEMBER SIEBER: Well, there was a change in chemistry years ago. Wastage occurred in phosphate-type plants, and then the all volatile, they ended up with all kinds of cracks and so forth due to impurities in the crevices, so the mechanism changed

as well as the phenomenon.

MEMBER ROSEN: The cure was marginally better than the disease.

MEMBER SIEBER: That's debatable. The ultimate cure is replacement.

MR. MURPHY: Okay. The new admin tech spec entitled "Steam Generator Program" defines a largely performance-based approach to be followed for ensuring tube integrity. Specifically, the new spec will state that a steam generator program shall be established and implemented to ensure steam generator tube integrity is maintained, and that's a pretty performance-based requirement. However, we dressed this performance-based requirement up a little bit.

We say that in addition, the steam generator program shall include a number of provisions. First, the new tech specs will define steam generator tube integrity performance criteria, such as if met, you would -- it's assumed that you have tube integrity, criteria are commensurate then with tube integrity.

The tech specs will include provisions for condition monitoring, which means that we're monitoring the condition of the tubes relative to the performance criteria.

In addition, the steam generator program spec will include requirements for tube repair criteria, SG tube inspections, and provisions for monitoring operational leaks.

MEMBER APOSTOLAKIS: So you will tell us what the performance criteria are.

MR. MURPHY: Yes, coming right up.

MEMBER SHACK: But the criteria themselves are defined in the 97-06 document, not in the tech specs.

MR. MURPHY: No, we're going to have them in the tech specs.

MEMBER SHACK: In the tech specs.

MR. MURPHY: Yes. Okay. We have three different types of performance criteria for tube integrity. We have structural criteria, we have accident leakage criteria, and an operational leakage criteria, and I'll discuss each of these in a moment.

MEMBER POWERS: One can surely understand how one would monitor operational leakage criteria. Bit of a mystery to me how you monitor accident leakage criteria.

MR. MURPHY: I can speak to -- how about I answer that question when we get to -- I'll be discussing that criteria, and maybe that's a good

point to address it.

MEMBER POWERS: That would be fine.

MR. MURPHY: Okay. In formulating these performance criteria, we looked for a number of attributes to evaluate their adequacy. We expected these performance criteria to be measurable, either directly or indirectly, and that's what I'll be telling you about the accident leakage criterion that is an indirect measurement. And that the consequences of the --

MEMBER POWERS: I mean, you said it's an indirect. We had defined performance metrics to be something that was directly measurable or easily calculable from a direct measurement.

MR. MURPHY: Well, let me amend my answer a little bit. It could also be done directly through an in situ leakage test. Typically, only a small fraction of tubes are in situ leakage tested, so primarily we rely upon analysis of the inspection results to characterize leakage potential for the cracks. However, outstanding cracks, so to speak, will frequently be subjected to an in situ pressure test to demonstrate their leakage potential under accident conditions.

MEMBER POWERS: I'm going to be patient

and wait, because I somehow remember a clot of voltage of a signal versus leakage that would not inspire any kind of analysis.

MR. MURPHY: Okay. I'm aware of questions of this nature that have been raised. Those questions and that issue exist irrespective of whether we're talking about the old regulatory framework or the new framework. The new tech specs don't speak to your question directly.

VICE CHAIRMAN WALLIS: The attribute being measurable I think is an important issue, how well you can measure the things you're really interested in predicting.

MR. MURPHY: Okay. Well, let's continue to talk about this perhaps when we get to that particular criterion, the accident leakage criterion.

VICE CHAIRMAN WALLIS: Because you can have the most wonderful criterion, but the measurements may not be very good. And then deducing whether or not you meet the criterion may be problematic.

MR. BATEMAN: This is Bill Bateman of the staff. I think this will become a lot clearer once Emmett gets a chance to get further into his presentation.

VICE CHAIRMAN WALLIS: Well, he keeps tantalizing --

MR. BATEMAN: I know, he is tantalizing. And I didn't realizing that we would be tantalizing you so much.

MR. MURPHY: The issue of which you speak comes up in the context of an alternate repair criterion. The resolution of the issues of which I think you're referring to are in the context of an alternate repair criterion. These tech specs that we're talking about today are independent of any alternate repair criterion. If one has an alternate repair criteria and associated requirements, it's plugged into the tech spec framework that I'm talking about. But the issue of what constitutes an acceptable alternate repair criteria, and how you calculate leakage when applying that specific alternate repair criteria, that's an issue that's addressed within the context of the alternate repair criteria.

MEMBER POWERS: Well, I wouldn't confuse alternate repair criteria for explicit physical data that had been collected. Now whether they've been collected in connection with an alternate criteria doesn't matter. It matters only that we know that the

data are. And if the data don't inspire analysis, or the data don't inspire confidence in the measurement, I don't care where they came from.

MR. MURPHY: Okay. When doing an inspection, one comes up then with an inventory of flaws found by the inspection. One characterizes the geometry's flaws. In general, one may perform an analysis of each of these flaws based on its geometry and size to establish the leakage potential associated with each of the flaws. If there are some flaws that look like they might be particularly marginal from the standpoint of being the applicable performance criteria, one can resort to a physical in situ pressure test, test the tube with the offending flaw up to an equivalent to main steam line break pressure, and assess the leakage under those conditions.

VICE CHAIRMAN WALLIS: The path from detecting flaws to predicting leakage is not a very straightforward, short, broad one, is it? It's given some measurement of flaws interpreted in some way. Predicting leakage is not an exact science.

MR. MURPHY: Well, clearly there are orders of magnitude uncertainty associated with any nominal leakage prediction for a given crack. And clearly, there is a need when doing an assessment of

alternate performance criteria, to consider the uncertainties.

VICE CHAIRMAN WALLIS: Maybe the performance criteria should be based on cracks, not on leakage, based on the thing that you actually measure.

MR. KARWOSKI: I think that would be more consistent with the current approach. And we know one of the potential problems with that is depending on the degradation mechanism that you have, you're talking specifically about cracks. But then we would have to develop similar limits for wear-type flaws, volumetric-type flaws, circumferential cracks, axial cracks. So the approach that you're suggesting is more consistent with what we have now, one criteria that fits all the degradation mechanisms, which tends to be overly conservative.

We understand some of the issues with respect to correlating leakage to certain parameters. And as Emmett indicated, there is a lot of scatter in the data, but we believe that the EPRI guidelines and our review of alternate repair criteria provide some confidence that we've conservatively bounded the estimate of leakage. And we're not looking at the leakage to meet the accident --

VICE CHAIRMAN WALLIS: I'd be happy with

direct measurement of leakage. I mean, you measured Boron in the condenser or something.

MR. MURPHY: There are many issues, technical issues that exist with respect to how one should be managing SG tube integrity, how one should inspect, how one should perform tube integrity analysis. These issues exist irrespective of whether we have old tech specs, or whether we have new tech specs.

VICE CHAIRMAN WALLIS: Well, the tech specs have to be enforceable, so there has to be a way of measuring this leakage. That's the whole point, isn't it?

MR. MURPHY: Yes. But also, a key consideration is going to be -- of these new specs is we don't do any harm; that is, we don't give up a critical line of defense that has been effective for us in the past. And have a set of requirements that is more realistic in terms of considering past experience and what we really have to be concerned with, and a more effective approach for ensuring integrity while at the same time not putting licensees unnecessarily into a burdensome situation.

Just finally with respect to attributes, we attempted to maintain consistency with the current

licensing basis in terms of structural margins we're trying to maintain or allowed leakage. Finally, sometimes risk was a consideration. In the case of the accident leakage criteria, I will discuss the desire not to cause an increase in risk factored into the performance criteria.

MEMBER FORD: Before you go into a detailed discussion, Emmett, of the various attributes in the performance criteria, let me just check - are there any other presentations from the industry?

MR. RILEY: I don't have a presentation.

MEMBER FORD: It's just we're slightly over half-time here.

MR. MURPHY: Okay. The structural criterion requires that you maintain tube integrity over the entire range of conditions that the steam generators will be subjected to. This would include maintaining a factor of 3 under normal operating pressure differential, and a factor of 1.4 under design-basis accident differentials. This is a criterion that we discussed with you back in `01.

Since that time, we've had considerable interaction with the industry over safety factors that should apply to non-pressure type loadings. And what has been agreed upon is a safety factor of 1.2 under

combined pressure, and non-pressure primary design-basis accident loads. And 1.0 for --

VICE CHAIRMAN WALLIS: These are all these transient stresses due to things moving around in the steam generation.

MR. MURPHY: Yes. Bending, seismic.

VICE CHAIRMAN WALLIS: And it's because you didn't have them in before, you needed a bigger safety factor before; 1.4 was to cover these other things, and now you know them better, you have only 1.2.

MR. MURPHY: Well, the 1.4 --

VICE CHAIRMAN WALLIS: That's based on pressure differential.

MR. MURPHY: The 1.4 were applied to pressure differentials, which is normally controlling. You tend to have maximum bending moments in thermal loads at times when you don't have maximum pressures. Usually, in general, the pressure loadings are the dominant consideration. But for completeness, we have appropriate criteria here for the non-pressure loads.

MEMBER APOSTOLAKIS: What does a safety factor of 1 mean?

MR. MURPHY: We're talking about axial secondary loads. In Section 3 of the code, a one-time

application of secondary stresses is assumed not to cause component failure. For tubing, where we have -- say once-through tubing which is subjected to very significant axial thermal loads, and if we were to have a large circumferential crack, or a circumferential crack, the assumption in Section 3 of the Code for design may not be appropriate for evaluating a cracked component in service. So this factor of 1 here for axial secondary loads is really intended to address thermal loads and once-through type steam generators. And we didn't talk about thermal loads. We talked in terms of secondary loads, because there are cases where the thermal loads, once-through type generators, should be treated perhaps as primary loads.

If you have a large crack, a very large circumferential crack, the thermal load may behave more as a primary-type load than a secondary-type load. And industry guidelines would provide guidance to the utilities on when they should think of the summer loads as being primary or whether they should be secondary.

MEMBER APOSTOLAKIS: It's not a safety factor any more.

MR. MURPHY: Well, if it's a secondary

load and it's computed elastically, when that analysis is saying that you have a safety factor of 1, you actually, you're not at the point of failure.

VICE CHAIRMAN WALLIS: Does that mean you have 5 percent chance of failure, or 50 percent?

MEMBER APOSTOLAKIS: That was my next question. Are these factors the result of a negotiation, or the result of some sort of analysis of the actual probability of failure?

MR. MURPHY: No, not as a result of an analysis of the probability of failure. These safety factors were derived from stress limits in the ASME Section III Code. The challenge was to infer the safety factors against failure that the stress limits were intended to ensure.

MEMBER APOSTOLAKIS: I see. Which are also the result of some sort of give-and-take.

MR. MURPHY: Right. Well, there are a variety of ways one might look at it. A philosophical issues come up when you talk about what the fathers of the code had in mind in the way of margins when they set the stress limits, but these were -- the 1.2 was a consensus position adopted by both the industry and the staff, after great deliberation.

VICE CHAIRMAN WALLIS: But one does have

a significant margin. It's not as if one represents the average load at which the thing will break.

MR. MURPHY: That's correct.

VICE CHAIRMAN WALLIS: It's somewhere out of the 95th percentile.

MEMBER APOSTOLAKIS: What are they? I mean, the safety factor is the ratio of something.

MR. MURPHY: Safety factor is the ratio of failure load. It's failure load divided by allowable load.

MEMBER APOSTOLAKIS: Yes, but I mean the failure load is some sort of a low bound with a bunch of data.

MR. MURPHY: Well, this 1.2 --

MEMBER APOSTOLAKIS: Or is the medium values

of --

MR. MURPHY: Is 1.2 considered a numerator for failure load. We considered code minimum material properties.

MEMBER APOSTOLAKIS: So it's a conservatively calculated --

MR. MURPHY: It's conservatively calculated.

MEMBER APOSTOLAKIS: But we don't know

conservative is.

MR. MURPHY: The code values are pretty conservative, in my experience.

VICE CHAIRMAN WALLIS: So if 1 is X psi, this means that a certain fraction of them will break, and then if you say you must design for 1.2X, that means even smaller fractions of them are going to break. But we don't know anything about what those fractions are.

MR. MURPHY: I'm not sure I understand the question. These are --

VICE CHAIRMAN WALLIS: If I test 100 pressure points, and I say they're designed for 15 psis. They probably don't break until about 100 psi, so you said there's a safety factor of 7 or something. Is that what it means? Does the 1, when I get down to 1, does it mean that half of them are going to break, or a very small fraction are still going to break or what?

MEMBER APOSTOLAKIS: I guess they're relying on the fact that the load is calculated very conservatively.

VICE CHAIRMAN WALLIS: It must be.

MEMBER SHACK: A secondary load is -- you know, if it was true that this thing was loaded with

a big dead weight hanging on the end of the tube, is one thing. But the thing about a secondary load is it's a thermal stress, so a small deformation essentially will ease the load. And so that's why you, without going into a great deal of detail, you know that up until this time, you're just beginning to elastically perform, basically.

MR. MURPHY: And the loads are computed elastically, so the load doesn't take -- the computation of the load does take into account this relaxing effect that you're talking about, so the analysis is very conservative.

VICE CHAIRMAN WALLIS: But this 1 comes back to the simple stretching of the weight. Does that mean that half of them would pop at that load, or it means a ratio of --

MEMBER SHACK: If you were hanging dead weights on the end of tubes, yes. But it could --

VICE CHAIRMAN WALLIS: Half of them --

MEMBER SHACK: If the thing has a failure strain of 50 percent, it means you have to extend the tube 8 inches, and it can only move a quarter of an inch. All it's going to do is deform.

VICE CHAIRMAN WALLIS: So I guess we were asking what you meant by 1.

MEMBER FORD: Could I just interject a managerial point here - about 20 minutes left, and we've got some really interesting things on inspection periods coming up. And it's also fairly obvious to me that --

VICE CHAIRMAN WALLIS: We're trying to understand if he understands what 1 means.

MEMBER FORD: I recognize that, Graham. I was about to say, it's fairly obvious to me that we will have --

VICE CHAIRMAN WALLIS: Yes, I agree.

MEMBER FORD: Which you can discuss all of these -- the whole credibility of his presentation.

VICE CHAIRMAN WALLIS: All right.

MR. MURPHY: If the calculated plastic collapse load is equal to the applied elastic load, or the applied load evaluated elastically, if that number is 1, that's deemed acceptable and you actually have a considerable margin beyond that point since it does now account for the relaxation of load that takes place as a result of filling the tube.

MEMBER APOSTOLAKIS: I guess what I got out of this is what Dr. Shack said, there's much more to this story than just the safety factor.

MEMBER SHACK: In the secondary load in

the formula, when you hit the pressure burst load it blows up, so there's a dramatic difference in what you mean by failure. In one case, there really is margin and you don't need the extra margin.

MR. MURPHY: Okay. The accident leakage performance criteria has two --

VICE CHAIRMAN WALLIS: I think it would help everybody if instead of talking about safety factors, you talked about probability of failure.

MR. MURPHY: They don't have --

VICE CHAIRMAN WALLIS: We don't know what you mean then, do we?

MEMBER SIEBER: Well, it's deterministic. It's a number.

MEMBER FORD: If you remember back in 2001, this is exactly the same question we asked then - what the safety factors really meant physically, and all questions --

MR. MURPHY: We were trying to maintain consistency with the design-basis, which was Section 3 of the code, which consists of deterministic stress loads.

MEMBER SIEBER: It's deterministic.

MEMBER APOSTOLAKIS: So what's going to happen throughout the years we going to have another

presentation --

VICE CHAIRMAN WALLIS: We'll keep asking --

MEMBER APOSTOLAKIS: But that's okay. I mean, this is the standard way of doing business.

MR. MURPHY: The accident leakage criterion consist of two parts.

MEMBER APOSTOLAKIS: Which DBA is this now?

MR. MURPHY: The design-basis accident, whatever is the most limiting one, the most limiting one from the standpoint of off-site dose.

MEMBER APOSTOLAKIS: Which one is the most limiting?

MR. MURPHY: Usually steam line break, I believe is the basis of this. Design-basis accident leakage should not exceed values assumed in the FSAR's accident analysis to ensure acceptable dose consequences off-site in the control room. In addition, DBA leakage should not exceed 1 gpm from all steam generators.

VICE CHAIRMAN WALLIS: That's pretty small.

MR. MURPHY: Yes. And leakage beyond this value may potentially increase risk under severe

accidents. So if one is going to -- if someone wishes to allow more leakage than 1 gpm, we would need to take a look at that from a risk-informed standpoint.

VICE CHAIRMAN WALLIS: How are you going to measure 1 gpm?

MEMBER SIEBER: You do it by isotopic analysis, typically.

MR. MURPHY: Again, if my --

MEMBER SHACK: If it's a design-basis accident, he'll measure it.

VICE CHAIRMAN WALLIS: It's all theoretical. I deal with that kind of space.

MEMBER SIEBER: You're into DBA --

MEMBER APOSTOLAKIS: So you told us earlier that this number was 500 before, and now it's 150.

MR. MURPHY: Correct.

MEMBER APOSTOLAKIS: Why?

MEMBER FORD: Five hundred gallons a day.

MEMBER APOSTOLAKIS: Yes.

MR. MURPHY: The plant will be shut down before a rupture occurs.

MEMBER POWERS: That was not my understanding. My understanding was that the 450 was set up for a three-loop plant, and this is per loop.

Right?

MR. MURPHY: The 150 is per steam generator. Yes, correct.

MEMBER POWERS: Yes, it's per loop. Whereas, the 450 was set up for a three-loop plant.

MR. MURPHY: Well, the 500 gallons per day applied to each steam generator, as well.

MEMBER POWERS: Yes. The 450 applies to a three-loop plant.

MR. MURPHY: This is one your documentation. I'm quoting you. By limiting leakage to 150 GPD per generator, yes. Then for a three-loop plant the total leakages, all SGs can be 450.

VICE CHAIRMAN WALLIS: Now these -- I'm sorry to keep asking questions. These numbers like 1 gpm, 150, are they pulled out of the sky, or are they based on risk information or what?

MR. MURPHY: The 1 gpm is a rather historical number. Plants were originally licensed considering 1 gpm leakage as the initial condition for their safety analysis.

VICE CHAIRMAN WALLIS: Just pulled out of the sky. It goes back into the depths of history somewhere, and no one knows why.

MEMBER SIEBER: It's a nice number.

VICE CHAIRMAN WALLIS: One-fifty is something you're doing.

MR. MURPHY: That's the 1 gpm. The 500 gallon per day limit was developed in the mid-1970s. It was intended to -- it had a slightly different purpose. It was intended to reduce the likelihood of tube rupture, that you would shut the plant down before you had a tube rupture. Going from 500 to 150 gallons per day is to provide added assurance to that effect.

VICE CHAIRMAN WALLIS: Why not 75 or 291 or something?

MR. MURPHY: Well, the industry has guidelines that attempt to ensure that the plants don't operate beyond 75 gallons per day. Those are the guidelines indices we're working to. What we've agreed to as far as the tech spec is concerned is 150. They can typically be expected to shut down well before they get to the 150.

MEMBER POWERS: In any of the nine or so steam generator tube ruptures that we've experienced were they preceded by leakage in excess of 150 gallons per day per steam generator?

MR. MURPHY: Possibly one, the first one, Point Beach. But the circumstances surrounding Point

Beach back in `75 are rather murky, so we don't really know for sure. In general, no - leakage was less than the 150 or the 500 at the time rupture occurred. At Indian Point, it was just 6 gallons per day. At what plant was it that had no leakage - that was McGuire. McGuire had no leakage prior to rupture in `89.

MEMBER APOSTOLAKIS: So what does this do?

MR. MURPHY: There have been 204 shutdowns due to SG leakage. There's no question that many of those would have been tube ruptures had the plants not shut down. Sure, limiting leakage is not an air-tight defense against preventing tube ruptures or ensuring adequate margin, but these limits certainly do, and are effective for reducing the instance of tube ruptures where you don't have sufficient margin.

MEMBER FORD: Emmett, I'd like to finish by 2:00. I recognize you're being constrained by all our questions.

MEMBER SIEBER: Just don't answer them.

MR. MURPHY: At this point, I'm going to -- I think I've already explained that during each inspection, plants will be evaluating the condition of their tubes relative to performance criteria that's condition monitoring. Going beyond that, I don't think there's anything more I need to say about tube

repair criteria, other than the fact that we will be specifying tube repair criteria in the new tech specs. It's somewhat of a departure from true blue performance-based, but --

MEMBER FORD: Can I ask you, Louise, is there a plan to come in front of the ACRS to give us -- obviously, as I look through these following pages, there are a lot of statements being made which are just aching to be challenged or asked for information. Is it your plan that you will come in front of the ACRS to give us more technical data, drafts, and things of this nature presentation?

MS. LUND: Yes, if that is what you'd like to see. In fact, especially I was thinking for the 600 Thermally Treated and 690 Thermally Treated, not only have we had licensee submittals report on that, we have also independently put together a review of 600 Thermally Treated and 690 Thermally Treated experience in the plants. In fact, we put out one of them as a NUREG, and there's one of them we're in process of putting out as a NUREG. It's almost complete, so we have -- behind the scenes, we have been doing a lot of things to look at these particular issues that you've brought up. And I think we've convinced ourselves that -- I don't mean to short-

circuit what Emmett's going to talk about, but these particular values, as far as the inspection intervals, would be sufficient.

MEMBER FORD: I'm not trying to close. I just wanted reassurance to the rest of the committee that we're going to hear more about this, data, drafts, et cetera, et cetera.

MS. LUND: Yes. We're fine with taking any of these specifics. The question -- I guess our interpretation of what we needed to present today considering we only had an hour was to give you an overview of where we were at, and also kind of just give you an overview of the safety evaluation which we sent over. If there are certain parts of it that you'd like to discuss in more detail, we probably need to schedule additional -- what I'm seeing from here is we need to schedule additional time. This would not have covered --

MEMBER APOSTOLAKIS: You're supposed to finish something by the 17th.

MS. LUND: Right.

MEMBER APOSTOLAKIS: Which is the safety evaluation report.

MS. LUND: Right.

MEMBER APOSTOLAKIS: And then what

happens, it goes to the Commission?

MS. LUND: No. Basically when it's put in the license amendment process, is that it comes in, we review it, and then we approve it through the license amendment process.

MEMBER APOSTOLAKIS: But I mean, if the ACRS is going to have a subcommittee meeting and someone will write a letter later, is there a time constraint there, or we can do it at our leisure, before something real happens.

MR. MURPHY: Something real is going to happen on the 17th. A plant is going to have new tech specs.

MEMBER SHACK: That's Farley's tech specs.

MEMBER APOSTOLAKIS: And then what happens? I mean, if we write a letter, does it affect anything? We're not going to write on by the 17th, I doubt.

MR. MURPHY: Well, we also have in mind to write a generic SE that would apply to the Generic License Change Package. Since that will be a template for future SEs, we'll be putting that one out for public comment, so potentially that's something --

MEMBER APOSTOLAKIS: SC?

MR. MURPHY: SE, a generic --

MEMBER SIEBER: Safety evaluation.

MEMBER APOSTOLAKIS: Oh, SE.

MS. LUND: Right. How this works is you have a lead plant then you put together the lead plant and the safety evaluation associated with the lead plant, and then you basically put together something that is generic, a package, a box within which the rest of the licensees can use to help their Ses.

MEMBER FORD: What I suggest is, let them talk with our staff and arrange a meeting. Obviously, we're going to need more information, more technical data. I tried to take the --

MR. MURPHY: Well, let me just wrap-up here. I'll take five minutes to talk about inspections. And then I'll take five minutes to talk about where we're going.

With respect to inspections, the new requirements in the tech specs will have both a performance-based aspect to it, and a set of prescriptive requirements to ensure that we don't get into too big a trouble.

From a performance-based aspect is that the inspection scope, methods, and frequency of inspections shall be such as to ensure that SG tube integrity is maintained until the next scheduled

inspection.

MEMBER APOSTOLAKIS: Is that a performance requirement?

MR. MURPHY: No, this is not a performance criteria. This is --

MEMBER APOSTOLAKIS: Programmatic approach.

MR. MURPHY: This is a programmatic requirement.

MEMBER APOSTOLAKIS: But how do -- and there are accepted methods that one can use?

MR. MURPHY: The industry has guidelines for looking at your inspection results, trying to figure out what your flaw growth rates are, taking into account what your eddy current flaw measurement error may be, and trying to project the condition of the steam generator tubes at the end of the next cycle, or when you plan to do the next inspection, and demonstrate that the inspection interval and so forth are such that you will meet all the performance criteria at the end of the next cycle.

If that analysis indicates you're not going to meet all the performance criteria when you make your next inspection, then you need to adjust program, you need to inspect more frequently, you need

to do something.

VICE CHAIRMAN WALLIS: You can regulate them with the probability.

MR. MURPHY: No.

VICE CHAIRMAN WALLIS: Are you specifying what that probability is?

MR. MURPHY: No.

VICE CHAIRMAN WALLIS: But you cannot be deterministic in this.

MR. MURPHY: Sure.

VICE CHAIRMAN WALLIS: You can be probably deterministic about flaw growth.

MEMBER POWERS: I think they do.

MEMBER SHACK: Make sure every tube is 3 Delta P by the end of the next cycle --

VICE CHAIRMAN WALLIS: But you can't say every tube always is perfect. I mean this isn't that kind of --

MEMBER POWERS: Three delta, I mean three standard deviation --

VICE CHAIRMAN WALLIS: Three standard deviations, okay.

MEMBER SHACK: Three-delta P.

VICE CHAIRMAN WALLIS: No, that doesn't do it.

MEMBER SHACK: The strength of the -- the weakest tube has to meet the three-delta P requirement.

MR. MURPHY: The criterion states that the tube shall maintain a factor of three-delta --

MEMBER SHACK: Now what happens if it doesn't meet it? If it's 2.5 delta P, do you lash him with a wet noodle?

MR. MURPHY: No. We have the Reactor Oversight Program. First such an eventuality would be reportable under 50.72.73, so it's reportable. We find out about it. Two, we're written up screening criteria for the Reactor Oversight Program. We relate each of these performance criteria to red, yellow, and white, and so forth.

MEMBER SHACK: So he would go white or something if he misses it?

MR. MURPHY: For example, failing to meet three-delta P, if you fail to meet three-delta P, there's also plant-specific considerations or specific facts you have to consider, but in general, that might put you into the white category, yes, for example in terms of risk significance. So anyway, if you fail to meet the performance criteria, its reportable and two, the Oversight Program then takes a look at it.

MS. LUND: And if there's a performance element as far as the licensee goes, then that's when you would end up with some type of inspection to follow-up, to see what's actually going on.

MEMBER SHACK: Suppose he had a loose part where there was nothing there at the beginning of the cycle, and he ended up with less than three-delta P at the end of the cycle, is that a performance deficiency?

MS. LUND: Well, it depends on whether he knew he had a loose part or not. I mean, we've had actually even recently situations where we've had plants experiencing primary, secondary leakage and you end up with a loose part that could have been detected, so that's --

MR. MURPHY: One of the nice things about a performance-based set of requirements is we're basically saying do what you've got to do to ensure tube integrity. And if turns out you don't have tube integrity, then obviously you weren't doing everything that was necessary to ensure tube integrity.

MEMBER RANSOM: How do you determine if these meet three-delta P? Do you hydrotest each tube?

MR. MURPHY: We may.

MEMBER RANSOM: And you'll rupture it if

it goes to --

MR. MURPHY: As a first step, you gather your inspection results, you look at each of the indications individually, and you ask yourself how big are they, and given how big they are, what is the predicted burst pressure of each of these flaws. If there are some that look like they may be starting to get marginal in terms of having three-delta P, you might decide to do an in situ pressure test. You'll pressurize the individual tube and take it up to three times normal operating pressure and see if it holds or not.

MS. LUND: The EPRI guidelines has screening criteria. And the screening criteria does exactly what Emmett says that it does, but in addition, it also talks about new degradation mechanisms too need to be screened. I mean, there's other additional things that might get put into the bin in doing in situ pressure tests to confirm that they do have structural integrity.

MR. MURPHY: Okay. Just in terms for inspections, I've explained that we have a performance-based requirement concerning the scope, methods, and frequency of inspection. We've supplemented this performance-based requirement with

a series of prescriptive requirements that would ensure that in the event that we have a condition where the performance criteria are not met, that such a situation will be detected in a timely fashion. Corrective actions will be implemented in a timely fashion in accordance with Appendix B. So for mill annealed tubing, the original steam generators, first generation steam generators, we do expect the requirement will be that you do an inspection every refueling outage. If you have the --

VICE CHAIRMAN WALLIS: Inspection means a certain percent of the tubes?

MR. MURPHY: Under these new tech specs, we will not specify --

VICE CHAIRMAN WALLIS: They have to do however much inspection they need to do to ensure integrity.

MR. MURPHY: That's right. For thermally treated tubing, 600 Thermally Treated tubing, they can operate for as many as two fuel cycles between inspections, if performance-based analysis shows that they can maintain their integrity margins for that long. And finally, for 690 Thermally Treated tubing, they can operate for up to three fuel cycles.

VICE CHAIRMAN WALLIS: When are they going

to discover that 690 isn't as perfect as everybody believes?

MR. MURPHY: They can operate up to three fuel cycles if they can show by analysis based upon the flaws they've seen before, that they're going to be maintaining the appropriate margins until their next scheduled inspection. And with that, I think I'll just move on then to a close.

MS. LUND: Did you want to cover that slide?

MR. MURPHY: That's a good point. I'll mention that one. With this new advanced tubing, the 600 Thermally Treated and the 690 Thermally Treated, if they ever run into a cracking problem, they start detecting cracks, they can no longer operate for multiple cycle inspections. They'll have to inspect it every --

MEMBER SIEBER: Go back to the 600 mill annealed.

MEMBER SHACK: Now when Seabrook finds 600 TT tubing that really isn't TT, does that mean they have to inspect the rest of their 600 TT tubing?

MR. MURPHY: That's a real fine point. I'm not sure I want to get into that right now. I've only got five minutes left.

MEMBER SIEBER: Saved by the bell.

MR. MURPHY: All right. Future actions - we intend to complete our review of lead plant amendment requests. We're about to issue our SE or safety evaluation for Farley 1 and 2 by September 17th. We have an existing amendment request in just in August for South Texas 1 and 2. We're expecting any day now to get a revised amendment request from Catawba 1 and 2.

Next, we're going to complete our review of the Generic License Change Package submitted by NEI and issue a draft SE for public comment. Once this SE is finalized, the CLIIP process can be used to expedite subsequent tech spec amendment requests from utilities.

MEMBER SHACK: And the CLIIP process is?

MS. LUND: It's Consolidated Line Item Improvement Process. Did I get it all? That's why I have Kerry here.

MR. MURPHY: All right. The staff is preparing a draft generic letter entitled, "Steam Generator Tech Specifications", which it expects to issue for public comment in early fall of --

MEMBER APOSTOLAKIS: That's where we are now. Right? This is already fall of 2004.

MS. LUND: We'll be going to CRGR on that. We're trying to schedule a meeting with them. We have not done that yet.

MR. MURPHY: Okay. What this GL -- we don't know what a plant's intentions are with respect to -- whether all utilities are going to be submitting these new tech specs or not, and so this generic letter is going to help us determine what the industry's intentions are. The generic letter will request information regarding the program each utility is implementing right now to ensure tube integrity, and we're requesting information concerning licensee plans for modifying their tech specs to reflect their program.

It's our expectation that licensee programs are modeled on NEI 97-06, and to the extent that's true, then they're implementing a program that parallels very much these new tech specs, so they then have alignment of the tech specs with their NEI-based program. And that's it.

VICE CHAIRMAN WALLIS: What's a "liming" condition?

MR. MURPHY: The new tech specs are based --

MEMBER APOSTOLAKIS: Look at the slide

before you answer.

MS. LUND: it's misspelled.

MEMBER FORD: I thank you both very much indeed. Obviously, there's a lot of information behind all these slides. I think that we should leave it up to respective staffs to schedule a meeting with Materials Subcommittee and the Full ACRS Committee in the near future. I don't know what near is, but in the future.

MR. BATEMAN: Dr. Ford, could I request that if we do have a meeting, there is so much data associated with steam generator arena, it would be helpful if you would be specific to the best of your ability to let us know what you want us to talk about. I mean, if you wanted to talk about safety factors of 1, if you want us to talk about three-delta P, if you want us to talk about -- we need some help here because it's a very broad area.

MS. LUND: We could definitely talk for days.

MEMBER POWERS: We need to see the technical basis for your technical specifications, and understand what the technical rationale - whatever data it takes to understand that, that's what we need to see.

MR. BATEMAN: So you want to see the technical data behind the performance criteria, which is the design and licensing basis, so it wouldn't be much of a presentation there. Anyway, I think we're having a little communications. I just want to be sure that if we come back and brief you on something, that we understand what it is that you want, so that we can make the appropriate presentation. This presentation was not intended to get into the areas we got into. It was intended to give you an overview of where we stood with this moving forward.

MEMBER FORD: Earlier this year we had some very extensive discussions on the DPO issue, performance of the tubes under accident conditions, and some of that data is obviously relevant to some of the conclusions that you've come to. The whole question of probability aspects, tube ruptures, leakages. We will make up a list.

MR. BATEMAN: Okay. Thank you.

MEMBER FORD: But we do need to see the data.

MS. LUND: I think as you guys discussed, the presentation we made, I think that you also need to keep in mind too that our need to keep this consistent with the design and licensing basis of the

plant, which that Section 3 argument was all about, because that's how the plants are designed, the steam generators are designed. And we had to maintain consistency with that, so keep that part in mind.

MEMBER FORD: Okay. Louise and Emmett, thank you very much indeed. Pass it over to you, Graham.

VICE CHAIRMAN WALLIS: Thank you, Dr. Ford. I was going to congratulate you on finishing exactly on time, but you're actually a minute and a half over the time that you intended to finish. Of course, you were supposed to be finished --

MEMBER APOSTOLAKIS:We're losing time now.

VICE CHAIRMAN WALLIS: Okay. We are now going to take a break until 2:15. We don't need the reporter after that. We're going to go into safety and security matters upstairs.

MEMBER SHACK: Should we meet here first and then go up?

MEMBER APOSTOLAKIS: Yes.

VICE CHAIRMAN WALLIS: We'll meet here at 2:15, and we're now going to take this break, and we don't need the transcript any more.

(Whereupon, the proceedings in the above-entitled matter went off the record at 2:02 p.m.)