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478TH ACRS MEETING

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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SUBCOMMITTEE ON PLANT OPERATIONS

478th ACRS MEETING

U.S. NRC

11545 Rockville Pike

Room T-2B3

Rockville, Maryland

Wednesday, December 6, 2000

The above-entitled meeting commenced, pursuant to notice, at 8:35 a.m., the HONORABLE DR. DANA A. POWERS, presiding.

MEMBERS PRESENT:

DR. DANA A. POWERS, ACRS Member

DR. GEORGE APOSTOLAKIS, ACRS Member

DR. THOMAS S. KRESS, ACRS Member

MR. JOHN D. SIEBER, ACRS Member

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DR. GRAHAM B. WALLIS, ACRS Member

DR. ROBERT L. SEALE, ACRS Member

DR. WILLIAM J. SHACK, ACRS Member

DR. ROBERT E. UHRIG, ACRS Member

DR. MARIO V. BONACA, ACRS Member

DR. GRAHAM LEITCH, ACRS Member

MS. MAGGALEAN WESTON, Designated Federal Official

PARTICIPANTS:

FRANK GILLESPIE

MIKE JOHNSON

TOM BOYCE

DON HICKMAN

DOUG COE

P R O C E E D I N G S

[8:35 a.m.]

CHAIRMAN SIEBER: The meeting will now come to order. This is a meeting of the ACRS Subcommittee on Plant Operations. I am John Siebert, Chairman of the Subcommittee on Plant Operations.

ACRS members in attendance are Dr. George Apostolakis, Dr. Mario Bonaca, Dr. Thomas Kress, Mr. Graham Leitch, Dr. Dana Powers, Dr. Robert Seale, Dr. William Shack, and Dr. Robert Uhrig, and Dr. Graham Wallis.

The purpose of this meeting is to discuss the changes to the revised Reactor Oversight Process since implementation of the pilot program. The subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full committee.

Maggalean W. Weston is the Designated Federal Official and Cognizant ACRS Staff Engineer for this meeting.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register on November 15th, 2000.

A transcript of this meeting is being kept and will be made available as stated in the Federal Register notice.

It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they can be readily heard. I also request that speakers use the microphones provided for you, so as to aid the subcommittee's members' understanding of the information that you are providing and also to aid the Court Reporter in obtaining an adequate transcript of the proceedings of this meeting.

We have received no written comments from members of the public regarding today's meeting.

We originally had scheduled a presentation from NEI, but NEI is unable to make a presentation at this meeting because there are, it turns out, a lot of meetings going on with the NRC and NEI has a limited staff.

I would like to also welcome Rich Janati, who is an old friend of mine, and works for the State of Pennsylvania in the Department of Environmental Resources and is the State's representative, one of the State's representatives for the inspection of certain aspects of power reactors in Pennsylvania.

As you are all aware, the NRC Staff has developed a power reactor licensee oversight process which is intended to mesh with the concepts of risk-informed, performance-based regulation. Over the past few years the Commission has directed that the Staff develop and implement

risk-informed, performance-based concepts on their own volition and in keeping with the recommendations of the General Accounting Office.

The direction that the Commission has taken is also in concern with modern management concepts used throughout private industry.

These concepts have indeed led to general improvements in productivity, safety, economic viability, and competitiveness for many businesses in the United States. The nuclear industry in general supports these management concepts and has supported them in the past, so it is prudent that the Commission has embraced these concepts and recognized that the institutional concepts that make up our current business atmosphere are successful and they are also applicable to Government regulation.

In today's program the NRC Staff plans to present information on the implementation of the pilot program, performance indicators and the significance determination process.

I would like now to invite any members of the subcommittee to express any views that they may have at this time.

DR. APOSTOLAKIS: Are we going to have a detailed presentation of the SDP, give us an example? We never really did that.

MR. BOYCE: Well, we have got two slides. I am not sure how detailed two slides can be.

DR. APOSTOLAKIS: Is it in this package?

MR. BOYCE: It is in that package.

DR. APOSTOLAKIS: I think it is too high level.

CHAIRMAN SIEBER: I think what you are looking for is working through a specific case.

DR. APOSTOLAKIS: Yes, that was the idea of the subcommittee meeting.

MR. BOYCE: Okay. We could have done that, George, because I mean we just came off doing that with Indian Point 2 in immense detail, which is kind of our near term, worst case effort you might say.

MR. JOHNSON: We would be more than happy to do it at not this meeting perhaps, but at a future time. We would be more than happy to sit down and go through --

CHAIRMAN SIEBER: And I would be just fascinated to go through and understand how the fire protection SDP process works.

DR. APOSTOLAKIS: There is an example here in the document I received from Ms. Weston on operator requalification. To read it by myself is agony but if somebody explains it that would be great.

So there is no way we can do this today?

MR. GILLESPIE: Doug, are you familiar enough with

that one --

DR. APOSTOLAKIS: Or anyone. Do you have any other example that is already on transparencies?

MR. COE: I don't have anything already on transparencies. If you wanted to give me an hour, I can go back to the office and try to put something together. I don't know if it would meet your needs or not.

If you are interested specifically in the fire protection area, I am probably less able to provide a good example in that area because, as you are well aware, it is very complex.

DR. APOSTOLAKIS: Any example that will be the easiest for you to put together in an hour and come back. We will try to ask questions so it will delay the whole thing for you.

[Laughter.]

MR. COE: Are you more interested in the Reactor Safety SDP with the Phase 2 worksheets and that sort of thing?

DR. APOSTOLAKIS: Yes. I would like to see those worksheets, what decisions the inspectors have to make, because we have never done this.

All of a sudden, you know --

MR. COE: Give me an hour and I can try to put something together.

DR. APOSTOLAKIS: If that is okay with you guys?

CHAIRMAN SIEBER: Well, this is an appropriate time too, since NEI isn't here. We will have time. We have the room. The meeting is intended to last until Noon.

MR. JOHNSON: I guess I ought to mention that one of the reasons NEI is not here is because we have -- our branch is meeting with NEI, one of our regularly-scheduled meetings.

CHAIRMAN SIEBER: On the same issue.

MR. JOHNSON: Yes, on the same issue, so Don Hickman, for example, who is here to talk about performance indicators, we were really trying to enable him to talk early on so they can get back and support that other meeting, so there are some additional time constraints on us.

MR. GILLESPIE: Doug, pick a typical one --

MR. COE: Reactor safety.

MR. GILLESPIE: Reactor safety SDP -- something at least proceeded through the Phase 2 worksheets to a white or a decision at that point?

DR. APOSTOLAKIS: Yes, or maybe led to a more detailed analysis.

MR. GILLESPIE: Or it goes to Phase 3.

DR. APOSTOLAKIS: Yes.

DR. SEALE: Could I make another suggestion?

CHAIRMAN SIEBER: Yes, sir.

DR. SEALE: I think it would be perhaps appropriate to put Mr. -- what was your friend's name again --

CHAIRMAN SIEBER: Janati.

DR. SEALE: -- Janati on notice that if he has any comments that he feels that would be appropriate for the committee to hear from a perspective of the state system, when we get through I think we would be very interested to ask him to make those comments.

THE REPORTER: Can't hear you.

DR. APOSTOLAKIS: You have to come to a microphone.

CHAIRMAN SIEBER: There is a microphone right here -- on the side.

MR. JANATI: My name is Rich Janati and I am with Pennsylvania Department of Environmental Protection. I am pleased to be here today. I am here as an observer. I have not prepared any comments or was not planning to make any comments, but I will be happy to ask questions if you would allow me to do that.

[Laughter.]

MR. JANATI: Either during the presentation or after the meeting.

DR. SEALE: Well, just any comments at the end

that you might be --

MR. JANATI: I would be happy to do that.

DR. APOSTOLAKIS: Instead of asking a question, start by saying "I wonder why" --

[Laughter.]

DR. APOSTOLAKIS: That's a comment.

MR. JOHNSON: Really, we are learning the process. It's a new process and unfortunately there were no pilot plants in Pennsylvania so it is going to take us some time to learn the process. Thank you very much.

CHAIRMAN SIEBER: Thank you. Any other comments?

I noticed in a recent edition of Inside NRC they talked about applying the oversight process to steam generators and if you in the course of your presentation, if you have any insights that you could tell us about, what your intentions are in that area, I think that I would appreciate hearing that.

MR. BOYCE: Okay, perhaps after we go through the SDP, reactor safety SDP, that discussion in question should come up because I think it will be a little more clear, particularly in light of what we are doing with IP-2 so let me try and cover it during that part.

CHAIRMAN SIEBER: And I understand that that is all prospective at this time and no real decisions have been made, and so that ought to be on the record, but I think it

would be interesting for the subcommittee to hear about the potential plans you might have in that area.

MR. BOYCE: Yes, we can touch upon it, but the first thing is steam generators are in fact covered by the Reactor Safety SDP today.

CHAIRMAN SIEBER: Right, okay.

MR. BOYCE: So I wouldn't want to imply that they aren't, and in fact it worked at Indian Point. We appraised it through it. There were multiple degraded cornerstones. We went into reactive inspection. Reactive inspection ended up in coming up with a Red finding, but then at the end we can address what the future plans may be and what the pluses and minuses, because no one has really decided where it is going.

One concept to think about is if for everything that comes up you decide you want to have a set of indicators, you pretty soon will be overwhelmed with the number of indicators you could have.

One of the recommendations is have indicators for steam generator leakage. Right now we do have an indicator -- that is 75 percent of tech specs. Is the problem the indicator or is the problem the tech spec is too high?

Those are the kinds of questions that are getting asked as a result of the Lessons Learned Task Force.

CHAIRMAN SIEBER: Well, it would be good if you could review that for us, so with that what I would like to do is ask the Staff now to begin.

MR. GILLESPIE: Let me say a few words. We are keeping everything as static as possible, so we are here to report we have had minimal change from the last time we talked to you.

It has been difficult to do, by the way. Don is going to come on first and talk about the most visible thing that you have heard complaints about or seen issues on, and that is on the PI for unavailability. He can kind of give you a status on what is happening there.

People didn't like the scram PI so we have got a slightly different PI with a slightly different name but with a similar focus and that is being trialed, and so Don can address some of the PI things and then he's got to get back over to the NEI people who couldn't come here because they are going to talk to him over there on exactly some of those issues.

The reason we have been keeping the program static, if you remember one of the major criticisms of the pilot program was it was a small sample and nothing happened and so because nothing happened we couldn't judge, if you would, in a severe case how the program would have reacted, and so this first year of initial implementation has

actually been an expanded sample size to include the whole industry.

We have a comprehensive program that got put in place about a month ago to collect information and data which really won't yield any results until about February or March. We are now collecting information.

We do have anecdotes and they are strictly anecdotes of various instances, and Doug will probably cover one in the SDP of where we applied it and where it appears to actually quite honestly have worked, but we have kept it very static, so we are not here to tell you of a lot of drastic changes because if we changed in midstream we wouldn't be able to appraise how the program was working and we felt we needed the entire industry for a full year with some stabilization in it, to then step back and say now what would we change in an integral way, because the whole thing is linked.

So you will be disappointed if you are thinking yo are going to hear a lot of revolutionary changes because we deliberately haven't done them but we do have them backlogged but we want to see how to do it.

MR. LEITCH: These changes that you are going to talk about, are they changes since the full implementation in April or prior to the full implementation?

MR. GILLESPIE: Since the full implementation in

April.

We have a Commission paper up, for example, on the Reactor Safety SDP. As a result of a Quad Cities inspection it was fatally flawed, so that is the one fatal flaw that we found that caused us to go back to the Commission and say, hey, this one needs to be changed and we offered the Commission a temporary solution while we get with the stakeholders again and try to rework the right kind of ground.

That was the one major, major flaw that did come out of it. The others we have had some tweaks to improve inspection report format, to resolve smaller questions around the edges, and the team will kind of go through what some of those were -- but no revolutionary changes.

We really have tried to keep the basic program stable.

In inspection space we have not altered scope, depth and frequency of inspections. We have really tried to maintain them and take the heat for where it is not perfect until we can get a full year cycle in and be able to step back.

With that -- Tom?

MR. BOYCE: Well, actually, we are going to go slightly out of order. I was just going to present an overview, but I think Don Hickman is going to go first and

talk about performance indicators, who will dive right into that so that Don can get back and meet with NEI and keep working some of these issues that we are trying to take care of. Don?

MR. GILLESPIE: While Don is walking up, I think you are going to see that one of the problems that has really manifested itself with the PIs, and it happened with unavailability and in the scram PI and in some of the others, everyone seems to want to have a custom PI. In fact, PE&G -- Pacific Gas & Electric -- is coming in and they are going to be talking individually to different people because they don't like the new scram PI alternative we are testing because for their facility seaweed twice a year gets backed up in their screens. They have to do a rapid down-power and they sit there and wait.

So even the new PIs that we are trying have people already before we have tried them saying they don't like them, which means some places envision a future, and George will remember this from an earlier presentation, at some point we have to evolve to something that is going to likely have to be more plant-specific, otherwise we are going to get overwhelmed with exceptions, so I will give you that one upfront.

You were right. We knew we had to get there and it is almost like it is starting to develop on how we might

do it and where are the first places that it might best be tried, so there is a longer term vision we still have in mind on that one.

DR. APOSTOLAKIS: In fact, I believe there is work by others in the Agency trying to develop plant-specific.

MR. GILLESPIE: The risk-based PIs or risk-based data --

DR. APOSTOLAKIS: Yes, yes.

MR. GILLESPIE: -- and that is again a three-year vision.

DR. APOSTOLAKIS: Right.

MR. GILLESPIE: And so I think we are pretty much in synch that there is something that we need to do now in sort evolving in that direction.

DR. APOSTOLAKIS: Okay, very good.

MR. HICKMAN: Good morning. I am Don Hickman. I am the Task Lead for Performance Indicators and Reactor Oversight Process.

I am here today to talk a bit about the experience we have gained in the last year with the pilot program and now with initial implementation and some of the things that we have done with the PIs.

We have a process that we call the Frequently Asked Question process, perhaps a bit of a misnomer. Typically they are questions asked once that we address.

We have over 230 of those that we have officially answered and a number in line to be answered. Many of those resulted in clarification for the guidelines. A few resulted in some changes. We recognize the need to make some changes to what we were doing. We continue to get these and we will continue to get these for a number of reasons.

The first bullet on my slide talks about the complicating factors that have generated a lot of these questions. One is the variety of plant designs. An example of that would be the post-accident recirc mode of what we have been calling the residual heat removal system, which is a typical Westinghouse design, and it turns out the CE plants have a very different means for performing post-accident recirc, and so we had to address that issue and come up with a definition of how they should report the equipment that performs that function.

Another variable is the tech specs, a lot of tech spec requirements that vary from plant to plant. An example of that is the way that licensees measure reactor coolant system leakage. Some plants measure total leakage and unidentified leakage. Other plants measure identified leakage and unidentified leakage. Some PWRs include primary to secondary leakage in the totals. Some don't.

With Indian Point it just so happens that they did

include primary to secondary leakage in the totals so the PI for Indian Point did fall out the bottom. In another plant that might not have happened.

Another factor is a difference in operating procedures. We came across this with regard to the scram with loss of normal heat removal indicator and what we said was that if the indicator would count those events where the normal heat removal path through the main condenser was lost and that path includes main feedwater, and we found at least one plant where -- in a boiler -- where they have been instructed to when they hit double-0 on a scram if HPSI and RCSI start to, just let it go, or even if they don't start, the feedwater pumps continue to run, to let the level fill up until they hit the trip point and trip the main feedwater pumps and that they should concentrate on the other scram recovery actions, so that is something that they were trained to do. They would lose main feedwater and so we had to address that issue -- should it count or should it not count.

We told them that if that is their procedure and that is the way they operate the plant that that would not count.

Those are just some of the issues and, as I say, there's a couple hundred of those.

Another factor here is the licensee response to

the program. I guess as we might have expected, we have set these thresholds and so the licensees will set internal thresholds below those to ensure they don't exceed the threshold and go White.

Of course, for every layer of management there is another lower threshold and what we wind up with is licensees who want to have zero events. They want to keep the unplanned power changes. They want to try to not have to count every unplanned power change, every safety system function failure -- all of these kinds of events, and that is a problem.

The program wasn't designed to work that way. The program was designed to provide this normal operating band in which they could operate the plant and have a certain number of events that we would leave to their corrective action program and we would not get involved, so those kinds of issues, this desire to minimize or reduce number of events to zero, has generated a lot of questions as well.

Probably the most significant factor, however, is the unintended consequences, and those are perceived differently I think by different groups.

The scram issue, the fact that we count manual scrams, and of course INPO has not done this in the years that they have been collecting their performance indicators, that rose to a very high level in industry. A few high

level people are concerned about the unintended consequences of counting manual scrams and the effect it might have on operators, inhibiting them from performing a manual scram when necessary.

We have not been terribly concerned with that. We have not included manual scrams in the AEOD PIs, but we always track manual scrams. We watched those over the years. They have remained relatively constant.

Even though the automatic scrams have come down significantly, the manual scrams have come down only about 20 or 30 percent where the automatic scrams, as you know, have down significantly more than that.

We will continue to watch the manual scrams. We really aren't terribly concerned about an operator not manually scramming the reactor when he thinks it is necessary, but we have to address the industry's concern, so what we are doing is --

DR. APOSTOLAKIS: I am not sure it is the industry's concern, you know?

I have seen letters from very senior people complaining about this, but then I have been in meetings where actual operators are and other experienced people and they just dismiss the issue, that the operators will never think that way, so I don't know where the senior people got this idea that this will inhibit the operators.

MR. GILLESPIE: George, there is a difference, as we were going through this, talking to different senior people. The industry is definitely not a monolith on this question.

DR. APOSTOLAKIS: Exactly.

MR. GILLESPIE: There were several very, very senior, very large utilities -- Southern Company was most notable -- that came in and said we object to this, so in this case I would not want to say we had a monolithic industry.

DR. APOSTOLAKIS: Exactly.

MR. GILLESPIE: There was an industry concern in one segment of the industry but then there was Dave Garchow, people at other utilities, who said this is no big deal, our guys are trained. They are going to do the right thing and you have given us three scrams. It is not zero.

So there is a difference of opinion out there but Don's stuck addressing it.

DR. APOSTOLAKIS: And it also seems to me, and you touched upon it, we cannot talk about removing manual scrams from the PI without at the same time without finishing the sentence talk about the numbers you have put forth.

That three has to change, in my view. The numbers were set, the way I understand it, having certain PIs in mind.

MR. GILLESPIE: Right.

DR. APOSTOLAKIS: Now if you start removing things are you keeping the three and the six and the 25 --

MR. GILLESPIE: Well, let me let Don -- those -- one is normal operations, the other is risk-informed. In this case normal operations is a better indicator than risk-informed maybe, but he's got a different alternative. He can touch upon that.

DR. APOSTOLAKIS: Very good.

MR. HICKMAN: You are absolutely right.

If we change the indicator, we have to address the thresholds and we will do that.

DR. APOSTOLAKIS: Sure.

MR. HICKMAN: What we are doing right now is we have begun a pilot program with 21 utilities -- or 21 plants to try out the replacement indicator that's been agreed upon. It is called Unplanned Reactor Shutdowns.

This is what Frank was referring to earlier. It, unfortunately, has a time limit in it. It talks about 15 minutes from the time of commencing the insertion of negative reactivity until reactor shutdown.

The idea is to capture the same information that we captured with the old definition, which said very clearly manual and automatic scrams, but without using the word "scram" -- that is the concern to the senior people in the

industry.

We will collect the first data December 21st for two months and we will run it for a total of six months and we will look at what we have. As Frank mentioned already, Pacific Gas & Electric and Diablo Canyon have complained that 15 minutes is too short. On the other hand, we have received complaints from another utility who said 15 minutes is too long, so we are kind of stuck in here in the middle.

My gut feeling is that whenever we have a time limit we set ourselves up for problems and that we are going to probably see that in this indicator. It was the best that we could come up with given the constraints and the time we had to do it, so we will see what happens and we will you involved.

MR. LEITCH: Will that new indicator also include therefore automatic scrams, since they are instantaneous? I mean they are less than 15 minutes obviously.

MR. HICKMAN: Yes. It is intended to capture all automatic and manual scrams. The concern was it might capture a few others, but the intent was to try to make it capture exactly the same data as the old definition.

DR. APOSTOLAKIS: So it is 15 minutes now?

MR. HICKMAN: That is the way that it is worded.

It says 15 minutes from the time of insertion of reactivity until -- negative reactivity until you are shut

down.

Oh -- that would also include -- we have two indicators that count scrams. One is just the scrams, what used to be called unplanned reactor scrams, and the scrams with loss of normal heat removal. Both of those have been changed to be worded the same way and we'll see what the results of that will be.

The other indicator in the initiating events cornerstone was unplanned power changes, and we have always had more concern about that indicator.

Again, it has numbers and the numbers start causing problems.

It has the 72 hour rule, and the way the indicator is worded is that what is important is whether the licensee has planned the shutdown or not, and we use a 72 hour rule which simply says that if 72 hours have elapsed from the time you have identified an off-normal condition until you begin the reactor shutdown, then we consider it planned.

Now it does not matter what degree of planning has occurred during that time. It is simply 72 hours.

The other aspect of that, the other numerical aspect of that is that it talks about a greater than 20 percent power change.

We've had a number of questions, a number of issues about both the 72 hours and the 20 percent. We think

that there have been some cases where this indicator has influenced licensees to do things they would not have done otherwise, either to perhaps wait 72 hours and try to ride the problem out, or to come down less than 20 percent in power, see if they can fix it, and if they can, then they're off free, and if they can't, they'll have to come down further to fix it.

Those are the kinds of issues that we're concerned about there. We are discussing alternatives with the Industry Working Group, NEI and their representatives from the utilities, and we intend to pilot an alternate indicator to replace the unplanned power changes. We would hope that that would start relatively soon.

I should mention that we have a formal process for making changes to the program. We've made some changes early on that maybe weren't thought out completely, and in a few cases, have caused a few more problems.

What we've tried to do now is to have a very structured and formal process that would be very deliberate so that the changes we make are thoroughly understood and piloted, and we know -- we have some idea of how they're going to work before we make the changes.

DR. LEITCH: In the 72 hours, I would think that a lot of times, a situation comes up, an elective power reduction that could be done, say, within 24 hours, or could

be done beyond 72 hours. Maybe the system operator makes that decision as far as wait till the weekend.

So if this situation occurs on a Friday, he might say, well, might as well do it right now, although it could have been deferred for 72 hours. Does that enter into this expression, that it could have been deferred for 72 hours? Or is it actually deferred for 72 hours?

MR. HICKMAN: The guidelines say that the degree of planning is measured only by the 72 hours, and not by whatever paperwork or anything else that you've done. But that issue has come up.

We had early in the pilot program, a licensee who had a problem that had occurred in the past. He had all the paperwork to fix it then available.

He felt that he could go out and fix it right away and it would be planned. He already planned it. So he started the shutdown before 72 hours. And what he was told was that it's the 72 hours that's the determining factor, not what planning you have done in the past. That is an issue.

There are many cases where they conceivably could do it very well, have it well controlled and well planned in much less than 72 hours.

MR. GILLESPIE: This is one of those cases where you have to keep in mind that the indicator isn't zero.

DR. LEITCH: Right.

MR. GILLESPIE: It allows for this, but the institutions have driven themselves to say, well, we don't want to use that allowance, just in case something happens later.

DR. LEITCH: Sure.

MR. GILLESPIE: And so we've got a disconnect between the theory and how we thought it would apply and how the institutions are actually applying it and driving things to zero inappropriately.

DR. LEITCH: This could be an unintended consequence if you defer maintenance for 72 hours and you're all ready to go in 24, but it's an issue of managing the indicators. That's what happens with performance indicators. People manage the indicators.

MR. GILLESPIE: And they're managing them because it's a just-in-case; in case something comes up I haven't anticipated in six months, I don't want to already be at one or two.

CHAIRMAN SIEBER: It seems to me that under some circumstances, and indicator like that that people are trying to manage, too, might be adverse to safety or good operating practice.

MR. GILLESPIE: It's interesting that the inspectors haven't seen this, and we get it anecdotally, and

it's almost like every utility talks about another utility would do it.

So, it's a tough one to get your arms around, because we don't have specific instances that we can sit down and analyze and say, well, does that mean the threshold should be adjusted, if, in a practical sense, there are two or three of these a year, shouldn't we make allowances for that?

And that level of detail and discussion doesn't seem to quite gel on this one yet.

CHAIRMAN SIEBER: On the other hand, I don't think that you specifically need examples of situations that have occurred that have brought decisions one way or the other.

It seems to me that logic would indicate that there might be or could be some situations where this would be adverse to safety.

MR. GILLESPIE: We agree, and what we're grappling with is what's the alternative to it that still gets to the safety meaning we are trying to get to, but allows the plants to operate.

CHAIRMAN SIEBER: I can think of instances in my own career where we reduced reactor power to reduce radiation dose because we had sent people into the containment. And, you know, to me that was the right thing to do.

Under this system, you get penalized for it.

MR. HICKMAN: Another issue has been brought up by NEI that under deregulation, licensee may reduce power at night at low load times to fix minor problems so that they can be sure to operate before the peak load the next day.

And this might change -- might result in more power changes.

CHAIRMAN SIEBER: And you have the other situation which we had frequently where the system operator would call you and say, the voltage is too high on the system, and you have to cut back. And we did that every weekend. I don't know how that fits into the grand scheme of things, but, you know, we followed the letter.

MR. HICKMAN: Well, this indicator has a fairly high threshold. It's set at eight, and so we allow for it. That means you have to exceed eight to go white, so we have allowed a significant number.

CHAIRMAN SIEBER: That would take me eight weeks.

DR. BONACA: It seems that the example you gave, you know, operator coming down at night to fix something, and it seems almost in the definition, 72 hours as part of the definition, really is the problem, rather than the concept.

DR. KRESS: Particularly for things that routinely they do a lot. You know, it's the same process and if they

do it routinely, you could probably relax that 72 hours and still call it a planned power change.

MR. GILLESPIE: That's why we're talking to them. Do you want to address the alternatives?

MR. HICKMAN: Well, this indicator, we like it because we benchmarked this two years ago, and it showed a pretty good correlation with watchlist plants, trend-letter plants, and -- but what we used at that time was the best information we had, which was from the monthly operating reports.

And in the MORs, licensees had to tell us about changes in average daily power level of greater than 20 percent from one day to the next.

That's actually what we benchmarked, and so that's one of our proposals. Now, we've got two of them, and that's one that we go back to exactly what we benchmarked, exactly what licensees had been reporting in the monthly operating reports for many years.

And that's changes in average daily power level. And we would count those any time that those occurred.

Those are a little more difficult to manipulate, because we're not talking about a rapid power change and then coming right back; we're talking about being down in power long enough to make a change of 20 percent in average power.

DR. KRESS: That would smooth out your time problem.

MR. HICKMAN: Yes, yes. That would solve a few of the problems.

DR. LEITCH: Does it depend on whether you do maintenance during that power reduction? In other words, say, on a Sunday night, you just come down 20 percent because of load-carrying situation and that's one situation?

But say you're in that period of time and you also decide, well, the water box differential looks a little high, and we'll clean the tube sheet while we're down. Does that make a difference as to whether that's an event or not an event?

MR. HICKMAN: It could. In the monthly operating reports, they had to report any change in average daily power level, but for each one, they had to indicate whether it was forced or scheduled.

Now, if it was an equipment problem that forced them to come down, as opposed to a scheduled power reduction, we could tell the difference.

And actually, what we benchmarked was just the forced power reductions, so we could do it either way; we count them all, or we could identify just the forced power reductions and count those.

DR. LEITCH: I see.

MR. HICKMAN: Safety system unavailability is probably the most contentious indicator. It's got the most issues associated with it.

We borrowed this one from WANO for a couple of reasons: It was available; licensees had been reporting it for many years to WANO.

But as we got into it, we found some problems. A lot of these, I think, had to do with the closer scrutiny that we were giving to the reported data with the inspectors doing verification inspection.

So licensees became much more concerned about getting this data accurate, and so a number of -- many of the licensees have changed the way they calculate the -- the way they collect the data, to make it conform.

Probably the two biggest issues in the indicator are the use of fault exposure hours. WANO does not have an unreliability indicator. So they got some unreliability information into the unavailability indicator by counting fault exposure hours for surveillance test failures.

And that causes a problem. We've had three licensee in initial implementation fail an 18-month surveillance test, and so if you take half the time, they have nine months of unavailable hours for the system.

And it's really not representative, I guess, of the risk significance of that failure. In some cases, they

could have recovered relatively easily.

That's an issue; what do we do with fault exposure hours?

The other significant issue with this indicator has to do with -- oh, the WANO indicator allows licensees not to count unavailable hours when the train is not required, even though the system may be required, the function may be required.

And an example of that is -- the best example is emergency diesel generators when you're shut down. If you're in cold shutdown or refueling or de-fueled, you're only required to have one diesel.

Therefore, the other diesel can be taken out and you can do anything with it that you want to, and you don't have to count it.

That means that licensees who do diesel generator maintenance while shut down, don't have to count the biggest hunk of the unavailable hours of the diesel, the overhaul.

But those that are doing it online would have to count it by those rules. Within the last few years in the 90s, we have issued a couple of dozen of extended AOT tech spec changes to extend the AOT to allow licensees to do that work online, and they have justified that with a risk analysis and the requirement in Reg Guide 1.177 says on the order of five times ten to the minus seventh, incremental

conditional core damage probability.

And they have shown that, and the argument is, if it's no risk here to do it online, then when I'm shutdown, why would I have to count it here and not have to count it there?

We've addressed that issue and we have made an exemption for people who have shown by risk analysis that there is, in fact, no difference in this.

But that's opened the doors and we've gotten all kinds of other requests now for other things, and once you open the doors, that --

DR. KRESS: Well, that gets you back to this plant-specific PI, I think.

MR. HICKMAN: Exactly.

DR. KRESS: And I think that's what it's going to end up being.

MR. GILLESPIE: It's surprising, and what we've done in trying to -- we talked about this way, way back in the beginning -- in trying to apply a consistent oversight process and consistent measures to all the utilities, what it's done is started to expose the inconsistencies in the requirements themselves.

Some people have this tech spec; some people have that tech spec; some people have this leakage, some people have that leakage, and what it's doing is, the warts are

coming -- the warts in our requirements are coming out via the oversight program to some extent.

And now we're trying to deal with the warts, and I think we have to be very careful that we don't deal with them incorrectly; that if the underlying problem is in the requirement, that we don't do too much adjusting on oversight and not get at the right problem.

So there's a caution there and a real reason why we have a very deliberate slow process for change. It's an interesting measure to come up, and we always thought the requirements would now have to consistently catch up with us.

And they really are and that kind of insight is starting to come out of this.

DR. APOSTOLAKIS: Also, I think you will remember that we've had the problem in the past with the definition of unavailability.

The industry simply takes the down time divided by the total time, but in PRA's that's not the unavailability; that's only a component, and it includes the unreliability, I believe, that the industry has.

And for some reason, people don't want to develop a consistent set of definitions. I don't know why, but --

MR. HICKMAN: And that's a big issue within industry, too. They want to have -- to report one set of

data, one time, but we have a variety of different definitions between WANO --

DR. APOSTOLAKIS: Do you have any idea why they don't want a uniform set of definitions? I don't understand that.

I had a telephone conversation with some folks at Research two or three weeks ago, and they were adamant that we shouldn't do it.

It's a mystery to me why we shouldn't even try. I guess these definitions are so entrenched within the industry that if you try to change them, it would be a major task, so it's probably easier to change the PRA, guys, and say that at least in the PRA, we start talking about it.

But there's such a reluctance to have a uniform definition that we had it also with an appendix that was in one of the NEI documents, I remember, related to the maintenance rule, where the definition, again, was inconsistent with --

DR. BONACA: And we recommended, in fact, that there would be a definition provided, and that -- because it was brought to us as a presentation that the lack of a consistent definition, in fact undermines the benefits of certain rule implementation for station blackout.

MR. GILLESPIE: Yes, in this case there now is a major industry effort with us, but actually the industry is

deriving it to come up with a uniform definition. As it happens, the INPO-WANO piece of this is more awkward for them than the NRC piece. In fact, the maintenance rule and the oversight definition are -- we're going to get the words changed, but they're going to be exactly the same, and there's no problem on the NRC side of things with making those two exactly the same.

And the industry likes our definition better than they like INPO's and WANO's. So they're going against their own institutional momentum.

They were participants in developing ours, much more recently than the INPO and WANO development took place, and so now they're trying to harmonize the other interests to the industry and the NRC's.

DR. APOSTOLAKIS: So your definition, then, is what, of unavailability?

MR. HICKMAN: We use the definition that came out of the WANO indicator, which says that the unavailable hours, divided by the hours the train was required to be operable.

DR. APOSTOLAKIS: So it still does not include the probability of the failure to respond?

MR. HICKMAN: It does not, no.

DR. APOSTOLAKIS: Even if it's available.

MR. HICKMAN: We feel -- I personally feel a great

responsibility to try to work on common definitions in everything that we do in this process.

And we've done that in a few areas, with the maintenance rule people, with the PRA people, people in Research, with the reporting requirements people, and in our program in a few areas.

This is a big one. The industry is pushing all of us to do something here. The real difficulty is working with WANO.

INPO represents the U.S. utilities, and we can work with them better than we can work with WANO where they have the influence from the European and Japanese plants.

That is more difficult, but it's something that we will pursue. We need to pursue that.

DR. APOSTOLAKIS: Now, if you have an interim between tests of T, and it's unavailable for tau, then you take one-half of tau over T or tau over T for the unavailability? Do you remember? If you don't remember, it's okay.

MR. HICKMAN: We used T over two in those cases where you have no knowledge of when it failed. You only know that I ran the test and it didn't work. The last time I know that it worked was 18 months ago.

DR. APOSTOLAKIS: So you divide by two?

MR. HICKMAN: So you divide it by two.

DR. APOSTOLAKIS: Now, the division by two is to -- if you average the unavailability over time, and you do it, you know, in the PRA context for a long time horizon, then it makes sense to divide by two.

But if you go actually and find that this component was down during this interval for a certain period of time, I don't know that you need to divide by two. Why should I take the average? I can find the exact availability. It was down for 16 hours and the interval, you know, was 700 hours.

DR. KRESS: And if you don't know how long the interval was, you'd want to multiply it by something, rather than divide.

DR. APOSTOLAKIS: I don't know why you have to divide by two.

DR. KRESS: I don't either.

DR. APOSTOLAKIS: It's these details that somehow we -- I mean, this comes from a PRA. We don't like the definition of PRA, so PRA is different. But then we see the one over two in the PRA, we like that, we take it and use it.

This is like picking and choosing from risk-informed regulations. We use what we like.

I think we need to have a group sit down and write down what exactly we mean by all these things, and why we

divide by two, why we don't divide by two, and have a common understanding of these things.

MR. HICKMAN: Well, you're right and you hit on a good point, that the T over two tends to dominate the statistics.

DR. APOSTOLAKIS: Sure.

MR. HICKMAN: It only takes one failure, and it dominates the statistics.

DR. APOSTOLAKIS: But its purpose was different. It was the long-term unavailability, you know, to eliminate transients.

MR. HICKMAN: The tradeoff comes with the amount of root cause analysis you have to do. How much time and effort do I want to put into this failure to try to figure out exactly why it happened, so that I can determine with a high degree of probability, when the failure actually occurred, rather than take in the T over two.

We've had licensees go to great lengths, trying to do that.

DR. APOSTOLAKIS: Were they successful?

MR. HICKMAN: It was a random resistor failure. They sent it to a lab to try to determine the time of failure of the resistor, spent quite a bit of money, spent quite a bit of time, and they came up with what they thought was the most probable time.

They had to de-energize the circuit, and when they re-energized it, they think that that's probably when it blew, and they were probably right, but they couldn't prove it, of course.

MR. GILLESPIE: George, this is one where Pat Baranowski and his team are supporting us to try to come up with the reliability indicators of some kind, so that we can get rid of this term. No one feels comfortable with the term, versus risk-based PIs in total. He had a near-term deliverable to us to try to see if he could come up with a scheme on reliability.

So we're hoping we come up with that, and then we're kind of more in tune with the real number we want to look at, how reliable is it when you go to turn it on?

The other piece that's interesting is that if the component is that important, why do we let the surveillance interval be that long?

Well, because the component probably isn't all that important. So that's another aspect that kind of gets into are we measuring the right thing, are we judging it the right way?

DR. LEITCH: In the area of unintended consequences, if there's too much pressure to drive down unavailability, it can have an adverse effect on reliability, a lot of this unavailability is for maintenance

on systems.

MR. HICKMAN: You're right.

DR. LEITCH: If there's too much pressure to not do that, to push that out into the future, that can have a negative impact on reliability.

MR. HICKMAN: Yes, industry has mentioned that. Of course, this is an indicator where zero is not good.

DR. LEITCH: Right.

MR. HICKMAN: You don't want to be zero, necessarily. You want to have some preventive maintenance, and we understand that.

We used the WANO data from the last three years to set the thresholds. When we got into the program, licensees began to realize that they had not been reporting completely to WANO.

So the thresholds may or may not be set appropriately. What we've told them is, we will continue to monitor the thresholds, and if we see more up-to-date, more realistic reporting pushing the thresholds, we'll look to see what we can do.

But we need the data. We don't know what threshold to set if we don't have the right data.

DR. LEITCH: We're not trying to drive this to zero.

MR. HICKMAN: Definitely not. In fact, WANO, when

they set their goals for that, they have a lower goal and an upper goal, and they set a band.

DR. LEITCH: Right.

MR. HICKMAN: Let me go on to the next one, the safety system functional failures. This is an indicator, copied exactly after the AEOD indicator called Safety System Failures. We've been using that one for 15 years.

It correlated very well with the watchlist plants and the declining trend plants. It picked out every one of them.

We're trying to reproduce the same thing with licensees, making that determination on their own. We had the Idaho lab reading LARs and coding these events.

And now the licensees are doing that. Probably the biggest issue in this indicator is the reactor core isolation cooling system.

That system is reportable by about a third of the boiling water reactors. The others have not in the past been reporting it.

It is a risk-important system. It shows up and ranks very highly. And, in fact, at some of the plants, it's right behind emergency diesel generators and high-pressure coolant injection.

So on a risk-informed program like ours, we need to count RCSI, but in the past, we would not know about all

the RCSI failures because they weren't in LARs. As I said, only about a third of the plants put them in there.

We're now discussing with NEI in our meetings about adding RCSI to the list for reporting safety system functional failures.

The way it's worded now is, to capture exactly what we did in the past, we ask them to report to our program, any of the failures that required reporting in accordance with 10 CFR 50.73, the section that says any event or condition that could prevent fulfillment of a safety function.

But some licensees didn't report RCSI failures under that at all. So we're adding that one or we would like to add that one.

MR. GILLESPIE: Again, an example where you try to do something uniform, the inconsistencies of the past start showing up; that some facilities -- I don't know if you're familiar with this one, but some facilities did not account or did not need to take RCSI into account in their accident analysis, so they said it's not a safety system we need to report, and other facilities did.

Well, it's safety-significant at all those facilities, independent of how they did that licensing analysis. So again, so Don's caught betwixt and between now.

DR. KRESS: That one strikes me as not being the same character as the other unintended consequences.

MR. GILLESPIE: This one doesn't have a down side.

MR. HICKMAN: The last bullet is on the problem PIs. All of the indicators in those two cornerstones, the barrier integrity and the physical protection, are under review.

We eliminated the containment leakage performance indicator that used to be in the barrier integrity cornerstone, for the reason that Frank has talked about here; that is that the requirements to measure and record containment leakage varied so much, and in some cases, they were not even required to report as-found leakage, only as-left, and, of course, as-left had to be good or they couldn't start up. So it didn't tell us a whole lot.

We have similar kinds of issues with RCS activity and RCS leakage. They're measured different ways, with different procedures, over different time intervals and all of this.

And the activity measurement is something we expected would tell us something about integrity of the fuel clad barrier.

But, in fact, it said it ran white at 50 percent and white/yellow at 100 percent of the tech spec limit, and what we're seeing is that when you have a significant number

of fuel pins leaking, that you don't get very close to 50 percent. You maybe get ten or 15 percent.

So the threshold is set pretty high. And if you do have leakers, you're going to do whatever you can to minimize that by maybe reducing flux or making slow power changes. You try to manage that and try to drive that number down.

So that indicator, we don't think tells us a whole lot.

And I already mentioned about the RCS leakage, how it's measured differently at different places, and some things are included at one plant and not at another.

The physical protection cornerstone --

DR. KRESS: On the leakage, on the barrier integrity, do you have an indicator -- I forget what they all are, but do you have one on the unfiltered in-leakage into the control room envelope?

MR. HICKMAN: No.

DR. KRESS: That's not one of them?

MR. HICKMAN: No, that's not.

DR. KRESS: Okay.

DR. WALLIS: It does seem though that leakage is an important thing to know about, but because it's difficult to do, you have to think more about how to do it.

MR. HICKMAN: I believe that we could make a

useful indicator out of RCS leakage, but we don't have it now. Right now, it measures only one of three parameters that could cause the plant to have to shut down.

We measure either total or identified leakage, and we had one plant that had that to zero at one time. They had some unidentified leakage that was slowly going up.

It never got really close to the tech spec limit, but if it had, we would have had a PI that showed zero, and then the plant shuts down because of RCS leakage.

So it's not structured very well, and perhaps if we restructure it, we can get something.

DR. WALLIS: That doesn't mean to say you should throw away the idea.

MR. HICKMAN: No, I agree.

CHAIRMAN SIEBER: It seems to me that the Staff about 10 or 15 years ago had an inspection module on leakage, RCS leakage, and in the process of applying that inspection module to PWR plants, I think a lot of utilities tried to adapt their calculational methods so that they would be consistent with the NRC guidance.

Is there an opportunity to go and sort of redo that or inform licensees as to what the Staff's position is on calculating leakage?

MR. HICKMAN: That might be a useful thing to do. I'm not really familiar, I guess, with what you're talking

about.

CHAIRMAN SIEBER: Yes, it goes back quite a number of years.

MR. HICKMAN: That may be something we should look at.

DR. SHACK: Those leakage requirements are in their tech specs, so it's not simply a matter of issuing the guide. I mean, you literally have to change the tech spec.

MR. GILLESPIE: Yes, and I think this is one of the things that's going to come out of the IP-2 lessons learned report. One of the recommendations was that we should develop some PIs for steam generator leakage.

Well, then you have to ask why? Well, because everyone reports it all over the place right now, by tech spec. It's different ways, as Don said.

So then I've challenged this, and my question is, if the problem is the reporting requirement and the tech specs, then let's fix that problem and not have a de facto fix through PIs. If we have a reporting requirement that's not right, let's fix the reporting requirement and don't do a de facto fix by manipulating it through oversight.

And so that's kind of my question that I have on the table, and we're all going to be looking at those kinds of questions. Indian Point brought it to a head. What's the right leakage number? Is it consistent? Do we have

apples and apples?

And the answer to all of those things was no.

We shouldn't fix it the wrong way, and I think that is going to be very important. So this is the going to be the first test of can we fix it the right way in the next year or so.

DR. LEITCH: I would think in some cases, plant instrumentation may be different plant-to-plant, so it may not be just as easy as --

MR. GILLESPIE: Oh, you may not be able to monitor what -- the right parameters.

DR. LEITCH: Exactly. Yeah, right, exactly.

DR. KRESS: This barrier integrity cornerstone seems to be a lot different animal than all your other PIs. You don't count numbers of incidences, you count amounts of leakage or amounts of activity, or how close you approach some figure of merit like a PTS or something.

It seems to me like all the plants are going through some sort of process of leakage occasionally and fatigue on the things, and approaching some sort of degeneration of barriers to some extent, aging. It seems to me like when you are measuring performance of the plant, you shouldn't be asking how many times it leaks or how much leaks, you should be asking what the licensee did about it. What was their response to it?

Is there some possibility of changing the nature of those PIs so that it really looks at -- I think you used to look at the response to it, how did they react to it. Did they find it? Did they find it in time? Did they shut down and fix it?

DR. APOSTOLAKIS: I thought that was in the action matrix. Was that in the action matrix, what the licensee proposed to do?

MR. GILLESPIE: Yeah. The answer to both questions is yes. And if you go back to the first time we came and talked about this PI, the PIs for containment are kind of like a different animal. It is almost like a measure of how much you love your containment process, okay, it really is. It is how much do you love it on a day-to-day basis. The real risk issue is, do I have a big hole and is the big hole going to be there when the accident occurs?

DR. KRESS: Big holes you don't know about?

MR. GILLESPIE: Yeah, big holes I don't know about so I can't measure them. And we haven't gotten there, the damper that is open. In fact, 10 years ago we used to have a lot of dampers left open and valve lineups. We are actually not seeing a lot of those now. They love their containments more now and they seem to be more careful about those things.

But, yeah, it is the ongoing -- what is the

ongoing measure to make sure that I don't have a hole in my containment that would be there in an accident. The only containment that gives us an easy answer to that is probably the sub-atmospherics, the couple that there are. Because if you can maintain a vacuum, you are probably okay.

We don't have a similar parameter for the other containments. In fact, that would be the ideal parameter would be to say if you can maintain some sense of atmospheric differential, the pressure inside and outside of containment, I don't have a big hole, I am in good safety space. We haven't gotten there, though.

DR. KRESS: Well, let me ask you a question about that. Dana and I are familiar with the big tanks up at Hanford, and one of the things they do is measure the diurnal pressure changes outside and inside, and there is a lag between those, and the lag has to do with the leakage, how fast, how much they are leaking. Is that a possibility for containments? I mean you would have a continuous, sort of a continuous measure, rather than a vacuum. It is the same thing as looking at --

MR. GILLESPIE: I honestly can say I raised that and was basically ignored by my staff, early on.

DR. KRESS: Shame, shame on them.

[Laughter.]

MR. GILLESPIE: No, I did raise that, because

everyone measures pressure, they have got the inches of mercury, water, whatever, inside and outside. I would like to still keep that on the table, because to me that is a real safety measure, and on a continuous basis, so I have some integrity in my containment.

I have talked to Steve Floyd at NEI about it on several occasions and he keeps kind of saying, well, I will ask about it. But then the first thing someone is going to ask, is that a safety grade barometer? And I think there are some people --

DR. KRESS: Is this also a backfit?

MR. GILLESPIE: Is this also a backfit? So there are some other institutional issues. But I think that is the right thing we should be getting to. And I haven't quit, I am very patient.

DR. WALLIS: There is a great virtue of simplicity.

MR. GILLESPIE: Yeah.

DR. KRESS: Can we help you?

MR. GILLESPIE: Well, I think it is there. I think the guys are going to be -- that we will be talking more about it, and just see if we can get there, because for the oversight process, it doesn't have to be safety grade. It just has to be realistic.

CHAIRMAN SIEBER: It would seem to me, though,

that there's a lot of things that are going on in containment. You know, it is like RCS leakage, when you go to measure that, you have to hold the plant steady. You can't be changing power, and you meter everything and then you come up with a calculation.

On the other hand, you know, the biggest energy input into containment is the ambient temperature, the heat input, and that changes from time to time depending on plant power level and all that, and that would overwhelm some subtle change that is caused by the sun shining or not shining.

We used to be able to tell when you turned the lights on in containment, that would change the pressure.

MR. GILLESPIE: But, see, that could be a good enough indicator. I think Joe Murphy told me one time many, many years ago that if you have anything less than about a five inch diameter hole, you don't really have a problem. It was interesting that, in fact, you might get more clean energy out early in the accident and may, in fact, be better off.

So there are some concepts here. But the idea -- you don't care what the pressure is, what you are trying to do is see, is there always a difference? Because it is that difference in pressure that says you are not communicating adversely with the outside environment. I kind of like it,

but I haven't gotten anyone to totally buy in on it yet, but I haven't quit.

CHAIRMAN SIEBER: I have worked mostly with sub-atmospheric plants. It was very easy to tell what was going on in containment.

DR. LEITCH: In a more general sense, though, it seems to me as though a lot of these performance indicators are really lagging indicators. And I guess what I think we need to be more concerned about is a licensee's performance. And I think that is what you get at when you say, do they love the containment, do they love a lot of other things as well.

And I guess I am concerned that I don't see any performance indicators on some of these cross-cutting issues, which I think are more of an indication of -- more of an anticipatory indication of licensee performance. I am thinking about, I think there are three cross-cutting issues, human performance, safety culture, and corrective action programs. And I guess what I am wondering, is there any intention of developing performance indicators on some of these things?

I mean I think the licensee's corrective action program is a very, very important part of this, and it addresses some of what Dr. Kress was saying earlier, in other words, how thorough has the licensee's corrective

action been, how prompt has it been? And there are a lot of ways that that performance could be measured. But is there any thought of doing that type of thing so that we try to get in an anticipatory mode rather than a lagging mode?

MR. GILLESPIE: Well, I have to question, what are we trying to anticipate? Because one of the underlying premises of the program was our thresholds are set low enough that something is going to show up. Crossing a white threshold is not the end of the world, yet it has become the definition of significant. It is not, in fact, safety significant.

So our indication, and I give you an example, Kewaunee, Kewaunee had problems with the sirens, they went yellow. The result of that was that the sirens had a problem they didn't put in the corrective action program, it had not been dealt with in a timely manner. A reactor inspection took place, identified the corrective action program. And, in fact, that site ended up going outside their system to get help to improve the corrective action program.

Which was one of the anecdotal cases which, to us, kind of said, well, you know, our system maybe kind of works. It wasn't that it was the corrective action program for the sirens, it was the plant corrective action program, that when we reacted to that indicator, was the broken

piece.

DR. LEITCH: Right. But I guess what I am saying is you had direct indications that performance indicators of the health of the corrective action program, wouldn't that be more of an anticipatory thing than waiting to see that the sirens didn't work and trace it back to the corrective action program?

MR. GILLESPIE: Well, at some point there is the threshold between the regulator and the guy running the plant, and that is what our program is really groping for. And we want an indication that we are protecting the health and safety of the public. And we are not trying to anticipate that.

DR. LEITCH: You can only do that in the lagging sense.

MR. GILLESPIE: Well, lagging --

DR. BONACA: But you are inspecting the corrective action program.

MR. GILLESPIE: We are inspecting it.

DR. KRESS: Yeah, you take care of that end on the inspection.

MR. GILLESPIE: In fact, we have an annual inspection that runs around 240 hours, which is actually a lot of man-weeks, and 10 to 15 percent of every inspection procedure focuses on the corrective action programs in the

area of the procedure. So it is the most inspected area we have.

DR. KRESS: And those are subjective judgments, and I think the principles of these PIs here was to try to get that subjectivity out of it as much as you could.

MR. HICKMAN: Yeah, but it is not all out.

DR. KRESS: You can't get it all out.

MR. HICKMAN: I mean the biggest increment of our program is actually individually focused on corrective action programs. Now, do we have a measure for it? No. Do we have an insight into it? Yes.

DR. BONACA: And you do monitor for that, for example, the number of condition reports per year?

MR. HICKMAN: Yeah.

DR. BONACA: And you are looking at the fraction of those which are in the top tier.

MR. HICKMAN: And how many are repeats, which systems they affect.

DR. BONACA: And the corrective actions that the utility takes for the corrective action program, actual improvements and so on?

MR. HICKMAN: Yes.

DR. BONACA: So you do monitor that?

MR. HICKMAN: Yeah. But we don't have a measure for it, that's true.

DR. LEITCH: And a lot of those types that you just mentioned, repeats, age of corrective actions and so forth, would lend themselves to a performance indicator.

MR. GILLESPIE: And then you have to have all the utilities define their aging process and their priority system the same way. And I am just giving you a sense that it is probably the biggest backfit we could ever try. I mean that is getting right to the heart of how people manage their facility. And to try to regulate at that level, I am not sure we would be successful.

Right now we say you have to have a corrective action program, you have to follow Appendix B. There is a lot of freedom utility-to-utility within those regulations.

I am not saying it wouldn't be a neat idea to do, but as a practical sense, and within our mission, I am not sure really how to do it.

DR. BONACA: More and more it is becoming, when look for license renewal, so many commitments are going back to the corrective action program. And so it becomes a more and more important tool for the regulator, too, I mean not only for the licensee. I understand it is a management tool for the licensee, but so many of the commitments to the regulator are made through it, it is becoming really a shared system it seems to me.

MR. GILLESPIE: Yeah, I agree, and it dominates

the inspection piece, we just don't have a PI for it.

DR. BONACA: No, but the question I had is, since the inspection also ends up with the color grades and so on so forth, so that also should have some visibility, right, in the process?

MR. GILLESPIE: Oh, it does. If you look at our web page and look right underneath the little graphic that has got the cornerstones, there is the PIs, and then the next line is the inspection results. And it has got the latest color, the latest applicable color under each one.

DR. APOSTOLAKIS: Isn't the concept of a leading indicator a relative one?

MR. GILLESPIE: It is relative to what you are trying to indicate, George. And that is what I am really saying is what we are trying to indicate.

DR. APOSTOLAKIS: All of these are really the performance indicators, are leading, aren't they?

MR. GILLESPIE: We think these are leading in the sense of public protection.

DR. APOSTOLAKIS: Right. That is my understanding.

MR. GILLESPIE: But they aren't leading in the sense of economic protection for getting an indicator that turns yellow or an indicator that turns white, or an inspection finding that is white.

DR. APOSTOLAKIS: That's right.

MR. GILLESPIE: And what ramifications that may have on the utility, that is their responsibility. So it is -- that is what I am saying, it is exactly -- it is relative to what you think you are protecting from.

DR. APOSTOLAKIS: Now, if you wanted to have the indicators that Mr. Leitch talked about, then it seems to me you have to rely on the significance determination process a lot, because you would be talking about programs. So if you find something, then you go through the SDP to determine the significance of that, isn't that true?

MR. GILLESPIE: That's true.

DR. APOSTOLAKIS: Okay.

MR. GILLESPIE: And that is one of the difficult things on corrective action programs. If you take any one thing, any one thing by itself, there is no synergism with other things.

Part of the picks to this, by the way, may be A4 was implemented, A4 became effective as the Maintenance Rule, which is fundamentally asking the question, is my plant safe today in its current configuration? That is going to help, because if your corrective action program has a number of out of spec, inoperable, non-functional systems in it and they are backing up, you are now going to be doing a daily analysis in a risk sense that sets your threshold

for operation that day, which will include all those backups, because it is the actual configuration of the facility on any given day.

So I am coming at it a little different way. It is say if you have a big backup of safety significant things in your corrective action program, where things are inoperable, you are going to start bumping up against A4 and the recommended limits within A4. And that is kind of one of our backstops to the whole thing.

DR. LEITCH: Are we going to hear a little more about what you did at Indian Point 2? Is that part of your presentation today or later, or could we talk about that now?

CHAIRMAN SIEBER: Well, it seemed to me that --

MR. GILLESPIE: No, I think we need the right crew of people, because that one went all the way, George, this one went all the way to Phase 3, went through the process of the interchange between us and the licensee.

DR. LEITCH: I guess my fundamental question was, was that work done after the steam generator tube rupture or was it predicting that they were in trouble prior to the steam generator tube rupture?

MR. GILLESPIE: After. After.

DR. LEITCH: It was reactive.

MR. GILLESPIE: Yeah.

CHAIRMAN SIEBER: I think what we ought to do on the discussion of Indian Point would be to do that after the break, you know, because we asked them to get a few things together for the us.

MR. GILLESPIE: Yeah. This is not a cop-out, but Doug has been involved in most of the panels with the process. On Indian Point, it was Steve Long who really chaired the panel and was kind of full-time on it and acted as kind of the headquarters PRA/SRA expert on it. And I have been to three or four presentations, and whatever we said would be hearsay, and we really should get the right people to kind of go over that I think.

CHAIRMAN SIEBER: All right.

MR. JOHNSON: If I can just add a point. There is nothing in the -- to go to the question from a different way, there is nothing in the process that we set up that would try to be leading of events. That is to say that we expect that there will continue to be events, and that you will have PIs that react to those events.

The process, though, was set up with PIs and the series of thresholds to enable us to step back and look at what the PIs and the inspection findings were telling us in a timely manner to enable us to take action to really address subsequent performance declines that would result in that plant being unacceptable.

So, and we were discussing that a little bit earlier, but I just wanted to make sure that we were clear. There is nothing -- you know, we don't want to leave you with the impression that we tried to set up a series of PIs that would forecast, if you will, upcoming events or enable us to make sure that those events didn't happen, because we know that events will continue to occur, but what we are really focused in on is the performance of the plants and the actions, regulatory actions that we take, and licensee actions that are taken to prevent that plant's performance from becoming unacceptable.

DR. LEITCH: I guess I thought I heard earlier that you were quite impressed with these performance indicators in light of the Indian Point 2 event. And I guess that's good. It was retrospective. I would have been more impressed if somehow the indicators gave you some kind of a tip-off that there may be some kind of a problem that will occur at Indian Point 2, and you are saying that that did not occur, right?

MR. GILLESPIE: That did not occur.

DR. LEITCH: So that the indicators, in retrospect, were useful.

MR. GILLESPIE: The indicators did not prevent the leakage event from occurring, but it did give us reasonable assurance that if you did have an event like that, your

safety systems and your crews could react appropriately and protect the public. In that case, I mean the whole event was over in a matter of hours, if not minutes. All the right appropriate actions were taken, all the safety systems worked. So we are not trying to predict that leakage event, but we are trying to say that the plant will not have a public protection problem with those events occur.

There is a leakage event, what, someone told me every seven years, and it really doesn't matter who does anything about it. It just seems that about seven years there is one of these things.

DR. BONACA: So, do you mean that that kind of performance that you indicate then has nothing to do with the judgment that you have on the licensee?

MR. GILLESPIE: Then you go in and you look and you say now, was there a program failure? But now you are after the fact. Was there a program failure that contributed to this event, that if we don't correct it, would make this event happen again? And in the case of Indian Point, it was.

DR. BONACA: We have discussed this before, I mean as far as some of the judgments we expressed, that maybe the indicators were not as useful as, for example, the inspection program. That, because the inspection program, if you went really into the paths of the corrective action

program, it will give you insight in how the organization thinks and operates, and it may be a predictor of possible troubles in this future, while these indicators really are simply a statement of certain events, of facts, and then you have to analyze them to determine whether or not there is anything to do with the reports.

MR. GILLESPIE: Yeah, but is a total program. The indicators, you can't have indicators of inspection.

DR. BONACA: As you know, I was more critical at the time, and I am beginning to see some of the benefits of the program as-is, but, still, there is an issue of the fact that these are not leading indicators of anything in particular.

One thing that, by the way, I wanted to ask you was, before Dr Kress, I think, raised the issue of this doesn't really recognize performance. For example, I mean you have got an example on barrier integrity, you may have a border where there are examples of that, you have one pin failure, and many licensees have taken the conservative action of shadowing the fuel rod even early in the cycle and losing, literally, four to five months of operation because of that.

And yet if you do not shadow that pin, most likely you will not even exceed these ranges of activity. Okay. You will have probably, however, contamination that

licensees don't like to have. But really, I think it is an very important indication of licensee philosophy and safety commitment, a decision to shadow or not shadow.

And is there anything in the inspection program that allows for this kind of recognition to be given to certain decisions? Or is it totally, you know, blind to those kind of decisions?

MR. GILLESPIE: No. In fact, one of the recent changes, the most recent change to what goes into an inspection report, Manual Chapter 610, now actually allows or causes the inspectors to put those types of things into the reports. It is not subjective, it is not going back to the old way we used to write reports, but there is now a lower level of thresholds for documentation of those, so that we don't lose those insights.

And, in fact, that is one of the indicators that Don said it has kind of got a problem with.

DR. BONACA: Because the industry struggles with those issues. And then if they see that there is no payback whatsoever from a regulatory standpoint, and there is no recognition whatsoever, why would you sacrifice four months of operation or more just because you want to be as clean as you can, you know, to be as responsible as you can to your people. I mean it is good motivation, but I think that there should be some regulatory incentive that is always

important.

MR. GILLESPIE: That causes them to go that way.

DR. BONACA: Yes. Do the right thing.

MR. GILLESPIE: Yeah. I agree. But our reports now do recognize that a lower level, and that was a change a month ago, I think, when we put out 0610-Star.

MR. HICKMAN: Let me just go very quickly. The concerns about the security, the safe physical protection cornerstone, there are three indicators there. The one is the protected area, security equipment, performance index. We use the compensatory hours, the guard hours, to compensate for equipment that is out of service as the measure, so it is kind of a surrogate.

There has been some desire on the part of some to actually count the number of hours that the equipment is unavailable rather than the number of hours that a guard is stationed. That was done largely at the instigation of the industry, because that information is readily available. They know how much time they paid the guard force for overtime to do the compensatory hours.

We are looking at that one and what we can do to make that perhaps a better indicator. There are a number of problems with it, but the funny thing about it, it is the same thing I noticed when I worked in the old AEOD PI program, was that despite all the flaws that some of these

indicators appear to have, the results came out pretty good, about as we expected. And, in fact, we have had some good results. We have had about two or three licensees at the beginning of initial implementation that were yellow in that indicator, and really had no idea how their equipment was performing until they saw that. And they made quick changes to fix it. So it has had a good impact on licensees who did not have adequate programs for security of the perimeter.

But there are still complaints from industry on that. We are still looking at that one to see if there is maybe a better way to do it. Although, as I say, we had identified the plants that we thought had poor programs and needed to address them.

CHAIRMAN SIEBER: It seems to me, though, that when you are told your licensee applies a compensatory measure for a failed piece of security equipment, the assumption is that the degree of physical protection has not declined because the comp measure was applied. And so you aren't really measuring, for example, the effectiveness of physical protection, you are measuring the availability of the equipment.

MR. GILLESPIE: Yeah, and that is one of the reasons we were able to go with the PI, because it didn't measure reduced security. We actually got comments from some other government agencies involved in security of

infrastructure that said, well, you don't want to publish something that someone says this plant has poor security, because that kind of sets them up.

CHAIRMAN SIEBER: Right. Here is the unlocked door.

MR. GILLESPIE: The attribute you just described made this okay as a public PI because it really was getting not at the security status of the facility, but trying to get at the operability of the equipment that was expected to be there, that they were actually licensed in the security plan as the norm. So compensatory measures are becoming norm. That really wasn't consistent with the way we thought the place was operating.

So it is an interesting quandary. It made it useful in a public PI because of that attribute.

CHAIRMAN SIEBER: Right. Now, let me ask another question. I have been to some sites where, on a regular basis, the fog rolls in in the morning, and so the cameras are not as effective as they might be, and sometimes the security supervisor will post out because of the degree of fog, so he can protect the isolation zone. Is that counted as part of the --

MR. GILLESPIE: No. Environmental factors are not counted against them.

CHAIRMAN SIEBER: Okay.

MR. GILLESPIE: It is really trying to focus on failures.

DR. LEITCH: Just a couple of real specific questions about performance indicators. In our handout, we got a sheet that looked like this, with various plants, and just a number of keys, the letter N, I and U are used on this. Do you know what they stand for? I just couldn't find that.

MR. HICKMAN: Some of them are not applicable. For example, the reactor core isolation coolant system, there are plants that have isolation condensers, don't have RCSI 2.0 plants. So an N should be not applicable. Incomplete, are there some on there? That would indicate that the licensee hasn't reported all the data.

DR. LEITCH: The U and the Y.

MR. HICKMAN: The U.

DR. LEITCH: And the Y, yeah.

MR. HICKMAN: Yes. There are some thresholds that are under development. For example, and maybe we are a bit tardy at this, you might see that under Oconee. Oconee has a very different emergency power system. We haven't yet established the thresholds for Oconee with their hydro units.

MR. JOHNSON: Incidentally, what that page is a printout, really, a printout of what is on the external web.

It is a summary rolled up of all of the performance indicators that are available. And so it is just a picture, if you will, for any stakeholder to get on and see where the performance indicators stand with respect to the plants. And we are developing an additional page that does the same thing for inspection findings, so you can take this same kind of a look.

In addition to that, you can look for an individual plant to see what that plant's performance indicators and inspection findings are.

DR. LEITCH: Are these columns labeled on the web?

MR. JOHNSON: Yes. In fact, the reason why I mentioned that was to make mention of the fact that the labels are there, and the explanations are there.

DR. LEITCH: Okay. Good. Thank you. And just one other specific question. Well, I am not really sure, we had some information in our handout concerning simulator operational evaluation. Is there a performance indicator under development there?

MR. HICKMAN: There is not a performance indicator under development. We do use simulator evaluations in some areas. We use it under an emergency preparedness for drills. We allow them to use simulator drills. That may be what it is referring to. I am not sure what you are looking at.

DR. LEITCH: I just noted that if I am interpreting this chart correctly, that if eight out of eight crews failed, that is a yellow, and I guess -- I don't know what would drive it to a red.

MR. COE: That is the significance determination process that has been proposed. We have discussed it with industry, and we expect to add it to the Manual Chapter in the near future. But that is requalification, and it is there to monitor the success and/or non-success of the requalification program in testing their crews.

DR. LEITCH: Am I interpreting it correctly that if eight out of eight fail, you consider that a yellow? It says Y.

MR. COE: Yes, Y is yellow, that's correct.

DR. LEITCH: I would think that would be pretty red if eight out of eight failed. Pretty bright red.

MR. COE: Right. I think you have -- I can't go through all of the basis for each of those. The way that that chart was set up, the old SDP was run, we would have to have somebody from the operator licensing group that worked on that come in here and explain that in more detail to you.

MR. BOYCE: At this point, we can -- I was actually going to present an overview of where we were and set the stage.

I'm Tom Boyce, I'm the Acting Section Chief in the

Inspection Program Branch of NRR. We went slightly out of order this morning, because we need to get Don Hickman to the NEI meeting that's ongoing right now.

I was going to provide an overview, and I can do that right now, or if you wanted to take a break, we could do that, too. And that would essentially set the stage for Doug Coe to talk about the STP after that.

CHAIRMAN SIEBER: Yes, why don't we take a 15-minute break now and come back at 20 after 10:00.

[Recess.]

CHAIRMAN SIEBER: Let us resume the meeting.

MR. BOYCE: As I said, I'm Tom Boyce, and I'm the Acting Inspection Chief in the Inspection Program Branch of NRR. And today we wanted to give you an overview of several things, and then lead into a discussion of PIs and STP.

I want to talk about just initial implementation status, some highlights of program feedback and how we're going about obtaining some of that feedback. The two issues that we called selected issues were PIs and STP.

I will then give you a glimpse of where we're going in the future.

We've completed eight months of initial implementation. The program formally kicked off on April 2nd, 2000, and we've been exercising every aspect of the oversight process since then.

On the inspection side, I think we've worked through almost all of the baseline procedures. We've had an opportunity to work through a lot of the supplemental procedures.

And we've even had a chance to perform some of our special and infrequent inspections. We've had generally positive feedback.

I'm not sure that everyone shares that view, because you only hear about the highly negative things, but in general, when we've done some of the surveys, the answers have come back in a positive tone; the majority of the answers have come back that way.

That doesn't mean it's uniform across the board, and it doesn't mean we don't have things we need to work on, but I wanted to say, in context, it's been fairly well received by both internal and external stakeholders.

And I'll go more into how we're obtaining some of that feedback. Finally, we just completed our mid-cycle assessments that are performed in November. As you may remember, we have two assessments of plant performance every year where we issue a formal letter to licensees, and we just completed those, and letters have just gone out, and we're in the process of posting them on our external website.

Those are our selected issues. We've really had a

lot of feedback, and we've gone out of our way, I think, to try to get some of that feedback. I was just taking a look through the package that you had been handed, and this kind of illustrates the methods we're using to collect the feedback.

There's a form in here that shows what we're asking our internal stakeholders to submit comments to us on. We've established a formal feedback process. We don't want anecdotal comments given to us -- well, we do, but we would prefer them to be formally documented, because we have a group of people that are dedicated to analyzing the comments, the basis for the comments, taking a look at what our current program does, checking it against data, and finally making changes.

And that's illustrated in this simplified drawing right here in your handout. This is what we've set up to try and handle feedback. And it looks complicated, but the intent is to make a it a very controlled process, as was alluded to earlier, where you are trying to have a stable process and do the right thing, based on good data, and not anecdotal information.

There's a copy of the feedback form that we asked for stakeholders to fill out, and it's not just, well, we think there's a problem with this procedure; we saw a problem on one plant. It's, we saw this problem on one

plant and here's some of the background; here are the specific aspects of the procedure that we think ought to be changed in a recommendation on where to go with it.

We've got right now --

DR. SHACK: Excuse me, but how much of that kind of response have you gotten?

MR. BOYCE: Fairly good. I don't have hard numbers, but I want to say that we've had 100.

DR. SHACK: It's on that order?

MR. BOYCE: It's on that order of 100, and the way the Regions are -- the Regions are the primary people giving us that input. And the Regions are establishing their own internal processes to get us good feedback.

Typically, a Resident Inspector who is on the front line, will identify an issue; he'll work it through his Regional branch chief; Regional management will discuss the issue, flesh it out, apply the right context to the issue, and decide whether or not it needs to go forward for a program change, and then it gets forwarded to us at headquarters for us to look at.

DR. SHACK: Now, does an Inspector use the same kind of form if he sees a problem with the process?

MR. BOYCE: Right, in general, he fills that out and sends that in to the Regions, although some of the Regions have adopted a different strategy that the form we

get ultimately is this form. But the many of the Regions have started with the Resident Inspector on this form.

We have a monthly meeting with NEI where we go through a variety of issues. There is in your handout, a sample agenda from a recent meeting, I think, as well as some of the meeting minutes. And that can give you a sense as to the sorts of things we discuss there.

We found that very, very useful in getting a sense as to where industry is, particularly on things like performance indicators. And a lot of the things Don was saying, we would hear NEI's position on, we'd be able to move forward with a good resolution that way.

We've got something called an Initial Implementation Evaluation Panel. The Commission directed us to have an independent panel take a look at our implementation during this first year. It's very similar to what we did in the pilot program where we had a pilot program evaluation panel.

And that report was published. I think this panel reviewed that, but I don't know for sure.

There are four meetings. It's chaired by a Regional Division Manager. It's got representatives from the two states, industry representatives, Regional representatives, and several Headquarters representatives.

We've also had a variety of public forums. This

says mid-cycle, but actually we conducted what are called the end-of-cycle reviews on our nine pilot plants back in April, and we actually issued an end-of-cycle letter as if they were under the reactor oversight process.

And then we held a public forum to say this is our evaluation of the plant. In addition, we have gone out at every site and held a meeting in the vicinity of the site where we gave the public an overview of the reactor oversight process, and the opportunity to comment and provide us with input.

We're also in the process of conducting Regional site visits where members of our Branch go out and actually visit the Resident Inspectors at the sites, talk to the licensees, talk to members of the public, and try to obtain firsthand feedback.

We're going to be issuing a Federal Register Notice very shortly, where we're specifically soliciting feedback on a variety of issues associated with the oversight program.

And we're going to conduct lessons learned workshops, one for the public, external, and also one internal for our internal stakeholders. So I think the message is, we're really trying to beat the bushes and get as much input as we can to improve the process during this first year.

And here's a look at where we're going in the future. You're going to hear a lot more, I hope, on STP improvements and enhancements.

You've heard about the Scram PI Pilot Program from Don Hickman, and also unplanned power changes and unavailability PIs. We're trying something a little bit new on this bullet right here, where we're talking about industry trend assessment.

The thinking here is that we've done a lot to modify our oversight program recently. And we're trying to say, okay, let's take a step back. Are we really making a difference?

Is industry performance improving, holding constant, or being degraded as a result of our new oversight process? You know, there an underlying assumption that industry is doing a good job and that their programs are effective a maintaining safety at the plants.

Well, it's not enough that we inspect each plant and that we've got performance indicators on each plant; we want to take holistic view and come up with an answer that we're comfortable with that says we're doing well.

And there are several things that we're looking at. This is the early stages.

One is the AEOD PIs, because they have been around for 15 years, and we're going to continue that program under

NRR. And we're going to watch. All the trend lines have come down -- well, most of the trend lines have come down on those PIs, and we're going to continue to monitor those and we're going to look for any adverse trends.

We're taking a look at the accident sequence precursor program. We're trying to develop a means to take our current set of PIs that we've developed for the reactor oversight process, and try and get a way to aggregate those PIs and look for trends.

Right now, they're individual, based on, say, plant power changes or unavailability PIs. Does it make sense to try and pull those together and develop a whole other set of PIs?

Anytime you try and do that aggregation, you run into problems. An example might be diesel generators. Not every plant has the same number of diesel generators, and so when you try and aggregate them, your data might be skewed in a direction we don't fully understand.

So this is something we're going to be looking at the data and trying to develop. There are other ways that we can count beans and give us an indication.

You were alluding to earlier, that matrix which shows performance indicators on a sheet, and that gives you a nice overview of the how the industry is doing. Mike Johnson says we're going to develop one for inspection

findings as well, so we'll have an analogous matrix for those.

When you have performance indicators and inspection findings, you can combine those and show where any plant is on the action matrix. So we're going to show the action matrix and show what column of the action matrix each plant is in.

And that will give you a view of the whole process and the whole industry on our website. That's where we think we're going with that.

Another thing we're contemplating doing and we're going to be discussing with NEI this afternoon is, you can, from our website, count the number of plants that are in the regulatory response column, the licensee response column, the degraded cornerstone column, and you can come up with bean counts.

We have 80 percent of the plants in the licensee response column; we have 15 percent of the plants in the regulatory response column, et cetera, and you can come up with a mosaic of where all the plants are in the industry.

If we have that today, we can track that sort of thing down the road, and if we start to see a lot of plants migrating from the licensee response column over to the degraded cornerstone column, we'll be able to say definitively that we have a problem.

So those are the sorts of things we're looking at to try and develop a method for industry trends.

DR. SEALE: You earlier made note of the fact that the industry has is own programs of concern with safety, and presumably they're in the excellence rather than the minimum compliance business.

And so that makes the things they do somewhat different from the things you do. At the same time, undoubtedly, they have they own version of the industry trends assessment process.

Is there ever an opportunity for you, in the integral form, not the plant-specific form, because I know they always get nervous when you talk plant-specific, but in the integral form, is there a way for you to compare your industry assessments with their industry assessments?

MR. BOYCE: Are you speaking of the WANO indicators?

DR. SEALE: More than that. I mean, that's the high level up here. I'm talking about now that we get down to the nitty-gritty assessment kind of detail.

MR. BOYCE: I think if you -- the one that's really available is the INPO industrywide indicators where they take all of their's and aggregate them. I think that once we get our process and we do something similar, there's going to be no way to avoid analyzing any similarities or

differences.

DR. SEALE: Yes.

MR. BOYCE: It's not that we plan on doing it, but there is no way we're going to be able to avoid it.

DR. SEALE: Somebody's going to do it for you, and if you don't have some coherence and a story as to why it isn't, then you're going to have -- both of you will have a problem.

MR. GILLESPIE: I think that when we step back -- we're still trying to figure out how to do ours. So we're still up at bat here.

DR. SEALE: I understand that.

MR. GILLESPIE: But, yes, anytime there's a difference, we're going to have to do an analysis of some kind of the difference.

And also you've said something that we kind of have to watch where we go.

DR. SEALE: Yes.

MR. GILLESPIE: We are not pushing the same as INPO is when they set industrywide goals. They have excellence goals and things like that on exposure, unavailability, et cetera.

We have regulatory goals, and how we articulate our trends is also, I think, going to be very important, to distinguish between those two.

MR. JOHNSON: In fact, if I could add to what Frank's saying, you know, we have the NRC performance goals, and this goes directly to one of our performance goals, which is that we're going to maintain safety; that is, that we're not going to have any significant adverse trends in industry performance.

And we will end up reporting on this on an annual basis as a part of the Agency's -- we talk about it in the performance plan, the green book. We talk about it in the report that we owe to the Congress and the President at the end of the year that talks about our accomplishment of our performance goals.

And so this is one that has high visibility, and we're trying to measure and make sure that we maintain safety.

DR. SEALE: It's going to be interesting when certain elements of the public become aware of the fact that excellence is not a part of the objective of the NRC.

MR. BOYCE: This is where you say I wonder?

[Laughter.]

DR. SEALE: I don't wonder; I think there's a shock out there someplace.

MR. GILLESPIE: This gets back to George's earlier comments when he says we're trying to be predictive of what? And we did not predict the leak at Indian Point, but given

the leak, and the process we went through, we did find a program failure which might have been predictive of a multiple tool failure, which, in fact, would be a much more severe public hazard, which is why it was a red finding.

So, in that case, we feel, from the oversight point, to some degree that it was a success; the system worked.

Yet people would say, well, the system failed because you didn't predict the leak. Well, our threshold really wasn't set at that level, and right now it still isn't.

So, that's the difference between excellence and public protection, and we're trying to keep that in mind, yes.

CHAIRMAN SIEBER: On the other hand, I think it would be near impossible for you to predict a leak, and so it may not be worth the effort.

MR. GILLESPIE: Well, there were some lessons learned. Now let me backtrack on what I said, because there were some lessons about how we conducted the inspections from two and three years ago when they did their steam generator inspections and how we oversaw it. Was there some correction available?

It may not fix the problem. I don't know that it would have predicted the leak, but there were some things

where we could tighten up on how we do some reviews in the field, and the experience level of the people doing the reviews.

And so that was a positive thing that we do need to fix. And that may or may not fix the problem, but it will help, I think.

MR. BOYCE: Risk-based performance indicators: We have alluded to that. We just got done reviewing Research's Phase I risk-based PI development report and providing them comments. I think Research is on your agenda for early next year to present this. I don't know exactly what month, but we think that effort has got an awful lot of potential.

There are some serious pitfalls that may or may not be show-stoppers, but definitely need to be addressed. For example, the data that you're talking about for unavailability, how do you gather all of that, and how do you do it consistently.

Right now, we have 18 performance indicators in our current process. Research identified in this early document, 31 potential performance indicators.

And getting data to feed that right now is an issue. NEI has gone on record as saying, well, we've got 18 that work, you know, it's a voluntary program and why do you want us to collect and submit data for 31? That's a huge increase in burden, and if we're going to go in that

direction, we want a corresponding decrease in the inspection that we get.

And so that's one early position that we need to look at closely. And we need to say whether or not the benefit that we're getting from risk-based PIs warrants that sort of response.

But we don't know where that's going, but that's one issue.

DR. APOSTOLAKIS: Now, risk-based means plant-specific?

MR. GILLESPIE: It is very close to plant-specific. It depends on -- what it depends on is the modeling used. Research is using what are called the SPAR models. And to the extent that those are driven all the way down to the plant-specific level, you'll get your answer.

I think right now there's 30 SPAR models, and they are on their way to 70. But that development is again --

DR. APOSTOLAKIS: I wonder what NEI means when they say that the system works? Is it that 99 percent are green; is that what it means? Well, if I were they, I would say it works very well.

So I'm not sure that the systems works is really something that we all agree to. If you have very high threshold levels, there are lots of greens. If you're the industry, of course it works.

It's nice, and that's the whole idea of having plant-specific indicators, and then you will have some way to discriminate.

In fact, I remember several months ago, I read some comments from states and other non-industry groups where they expressed amazement that so many greens were collected. So, I don't know that the argument that the system works, carries much weight with me, at least.

DR. KRESS: That brings to mind Graham Wallis's standard question; what's the measure of whether or not this is working correctly or not? How are you going to measure that?

DR. APOSTOLAKIS: And if those guys have 31 indicators and you are using now, 18, it doesn't look to me like it's an insurmountable problem.

I mean, maybe they can lump some of their's and come up with a smaller number.

MR. BOYCE: Your concerns are very valid.

DR. SEALE: They're crying some crocodile tears here, too, you know.

DR. APOSTOLAKIS: Who is?

DR. SEALE: The industry is, because I think that anybody will tell you that if you go to a real plant that's doing things well, that there are a heck of a lot more than 18 indicators they're keeping track of.

DR. APOSTOLAKIS: My understanding is that INPO has made --

DR. SEALE: Yes, and so there's a little bit of disingenuousness in this added burden thing.

CHAIRMAN SIEBER: Well, that's probably true, but the difficulty is that each plant has their own set with different definitions.

DR. SEALE: I fully agree with that.

CHAIRMAN SIEBER: And trying to get them to agree is 98 percent of the problem, as opposed to just doing it.

DR. APOSTOLAKIS: They're getting some benefit from this, Jack.

DR. APOSTOLAKIS: Yes. And that's the way you manage your plant well.

DR. SEALE: That's right.

DR. APOSTOLAKIS: You said this was voluntary?

MR. GILLESPIE: This is voluntary. Our whole program is voluntary. The PI portion is voluntary.

DR. APOSTOLAKIS: The PI portion?

MR. GILLESPIE: The PI portion. They don't get to volunteer whether they want inspection or not.

DR. APOSTOLAKIS: Yes, but the inspections are different. You don't just do the baseline.

MR. GILLESPIE: If someone would un-volunteer, then we're committed to doing a different inspection program

to make up for the differences.

DR. APOSTOLAKIS: Which is what you had been doing before.

MR. GILLESPIE: Right.

CHAIRMAN SIEBER: Sounds like volunteering is a good deal.

DR. APOSTOLAKIS: So are they volunteering, all units are volunteering?

MR. GILLESPIE: Oh, yes, there were no dissenters.

DR. APOSTOLAKIS: No dissenters, so this is a warmly-embraced volunteer program.

DR. BONACA: I have a question with this now. You're going to look at the baseline inspection and assign colors to those inspections, too.

And the question I have is, for this PI, you had some criteria you used to determine the number that you're accepting for each indicator. That was essentially where you didn't see in any change in risk associated with the value.

What about the inspection? How are you going to set the criteria to go from, you know, green to white, and will the result be a consistency in the sense that only 99 percent will be green, or is it going to be a different kind of spread?

MR. GILLESPIE: Maybe we've just jumped into

Doug's presentation where he was going to go through the significance determination process.

CHAIRMAN SIEBER: Yes, but let me ask one final question. You talked about 31 future PIs. Does that include the 18 that already exist, or was that an addition to the 18?

MR. BOYCE: Well, there is some overlap, but, no, it does not include those. They're largely distinct and different.

CHAIRMAN SIEBER: Okay, so that's 49?

MR. BOYCE: Right, which we would not -- we have -- that's one of the huge issues with implementation, is how do you transition, if that's the right thing to do, and all the data collection mechanisms are in place, how do you do that transition?

MR. GILLESPIE: One of the things that you have to do is don't get hung up on the word, PI, in the risk-based PIs. It's risk-based data.

I don't know if you heard the hesitancy in my voice when I said this before. That would be a different program than we have today. It would be different.

CHAIRMAN SIEBER: This is not the green, white, yellow, red?

MR. GILLESPIE: It may have colors assigned to it, but you've got a different data collection process which

doesn't exist today, that has to be put in place in infrastructure.

You've got plant-specific thresholds like the maintenance rule kind of thresholds that might be useful. I mean, the data is there; the thresholds are there.

Consistency in reporting, we need a data dictionary so that the data elements are reported consistently.

It's like the next evolution of this program. It may not, in fact, be these PIs.

And I say that because these PIs have baggage with them. Part 50.9, and is it willful if you make a mistake, and all those arguments came up.

If we are actually going to have a window into all the operating data at a facility on all the safety systems, is it fair to expect the utilities to submit that to us under 50.9 with all the expense involved in that, or is it data similar to what an inspector gets and writes up in an inspection report, and it's the best available data? And you then get it confirmed if you're going to use it for an official purpose.

And if it's like inspection data, but available long distance, that's a whole different approach to monitoring reactor safety than we're in today. It's a different scheme, and I would suggest that you can't think

of it in the same context of this program.

You almost have to think of it as the next incremental jump.

DR. APOSTOLAKIS: It's moving to homo sapiens, right?

MR. GILLESPIE: Yes, we're still kind of walking on two's and three's, and so it would be a different vision; it would be a different mix of program.

DR. APOSTOLAKIS: But it seems to me, Frank, that you said something earlier that's very relevant. There is a perception among the licensees that no matter what colors you give them, they have to be green.

And as you said earlier, being white is not the end of the world.

MR. GILLESPIE: It's not.

DR. APOSTOLAKIS: And I think, in fact, having the vast majority of the indicators being green works against the program. Now, people might say, well, what's wrong with that? The industry is working very well.

Well, yes, but every now and then you have something that upsets that perception.

DR. KRESS: Maybe we need light green and dark green here.

DR. APOSTOLAKIS: I think green and white is perfectly legitimate to find green and white, and then you

correct things and so on.

CHAIRMAN SIEBER: I think that the problem is that you have to look at it from the Chief Nuclear Officer's standpoint. As soon as you get a white, you're talking to the Directors and the CEO and the financial people and everybody in the world.

DR. APOSTOLAKIS: You do not distort the inspection process because you have to do that.

MR. GILLESPIE: And we haven't. That's why I would really like to get to Doug. Doug can go through an example, having had a whole hour to prepare several case studies for presentation to the graduate panel here, and we'll see if he gets his degree or not.

[Laughter.]

MR. GILLESPIE: I think that will illustrate the leveling, because the FDP process is really the leveling process for the inspection results to bring consistency.

And this is one of the real successes. This was a real innovation. We had PIs before; we just didn't use them the same way.

The real innovation is the measurement yardstick for inspection results.

DR. APOSTOLAKIS: I have one question before we get into that: There are some numbers that are now in the books that are kind of puzzling.

For example, to get into the red for the initiating events, you have to exceed 25 scrams. I mean, where did this 25 come from?

MR. GILLESPIE: Actually, I wish Don were here to take the blame. No, it wasn't Don.

That came from our risk people talking to their risk people, and focusing actually very, very narrowly, which is why there is a difference between the normal C-level, which is the green/white threshold at three, and the risk level at 25.

If nothing else is wrong and you strictly vary the number of scrams in a PRA, and everything else works, it is not very risk-significant. And, therefore, you can have a whole lot of scrams and everything else is working.

And that was the difference between people who wanted to have a measure and people who wanted to have an indicator. Those of us who wanted an indicator and not a measure like the normal C-green/white threshold and say, hey, that's the real meaningful threshold, when you depart from normalcy, we should inquire more.

And the risk-informed thresholds that are lower for that parameter, are just out of sight, because way before someone has 25 scrams in a year, they're going to fix it.

DR. APOSTOLAKIS: Right, and presumably you will

do something.

MR. GILLESPIE: Presumably we'd be on their case pretty heavily by that time, too.

That's the reason, and that is the difference between a risk measure which is purely done as a parametric kind of study for risk, with a single parameter being varied, and the normal sea level which is kind of the green/white thresholds. And I don't know that we will ever fix that, I mean it is kind of we are stuck with it the way it is right now, but that is where it came from.

I would like to give Doug some time because this is -- he is actually a better speaker than the rest of us.

MR. BOYCE: To segue into your question, Doug will try and address how we separated out the wheat from the chaff with our inspection findings into the more significant ones.

MR. COE: Thank you. For the record, my name is Doug Coe, I with the Inspection Programs Branch at NRR. I am pleased to be here. In fact, I am real excited to be here, because, as Frank mentioned, I think the SDP is in fact an innovation and a quantum step forward in our ability to risk-inform people's thinking. I am going to come back to that point in just a moment.

But to answer the question that you asked, about 2-1/2 years ago, Mike Johnson approached me. He said, we

have got these great indicators, performance indicators, and we have got this concept and we want to set these thresholds, he said, but we have a real problem. He said, we need something to match inspection findings in terms of their significance so that we can add these things together, in effect, in the action matrix to decide what kind of action to take. We want these things to be more or less on the same footing and the same scale.

So the performance indicators, at least in the reactor safety area were built around this concept of the change in core damage frequency. And so the only real answer for Mike -- of course, Mike wanted a simple tool, but we will give the exact answer that was, you know, the most accurate answer. So that was the genesis of the SDP. And, of course, you know, what it meant was we had to design a tool that would estimate the risk change in terms of a delta core damage frequency metric, so that it can be compared to the thresholds that have been established or were being established at that time for the PIs.

You know, we also, of course, in the larger sense, there is other cornerstones that aren't related to risk, as you well know. And so the idea there, as time progressed and as we began developing those other cornerstone SDPs, we were -- I think the idea was to try to represent the significance in a way that caused the NRC to react with what

we thought was the appropriate amount of response relative to what we would be responding to and reacting to in the reactor safety area. So there was a commensurate level of response, even though we couldn't actually quantify the risk value for some of those other cornerstones.

But I want to make a couple of points real strong, and as I go through the couple of examples that I have provided today, I hope that it illustrates these points. Inasmuch as the SDP was originally intended to be a backend tool for an inspection finding, in other words, the inspector goes out, does the inspection program, gathers up a bunch of findings, brings the findings back, plugs them into the SDP, turns the crank and out comes a number. That was kind of the original idea.

However, a number of us saw, who had been struggling for a long time, feeling a little bit like the guy with the bamboo cane that is kind of whacking at the elephant's leg, you know, trying to get the elephant to move in the risk-informed direction, we saw some real value in helping to risk-inform people's thinking because, at least personally, my assessment, having immersed myself in this business since 1995, was that the real bottleneck, the real problem was that the people who were deciding things on the basis of risk insights really didn't own the risk analysis. They hadn't participated in it and, in fact, they were

simply looking to other people, specialists, analysts, to provide an answer, a risk answer.

And, so, in fact, one way to answer Mike's question 2-1/2 years ago was say, okay, Mike, that's great. You have established a threshold already, we will just hire a bunch of risk analysts and we will just put them to work. And all the inspectors will give their findings to the risk analyst. The risk analyst will be the oracle and they will come back and they will say, well, this is a green, and this is a white.

DR. APOSTOLAKIS: So what is wrong with that?

[Laughter.]

MR. COE: What's wrong with that? I will tell you what is wrong with that. Part of the effort that we have tried mightily, I think, and now with greater success because of the SDP, is to risk-inform inspectors' thinking. Because if they don't know, if they are not sensitive to the plants, the things at a particular plant that drive risk significance at that plant, then, you know, their effort and their success in finding the most significant issues is hampered.

And in the past we have tried, we have given them training, and I even helped create a course, a two-week course, at Frank's behest a number of years ago, which I think has been somewhat successful, although it still fell

short. We sent them forward. Two weeks of training later, they knew how PRAs were done. They had had some exposure to the IPEs, okay, because we brought those into the classroom, and we sent them out. And we said, well, make the best use of this, do what you can. You know, take the risk insights that you have gotten out of the IPEs, which, by the way, are 10 years old, so they are not very useful anymore, and you will have to get new insights from the licensee, and use these to help find good issues.

Well, we sent them forward without any tools. We sent them forward without any -- well, I mean the computer-based tools, we weren't able to give them training on in a two-week course.

So what the SDP does is it provides a link between the sophisticated, computer-based analyses that we have created over time, and need for the inspector to have at least a conceptual understanding on a high level, on a functional level as to what drives risk at their plant.

I think we have struck the right balance, because, on the one hand, our inspectors looked at our initial SDPs and said this is hopelessly complex. The analysts, on the other hand, looked at our initial SDP worksheets and said this is hopelessly crude. So, given the two extremes and the two perspectives, I think we have probably hit about the right mark in the middle.

And so we have got a tool that isn't perfect, it is a gross estimator, but it forces the user to think in risk terms. And I can't tell you how it has warmed my heart to hear not only inspectors, not only some NRC managers, but licensee PRA people that have come to me and said, this is a tool that I can use to help explain risk to my management and I have never been able to do that until now.

And so, you know, I don't want to overplay this.

DR. APOSTOLAKIS: I have a question on this.

MR. COE: Sure.

DR. APOSTOLAKIS: The SDP documents are plant-specific? Because you said that they have to appreciate the risks, so, you know, the dominant contributors and all that. So an inspector at, say, a Davis-Besse would have matrixes that would reflect somewhat that plant?

MR. COE: Yes. It is intended that the plant equipment, the equipment that is designed for that plant, and, of course the type of plant that it is, whether it is PWR or BWR, and so forth, it is intended that, in fact, the SDP be a fairly accurate, high level representation of the plant-specific PRA that the licensee has performed, and that we also try to capture in our SPAR model.

DR. APOSTOLAKIS: And this is based on the IPE?

MR. COE: Well, initially, we created -- you see,

this is a problem because we created -- the SDP initial concept was developed from the IPEs, because that is the only thing that we had available to us. We have legal restrictions on going out and asking licensees for broad -- you know, making broad requests for information to supply us with their up-to-date, most current models.

So we started with that knowing that we would have to go get, on a plant-specific basis, an update, and we did that. We formulated, early in the program, -- actually, we didn't even have all of the initial worksheets developed in April when we started initial implementation, but we finished shortly thereafter, and we engaged in a series -- a site visit to every site.

We sent one of our risk analysts, and sometimes more than one. We had some help from our contractor. And we gathered -- and we allowed the licensee to comment on the worksheets and to incorporate things that we knew were missing from the IPEs.

DR. APOSTOLAKIS: So right now they are not they are not based on the IPEs?

MR. COE: Now they have progressed beyond the IPEs and we have incorporated, or are in the process of incorporating the comments and feedback that we got from doing the site visits.

DR. APOSTOLAKIS: Perhaps you are aware that there

is a letter from the Union of Concerned Scientists to the Commission to direct the staff not, as I recall, not to use the IPEs because we have told them so many times that the IPEs are not very good.

MR. COE: Right.

DR. APOSTOLAKIS: So if the Commission says don't use these IPEs, this program is not --

MR. GILLESPIE: Right. I am watching the clock because I want Doug to go through some details, otherwise, we will never really answer your questions.

They are plant-specific, we did have plant visits with the contractors. We have shared the booklets, and there is a booklet for every plant, with the licensees. And the licensees know we are measuring them against that. So I think every licensee has done his best to make sure it fairly reflects his facility. So it hasn't been unilaterally the NRC taking 10-15 year old data now.

Yeah, at a high level, I think we have got really pretty good information.

DR. APOSTOLAKIS: Okay. So the booklets then are plant-specific, but the ultimate comparison with the thresholds are generic?

MR. GILLESPIE: Yes.

DR. APOSTOLAKIS: And we are planning to fix that.

MR. GILLESPIE: Fortunately, though, we are

dealing with delta risk and not absolute risk. Changes.

MR. COE: And it is important, too, to answer the concerns that are still out there and will stay out there, I think, for a while, that, you know, the quality of the analysis that we do is only justified based on whether or not we agreed upon the influential assumptions that were used in the analysis. And part of the process that we were seeing happen here, I think, which is one of the intents is that the influential assumptions of a particular risk analysis be more broadly understood by a lighter population of people, including the inspectors in the field, who are in a position to challenge those assumptions if they have, you know, having information that they do, that they gain on a day-to-day basis.

So, you know, it is a question of improving the understanding at all levels in the organization of what is a risk analysis, and what it isn't.

So let me just make a couple of points real quick. I have got a couple of overview slides in here. And let me just point out, you talk about a lot of green findings, and that is true, however, eight months into the program now, in the initial implementation, we have 16 greater than green issues that have been processed by what we call the SERP, or SERP, which is the SDP and Enforcement Review Panel. This is the headquarters panel that meets to look at every issue

that the regions send us as a white issue or greater.

And these are the cornerstones along this side here. And not too surprisingly, of course, we have got a lot of whites, a couple of yellows, and, of course, you know about the Indian Point 2 red. The note at the very bottom is supposed to reference the physical protection cornerstone and reflects the Commission's review currently of an interim SDP that is going to be used. So that one white issue may change after we hear from the Commission.

DR. APOSTOLAKIS: So what is the first bullet, 16 greater than green?

MR. COE: Sixteen. If you count up these issues, you will find 16 issues here, and these are all greater than green, and they have all been processed by the headquarters panel. And this is simply a high level tally, the stats to date, since April. Okay.

And my only point, the only take-away on this is simply that we have had --

DR. WALLIS: I found it greater than confusing, because, to me, grades go up and greater than green would mean better than green, not worse than green.

MR. COE: I'm sorry, I was using a mathematical symbol, I probably should have used language.

DR. WALLIS: Or non-green or something.

MR. COE: Non-green is better. Non-green is

better.

DR. SHACK: One thing that has been surprising to me is those two yellows that plug in there for what seems like a long time. They were yellow when I first looked them. You know, they are yellow, you know, months later.

MR. COE: Yellow inspection findings do stay yellow for four quarters, that is a characteristic.

DR. SHACK: So a corrective action may well have been taken.

MR. COE: Yes.

DR. SHACK: I see, but its color hangs in there.

MR. COE: Right. It is not real time like a performance indicator, or it is relatively less real time. But the idea was there that --

MR. BOYCE: One second. You need to carry that for four quarters, because if you have one and then it is fixed, and then one the next day and then it is fixed, you can do that every day. And the process is built on if you have got more than one, you end up degrading your cornerstone and that takes you into the action matrix where you get increased regulatory attention. That is the basis for it.

MR. COE: And, also, a yellow inspection finding does represent some underlying causal factors that make -- it would probably take, it was more likely than not to take

some time to fix, and to be assured that it wasn't going to recur. So a year seemed, for better or for worse, seemed like about the right amount of time.

Okay. And we talked a little bit about some of the key issues earlier in the meeting. The risk-informed, plant-specific, again, plant-specific, risk-informed notebooks, I am going to illustrate their use with these two examples that I have here for reactor safety cornerstones.

Fire protection, I know we have talked about that. I know your interest in that area, and it is an area that we acknowledge that, because of the nature of fire protection issues and the spatial complexities that are inherent in that, it is a more complex SDP, and there is essentially no way to get around that. But we do need to make the tool usable, and we are working to improve its usability.

Safeguards, I have talked about, and the Commission is reviewing the current interim SDP containment. We really haven't made as much progress as I would like to have made on containment. We have a basis document that is in place, and the Risk Analysis Branch of NRR has taken on the task of improving that process from a usability standpoint for the inspectors' use.

Shutdown, we have a checksheet basically that goes through some of the industry guidelines and, basically, it is a Phase 1 kind of a process where it prompts the

inspector to send the issue to headquarters for further analysis if certain thresholds within that checksheet are met.

So, with that, I think I am ready to dive into an example, unless there's any questions at this point.

[No response.]

MR. COE: All right. I have given you a package that incorporates two examples. I have to point out that these examples we used for the rollout training prior to April and so the worksheets have changed slightly since April, since we have gone into initial implementation. And what I hope to achieve today is simply to illustrate to you the concept.

First, just as an overview, let me say that the SDP for reactor safety is divided into three phases. And, Dr. Apostolakis, it actually parallels very closely the work that you and Budnitz did on the fire and seismic. You actually had three levels, I believe, we call them phases. But I think it paralleled -- what we have done here parallels very closely the thoughts and concepts that you articulated in that NUREG on how to assess. And I know your task at that time was to assess LERs for their possible addition to the ASP process, the Accident Sequence Precursor process. But the concept is very similar.

So Phase 1 is essentially a screening where we can

call as green those issues which have a very high likelihood of not reaching the 1E to the minus 6 delta core damage frequency threshold.

Phase 2, if something does not pass that screen, and we can't just say that it is definitely, you know, of that low of significance, then we have to do a little further analysis on a higher, on kind of a gross level, functional level. But that is the process that I believe will give us the most gains in helping to risk-inform our inspectors' thinking, and that is what we are going to go through here.

The Phase 3 is the point at which the inspector has to hand-off the issue for either verification that it is a risk significant issue, to a risk analyst, or because the SDP process simply can't accommodate the particular issue the inspector has, and that should become apparent as the inspector tries to work through the process. So it is an automatic acknowledgement that there's limitations to Phase 2, and if you exceed those limitations, you need help.

This part of the worksheet right here is just basically setting up the problem. And in this particular case, we have an accumulator and a PWR, one of four that has not met its required tech spec level for a period of time. And so this is very important, because, as we have experienced with our initial rollout of this technique,

inspectors really have to write down very clearly what the deficiency is, because, as they proceed through a risk-informed process, there is a strong tendency to change the rules, or change the initial conditions as you go. And you have to resist that, and so we have to very clear.

So, basically, this is just information that helps identify the problem and in the lower half of the worksheet simply helps the inspector identify that one of the cornerstones that we are going to address in this process has been affected, there has been an impact or a change.

DR. WALLIS: Well, this looks like a cascade. I mean I would think you would check core decay heat removal, because that is what it has to do with. Then you would check initial, and then you would check primary, and then you would check one of the pressures. Instead of just checking one of those things, you would check probably four of those.

MR. COE: Yes, you are quite right.

DR. WALLIS: It is a cascade of reasoning.

MR. COE: That is exactly it. It is a cascade of reasoning, that is the way it was developed. And, in fact, that is a very good point. And we have seen inspectors use it in that fashion as well.

But given that the logic should be apparent here, it would be clear, I hope, that if you check this, that it

really related to these other two higher order functional statements.

DR. APOSTOLAKIS: What does it mean that for the Maintenance Rule, it is a risk significant event? I mean they can tell that right away?

MR. COE: The Maintenance Rule required licensees to categorize the systems and components into two categories, risk significant and non-risk significant -- or high risk significance, low risk significance.

DR. APOSTOLAKIS: Oh, it is a categorization of the accumulators.

MR. COE: It is what the accumulators, where they are in the licensee's scheme.

DR. SEALE: That ties it all together.

MR. COE: And that information is needed for the Phase 1 screening question, which we will get to on the next page, actually.

The next page is the Phase 1 screening process, and this is the series of questions that are related to trying to -- you know, if we have an issue that is --

DR. WALLIS: So this value is a cross instead of a checkmark, so his vote doesn't count.

[Laughter.]

MR. GILLESPIE: Well, it depends on what happens to the chad.

MR. COE: This process here, Phase 1 starts by checking off which cornerstones are affected. And, again, we have updated this a little bit, clarified it a little bit more. But the basic idea here is that if more than one cornerstone is affected, then we go ahead and go on into Phase 2. We are not confident, if more than one cornerstone -- typically, this might be something that would affect both initiating event frequency and the mitigating system capability.

DR. APOSTOLAKIS: Can you give me an example of something that affect no cornerstone? It seems to me you have covered just about everything there.

MR. COE: Yes. A licensee fails to put an SSC into Category A1 of the Maintenance Rule, an SSC has reached its performance criteria, and so they begin to take -- well, they are taking corrective actions on a failure-by-failure basis, but the licensee fails to recognize that it has exceeded its performance criteria, it has been now put into the Maintenance Rule. The deficiency is that they failed to take an administrative action that would then help give more attention and, presumably, improve the reliability of that component.

This is an issue currently because those kinds of things that can't be related to a cornerstone, and that is a good example of one, end up as what we call a no-color

finding. In other words, the licensee failed to comply with the Maintenance Rule, but there was no -- for the deficiency that I described, there was no affect on plant reliability.

DR. APOSTOLAKIS: So, primarily, administrative kinds of things.

MR. COE: Yes.

DR. WALLIS: There is one thing that is missing here, and that is none of the above. And maybe the inspector has a very good reason to know he ought to go to Phase 2, although it doesn't fit in one of these boxes.

MR. COE: And that is a good point, and what we have stated in our implementing guidance, and what I stress when I talk to inspectors, is that they should never at any time feel constrained to not go, proceed into a Phase 2 analysis, because, as I mentioned, and as I stress over and over again, it is like anything else, the more you use it, the better you understand it, and that is, in fact, one of the goals. Okay. So that is a good point.

If, however, only one cornerstone is affected, Phase 1 screening questions try to get a little bit more definition of the potential significance. And, so, in this particular case, the mitigation system cornerstone was affected. We asked a series of questions. And, as you can see here, Question Number 3 was the one that was checked yes, and it was that the issue represented actual loss of a

safety function of a single train for greater than tech spec allowed outage time.

I would point out that these screening questions are in sync with or came out of the accident sequence precursor screening criteria. So we drew from that to try, number 1, to be consistent, and -- well, that is primarily it, is to be consistent with that. And we might adjust these screening criteria as time goes on, as we gain more experience. If we had found an issue that passed through this and none of the questions were answered and it came out green, and we subsequently found it to be of significance, we would certainly want to revisit this. But to date, we have not encountered that.

So we say, okay, this has greater than -- potentially greater significance than green. So we want to continue the analysis. At that point we ask the inspector to look at what are the accident sequences that are of concern here. And for an accumulator, its function, as was represented in the worksheet, the first page of that worksheet, was to provide core reflood capability upon a design basis LOCA.

And so we look at large LOCA and we look at the frequency, and we look at how long the condition existed. In this case, the condition existed --

DR. BONACA: How does the --

MR. COE: What did I say? Ninety hours. I said 90 hours.

DR. BONACA: How does the inspector know that you don't rely on this for a small LOCA? I mean does it have sufficient understanding of that? What kind of effort --

MR. COE: No, actually, the process requires the inspector to right down what the function is of the system. And I believe, I think we might have even changed this, so it doesn't just focusing on licensing basis.

MR. GILLESPIE: How does he know which sequence to pick for his plant?

DR. BONACA: Well, I mean here, you know, if you understand the LOCA, you know, for a small break LOCA, you can use the accumulators. But mid-break LOCA, it depends on the plant, and large break LOCA, all of them need it.

MR. GILLESPIE: Right.

DR. BONACA: So the question is -- you know, that is quite a time-consuming effort to go back into this.

DR. APOSTOLAKIS: That is why they take the two-week course. Is that what you teach them?

MR. GILLESPIE: That's the key to it. Plus they had a week of additional training specifically on the applicability of this.

But, Doug, do you want to?

MR. COE: Yeah, we have a table in the

plant-specific workbooks, and what they will do, for every system, in this case, accumulators would be listed on the left column of that table. You would go over to the right column and it would tell you which accident sequences, and each accident sequence that is represented there would have a separate worksheet. And we are going to go through a couple of those in just a moment.

Now, I am noting here that what I gave you here was that we should have had a 90 hour time period, which would actually have put us over here in the -- well, actually, in the middle column. Okay. And so this isn't exactly right, and I think that has been fixed in our subsequent presentations.

DR. BONACA: We have different --

MR. COE: Three days. Three days is what, about 75 hours or so. And so what we really have is we have a time period that is greater than three days and less than 30. So what we really should be in is this block right here.

DR. BONACA: Our slides, in fact, are correct.

DR. APOSTOLAKIS: A little different.

DR. BONACA: They show the F for Category 5 and the G for 6, so they are correct.

MR. COE: Well, the time period here is specified as 90 hours.

DR. WALLIS: We have 5 and you have 6. Why is that?

DR. SHACK: Medium LOCA and large LOCA.

MR. COE: Okay. All right. You have -- I think you have the updated.

DR. BONACA: We have the updated version.

MR. GILLESPIE: You gave them the right answer.

MR. COE: I gave you the right answer, I have got the wrong slide. Okay.

[Laughter.]

DR. APOSTOLAKIS: So let me understand, it is a G, is that what it is?

MR. COE: For large LOCA is G.

DR. APOSTOLAKIS: And what does G mean?

MR. COE: G is simply the value here, multiplied by this in terms of years. It gives you an estimated likelihood that that event will occur during that period of time.

MR. GILLESPIE: It is an index to get to the next table.

DR. APOSTOLAKIS: Okay. The next table, okay.

MR. GILLESPIE: Yeah, let me continue. Now we are at the simplified tool stage.

DR. APOSTOLAKIS: Yeah.

MR. GILLESPIE: To avoid a calculation.

MR. COE: If you want to just jump ahead to this in your first example, this is where we are headed. This initiating event likelihood of G represents that value, that likelihood that that event would occur during that period of time. And the remaining part of the risk equation is what is the likelihood that, given that event during that time, that the plant's mitigation functions would completely fail? And so that depends on how many mitigation functions are available to address that initiating event.

And so our final, what we are shooting for here is which one of these cells are we in for any of the initiating event sequences that were affected by that particular deficiency.

To get to that point we need to know what the plant's capability is, and what we have represented here is simply a high level representation of accident sequences beginning with, in this case, the large LOCA initiating event.

So this worksheet is going to take the value of the large LOCA initiating event probability during that period of time, which we have represented as "G" -- correctly on your handouts, "G" -- as an entry point to that table that I just showed you, but we document on this worksheet as "G" for these large LOCA sequences.

We note that the exposure time was 90 hours and in

other words we know where that G came from because it could have come from a couple of different places in Table 1.

In the next section here --

DR. WALLIS: Just look at that, because it seems to say that four out of four accumulators are needed. Isn't that what it says there?

MR. COE: That's correct.

DR. WALLIS: But you have lost one.

MR. COE: Right.

DR. WALLIS: So why is not a bad thing to lose one?

MR. COE: These definitions up here are there to define these functions down here, and of course these are going to represent the accident sequences that we are going to be concerned about in this analysis.

Therefore, the early inventory accumulator function is satisfied in terms of the full plant capability for that, to satisfy that function. The requirement, and this is actually a restatement of the success criteria, is that four out of four accumulators are required to function, okay, to satisfy the EIAC safety function.

DR. WALLIS: He's lost one. Hasn't he lost one?

MR. COE: You have indeed lost one.

DR. WALLIS: So why is a zero in there?

MR. COE: Because what you do down here is, first

of all, can you recover the failed train, and you either get a credit of zero if you can't or you get a credit of one if you do --

DR. WALLIS: And so zero is bad?

MR. COE: Well, zero is simply a reflection that you cannot recover that train --

DR. WALLIS: I was puzzled by that, because zero equals Green on the right.

MR. COE: I'll get there. You are jumping ahead of me.

DR. WALLIS: Okay, I'm sorry.

MR. COE: Let's walk through this as logically as I can.

The EIAC function has been affected, okay, and that is the only function here that has been affected. In other words, all of these sequences are large LOCA sequences, but the only sequence likelihood that has changed is this one up here, because that is the function that was affected.

The function requires four out of four accumulators. You have less than four. Therefore, over here you get zero credit for that function, zero credit here. We ask the supplemental question in almost all cases could this function be recovered by manual operator action? What the user of this SDP has said here is that in their

judgment you couldn't do it fast enough.

In other words, a large LOCA is going to happen and there is no time -- there is no opportunity to regain that function.

DR. WALLIS: You are not going to refill an accumulator while there is a LOCA.

MR. COE: Precisely, and so that is why that is zero and so this is zero, and so we come over here for this sequence. We essentially have lost all functional capability and therefore the risk significance for that sequence is solely dependent upon the initiating event frequency or the likelihood that that initiating event would occur during that period of time.

That is how we get to Table 2 -- this table here -- where we have this G, initiating event likelihood during that period of time. We come out over here to zero, zero capability, and so what this cell represents is a range of delta CDF values that basically reflect the value of that --

DR. APOSTOLAKIS: So what saves you is that the frequency of the large LOCA is small enough.

MR. COE: That's correct.

DR. BONACA: Is small enough -- and the frequency is in the 90 hours. Its accumulators are very small.

DR. WALLIS: So it is small enough you could have

lost all the accumulators and you still wouldn't care?

MR. COE: For that particular accident initiator.

Now what the table would tell the inspector to do would be that not just the large LOCA takes credit for accumulators, which is design basis and really that's all the design basis looks at, but from a PRA standpoint the medium break LOCAs take credit for accumulator reflood, okay? -- so we also have to look at --

DR. BONACA: Before we go to that though, the interesting thing it seems to me that if, however, it was more than 30 days, going back -- then you would be an F --

MR. COE: Yes.

DR. BONACA: -- and you would be White.

MR. COE: Yes.

DR. BONACA: So then because the frequency of the LOCA and --

MR. COE: Time duration --

DR. BONACA: Exactly.

MR. COE: So what we have done is we have allowed the user to begin to see the interplay between time, initiating event frequency, and remaining mitigation capability, and to do so in a simple fashion that does not require them to sit at a computer terminal and understand the complexities of what is happening in software.

DR. APOSTOLAKIS: But if we did or if they did

only what you said, then even if all four accumulators were unavailable the result would be the same, but the Agency would have reacted in a different way, I hope.

MR. COE: Well, from a risk standpoint, if we are using that as the yardstick for our response, what we are saying is in this case, and for the large LOCA we would have the same -- the change in core damage frequency we would estimate to be less than 1E to the minus 6, but it is a good point.

Actually, when you look at the next accident sequence, medium LOCA -- actually, I don't know the answer right now, but let's see if that makes a difference.

Now in a medium LOCA the success criteria is that you only need two out of the four accumulators, okay, to satisfy that function, same function. Essentially you have got the same series of sequences here except that the medium LOCA frequency might be a little bit higher, but now you can satisfy the medium LOCA, which is generally going to be less than a six-inch break, with two out of the four accumulators, so if you have either three or four accumulators you can take credit for a multi-train system in terms of the reliability of the remaining accumulators to satisfy that function.

If you had lost two accumulators, you could not -- well, you would take credit for one train. You would

essentially have one train of capability.

DR. APOSTOLAKIS: Let's say you lost all four.

MR. COE: If you lost all four, then this would be, instead of three here, this would be zero, and now here, as was pointed out a moment ago, you have a higher initiating event frequency --

DR. APOSTOLAKIS: So it would be White.

MR. COE: Yes, but it is because of this rationale, this logic, which is grounded in probabilistic risk principles and forms the framework for our judgment that that is a more significant issue now.

The loss of three accumulators out of four would put this into a category where we would be more concerned. In fact, two accumulators would only give you a credit of two for a single train, and as I am sure you are aware, that value of two represents 10 to the minus 2 failure upon demand. It is simply the negative logarithm.

DR. APOSTOLAKIS: Then it would be a Green, right? If you have lost two --

MR. COE: I can never do this from memory.

DR. APOSTOLAKIS: I already can.

[Laughter.]

MR. COE: If you were F and you had two, you're right, you would be Green.

DR. APOSTOLAKIS: Something which may be obvious

to everyone, here you seem to be making decisions using the PRA results in some way. You are going to severe accident stuff.

MR. COE: Yes.

DR. APOSTOLAKIS: It is not just design basis, right?

MR. COE: Right. We reflect the dominant and the accident sequences.

DR. APOSTOLAKIS: Changing the rules?

DR. BONACA: Wait a minute. Why are you saying severe accidents?

DR. APOSTOLAKIS: They are looking at PRA --

DR. BONACA: -- insights.

DR. APOSTOLAKIS: Yes. I mean from the design basis point of view, did you really look at multiple failures? You did not. Just one.

MR. COE: We are essentially trying to establish the significance.

DR. BONACA: The significance, the safety significance --

MR. COE: Of a finding, okay?

DR. BONACA: -- of a PRA, a PRA reading the safety significance of the condition.

DR. APOSTOLAKIS: No, but would there be a case where from the design basis perspective there is no problem

but from the PRA perspective there is?

MR. COE: Yes, and if that condition were to arise, and we identified that the licensee's performance was deficient in some fashion, even though they were meeting their design basis, we may conclude that there was a change in core damage frequency sufficient to warrant our action.

MR. GILLESPIE: George, we had a specific example of flooding at Sequoyah.

DR. APOSTOLAKIS: Yes?

MR. GILLESPIE: Where the water in the whole site drained downhill and they had to put a transformer building right where all the water drained, and the water during a hundred year flood would bubble up out of the drain instead of draining down it, and that was considered a White finding and there was an NOV issued against the maintenance rule on it and it was not covered in their design basis documentation at all.

DR. APOSTOLAKIS: So does this imply now that if the licensee volunteers to accept this system that licensee is saying that it is willing to be regulated by things that go beyond their licensing basis?

MR. COE: No. We do not, absolutely do not, say that the licensee has to do anything but meet our requirements. However, the actions that we take, the level of management interaction that we engage in with the

licensee, is going to be informed by this yardstick.

DR. SHACK: He violated a tech spec.

DR. BONACA: Yes, he violated a tech spec.

MR. COE: Well, in this particular example. I think George is asking a larger question.

MR. GILLESPIE: What we did, George, on that -- that was a big question early on. If we find something that is not covered in the design basis but we find it is risk-significant, then we are going to call it according to the SDP and call it what it is, and we will write it up that way, but the resolution of it will be different.

The licensee could either choose to fix it -- I mean literally voluntarily -- or we have a backfit decision to make and under the backfit rule --

DR. SHACK: How would you get into this process if he hadn't done something wrong by your licensing basis?

MR. COE: Actually, the entry condition is not tied only to a violation of regulatory requirements. If a licensee -- if we evaluate that a licensee has had some kind of deficient performance that has caused a change in core damage frequency evaluated through our SDP process to be greater than 1E to the minus 6 per year, then that becomes a greater than Green issue, and we can process that issue.

As Frank just noted, we had one issue where that was pretty much the case.

CHAIRMAN SIEBER: In fact, it doesn't even have to be a performance issue. It could be a condition that was discovered, for example, by a resident inspector. Is that not true?

MR. COE: Well, actually, we have imposed the requirement that the Staff should be capable of articulating what the performance deficiency is as an input to a significance determination process because this question arises. A piece of equipment fails and the licensee has done everything correctly. That QA program has worked exactly the way it anticipated that it would. It was just one of those things -- if you will excuse the expression -- a "random failure" -- okay?

Under those conditions if we cannot identify a performance deficiency, then what the program says is that this is just part of the baseline risk of a large, complex industrial facility that will sometimes have components that fail.

CHAIRMAN SIEBER: I am thinking more of a design defect that deviates from, for example, the construction code that went undiscovered during the construction process and the preservice testing, surveillance tests, and so forth, did not reveal its existence until somebody began to think about it and said oh-oh, this probably wouldn't work under these kinds of conditions.

MR. COE: And that is a good question and we have struggled with that one a little bit, because the question is has the opportunity arisen for the licensee to detect this and if they missed it, they had the opportunity and they missed it, you could call that a performance deficiency.

On the other hand, we struggle a little bit with -- you know, we want licensees to be aggressive in finding these things too, and so we treat those very carefully on a case-by-case basis so as hopefully not to discourage licensee initiative.

CHAIRMAN SIEBER: One example of that could be for an MOV to fail under dynamic conditions, accident conditions, because of high differentials or what have you.

DR. APOSTOLAKIS: Is it true that we are pushing a little bit the envelope of the licensing basis now?

MR. COE: I want to say absolutely not, because we have, as Frank mentioned, very clearly told the licensees we will not engage in anything that would not conform to the backfit process that we have established.

We have choices that we have to make about the focus and the nature of our inspection, and those can be done independently of whether the licensee is violating anything or not. If we find performance deficiencies that rise to a level of significance that causes us to think

about focusing our inspection program differently, that is within our purview, but we will not impose requirements on the licensee, although -- in addition to those that are already required.

If a licensee chooses to correct performance deficiencies by making the changes that then lower that delta risk back to what we would consider the nominal level, great, and that is in fact what happened in the case that Frank mentioned. If they choose not to, then we have a choice to make. Either it is significant enough that we do a backfit analysis or if it is not we may have to drop it, or we may choose to modify our assessment tools, our risk assessment tools of that plant to now acknowledge that there is a new additive value that is related to this issue that they are not going to correct and that has now become part of the baseline risk, and in the future they might have more susceptibility to a higher significance issue.

DR. APOSTOLAKIS: But in my mind this whole process is a small but a very significant step towards totally risk-informed regulation.

MR. COE: So far I haven't drawn a strong connection to it, George --

DR. APOSTOLAKIS: Why?

MR. COE: Why?

DR. APOSTOLAKIS: You have sequences. You have

the frequency of the initiator -- fundamental in your decision.

MR. GILLESPIE: This is where at some point the rules have to catch up with the oversight.

DR. APOSTOLAKIS: Exactly.

MR. GILLESPIE: The maintenance rule, because -- maybe it is easier because it is a smaller piece, is kind of there -- A(4) is is the plant safe today, and it is kind of integrated in, and we have got some links.

DR. APOSTOLAKIS: Right.

MR. GILLESPIE: And it's kind of got risk and guidance on how you apply it.

The other rules are not necessarily as in synch, and that is the whole risk-informing Part 50 kind of thing, and it's just got to catch up.

DR. APOSTOLAKIS: A different topic. This is based entirely on the sequences and this is a perfectly good thing to do.

I was wondering whether for some SSC that are not as big items as the accumulators, the importance measures would have a role to play and maybe lead you to the colors without -- especially if you have a component that appears in, you know, 66 different sequences it would be a little difficult to go through every one of them, but if you have an importance measure that takes into account the

frequencies or the initiator and everything maybe that could play a role in the decision of whether it is White or Red.

MR. COE: You are quite right, and historically inspectors, as I said, being given two weeks of training and thrown back out into the field, saying go do your best work will typically gravitate toward the risk achievement worth and the other risk-important measures.

What that doesn't do is give them a sense of why that is important and that is what we are trying to achieve here.

Secondly, we have one other step to complete. We are in the process now of issuing these notebooks with the best information that we have been able to glean from the licensee. There is one more step in our process, and that is through the experience of using these and through a systematic effort we hope to test the SDP worksheets against the licensee models to assure ourselves that in fact the dominating sequences that we're representing are in fact the dominating sequences that the licenses believe that they have at their plant and that there's some consistency at a high level.

We acknowledge that there will not be necessarily consistency at all levels but this is something that we expect we will improve over time as we gain experience with each one of these.

DR. BONACA: I have another question that I would like to ask you about just to understand the whole thought process of the inspection program.

For example, you said -- you postulated there was a miscalibration of a level and this is 90 hours and it could have been over 30 days and with so high a level change.

Assume that you have discovered that this happened because the training was not that detailed and the operators don't understand the importance of the accumulators. They use the water to wash their car in the yard or something -- I don't know -- so you discover that kind of issue.

You would still go to this tabulation and find the Green. How does it kick into the significance, to the training program or whatever are the reasons which led to this kind of condition?

MR. COE: The agency has agreed that or has formulated this whole program, the framework of the program, such that Green is called the licensee response band.

Issues that arise and are a significance of Green are our responsibility under our program is to ensure that the licensee has captured that issue in their corrective action program.

We will not engage further in terms of root cause analysis or failure. We have an opportunity to come in and

look at Green issues kind of in the aggregate during our annual PI&R, Problem Identification and Resolution inspection, so we have an opportunity to do that, but on a single issue basis, we would not go to the depth that you have suggested.

DR. BONACA: I mean if you really had an indication, that example I gave you, I mean the total failure of the training program or preparation of the people behind an operation, anything of the kind, wouldn't you have a means by an inspector to flag it as an issue that has to be -- to try to pursue them.

MR. GILLESPIE: Yes.

DR. BONACA: I am trying to understand how the whole thing works together. You know, you have a window on the world here coming from these kinds of inspections and also from the Safety Determination Process, and you should not lose those insights.

MR. GILLESPIE: One of the things we needed a year to implement this was people were telling us you could have a site that is absolutely everything working perfectly and is all Green, yet has a totally failed training program, corrective action program and every other program.

Our premise was if those programs were totally failed it would show up either in an SDP evaluation as a White or in one of the PIs. That is a premise we are

testing this first year, and since you said a total failure of the training program, do we really believe that a total failure of the training program for the trades at a reactor would only result in one miscalibrated accumulator --

DR. BONACA: I understand what you are saying and --

MR. GILLESPIE: We are testing that and that is something we might agree with other people just to disagree with but we think it's going to show.

DR. BONACA: I meant to say that wouldn't it be prudent to have some process in the training that says if something really transpires that is significant in the evaluation and is not coming, you know, that at the minimum some note is made somewhere.

MR. BOYCE: There is. Let me try to address the process a little bit. In the inspection reports Frank had alluded to, we have made a change in our threshold so that you can document the sort of issue you described in the inspection report, and even if the issue comes out as Green, that is documented.

That means we don't take action on any individual finding but what happens is that there is an annual look at the problem identification and corrective action system of the licensees, and they will go back through and look at all the significance determination process findings and look for

those sorts of commonalities, so in that case you describe there could be an individual failure. The guy took the garden hose out and watered his lawn, but is that pervasive?

Now you would hopefully see that in your annual look. That is captured in a document called "The Plant Issues Matrix." That plant issues matrix is put up on the website for everybody to see, so that anybody can do the sort of review that I just described at any time. It isn't just incumbent on the NRC to take a look at it.

DR. BONACA: I mean for example the licensee for an event like this he would go back and try to understand in fact if it's a violation of tech specs. It would probably be a Level 1. He would perform a root cause, try to understand it.

He may determine that there are some fundamental issues there why this was lost. I don't think that the NRC process should be ignoring all those steps that we are requiring of licensees.

MR. BOYCE: Well, we are not. We are hesitant though to put our own label on the cause unless we know exactly what it was and that sort of thing, but also in the assessments that we do on a quarterly basis and for the mid-cycle and end-of-cycle reviews, we go and look for those sorts of issues.

If there are enough of them and they rise to a

level, that becomes a cross-cutting issue. We are documenting those cross-cutting issues in our assessment letters that we send out at the mid-cycle and the end-of-cycle, at the end of those reviews. We send them to licensees and we say we think we have got a human performance issue.

Now the problem is that we are not quite sure what to do with that. Once we say we think we have got a human performance issue based on these things it doesn't mean we have a path to take definitive action. We have identified it or are still wrestling with "so what?" So what if we have a human performance problem here? Does it show up in the plant operation? Does it show up in the performance indicators? We have got a whole working group trying to take a look at these sorts of issues during the first year of implementation.

We may come out with we may have a "so what" there and take a hard action based on that, but right now it is just a question we have been wrestling with since we started implementing the program.

DR. BONACA: My sense would be, for example, if you go back now and you look at what the licensee did and put in his Corrective Action Program and took proper resolution and et cetera, it would be become a no issue.

MR. BOYCE: That's right. You would hope that if

all these things show up in the PIM and it's publicly available, that scrutiny would drive the utility into fixing it.

DR. BONACA: Okay.

MR. BOYCE: But that is not what we are regulating towards. We are not using that as our tool. That is just a means where we are trying to be transparent to the public.

MR. GILLESPIE: Let me ask Doug because he has got a second example here --

MR. LEITCH: Let me ask a similar question. What about repetitive Green issues. Do they ever become White based on the repetitive nature of them or does that rather point to a problem with the Corrective Action Program?

MR. BOYCE: Well, I think it is more the latter, because the SDP relies on the risk on each individual finding and that becomes one of the problem identification resolution type of issues that we would look at in the annual look.

We would issue an inspection report that said you have had three repetitive deficiencies in exactly the same area, and that would be documented in our inspection report which would show up in the assessment letter sent to each licensee.

Again, it comes down to do we have a specific process that acts on that information. We don't have one at

this point -- it's just one of those issues we are wrestling with is how to handle those cross-cutting issues.

MR. COE: I can go through the second example, but at a high level it is essentially the same process that I have just described here.

It involves a much more substantial loss of function and in a system that has implications to a larger number of sequences and so it is intended to give the audience a sense that there are some issues that are fairly invasive in terms of the risk at the plant and affect a number of things, and that the process of working through the Phase 2 worksheets might be commensurately greater, but the process ends up to be the same.

If you look on the very last page of that example --

MR. GILLESPIE: Go to the highlight worksheets.

MR. COE: At least get to the plant-specific one and what it is applicable to.

DR. POWERS: The examples you have chosen all involve fairly non-controversial questions. Is the train there or is it not? Is the system there or is it not?

MR. COE: That's right.

DR. POWERS: When I look at the significance determination on the fire protection I find a more subjective sort of decision that has to be made. Is this

protection system degraded, and if so, is there a lot of degradation, a little bit of degradation, and how do I make that judgment? How do I decide whether it is a lot or a little bit?

MR. COE: Right.

DR. POWERS: Because those judgments then are translated into numbers that turn out to be exponents in a risk metric and I have no idea where those exponents come from, but I do know that whether I decide it is medium or low degradation makes a big difference on those numbers.

MR. COE: Yes.

DR. POWERS: I mean decades there.

MR. COE: Yes.

DR. POWERS: How do I do that?

MR. COE: Well, for one, the very fact that the analysis points to the things that are most influential is a big feature, is a significant feature and an improvement because it fosters communication and focus on those particular aspects.

There's certain aspects that you will see in these analyses that won't make a difference whether you judge it to be this way or that way. I mean they won't change the final result necessarily. However, there are some that will, and those are the ones that get focused on most intently.

The cases that you are describing, fire protection, we know we have some problems with guidance in there, some lack of guidance on how to be consistent in defining those levels of degradation, and in fact we are preparing a revision to that guidance right now that I hope to issue before the holidays that will provide additional guidance for certain of those characteristics in the fire protection SDP.

Ultimately speaking, it boils down -- you're right -- to a judgment, and what I stress when I talk to any number of different audiences about the SDP process is that this process does not produce, you know, numbers automatically. They are all the result of judgments that are made along the way and what the process does is it helps focus on those judgments that are most influential, and then what happens is all of the -- well, primarily all of the discussion focuses on the validity of those influential key assumptions.

Sometimes it takes an engineering analysis to discern whether the degradation was enough to warrant changing the reliability value that it is given or its availability value, and sometimes it just simply boils down to a matter of judgment, but in all cases the Staff's responsibility is to formulate the basis for that judgment and how it relates to the degradation that they have chosen

and it is our challenge over time to make that process consistent.

That's the best answer I can give you.

DR. POWERS: I mean, what you've said, I think, is that you're going to try to improve the guidance and at least we'll have this judgment that has the potential of being reasonably consistent.

The next question is, where did the numbers come from?

MR. COE: Where did the numbers come from?

DR. POWERS: Yes.

MR. COE: It's very simply a train is valued at about a ten to the minus two failure per demand. An operator action under normal stress conditions, typically is also valued at about a ten to the minus two.

DR. POWERS: I was thinking more of the fire protection numbers.

MR. COE: In the fire protection arena, I couldn't, off the top of my head, give you a good basis for how those values were -- why those values were put in there the way they were.

We have one individual on our staff that's been deeply involved in formulating that SDP. We've worked closely with him, but he's the real expert, and he's the guy that you really should probably have in front of you to

explain that.

DR. POWERS: It would be helpful if the documentation on this process explained those sorts of things. It would inspire confidence.

Because my looking at the fire protection SDP said this is totally subjective. I mean, if I know what -- well, as soon as I figure out that these are exponents in a risk metric, I know what answer I want to get.

And I go in and fill the matrix out.

MR. COE: Well, we have to guard against --

DR. POWERS: Even if there's a typographical error in the thing and it takes forever to figure it out, but once you figure that out, the typographical error, then you can go through and I can get the answer that I want at the end.

MR. COE: I can tell you from personal experience, from serving on these panels that meet with regard to -- and we've had a couple of fire protection issues -- that I have not detected any intent at all to try to get a particular answer.

I think what I have stated is, in fact, true, that it focuses our attention on the things that are most influential, and we have great discussions and great debates about, you know, how that -- what we know to be true and what we know we don't know, should be reflected in the value of degradation that we choose, the exponent on those powers

of ten that we choose.

So, you know, one of the objectives of the SDP was to foster greater communication, greater insight. And I think because of what I have seen in these kinds of discussions that we have, I think it's achieving that.

And as I said, our greater challenge over the long run is to make the process more consistent. I would say that this process, although it's going to -- it has retained subjectivity and it will continue, I think, to have some element of subjectivity in it, it is far less subjectivity than what we had before this process existed, and that this process is constraining our judgments and our subjectivity to within the logical framework of a risk analysis methodology.

So in that sense, I think we're on an improving track. I'd be happy to answer any of the questions about this example or anything else.

DR. APOSTOLAKIS: Are the SPAR models going to play some role eventually?

Are the computerized SPAR models going to play some role at some point after the inspectors become more familiar with them?

MR. COE: They already do, to some extent, those that have been improved to the point where we've started to get some confidence with them.

We have the Phase III part of our process which acknowledges that these worksheets have limitations and we may need to go beyond these to verify the results that we're getting or modify them.

We've used licensee analyses. We've interacted with the licensee, they have -- of course, they produced their own analyses.

The short-term answer is that I would expect SPAR models to be used for Phase III analysis as time goes on, more and more, as they become more available.

In the long run -- and now I'm speculating far out -- is, maybe the SDP process, as it's currently provided in Phase II, is just a stepping stone, and maybe ultimately we'll have inspectors out there that have access and training and the ability to appropriately utilize more sophisticated tools.

But believe me, I can only tell you how pleased that I've been that people are now starting to think in these terms on a day-to-day basis, whereas in the past, they simply turned to me or they turned to some analyst and said, what's the number? We're beyond that.

MR. GILLESPIE: George, when you look at these things, this is an obvious candidate for some kind of computerization. I mean, you're filling in tables and answering questions with yes's and no's and check marks.

The value to this in our training phase, in the initial phase, was getting people to think logically and think in terms of sequences.

Whether we'll get to the point here inspectors use SPAR models or not, will be driven by the practicality of it, and is it practical to train all of our inspectors to the level of training that if they can't see it on a check sheet, will we lose the understanding of that next inspector who didn't grow up with the program?

DR. WALLIS: Well, you anticipated my question. It seems that all these check sheets could be put in a nice little hand calculator.

MR. GILLESPIE: Oh, yes, the Palm Pilot could take care of this.

DR. WALLIS: And certainly the younger people might even be happier with that.

MR. GILLESPIE: You can electronic-ize the check sheets, but that's different than not having the questions there to --

DR. WALLIS: But then you can upgrade at any time.

MR. GILLESPIE: And the question is, would we want to upgrade? I'm not sure. The number of findings that go beyond white are very limited when you look at all the inspection we do.

And this shouldn't be surprising if you look at

the LER program. Generally it will go 1200 findings, and there are only 12 or less that actually break the ten to the minus six kind of threshold. I know that's a CDP threshold, but the fact that you have a lot of findings and only a few that pass this kind of risk screening, should not surprise us because we have years of evidence of that.

And, therefore, do we want to upgrade every inspector to a computer analyst?

DR. WALLIS: The inspector can learn, too. I mean, if you have this little hand thing, you can say, oh, I'm curious about what happens with this; I'll try it.

MR. GILLESPIE: Oh, yes, yes.

CHAIRMAN SIEBER: On the other hand, looking at the manual sheets allows one to actually see what the process is, and what the relationships are amongst the parameters that are in there as opposed to answering yes and no, and all of a sudden, it comes up yellow.

MR. COE: We've started to explore the very concept that you're discussing. We've actually been experimenting with some spreadsheets that can do this.

And the key is, as I think you just noted, is that it can't -- you can't lose the intellectual engagement. And once you lose the intellectual engagement, we're back to where we were five years ago.

MR. BOYCE: The other thing I would add is, you

could be driven to a bottom-line number as your main criteria, and that's not really the point. We're trying to stay within bands, so that we can make good regulatory decisions.

DR. WALLIS: It's always puzzled me as to why there is this aversion to having a number.

MR. GILLESPIE: What we are really avoiding is comparing bottom-line risk numbers, plant-to-plant-to-plant-to-plant.

MR. COE: It's consumer confidence.

DR. WALLIS: Every time you put in these judgmental things, you're really fuzzy'ing up the decision; aren't you?

MR. COE: But you're doing it in the daylight. You're no longer hiding the assumptions that are influential in a model in some software somewhere.

DR. WALLIS: That's right, but I get very worried about the cop who stopped me and used a lot of fuzzy logic to tell whether I was going over the speed limit or not.

MR. GILLESPIE: Let me take that to the next point, because I don't want to lose sight of this: Once you get through, the inspector gets through Phase II, and if he comes up with a white finding, it right now gets reviewed by a panel, a separate panel.

The licensee then gets a proposed finding of

white. The licensee then gets an opportunity to see what your logic was, to see the writeup of the detail that's contained in these sheets, and, if he so wishes, to put in a counter argument which now focuses him in on the specifics of what was wrong.

This includes fire protection. It may be subjective, but it is within the system of checks and balances that the regulatory isn't unilaterally subjective.

DR. WALLIS: So it allows argument.

MR. GILLESPIE: It allows for structured argument. This sets up the structure. What do you disagree with in my analysis?

DR. WALLIS: This was designed by lawyers, rather than engineers.

MR. GILLESPIE: Well -- so there is that element of checks and balances, and, in fact, once the proposed one goes out and then there's some give-and-take, and normally there would be a regulatory conference on it where the facts would get on the table, then even when the final one goes out, if there is an enforcement attached to it, there is yet another opportunity to rebut it.

So the checks and balances on ourselves and on the system is, in fact, with the licensee, but this gives us a structure to argue over the points. And, in fact, when you get to a Phase III, which is a phase Doug didn't talk about,

when you're beyond the check sheets, and if a licensee challenges it, then you're in Phase III. You've got the analysts involved with their analysts.

In fact, then you're arguing over things like assumptions on human reliability and other assumptions.

DR. WALLIS: But if you had -- you would need the inspector at all. All the licensee needs to do is go through the same thing.

MR. BOYCE: Licensees, of course, have their own models and can do that, yes.

MR. COE: And they should be. I think that's part of the communication process that we'd like to foster.

But it's not sufficient for just the licensee to do it. We need intelligent inspectors that are out there, not only assessing the significance of their finding, but as I said earlier, risk-informing their approach so that they are more likely to find the bigger issues that are out there.

DR. LEITCH: How do you deal with an issue such as an inspector finds a locked high-rad door unlocked? Is there a similar -- I mean, how do you deal with that?

MR. COE: There is a significance determination process.

DR. LEITCH: There is a significance determination?

MR. COE: Yes, there is. There's a significance determination process for each of the cornerstones, and that particular cornerstone would be radiation protection, occupational safety cornerstone. And I believe that locked doors and such are reflected in that SDP. I don't have it with me.

MR. GILLESPIE: Philosophically, though, all of those follow the same kind of barrier. The Table II that Doug put up, number of recovery systems, if you find an unlocked door in a high-rad area, did it lead to an overexposure, yes or no? It's got those kinds of questions.

Was there a training failure? Why was it unlocked? Was it loss of control of all the keys? Did someone just leave it behind?

So, it's got the same Phase I, Phase II kind of approach, which is looking for kind of barriers of protection. Did another barrier of protection that would have prevented overexposure also break down? Was there a loss of control of the keys besides one high-rad area unlocked?

Was there a problem in the training program so that you've lost two barriers of protection?

So, philosophically, that was used in all the areas.

DR. LEITCH: Okay, thanks.

DR. APOSTOLAKIS: One other question: The various colors, yellow, white, under various -- in different contexts, especially when it comes to the action matrix, do they all represent the same kind of core damage frequency change, or sometimes they do and sometimes they don't?

MR. COE: Well, we can't relate some of the cornerstone colors to core damage frequency, so what we did is, we tried to make sure that our level of response for that particular issue would be appropriate; in other words, that it would be consistent with what we would expect to respond to an issue of similar significance in the reactor safety area.

In other words, there was no quantitative attempt to link those, but there was a qualitative one.

DR. APOSTOLAKIS: So if I look at the action matrix, and it says, you know, when you have two yellows, do this, but if you have one yellow and a red, do something else, that the fundamental basis for that is really the judgment of the people who developed it, in looking at what red might mean and so on and say, well, gee, this is the appropriate level of response?

I shouldn't be looking for more quantitative justification?

MR. GILLESPIE: No. In initiating events and mitigating systems -- the mitigation cornerstone and the

initiating cornerstone, which is really reactor safety that Doug's been talking about, there is some sense of equivalency between PIs and inspection, because we could deal with it there.

But in radiation protection, we really had to look at the data. It's occupational protection we're really worried about there.

MR. COE: And emergency planning.

MR. GILLESPIE: And emergency planning and EP. You can't relate those to a delta CDF or a LERF number. You really kind of conceptually have a defense-in-depth, and so in EP, you know, there's a training PI. Everyone has to have practiced in something, and 80 percent within every two years.

So we're kind of -- and then there's the siren, so we're thinking more in terms of number of -- equivalent numbers of barriers to not -- to do the function that needs to be performed.

So at that point, it's strictly subjective, but traditionally, our reaction, a yellow reaction to EP should bear some resemblance to the Agency's reaction to a yellow in reactor safety. So it was by reaction.

MR. COE: These SDPs were created by a group of people with industry participation, public participation, and so it's got -- there's a lot of thinking that's gone

into these.

Not that they are perfect, and as we gain more experience, we do find that we need to make adjustments and we continue to do that. It should be noted that with all the hassle you're hearing about in the press about PIs and the comments about PIs from the industry, that everything that we've put in place for the first year of implementation was 100 percent consensus between industry and NRC.

It's kind of an interesting concept. And, in fact, they're critiquing something they have already agreed on, which is okay, but there's a certain perspective.

The regulator didn't just think all this up, and we weren't necessarily smart enough, just ourselves, to put it in place. It was actually a very tortuous consensus-building process to get there.

And sometimes that gets lost in the mix as if, well, the NRC just said we had to do it this way, but NEI took their 80 percent vote and all that kind of stuff that they go through to say this is consensus.

DR. LEITCH: I was just curious, and I think that at the outset, you mentioned that during the pilot program, what I think you termed the fatal flaw, was discovered at Quad Cities. Could you say a word or two more about that?

MR. GILLESPIE: Yes. Physical security was unique. We actually all agreed with industry on this SDP

for physical security. And what we did was, we had -- if you ran an exercise and the exercise, the adversary was successful in getting to a certain point, then it got -- you asked the question, what equipment did the adversary get to and compromise, and you took that equipment and you went through the SDP, really, that Doug has here.

In essence, you did that. What we forgot to stay cognizant of is success in the physical security area is actually in an adversary attack, having at least one train left.

Well, if I go into the SDP with only one train of cooling left to prevent core damage, which is the success criteria of the exercise, I am very far to the right to start with.

And we kind of didn't recognize that ourselves, that that's the design criteria for a physical security system. And so the design criteria that would already be put in this process would be considered to the extreme.

So, when we tried to apply it, it didn't work. And it was inappropriate to level of reaction and corrective action we'd be looking for. And none of us saw it, us or industry when we came to a consensus on how to apply this. And that was the fatal flaw.

So we've got kind of another, more subjective scale, quite honestly, up with the Commission, and saying

the Commission, as a temporary basis, we think this makes sense, and then we need to step back and figure out, is there a better way to do it in the long run?

CHAIRMAN SIEBER: If there are no further questions, I would point out that this afternoon's meeting will start on time at 1:00, and I would like to thank the Staff for responding to having a last-minute, total readjustment of their -- well, usually it happens sort of randomly, as opposed to structurally.

On the other hand, the presentation was very good. Do you expect a letter from us?

MR. GILLESPIE: No. At this point, in fact, this was kind of a status briefing.

CHAIRMAN SIEBER: Right.

MR. GILLESPIE: I'm going to expect that -- we're holding a major public/private workshop, internal workshop in the January/February timeframe, and then a major lessons learned public workshop in the end of March.

And at that time, we're going to have this massive evaluation document. It's massive, if you look at all the parameters we're looking at.

At that time, it may be appropriate to come back and say here's our picture of the first year. Here's the major things that we need to work on. Were there any fatal flaws like the one in security that jumped out, and why

we're doing which ones first.

So I would say that we'd probably see coming back and maybe getting back to the Committee and then the Full Committee in kind of the April timeframe.

CHAIRMAN SIEBER: Right.

MR. GILLESPIE: That's a precursor to a report we owe the Commission in June on the evaluation of the first year, so I would suggest April/May-ish, maybe May, so we can get all our ducks in a row. And then we'd be probably looking for a letter to be a precursor to the June Commission meeting.

CHAIRMAN SIEBER: Okay, thank you. Again, we appreciate your presentation and the time you took and for your versatility.

MR. COE: It's our pleasure.

CHAIRMAN SIEBER: So at this time, I'd like to adjourn the Subcommittee meeting.

[Whereupon, at 12:10 p.m., the meeting was adjourned.]

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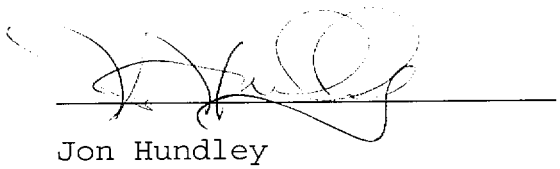

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