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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

June 5, 2007

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on June 5, 2007, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

MEETING OF THE SUBCOMMITTEE ON PLANT LICENSE RENEWAL

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TUESDAY,

JUNE 5, 2007

The meeting was convened in Room T-2B3 of Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, at 10:30 a.m., Dr. Mario Bonaca, Chairman, presiding.

MEMBERS PRESENT:

MARIO BONACA Chair

WILLIAM J. SHACK

J. SAM ARMIJO

SAID ABDEL-KHALIK

OTTO MAYNARD

JOHN BARTON

ACRS STAFF PRESENT:

MICHAEL JUNGE Designated Federal Officer

NRC STAFF PRESENT:

P.T. KUO

MICHAEL MODES

RICHARD CONTE

JONATHAN ROWLEY

LAMBROSE LOIS

JIM MEDOFF

ROBERT HSU

DUK NGUYEN

ALSO PRESENT:

TED SULLIVAN

JOHN DREYFUSS

PAUL JOHNSON

NORM RADEMACHER

DAVE MANNAI

ALAN COX

MIKE METELL

JIM FITZPATRICK

TED UNDERKOFFLER

LARRY LUKENS

JOHN McCANN

ALSO PRESENT: (CONT.)

JAY THAYER

SCOTT GOODWIN

JOHN HOFFMAN

DAVE LACH

GARRY YOUNG

MIKE STROUD

REZA AHRABIA

TED IVY

A-G-E-N-D-A

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

10:28 a.m.

CHAIRMAN BONACA: Good morning. The meeting will now corne to order. This is a meeting of the Plant License Renewal Subcommittee. I'm Mario Bonaca, Chairman of the Plant License Renewal Subcommittee for this plant.

ACRS members in attendance are William Shack, Otto Maynard, Said Abdel-Khalik, Sam Armijo, and John Barton. Michael Junge, of the ACRS Staff is the Designated Federal Official for this meeting.

The purpose of this meeting is to review the license renewal application for the Vermont Yankee Nuclear Power Station, the draft SER, and associated documents.

We will hear presentations from representatives of the Office of Nuclear Reactor Regulation, NRR, the Region 1 office, and Entergy Nuclear Operations, Incorporated.

The subcommittee will gather information, analyze relevant issues and facts, and formulate proposed position and action as appropriate for deliberation by the full committee.

Rules of participation in today's meeting were announced as part of the notice of the meeting

previously published in the Federal Register. We have received no requests for time to make oral statements, and we have received no written comments from members of the public regarding today's meeting.

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

We will now proceed with the meeting, and before I call upon Dr. Kuo, of the Office of Nuclear Regulation, to begin I would like to make a couple of general observations regarding this application.

The first is really a recurrent theme, I guess, and the question regarding GALL, and one thing what we notice is that there is an increasing number of exceptions being taken on the GALL, and this is not an issue only for Vermont Yankee. We've seen it coming, and I have raised a number of questions in the past regarding whether or not GALL should be updated to be less descriptive, and to incorporate some of this that are really not exceptions, they are just

alternatives. For example, in some cases to ASME code on the report, and to have their views regarding, you know, how do we reduce the number of exceptions being taken. I mean, GALL was originally a cooperative effort between the industry and the staff, to see that there is, you know, 70 percent of the programs take exceptions from GALL says something that has to be looked at.

The second issue I would like to raise is the one of the audit report. The audit report is growing, and it's becoming almost a duplicate of the portion of the SER, but it's not written the same way. So, a reviewer, like the ACRS members, is puzzled by, you know, what information is there in one that is not in the other. Typically, there is none, but in some cases there is. So, you know, is there any way in which that two things can be meshed together and become one document only in the future.

So, these are the two issues I would like to raise, and again, the first one that I talked about may be significant enough to deserve a meeting at some point in the future, because it's not specific to Vermont Yankee, it's more generic to GALL.

MR. KUO: Thank you, Dr. Bonaca.

I'm P.T. Kuo, the Director of the Division

of License Renewal.

Your observation is actually very correct, and very on the point. We have observed this same phenomena also, and in the past that's why we tried to update GALL, and in 2005 we updated GALL. The hope was that we would be able to eliminate many of the exceptions that we have -- you have been talking about.

And recently, in a couple of the most recent reviews, we find that, again, there were a lot of exceptions, more than what we would like to see.

So, this is the one thing that we are working on that. We will be working with the industry. We will actually bring this very subject to the industry and see if there's any ways that we can reduce the number of exceptions.

With the number of exceptions we see right now, it doesn't make sense anYmore to have the GALL report there with the program, and then, you know, everybody is taking exceptions, and then why there's no reason for the GALL to exist anYmore.

CHAIRMAN BONACA: For example, on the containment issue, if I remember, there is a statement that says exceptions are so many that there was no point in listing them, otherwise it would have been

confusing. Therefore, there is a description of the problem separate from GALL.

So, that, to me, was a clear indication we had to talk about where GALL is going.

MR. KUO: Yes, I fully agree with that assessment, and like I said we plan to work with the industry, and at some point we will come back to the committee and give you a status report on this.

As far as the audit report, I think we have come back to the committee about, I forget how long ago, about a few months ago. We told you that we are going to change from writing the 700 or 800 page report to what we call database.

What the database is, really, is something that when we go to the -- when the audit team goes to the site and audits the on-site design basis document, the applicant will create a question and answer database, and this database is evolving during the audit, so it's changing. Whenever we have a question, they have an answer, and that database has got to be revised.

But, at the end of the audit, we expect the applicant to submit this database, question and answers, to us, and their information, that becomes a formal document. Okay.

Then, the staff will take that database and build on it to actually provide a write-up similar to SER, basically, providing technical justification to the database and the status, whether it is still under discussion, open, or closed.

So, we are going to build, if you will, an audit report on the question and answer database submitted to us, and then provide the write-up on the technical justifications, and every time we will indicate what the status of that is.

So, that becomes, actually, the main body of the future audit report.

At the end of audit, okay, when everybody is ready to close out the audit status, then we will put a very simple description on top of this database, and then that becomes the audit report.

CHAIRMAN BONACA: Thank you, appreciate the explanation.

MR. KUO: So, that's what we are doing right now.

CHAIRMAN BONACA: Thank you. Okay.

So, I'll turn the meeting over to you, Dr. Kuo, for the Vermont Yankee application.

MISS KIMBALL: Well, yes, we have completed our safety evaluation, and we have an issue there to

report to you. About a month ago, you have it in your hand, and I believe in that safety evaluation report we have the four confirmatory items that is, basically, about the boundary of the non-safety-related structures over safety-related structures. Okay. We were -- because of the spatial relationship, we have asked our regional staff to help us to walk down the plant, and so that they can have a better assessment of that.

We haven't been able to get input from the region yet, but this is something that we are going to have it, so we make it the confirmatory item in the report. As soon as we get input from the region, we will be able to hopefully close that out.

Recently, it has caught our attention about a dam, their own dam, and that, the issue, it was closed in the SER, but we noticed lately that this dam was owned by Trans-Canada, and because of the different ownership there is a question who is really responsible for the management of the dam. Okay. So, we have some ongoing discussion with the applicant, and I'm sure today they will address that, too. So that, we think, is resolved, but we will treat it as a confirmed item, too, so that is a new item added to the original SER that you had.

And, that is, really, the review status right now. Right now I'm turning to the applicant to make their application, and then the staff presentation will follow.

With that, I turn to the applicant.

MR. SULLIVAN: Good morning, I'm Ted Sullivan, I'm the 2nd Vice President for Vermont Yankee, and I'd like to thank the ACRS for allowing us to present the license renewal application here today.

I'd like to introduce John Dreyfuss. John is the Director of Nuclear Safety Assurance at Vermont Yankee, and he'll be lead presenter today, and I'd like the Vermont team to introduce themselves, and then I'll turn it directly over to John to make the presentation.

Thank you.

MR. RADEMACHER: Norm Rademacher, I'm the Director of Engineering.

MR. MANNAI: Dave Mannai, Entergy Vermont Yankee Licensing Manager.

MR. COX: I'm Alan Cox with the Entergy License Renewal Team.

MR. METELL: Mike Metell, Vermont Yankee License Renewal Project Manager.

MR. FITZPATRICK: Jim Fitzpatrick, Vermont

Yankee Design Engineering & Civil Structural Group.

MR. UNDERKOFFLER: Ted Underkoffler, I'm a Co-Program Engineer, I am the responsible individual for the Section 11 Containment Inspection Program.

MR. LUKENS: Larry Lukens, vermont Yankee in Programs and Components Engineering Department. I'm the Supervisor of Code Programs.

MR. McCANN: Good morning. My name is John McCann. I am the Director of Licensing for the Entergy Fleet.

MR. THAYER: I'm Jay Thayer, I'm Vice President of Operations for Entergy Nuclear. I'm on loan to the Nuclear Energy Institute.

MR. GOODWIN: Good morning. I'm Scott Goodwin, Entergy Design --

CHAIRMAN BONACA: You are going to have to come to a microphone if we are going to go around the room.

MR. GOODWIN: Good morning. I'm Scott Goodwin, Entergy Vermont Yankee Design Engineer and Civil Structural Supervisor.

MR. HOFFMAN: Good morning. My name is John Hoffman. I'm currently retired from Entergy. I was the previous Site License Renewal Project Manager.

MR. LACH: Good morning. My name is Dave

Lach. I'm the Entergy Corporate License Renewal Services Project Manager for the VY License Renewal Project.

MR. YOUNG: I'm Gary Young with Entergy, and I'm the Manager of the License Renewal Group for Entergy.

MR. STROUD: My name is Mike Stroud with the Entergy Corporate Group for License Renewal, and I am the Electrical Lead for Electrical Programs and Review.

MR. AHRABIA: My name Reza Ahrabia, I'm the SI, Civil Structural Lead for License Renewal.

MR. IVY: And, my name is Ted Ivy, I'm with the Entergy Corporate License Renewal Services Group. I'm the Mechanical Lead.

MR. JOHNSON: I'm Paul Johnson at Vermont Yankee. I'm Electrical Design Engineer.

MR. DREYFUSS: All right.

MEMBER BARTON: I'm glad you left somebody there behind to run the plant. I was getting a little nervous about that.

MR. DREYFUSS: Gentlemen, good morning, John Dreyfuss, Director of Nuclear Safety Assurance for Vermont Yankee. I'm responsible for, among other things, the Regulatory, Compliance and Licensing

Group. I'm also the Project Sponsor for the License Renewal Project for Vermont Yankee.

Where we are at right now, and we'll talk about it a little bit as we go through recent plan performance and current plan status, but we are, as we speak, turning the moats switch after a refuel outage, and we are going to plant start up.

So, we appreciate being here, thank you for entertaining us here at the ACRS meeting.

I did want to point out a couple of quick features here. Here's the Connecticut River. Here's the plant. There's the stack back here. We have the intake and the discharge. I think what you'll find is that the plant has been very well maintained over the years. We will talk about some of the capital improvements that we have been making to the plant over the years, in accordance with our long-range plan, and a big investment by Entergy in the plant over the last several cycles. We'll talk about that as well.

We've done the introductions.

Agenda is, we'll talk a little bit about the site description, touch on licensing history and some of the big plant improvements that we have made recently and over the years. We'll talk about recent

plant performance and the project itself and team composition. We'll also discuss the cost beneficial severe accident management alternatives that we identified during the course of license renewal. None of them are age related, but they are interesting to speak about.

Additionally, we have a number of presentation topics we've prepared for you on the containment integrity, both the dry well and torus shell, and as P.T. Kuo mentioned, we will also discuss the Vernon Hydroelectric Station.

One thing that we have done is in these presentations we have put together an awful lot of detail, and we also have some hyperlinks and back-up slides. If at any point you want more information, we can provide that for you. If you have seen enough in the way of information, please say so, we will move on to any topic that interests you.

And, of course, we'll entertain any questions that you have during the course of the presentation here.

Site description, the plan is a 125-acre site on the banks of the Connecticut River. It's a very lovely site. General Electric was the NSSS vendor, and Ebasco was the AE and builder of the

plant. It is a BWR, Mark I containment. We'll be discussing that a bit during the course of the presentations here today.

The plant is now rated at 1912, 1912 megawatts thermal, with a 650 megawatt electric output.

MEMBER BARTON: Is that original, or is that an upgrade?

MR. DREYFUSS: That is, during the past cycle we implemented a power uprate. We had put the modifications in over the prior two cycles, and in March of this year got the license up -- I'm sorry, 2006, got the license to do the 20 percent uprate.

MEMBER BARTON: Thank you.

MR. DREYFUSS: Very good.

The cooling is a hybrid cycle condenser with forced draft cooling, cooling towers. You saw a little bit of the cooling towers, we have a better shot of that later as well in the presentation slides, and we are currently at a staff of 650 people. That includes our contractors of supplemental work force.

Here are some of the licensing highlights. The plant did go on line in 1972, in March. The expiration of the operating license is March 21, 2012. Thus, we are here.

I did want to point out, in July of 2002 the plant was acquired by Entergy from Vermont Yankee Nuclear Power Corporation, and that really marked the beginning of a number of substantial capital upgrades and major projects, the power uprate project that we talked about, the 20 percent power uprate, dry fuel storage on site at the facility, as well as the License Renewal Project kicked off after Entergy acquired the plant.

I'll go through some of the major plant improvements that we've had. We did replace core spray piping back in 1978. We did the full bevy of modifications to the Mark I containment in the '78 to '82 time frame, new saddles, the hold downs, the shortening of the downcomers to alleviate some of the Mark I containment loading. All of that work was done during that period of time.

In 1986, we replaced our recirc piping with low carbon steel, 316 low carbon steel.

In 1998, we put in our new suction strainers, resulting as a result of some of the industry operating experience that was out there. We also took that opportunity to recoat our torus. We'll be talking about that a little bit later in the presentation as well.

2001, we applied noble chemistry for the first time at the plant, successful application. We most recently reapplied or put our second application on in the past refueling outage. Again, a successful application. And, we've also gone to hydrogen water chemistry, and, of course, those two in combination really do provide for the asset protection and IGSCC mitigation.

MEMBER BARTON: What's your hydrogen water chemistry designed to protect? I mean, how much -- you know, it can vary on the amount of hydrogen depending on what you are trying to protect in the core internals. What are you trying to protect?

MR. DREYFUSS: We protect the full asset and the recirc loop as well.

MEMBER ARMIJO: How do you monitor that? Do you have online ECP monitoring, or just do it --

MR. RADEMACHER: This is Norm Rademacher.

Yes, we do have an online ECP monitor, and we just -- as a matter of fact, as a result of this outage we put in a new one just for ongoing cycling.

MEMBER SHACK: What fraction of the cycle is it operable for?

MR. RADEMACHER: We are also investigating other alternatives to the General Electric supplied

ECP monitor, to improve the reliability.

MR. DREYFUSS: We have had them fail after two months of operation. We have replaced them as well. We've had them work for quite a while, and we are working, as Norm said, on doing an upgrade.

MEMBER BARTON: What's your success rate with operation of hydrogen water chemistry as a system, 95 percent of the time? How much?

MR. RADEMACHER: 98 percent.

MEMBER BARTON: 98 percent of the time?

MR. RADEMACHER: That's correct.

MEMBER BARTON: Okay, good.

Thank you.

MR. ARMIJO: This is maybe a little bit off base, but have you made any adjustment in your hydrogen water chemistry when you went from 100 percent to 120 percent --

MR. DREYFUSS: Yes.

MR. ARMIJO: or did you notice an ECP change?

MR. DREYFUSS: Originally, at the previous license conditioning, we were running about 3 SCFM and now we are on a 3.5.

MR. ARMIJO: Okay.

MR. DREYFUSS: Not a substantial change.

This is not necessarily in the slide that you have in front of you, but we thought it was worthwhile to mention. We did implement zinc injection at Vermont Yankee during this past cycle.

And, as far as power uprate, equipment upgrades, I did want to talk some about that. Can we go to the hyperlink there?

MR. ARMIJO: Before you go to that, you didn't do zinc injection earlier, but you used to have a brass condenser. Do you still have brass condensers?

MR. DREYFUSS: That's correct. We have the Admiralty brass condenser, and there is some natural zinc that we do get as a result of the condenser that we have.

MR. ARMIJO: But, you still keep the Admiralty brass condenser, or have you changed that?

MR. DREYFUSS: We have not changed that, that's correct.

MR. ARMIJO: Okay.

MR. RADEMACHER: It is in our long-range plan after 2010 to change that up.

MR. ARMIJO: That would be titanium or --

MR. RADEMACHER: We haven't made the selection of materials at this time.

MR. ARMIJO: Okay.

MR. DREYFUSS: I did want to touch on some of the major equipment changes that we made that we believe position us well for extended operation and good plant reliability into that period.

We did a change out of the high pressure turbine, the LP turbines were replaced earlier, prior to our power uprate, not associated with the power uprate, so that train is all new.

MEMBER BARTON: Was that the rotor cracking issue?

MR. DREYFUSS: No.

MEMBER BARTON: Okay.

MR. DREYFUSS: No, we had a rotor -- we had a rotor insulation issue.

MEMBER BARTON: Okay.

MR. DREYFUSS: And, we did fully reinsulate the rotor to enable us to stay away from any kind of thermal sensitivity and vibration on the power train.

MEMBER BARTON: All right.

MR. DREYFUSS: We additionally replaced, rewound the stader. That's all new copper, and reinsulated the boiler as well.

Feedwater heaters, we do have new high

pressure feedwater heaters. We had replaced the LP heaters in cycles previous to the power uprate modifications.

Switchyard improvements, we, essentially, replaced the switchyard. We put in lots of new protective features and redundant protection schemes. All of the 345, 3-4-5 KV breakers, are new. That was not driven by uprate, that was driven by our long-range plan as well.

We replaced a number of control systems, feedwater, level control, the feedwater heater level control system. The reactor pressure regulator has gone to digital. We are digital on most of these control systems, and they are working very fine for us.

And, one of the other big challenges that we had in going to power uprate was, we went from two feed pump operation with one in standby, to three feed pump operation, and we had to make a number of modifications to be able to address in the event that we would lose a condensate pump, what would happen to the feedwater system, and this was an area of interest during the power uprate proceedings. So, we put in modifications to provide for auto tripping of a feedwater pump in the event of a trip of a condensate

pump. Also, an automatic runback of our recirc system, to maintain power, and additionally, a level setdown, ultimately, very well analyzed and our goal was, one, ensure, primarily, that we would maintain feedwater flow to the reactor vessel, and that we would not have an inadvertent scram on low level or a high level trip on the turbine.

MEMBER BARTON: On the loss of feedwater pump you runback or scram?

MR. DREYFUSS: Correct, loss of feedwater pump will do a runback.

MEMBER BARTON: Runback.

MR. DREYFUSS: Right, and we did an analysis using some sophisticated modeling. Ultimately

MEMBER ABDEL-KHALIK: What did you do to the condenser? You didn't say.

MR. DREYFUSS: To the condenser, we did some reinforcement in staking to avert any issues that we might have with vibration, due to the higher flows. We did take a look at the condenser this refuel outage, and we see no issues with the condenser, as a result of the power uprate.

This shows here, up top there is Wayne Manning, one of our operator, as we did reach the new

power level. The slide below there, or the picture below, is our Power Ascension Control Center. We did a deliberate slow power ascension, never going backwards, but methodical step by step changes in power, at small increments, analyzed. At the very end here we did a big integrated plant test, where we actually did manually trip one of the condensate pumps and this is the Power Ascension Control Center, the brain of the power ascension operation, and all of us sitting around watching the traces and transients.

If you are astute, you can see that the rods remain out, and these are the traces here. Let's go to that next slide. This was a really nice result. We had great results from this transient test. Classic quarter wave dampening on level, you can see the tripping of a pump here, and the tripping of the feed pump as far as the changes in feedwater flow, and this test matched perfectly with our analyzed projections for the test. So, a testament to, I think, the engineering staff for the work that they did in analyzing for this transient as well.

MEMBER SHACK: And, your secondary system piping, has much of that been replaced, or is it still all carbon steel?

MR. DREYFUSS: Go ahead, Norm.

MR. RADEMACHER: A lot of the high usage areas, drains and such where they go back to the condenser is chrome-moly. That was the original design.

MEMBER SHACK: Oh, the original design.

MR. RADEMACHER: And so, we haven't had to replace much of that.

MR. DREYFUSS: As far as recent plant performance, current plan performance, current plan status right now is, we are mode switch to start-up. We will be withdrawing control rods for start-up from our refueling outage.

Cycle 25, where we did the 20 percent power uprate, was a 549-day safe, continuous run. We had shut down for our prior refueling outage, did all of the maintenance, did some additional power uprate modifications, started the plant up, and it maintained -- we maintained it in service during the cycle, as well as doing the power uprate and power increase during the wave. So, a good, safe run, and a testament to the quality of the work that was done.

We started our refuel outage on May 12, 2007. Safe shutdown from that outage. We are starting up as we speak.

And, for key outage summary, one thing

that I did want to say, as far as the power uprate went, we were a full year operation at the extended uprate level with no challenges to the operators and good, safe performance of the unit.

A couple of key things as far the outage summary goes, some of the big things that we got done is, we did replace one of our large feedwater motors, the size of a walk-in kitchen, I would characterize it, pretty good size motor. That worked well, and it was fine. We did replace the last of the 345 KV breakers that we were seeking to replace. Again, that was driven by our long-range plan. We have a 15-year capital plan, and we have a large motor program, we are replacing and refurbishing motors as we go, and laying them out in a logical sequence based on priority.

MEMBER BARTON: Does that include your recirc motors as well?

MR. DREYFUSS: We are looking at the recirc motors as well, and that's a relatively high priority one for us as well. It's a big job.

MEMBER BARTON: Yes.

MR. DREYFUSS: The feedwater motor was a big job, had to cut a hole in the turbine building, cut a hole in the turbine building floor --

MEMBER BARTON: Roof, yes.

MR. DREYFUSS: -- it was a big deal, but very well done.

Service water, we replaced the discharge valve and check valve on our service water D train, our delta train of service water. Again, that was work that we are looking to do. We have the other trains laid out in our long-range plan that we'll be doing over the course of the next several years.

We did replace a HPCI high pressure cooling injection turbine exhaust and check valve, that we had had some history with leak rating. We put a new check valve in, it's working beautifully.

So, some of the highlights from the outage.

MEMBER ABDEL-KHALIK: Now, you've been operating with a MELLLA power flow limit line?

MR. DREYFUSS: We are, we are operating under the MELLLA operating regime, and we are -- we did some gamma scanning for this refuel outage in support of the GE application for the MELLLA+.

MEMBER ABDEL-KHALIK: And, your operators have had no problems operating with MELLLA in terms of the range of control that they have?

MR. DREYFUSS: That's correct. There

have been no problems. Ideally, the MELLLA+ will provide some additional operational flexibility, so that we have a larger flow window, in particular, end-of-cycle, so that we don't have to make as many pattern adjustments to the --

CHAIRMAN BONACA: You say a larger flow window, I mean, you have some flow window now?

MR. DREYFUSS: Yes.

CHAIRMAN BONACA: With the MELLLA?

MR. MANNAI: Yes, this is Dave Mannai, we have about a 4 to 5 percent flow window. It's a little bit larger than Brunswick's. We did some industry comparisons with them when we were going to implement uprate, and I'm pleased to report that over the last cycle we had a number of rod adjustments toward the end of the cycle, you know, as is typical, but not having MELLLA+ at a full EPU condition we did have to do more rod adjustments, but they are all done safely with excellent focus on reactivity management and performance. We had no issues as a result of that.

MEMBER ABDEL-KHALIK: And, you can enter into higher than 100 percent flow range?

MR. MANNAI: Yes, we implemented increased core flow back in late '99, early 2000 time frame, and

we went -- you know, we had the full 107 percent increase core flow. As you implement power uprate you lose some of that margin, so we went from 107 percent down to about 104.5, so our flow window is from 99 percent to, roughly, 104.5 percent flow, so we had a little bit more margin than one of the Brunswick units.

MEMBER ABDEL-KHALIK: Thank you.

MR. DREYFUSS: As far as an overall summary, excellent plant material condition. We did do a lot of looking as a result of a power uprate and the changes that we had made, and we found the plant to be in excellent health. We'll talk a little bit more about that.

We did not identify any significant equipment issues, routine items, routine added out of scope, and well managed and addressed. No generic issues.

Outage items of interest, a lot of interest from everybody on the steam dryer and its performance, as well as the performance of flow accelerated corrosion under the uprate power levels. I'd like to talk a little bit about both of those topics as well.

MEMBER MAYNARD: You said you are going to

talk more about your first bullet there, excellent plant material condition?

MR. DREYFUSS: Yes, sir.

MEMBER MAYNARD: Okay, because that's an easy -- that's a statement to make, but it doesn't really give me a feel. You obviously have some issues and some things that you are dealing with, I'd like to get a feel for kind of what level of items that you do have on your list of things to do.

MR. DREYFUSS: All right, very good, thank you.

As far as the steam dryer went during start up from the last refuel outage we did do extensive monitoring of the steam dryer to validate that we are going to remain within the low profile, code low profiles, and we did do that.

But also, during the course of the cycle we did online monitoring to a high degree. Additionally, during this last outage, lots of interest in terms of the steam dryer condition as we pulled it out of the vessel.

So, from an online monitoring standpoint, we have been monitoring, we saw no changes in reactor water level that we couldn't explain. Similarly, steam dome pressure, no changes there that would prompt us

or kick us into any off-normal procedure that we have for actual steam dryer issues.

Additionally, we do monitor moisture carryover, and we had no unexplained changes with moisture carryover. It tracked as predicted, with changes in power or changes in rod sequences, which, again, those were all anticipated.

MEMBER ABDEL-KHALIK: How is that measured?

MR. DREYFUSS: We use -- Norm, can you speak to this?

MR. RADEMACHER: Sure. We use sodium-24 testing. The chemistry performs the testing, and use a radioactive sample and verify. And, they do on a weekly basis, and we monitor statistically and see if there's any statistic changes, statistically unusual changes, every week.

And, the performance of that has been -- you could see the change with our uprate, as we increased steam flow you get more carryover, but then it stays relatively constant through the rest of the year for the cycle.

MR. DREYFUSS: It probably averages about .12 percent.

MEMBER ABDEL-KHALIK: And, the uncertainty in that is how much?

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

MR. MANNAI: We'll get that information and get back to you.

MR. DREYFUSS: It's very predictable. We'll get the numbers on the uncertainty for you.

For outage monitoring as well, we did take a look and found that there were no fatigue indications that have been seen elsewhere in the industry. I happened to be at one facility when they removed the dryer from the reactor vessel, and there were obvious flaws in that steam dryer, in particular, some of the areas where reinforcement and strengthening modifications were made. We took a look at all of those areas, and the steam dryer looks there were no indications, and the steam dryer is in very good health.

MEMBER BARTON: Are there any cracks at all in your steam dryer?

MR. DREYFUSS: There were some indications that we identified as well. We'll talk a little bit about that. We characterized them as IGSCC as well --

MEMBER BARTON: Okay.

MR. DREYFUSS: -- and dispositioned them

with General Electric as use as is. I'll explain some of those as well as we go forward.

MEMBER BARTON: All right, thank you.

MR. DREYFUSS: Go to the hyperlink here. This is a shot of the steam dryer here, and we did find these are the lifting lugs for the steam dryer. We found that on a tap weld on two of these lifting lugs, there's a structural weld underneath here, that was fine, but the tack weld, that's, essentially, anti-rotation for the lifting lugs, we did find a couple of small indications there, and they may be service-induced from lifting, lifting the dryer.

Where we did find IGSCC is, this shows here we have two steam dams, and they are about half an inch wide, 12 feet long, six inches high, and during the visual inspection, we did very high-quality visual inspections of this outage as well as last outage, we saw three indications right along one edge of the steam dam. They didn't turn the corner whatsoever, and they look like classic IGSCC-type indications, dispositioned as use as is. We concurred with that in our Civil Structural Group, and we will inspect them next outage.

CHAIRMAN BONACA: You didn't see them in

the previous outage?

MR. DREYFUSS: We did not see them in the previous outage.

CHAIRMAN BONACA: So, this is indications that developed over this period of operation.

MR. DREYFUSS: That's correct. What we had done, in 2004, two cycles ago, is we did do some strengthening modifications here, some weld build up at this particular area, as well as putting in a couple of gussets along the length of the steam dam to improve its strength, and we found that in the heat affected zone, where we did that work, that's where the IGSCC showed up.

MR. ARMIJO: So, you believe it's residual stress from your welding that caused the cracking to initiate there?

MR. DREYFUSS: Yes, Sir.

MR. ARMIJO: Do you have any micro structural confirmation that it was IGSCC and not something else?

MR. DREYFUSS: No.

MR. ARMIJO: So, it's just -- is there water up there? How can you have a cracking in a steam dryer? Is there liquid bays up there?

MR. MANNAI: A fraction of a percent.

MR. LUKENS: It's very low moisture content at that part of the dryer.

MR. ARMIJO: But, there was no metallographic sample taken to verify its intergranulars?

MR. DREYFUSS: That is correct.

MR. ARMIJO: So, it's an indication, and you concluded with G.E. that it was IGSCC.

MR. DREYFUSS: Right, and we will again look at it next outage to confirm that.

MEMBER MAYNARD: Can you explain to me what you mean by a very high-quality visual inspection?

MR. DREYFUSS: Yes, the standard that we used was G.E. SIL, Service Information Letter 644 requires visual examination. The technology that was used, the cameras that were used, the speed at which the cameras moved, the clarity of the water was very high as well.

MR RADEMACHER: And the lighting.

MR. DREYFUSS: And the lighting was very good.

MR. RADEMACHER: It was almost EVT -- met EVT standards, the enhanced visual requirements.

MEMBER SHACK: Now, how do you disposition this curve crack? You know, what's the process?

What's the acceptance criteria for the dispositioning?

MR. RADEMACHER: General Electric evaluates it. Well, first off, just to remind you, this is on the end of the steam dam, it's a ½ inch wide, just on the face of the steam dam.

Then they evaluate the condition, where it is, and whether it impacts the structural capability of the steam dryer, and then they provide a response to us that is reviewed by our structural folks to verify that it's acceptable.

And --

Larry, do you have anything to add to that?

MR. LUKENS: This is Larry Lukens.

We spent a lot of time on the phone with General Electric, both their metallurgist and their analysis folks, on this particular set of indications, and the cracks are consistent with IGSCC. The history on this particular spot in the dryer is that in 2004 there were a number of welds that were put on because of cracks found in structural parts in the vicinity of that steam dam.

This particular spot in the steam dam is not a structural part of the steam dam. It's about a 3-inch high piece of this 6-inch stainless plate, and

these cracks are characteristic of stress relief. And, in 2004, when the original indications in these areas -- this area was identified, there was a lot of discussion in that analysis about the stress induced by the welding, by the original manufacturing process.

There are four symmetrical locations to this specific spot, and only one of the four has these indications.

MR. ARMIJO: So, G.E. dispositioned that by saying, and correct me if I'm not saying what they told you, but these cracks were caused by residual fabrication stresses caused by the welding.

MR. LUKENS: That's correct.

MR. ARMIJO: And they must have assessed that these cracks wouldn't propagate and leave you with a loose part?

MR. LUKENS: That was our big concern, yes.

MR. ARMIJO: Okay, and that's been reviewed with the staff.

MR. LUKENS: No, the staff --

MR. DREYFUSS: Well, we did do a -- we had a telecon with Tom Scarborough and a number of the consultants that were involved in the steam dryer work, as a courtesy call, and did explain to them what we saw and what we had identified as well.

MR. RADEMACHER: And, in addition, we forwarded our detailed report to the staff for their review, as part of our license conditions, after each inspection of the dryer wall, for the next -- this cycle, as well as the next two refueling cycles, we'll be continuing to monitor the steam dryer, and we'll prepare a report for the staff for their review.

MR. LUKENS: That's a 60-day report.

MR. MANNAI: Yes, this is Dave Mannai. I think it's worth noting, we had set up that courtesy teleconference with the NRC staff ahead of time, even before we noted these indications, and we discussed those indications fully with the staff at that telecon, and much of the questions that you are asking now were similar to the questions they asked, and staff, I believe, was satisfied at the end of that teleconference. We owed them the formal reports in accordance with our license condition, 60-day report.

MR. DREYFUSS: And, some of the industry operating experience that we had followed is, there were substantial flaws here along the lower plate, along the gussets and shoes, as well as the gussets pulling away from the actual base plate here. Again, we looked at all of those areas, all of the preemptive strengthening modifications that we had done, and

found them to be in good order, no indications there.

MR. RADEMACHER: We performed over 460 inspections, both inside and out, and there was no change in any of the previously identified indications, and just the new ones that we have mentioned during our conversation here today.

MR. DREYFUSS: Any other questions on the steam dryer?

CHAIRMAN BONACA: Just the question I had was, you will inspect again at the end of the new cycle, and for how long do you plan to do inspections?

MR. DREYFUSS: We will follow the SIL-644 guidance. However, we did have a license condition that, rather than every other outage that we would do three successive --

CHAIRMAN BONACA: Yes.

MR. DREYFUSS: -- full inspections of the susceptible, accessible welds. So, this outage and the next two, we will also do the same type of high-quality visual inspection.

CHAIRMAN BONACA: So, the dispositioning was, essentially, for a cycle length, or a disposition that's acceptable for a cycle of operation.

MR. DREYFUSS: That's correct.

CHAIRMAN BONACA: And, they will be

inspected again.

MR. DREYFUSS: Inspect again next cycle, correct.

CHAIRMAN BONACA: Thank you.

MR. RADEMACHER: In addition now, as part of license renewal, we have an ongoing commitment to meet SIL 644 for the license extension period.

MEMBER SHACK: And, it is sort of a rock in a hard place. Every strengthening operation you make to protect against fatigue just gives you a new ISSC location.

MR. DREYFUSS: That was one of the concerns that we had, in terms of the modeling that we did on the steam dryer, to make sure that we had mesh sizes small enough to really get a good understanding of what the stresses were at those key locations. That did prove to have been accurate, and we don't see any indications.

MEMBER SHACK: Now, the fluids is up here low enough, you don't have to worry about helium in the stainless steel?

MR. DREYFUSS: Right, yes.

MEMBER ABDEL-KHALIK: Was the steam pressure monitored during the power uprate to detect any sort of high-frequency variations in steam

pressure?

MR. DREYFUSS: Yes, we had highly instrumented both the steam lines, feedwater lines as well, and looked at steam dome pressure, and we monitored any fluctuations there.

What we had learned from the industry is that there were some signals, acoustic signals, that were being brought from the main steam lines back to the steam dryer, that's what we monitored.

MEMBER ABDEL-KHALIK: And, what,were the results of those monitoring activities?

MR. DREYFUSS: We stayed well within the loads. We never -- it went as we predicted, and did not approach the ASME loads.

MEMBER ABDEL-KHALIK: And, what were the dominant frequencies?

MR. DREYFUSS: We had a frequency at 137 Hertz, and another one -- and we'll give you the exact numbers, but a little bit -- I think it was 148, 148 Hertz, and they coincided with the SRB branch line connections off the main steam lines. We had predicted we would see a spike there, we did see it there, it grew and then mitigated, and stayed within the limits.

MEMBER ABDEL-KHALIK: Thank you.

MR. DREYFUSS: Okay. Flow accelerated corrosion, this was another area that we paid particular attention to under the uprate conditions. We did increase the number of FAC inspections by 50 percent from what we typically do during outages. We did do 63 inspections overall. They were satisfactory and, in fact, they were consistent with your analytical predictions that we use in our modeling for FAC.

One area that, Jim, maybe you can talk about, the cross-around piping inspection that we did. It's one of the susceptible areas.

MR. FITZPATRICK: We've got one remaining carbon steel cross-around. Jim Fitzpatrick. It's the only thing left in the system that is still susceptible, so we use that as an indicator, and we've been doing visual inspections of that almost every outage. And, it's, essentially, the same condition it was in 1996, even with the power uprate.

We have visual marks on the inside, and they are still there after this cycle.

MEMBER SHACK: Okay, that's how you do the visual, it's still there.

MR. FITZPATRICK: Well, we did UTs, and we have a mat on the inside, and you go inside the pipe

and see if it's still there.

MEMBER SHACK: There's no wall thinning.

MR. FITZPATRICK: No and that's surprising.

MR. LUKENS: This is Larry Lukens, maybe, maybe the gentleman didn't completely understand what you said, there were marks -- marks we put on the inside --

MR. FITZPATRICK: Yes.

MR. LUKENS: to make sure that we understood

MEMBER SHACK: I was sort of wondering how you were going to do the visual, you know.

MR. ARMIJO: Poke in your head.

MR. LUKENS: Actually crawl down the pipe.

MEMBER SHACK: No, but I mean, you have marks, and if they are still there that's an indication you are not losing metal, yes.

MEMBER MAYNARD: The 50 percent increase in number of FAC inspections, is that just the number of inspections, or did you also increase number of locations that you are looking at?

MR. DREYFUSS: Jim?

MR. FITZPATRICK: A mixture of both. We do repeat inspections. We do some new areas, try to mix

it up, try to add more areas on the same system, look at the models, get more data for the check-works models we are using.

MR. ARMIJO: Now you used you have chrome-moly most here.

MR. FITZPATRICK: In the extraction steam system it's all chrome-moly. The heated drain systems, everything downstream of the local control valves are chrome-moly or stainless, except for the lowest load pressure here.

MEMBER SHACK: Do you have a feel for the amount of margin you have with this material compared to the carbon steel as far as FAC resistance?

MR. FITZPATRICK: EPRI publishes 34 times more resistant than the carbon.

MEMBER SHACK: Order of magnitude at least, huh?

MR. FITZPATRICK: Well, we are not seeing -- we've done some monitoring in the past 15 years on the chrome-moly and haven't seen anywhere at all.

MEMBER SHACK: And, this is 2-1/4 chrome-1-moly or what?

MR. FITZPATRICK: Some 2-1/4, some 1-1/4, EPRI rec -- even if you have a carbon steel that's got more than 1 percent it works.

CHAIRMAN BONACA: Going back to the 50 percent increase, what was the criteria used? I mean, you looked for still susceptible locations, right?

MR. DREYFUSS: Go ahead, Jim.

MR. FITZPATRICK: Jim Fitzpatrick.

Just for planning, going to the power uprate, we had pretty good confidence in what was going on prior to power uprate, and we figured we'd do 50 percent more inspections to get more data, just to get it back into the check-works models, and then at the end of the three cycles we'll be assessing where to go from there.

We've been on a trend of small in order inspections over time, and most of the industry is, too.

MR. DREYFUSS: Okay, and again, we'll continue to ,do the increased scope of these inspections for two more cycles.

Now, moving on to the license renewal project itself. As you have heard from introductions, we have a multi-discipline team, a good blend of people from both our Corporate staff, as well as at the site. At the site, we have personnel, not just from the key engineering programs, programs and components and system engineering, design engineering,

we also had operations, maintenance and other groups participate, so that we would get that synergy and make sure everybody sees what's coming here with license renewal.

We did, as far as the Revision 1 to the Standard Review Plan in GALL, it's noteworthy that both Pilgrim and VY were the first to go that route, and we are going to talk more about GALL exceptions. I know you are interested in that, but general overall -- over-arching philosophy on the GALL is that we comply with the GALL.

There were a number of areas where there, I'd characterize them as technical exceptions for the GALL that we needed to take, but we were conservative in the development of the GALL, and I think you'll find that these are relatively minor exceptions, and we'll speak to them in detail as well.

Of course, we incorporated industry lessons learned, both at Pilgrim and other fleet plants that have undergone license renewal, and others in the industry.

As far as the exception types, we have overall 30 exceptions to the GALL. As far as the types of exceptions, you know, for example, if we were committed to a different version of an ASME code, we

did take exception to the GALL. So, we've broken down the exceptions that we took into six categories that we'll describe to you, and I'd like to ask Alan Cox to brief you on that.

MR. COX: These six categories -- this is Alan Cox -- the six categories was our -- to try to characterize these exceptions, and you can draw the lines in different places, they are somewhat arbitrary, I guess, and there's some overlap between them. So, there's not a real clear-cut line.

The first category we've got there is where an activity is not applicable to the plant design. That was pretty straightforward. We may have -- I think we took an exception to metal enclosed bus program, where it talked about insulation between phases, we didn't have insulation between phases. In our bus, we had insulation or insulators that supported the bus, but we didn't have any insulation between phases.

So, we took, I guess, an overall philosophy on these exceptions, we took a pretty conservative or a literal interpretation of what was in GALL. If it said do an inspection, we did have an inspection, we tended to call that out as an exception. I think if you compare applications from

plant to plant you'll see that there's different degrees of that, there's different levels of conservatism or how literal you take things, so you'll see differences in numbers probably because of those factors.

The second category we've got there is an alternative that's consistent with approved methods. I guess one of the other philosophies that we took was, if we had a -- as you know, GALL says that that's one way of doing things, if we had an existing plant program that had proven within the, you know, the circumstances of our plant, our people, our training programs, if that existing program had proven effective over the years in dealing with that aging effect, we didn't make the change in the program just to say that we were consistent with GALL. We felt like it was more important to use what's already in place and what's establish and proven for our plant, for our circumstances.

The third category is programs based on different code --

MEMBER MAYNARD: Excuse me, alternative consistent with approved methods, from what I understood you to say, I'm not sure what the approved methods are. Is it approved method just because it

has worked for you, or is it other things in the regulations that --

MR. COX: In some cases it's -- the most obvious thing that comes to mind is the BWR VIP program. A lot of times you have specifics there that are -- maybe we've got an approved exception to the BWR VIP program because of plant unique circumstances, and we would take that approach.

MR. DREYFUSS: You know, Alan, we have an example that we could go to here.

MR. COX: Right.

This is one that dealt with the frequency, and we had approval of the Generic Letter 89-13, to do things at a refueling frequency, and I think the GALL report may have been more specific than that, it may have said annually. In some cases it was not practical to do it annually, you had the access to the system, you had plans to do things during refueling outages.

MEMBER BARTON: Your refueling outages are how often?

MR. COX: Eighteen months.

MEMBER BARTON: Eighteen months?

MR. COX: Right.

MEMBER BARTON: Okay.

MR. COX: That's an example of that category. Again, there are others. There was, oh, seven or eight examples I think that we had in that category.

The third one different ASME code edition, that's pretty straightforward. There's been a lot of discussion about that. There's was a handful of things that fell in that category.

Again, this category met the equal to or better than the NUREG 1801 method, that's a little bit of, you know, the second category that we talked about earlier is a little bit of the same thing, but we've got an example of that -- can you click on the example there?

MR. DREYFUSS: Yes, let's look at that.

MR. COX: The GALL analysis program, the GALL program, you know, again, was a program that was developed off of somebody -- some specific plant that was reviewed and accepted. Well, it turns out that that particular plant program had flashpoint testing in there. We have a practice at vy to do a fuel dilution test, which is considered to be a better indicator of the contamination of the lube oil with fuel oil than a flashpoint test. So again, it's an alternative that's equally effective, if not better,

than what was in the NUREG, and it's a fairly minor thing, it took pretty little interpretation and decided that that was something we needed to flag as an exception.

MR. DREYFUSS: Okay.

MR. COX: The experience justifies exception.

MEMBER BARTON: That's a scary one.

MR. COX: It really kind of ties back in to the philosophy that we were talking about earlier, where you've got an established program that's been proven effective under the plant specific circumstances that it's applicable to, and just go and click on the example of that, if you will.

Diesel fuel additives is specified in the particular GALL program. At VY, there's a long history of not requiring any additives beyond those which are provided as part of the manufacturing process by the fuel vendor, and we've had very good operating experience with the existing process. We didn't feel like it was appropriate to change that.

MEMBER BARTON: How about how about containment leak rate tests ten to 15 years, where did that one come from?

MR. UNDERKOFFLER: We presently Ted

Underkoffler -- we presently test containment on a ten-year basis.

MEMBER BARTON: Right.

MR. UNDERKOFFLER: We are right in a five-year extension right now.

MEMBER BARTON: About what?

MR. UNDERKOFFLER: On the analysis of the uprate analysis. We did the extension for five years.

MEMBER BARTON: One time?

MR. UNDERKOFFLER: One time only, and we'll be doing our integrated test in 2010.

MR. DREYFUSS: Go ahead.

MR. COX: I'd say there's only a couple exceptions that we considered in that fifth category.

The final one is the NUREG 1801 method is not feasible, and again, this examples that we had in that category were all related to the BWR VIP program, where the VIP program recognizes that some of the inspections that they called for are not technically feasible at this time, and, you know, they have some allowances in there. Larry could probably speak further to this, but that was -- all three of the items we put into that category were BWR VIP items, where the technology is not there to allow you to do the particular inspection.

MR. LUKENS: This is Larry Lukens.

Probably the classical example of this is the so called P9 weld and the core spray shroud the collar the P9 weld is inaccessible it's not visible, can't get there. Several years ago, we got a technique approved by EPRI to interrogate this weld by UT and that technique was subsequently disqualified because nobody currently believes we can come up with a UT technique to interrogate that weld.

So, that weld is inaccessible, and that weld is redundant to other welds, which we can examine, and which we have examined, we do examine those at the frequency specified by the BWR VIP, so that our inability to examine that weld doesn't affect structural integrity of the connection, it is an artifact of the way the plant was built, as all BWRs we build.

MEMBER BARTON: I think the concern I've got about this whole issue is that there were -- you explained your reasoning for not complying with all the GALL issues, but yet the audit team did find, when you did divert to your own program for whatever reason it was, that you did have to make additional commitments to that program that you were using, even though it wasn't a GALL program. So, that kind of

says: hey, how smart was the NRC team that was there that did the audit that picked these up that made you do -- that you then did agree to do some additional commitments to what you were doing. And, there were several of those in this whole stack of exceptions, and I guess that was the thing that was most concerning to me. Suppose somebody didn't pick this up, and you guys agreed to do additional things to the program you were doing. And, I don't specifically remember which ones they were, but there were a few of those like that.

MR. LUKENS: This is Larry Lukens.

I remember a few of those.

MEMBER BARTON: Yes.

MR. LUKENS: They dealt, in my area they dealt with things like frequency of inspections in fire protection systems.

MEMBER BARTON: Yes, that's one.

MR. LUKENS: And, the intervals that we have used are currently in our TRM, they were derived from are the same intervals that used to be in tech specs. They were the intervals that we've used successfully for as long as we've had a fire protection program.

And, we -- our preference would have been