MR. SALLEY: The wrap is the concern here.

DR. APOSTOLAKIS: Wait a minute; what wrap are we talking about?

CHAIRMAN SIEBER: The way the cables are wrapped.

DR. APOSTOLAKIS: Oh, the cables. So, the wall -- the barrier goes, what, not all the way to the ceiling, right?

MR. SALLEY: Right.

MR. HYSLOP: Not quite.

DR. APOSTOLAKIS: So, what, a couple of feet or --

CHAIRMAN SIEBER: So, it's really not a barrier.

DR. APOSTOLAKIS: What?

CHAIRMAN SIEBER: It's really not a barrier, the way that drawing shows it.

DR. APOSTOLAKIS: Well, I mean, for some events, it is.

MR. HYSLOP: My understanding was it was quite higher than the switch gear, and it was a couple of feet from the ceiling.

MR. SALLEY: This, of course, was probably back-fit to Appendix R, and it was a unique consideration where they put the non-combustible

marinite in to try to get some compartmentation between the three pieces of equipment from their original design.

DR. APOSTOLAKIS: So, what did you draw there now?

MR. SALLEY: The area of concern is where the cables --

CHAIRMAN SIEBER: Is the middle.

DR. APOSTOLAKIS: Right.

MR. SALLEY: -- from the three units came together at a common point. Now, the licensee's strategy for compliance would be, okay, from where we've passed into this area, we need to install one-hour fire wrap on those cables, so they can survive a fire in this center unit.

The inspector is looking --

MS. WESTON: I think we need to say this was probably -- was this an exemption --

DR. APOSTOLAKIS: No, you have to come to the microphone.

MS. WESTON: I think --

DR. APOSTOLAKIS: Speak with sufficient clarity and volume.

MS. WESTON: Your name?

MR. WHITNEY: Speaking of clarity, was

let's explain whether or not this was an approved exemption or not, that this doesn't meet the letter of Appendix R or does. Can you explain that, please?

MR. HYSLOP: That was Leon Whitney. You've got to use yoru name when you --

MR. WHITNEY: Leon Whitney, Inspection --

MR. SALLEY: This is an actual configuration, as I said earlier, for a plant to do their Appendix R compliance come up with a strategy, or this is an exemption for the barriers.

For example, in Generic Letter 8610, we provide a guidance which the licensee would use here. The requirement was still to have this one-hour fire wrap in this area, which the licensee claimed they had.

As the inspectors looked into the detailed testing of the fire barriers, they determined that it really wasn't one-hour. In reality, it was probably 10 or 15 minutes of fire endurance from this barrier.

So, that would get them -- to enter the SDP, there's a design requirement. They don't meet that design requirement, and that would be the start of this.

In addition to that, they looked at the CO_2 system --

DR. APOSTOLAKIS: Which plant is this?

CHAIRMAN SIEBER: If it hasn't been issued yet, we shouldn't --

MR. HYSLOP: It was over -- it's over a year ago. I guess it is; I don't know.

CHAIRMAN SIEBER: Let me point out that if the inspection report hasn't been issued, then we should not use the name here on the record, okay?

MR. HYSLOP: It should be. I don't know. I don't keep up with that.

CHAIRMAN SIEBER So, if you don't know for sure, don't tell us.

MR. HYSLOP: We don't know.

MR. SALLEY: We don't know for sure, but it's a real plant and this is a real case.

MR. HYSLOP: It's old.

CHAIRMAN SIEBER: Let's move on.

DR. APOSTOLAKIS: Was this identified as a critical area?

MR. HYSLOP: I can't remember. You know, I can't remember, to answer your question.

DR. APOSTOLAKIS: Well, that's a good question, I think, to investigate because that would be a good test --

CHAIRMAN SIEBER: Well --

DR. APOSTOLAKIS: -- of the IPEEE.

CHAIRMAN SIEBER: Yes. On the other hand, it depends on what the deficiencies are in the wrap. Was the material bad? Was the installation bad, or was there not enough of it?

DR. APOSTOLAKIS: No, but the IPEEE, we don't look at deficiencies. I mean, this is a critical area because all the cables come together.

CHAIRMAN SIEBER: On the other hand, if you met the regulations, then five would give you an answer, okay?

DR. APOSTOLAKIS: Well, then, I'm curious to know what five is.

CHAIRMAN SIEBER: Okay, right, and you're degraded from five's answer at this point.

MR. SALLEY: Right, that's an important point, George, because five had screening tools with it. And one of the criteria, for example, was if you have a suppression system and you meet the NFPA standard, then you take credit for it.

As the inspection here looks deeper into it and reviews that suppression system design, they say, "Hey, wait a minute; for a licensing basis, you don't meet your suppression system requirements."

CHAIRMAN SIEBER: Right.

MR. SALLEY: So, that could actually feed back into the five analysis. But the five was a snapshot in time. John?

MR. HANNON: Mark, this is John Hannon. I would think it would be also important to recognize that part of the inspection program itself has us looking into the areas of most risk significance.

And we would draw from the five analysis if that was what had supported the IPEEE. So, that would have been an initiating cause to get us to look at this room in the first place.

MR. HYSLOP: That's a good point, you know? That's one of the things that they do, yeah.

MR. SALLEY: Getting back to our scenario, we have the deficiency in the fire barrier, the cable wrap. Looking further into the suppression system, for the mechanics of the CO_2 system to extinguish a fire -- now, the hazard here would be the cables. The cables would be a deep-seeded fire.

If we took the minimum NFPA 12 for the CO_2 system design, it would tell us that you need a 50 percent concentration, and you need to hold that for 20 minutes with a deep-seeded fire -- basically, by suffocation, removing the oxygen leg of the fire triangle.

As they looked into the testing of the system, what they found was the -- I'm jumping ahead here -- what they found was the concentration was a little less.

If everybody has a visual, I'd like to get back to the -- that was an extra that I shouldn't have brought, George.

MS. WESTON: Now, let me copy it.

CHAIRMAN SIEBER: Well, somebody -- you need to be here.

MR. SALLEY: I just thought if we couldn't get a good visual --

DR. APOSTOLAKIS: You've been trained well in --

CHAIRMAN SIEBER: Yes, I have.

DR. APOSTOLAKIS: -- these proceedings.

(Laughter.)

MR. SALLEY: Okay, there's one error in the slides. We have one double-printed. This example phase two will come later. So, please pass over that.

MR. HYSLOP: So, skip the one slide and move to this one, please.

DR. APOSTOLAKIS: Degradations.

MR. SALLEY: Degradations. Now, the first degradation is the suppression system. Now, the

comment was made about this area does have a deviation. And yes, for a manual actuation, it wouldn't be equivalent to an automatic actuation. So, you would begin the degradation right there that well, hey, this is going to require some human to find the release box, release the system in the event that they do have a fire.

Looking at the system further, the CO_2 concentration -- like I said, the minimum would have been for 50 percent, held 20 minutes, to extinguish the design basis fire, which would be a deep-seeded fire. They didn't meet that. They had a 46 percent concentration.

And the third thing we discussed was the degradation to the fire barrier. How bad are we degraded? This is a good question that the inspectors get into routinely.

For example, if I had a 49 percent concentration for 20 minutes, and the Code said the minimum was 50, you know, we start splitting hairs for the one percent of CO_2.

Then, you can get into things like well, gee, where are the cable trays? Are they in the top of the room where the CO_2 is heavier and it's going to be lower?

And we can get into a lot of technical arguments through the SDP as we move on. But the fire barrier, being approximately ten minutes, where we originally had required an hour, is a pretty good degradation.

That's definitely a moderate to high degradation for the fire barrier.

CHAIRMAN SIEBER: Was that due to damage or design?

MR. SALLEY: I believe design in this case.

CHAIRMAN SIEBER: All right.

MR. SALLEY: And you can see the test that they had indicated the barrier's rating was 10 to 15 minutes.

DR. APOSTOLAKIS: I guess I don't understand it. What tests are these? I mean, tests that had been done in the past?

MR. SALLEY: Yes. The original tests --

DR. APOSTOLAKIS: And the licensee had access to them, and they misinterpreted them or what?

MR. SALLEY: This all ties back to the whole '90/'92 era of Thermalag as to just what is a rated electrical raceway fire barrier system. This isn't Thermalag; this is a different vendor.

So, we're seeing that same experience with different vendors going back and looking at the original qualification testing.

DR. APOSTOLAKIS: Was the licensee aware of this fact, that, you know, based on the tests, the rating was about 15 minutes?

MR. SALLEY: I believe the inspection, in this case --

DR. APOSTOLAKIS: Does that come back to what Doug was saying earlier about willful --

MR. SALLEY: I wouldn't say it's willful. I would say, how hard do you -- do you look? I mean, we operated a lot of years under the Thermalag where we were under the impression that it was good until we started really looking.

You know, just what did you test this to? And just what was your configuration like in the test compared to the plan? We got into all the details and the rigor of the engineering --

CHAIRMAN SIEBER: But I think this one is different than that. I think the Thermalag was difficult to interpret the test results. And in fact, I think there was a finding that some of those test results were not accurate.

On the other hand, when somebody designs

a barrier system, you use the test results from a test of the material and then calculate how much of it you need based on the conditions you have in the room.

So, it, more than likely, is an error in the application of the specific material to the configuration, as opposed to misinterpreting the test for a false statement, so to speak.

MR. SALLEY: We've -- we've --

CHAIRMAN SIEBER: That's the way I would interpret this.

MR. SALLEY: Yes, we've got great understandings into just how electrical raceway fire barriers work. And that's a whole discussion --

CHAIRMAN SIEBER: That's right.

MR. SALLEY: -- that we've had numerous times about the physics behind the barriers. But this is all of that. The --

DR. SHACK: This is a latent design error, is our best guess?

MR. SALLEY: That's an excellent way --

CHAIRMAN SIEBER: That's a good way to put it.

MR. SALLEY: -- excellent way to capture it. The third thing, and getting back to the defense in-depth of this, is the fire brigade. On this site,

they had a very good fire brigade. So, we would expect the fire brigade to perform well within their means.

DR. SHACK: Just, again, what are the questions the inspector asks himself to decide that this is moderate degradation for the auto suppression system and moderate to high degradation? How does he pick those values?

MR. SALLEY: That's a very good question. In the guidance that we provide in the Appendix, there's numerous suppression systems. Not all suppression systems are going to be created equal.

Let me just give you some examples here. If you're dealing with yoru gaseous systems, your C_2 and your halon systems, those are suppression systems. That means that when they go off, they will put the fire out. They are a pass/fail type of thing.

It's the little-bit-pregnant argument. I mean, the system works or it doesn't.

A suppression system, a sprinkler system, by its design, its original intent was to control the fire. You know, it could limit it into an area until manual suppression could come in and extinguish it.

So, you have those two schools of thought in the fire suppression system design. Now, you get

into degradation. Let's take a sprinkler system. Say a head had to be 12 inches from the ceiling, and, for some reason, they installed them 15, 18 inches below. Are they Code compliant? No.

Is it a degradation? Well, yes. Why is it a degradation? Because the fire is going to have to get a little bigger and a little hotter for the heat layer to build on to actuate that sprinkler system.

Will the system go off? Well, it will eventually go off. You may have a little more fire damage, but it should be creditable.

With a gaseous system, it's not quite that easy. In this case, the numbers are very close, so we'd want to call that a moderate degradation.

Let's take that same CO_2 system and say the inspector found a check valve that was installed backwards. Now, the system will get called upon, and no agent would come on. So now, you definitely have a high degradation.

Say he looked at the CO_2 refrigeration system and the tanks were empty; it's clearly a high degradation. So, there is judgement calls. There is engineering experience by the inspector as to what category to pick. And usually, there's discussions about that.

I'll give you an example of one I had -- a halon system in the past where it didn't make concentration. The original design was for a surface fire like you'd find in a flammable liquid.

You know, the argument the licensee put up was, "Well, hey, we designed for a surface fire. We really didn't anticipate a deep-seeded fire."

The only problem was the fire hazard was the cable spreading room where all the fires were deep-seeded and there was no surface fire to think of. So, that's the kind of dialogue you'll exchange with the licensee to get your degradations.

CHAIRMAN SIEBER: Now, generally speaking, during the construction of the plant, or sometimes during hot functionals, all of these systems are tested, and the gaseous systems are tested, for concentration. Is that not the fact?

MR. SALLEY: That's an interesting point. Yes, they are tested. And sometimes, we are finding systems, when we go back, and the inspectors are very -- doing a very rigorous, thorough look at is just how did your concentrations look and pulling the old strip charges from the original design.

And we're fine, and some of it just quite didn't make it, and maybe someone justified off, and

that's under question now.

CHAIRMAN SIEBER: Okay

MR. SALLEY: For example, if you missed by a little bit, they said, "Oh, my problem was from leaks over here, and I sealed those leaks. And I know that" --

CHAIRMAN SIEBER: Or my calibration was bad, and it deserves a correction.

MR. SALLEY: Right, and so those are debatable things that still occur today, and they happen routinely.

CHAIRMAN SIEBER: But the reverse check valve would have been found there, the fact that you may not have enough suppressing agent in a tank that would cause your system concentration not to be appropriate.

MR. SALLEY: Right.

CHAIRMAN SIEBER: Okay, thank you.

MR. SALLEY: There has also bee some work -- in 1986, we had a big study with Sandia on just how much agent does it take to extinguish a fire? You know, the National Fire Codes look at a broad band.

And deep-seeded to them is a cable fire in a nuclear power plant; it's also a bale of cotton in some other applications. They're all deep-seeded

fires by their definition.

We tried to refine it more to our hazards, which were the cables. So, yes, we know the numbers can be a little lower, and we have that guidance available.

CHAIRMAN SIEBER: Okay, thank you.

MR. SALLEY: So, that's the three key points here of the defense in-depth in this specific scenario. Knowing that and having assigned a rating factor with that, we get back to the analysis portion, which is where J.S. will pick it up, to how this all comes together now to define some level of risk. J.S.?

MR. HYSLOP: Yes. I just wanted to say the documentation on those degradation levels are in the public domain now. So, you can access that and look at them for more explanation.

As I said before, in a fire risk analysis, you're looking at the frequency of the fire, your defense in-depth elements, and your mitigating systems.

This first term, FMF, fire mitigation frequency, really just deals with the frequency of the fire and the defense in-depth that's left. Of course, a fire which -- where the suppression system fail,

where your barriers should fail if challenged, you know, these are fires that we're really worried about. So, that's why we developed the FMF.

Now, the ignition frequency of the 4160 vital switch gear cabinet, we said that was the cabinet in the center bay. So, it was an ignition frequency associated with that cabinet that we're concerned with for this analysis. And the IPEEE had provided that.

I'll give you numbers on the next slide; I just want to talk generally right now.

The next terms, the automatic suppression and manual suppression -- really, we had a manual fixed suppression system here. So, "AS" was really a manual suppression. We just didn't think about that when we were writing the guidance.

But we take into account that it's manual in the degradation rating, as Mark said. Manual suppression, that's typically the fire brigade and any type of early response that people -- that operators would have to put it out.

DR. APOSTOLAKIS: But how -- I mean, these things are not really modeled in the fire PRA. So, I don't know how you can --

MR. HYSLOP: I'd like to get to that on my

next slide.

DR. APOSTOLAKIS: Okay.

MR. HYSLOP: I'm going to talk about that. Let me just talk about it generally, George, and then we --

DR. APOSTOLAKIS: Okay, no, no, that's fine.

MR. HYSLOP: -- can get into the details.

DR. APOSTOLAKIS: That's fine.

MR. HYSLOP: And so, for the suppression system, the manual suppression -- the manually operated, fixed suppression system, which is "AS" and the fire barrier, we had degradations. And we're going to use those numbers in this equation.

Now, the fire brigade, everything was -- everything was great there. And so, we didn't have any degradations, so we'll use a lesser failure probability associated with it.

And we have this term, "CC". It's really kind of like a common cause dependency term. There, we recognize that, for some cases, if you have a sprinkler system and you have a fire brigade, those common delivery systems can introduce common cause failures; fire -- your fire water pumps, you know, it's a pressure for each one of those.

So, we recognize that there is an additional failure mode in there, and we've taken it into account. For this particular case, it was a gaseous system, so it wasn't an issue.

Now, I've got the numbers on this page, and then I'll explain them to you on the next page. All I want to say is these are the numbers that we attribute for the various degradations.

And the fire mitigation frequency essentially says we have a factor, a 10^{-5}, leading into the mitigating systems. So, you know, we don't have to have a lot of mitigating systems to derive us to a green here. If we have none, then we're in white territory, okay?

Let's move to the next slide. And what I want to say is, these numbers really are coined as exponents of ten. Remember Doug had the 1, 2, 3, or 4, or whatever; well, you know, these are exponents of 10. So, "-3" is 10^{-3}.

DR. APOSTOLAKIS: You have not included transient fuels, have you? This is just --

MR. HYSLOP: There weren't -- to my knowledge, there weren't any transients found during the inspection.

DR. APOSTOLAKIS: But if you want to have

a frequency of fire --

MR. HYSLOP: You're talking about having a probability of transient --

DR. APOSTOLAKIS: Yeah.

MR. HYSLOP: -- fuels, even though -- we haven't included that That's something that we're going to include in the next version.

We're going to be providing, in the next version -- this is another thing of the evolution -- a whole set of ignition frequencies for inspectors to use when the plant doesn't have them because some IPEEEs didn't go to this level of detail.

They said, "We've got a room. We've got suppression, and we've got some severity factors." So, they never got into this.

DR. APOSTOLAKIS: Right.

MR. HYSLOP: So, that's going to be in the next stage of this tool.

DR. APOSTOLAKIS: Okay.

DR. FORD: So, where do these numbers come from?

MR. HYSLOP: Turn to the next slide, and I'll tell you.

DR. FORD: Oh, okay, you will tell us now, okay.

MR. HYSLOP: okay, this table provides the origin of these numbers. The top column -- the top row of this table identifies the defense in-depth elements. And I checked that we just had a one-hour barrier, an automatic suppression -- or really, a manually initiated one -- and a fire brigade for this analysis.

DR. APOSTOLAKIS: So, this is not just for this incident?

MR. HYSLOP: No.

DR. APOSTOLAKIS: This is something from a document?

MR. HYSLOP: This is -- this is generic. And I'll talk you about, you know, the source of these, George, and how -- but let me get there. And so, the first column talks about the level of degradation, and we have three levels of degradation in this technique -- you know, you might say two levels, the moderate and the high.

The normal operating status when we -- when rate something, we find it meets Code typically. But we still have some sort of failure probability associated with those.

So, if we start talking about these, you know the first question is, where did these numbers

come from? Is there any reference for these numbers? Did I have to develop them? You know, what's the answer?

And if we start for the three-hour barrier for the normal operating state, we had -- new Reg 1150 developed these sandia during their preparation for the study, I guess.

And in this particular study, these said that a wall, three-hour barrier, fire-rated three-hour barrier, had a one in a 1,000 chance of failing. That was the base probability associated with it.

Now, if you had additional -- if you had dampers or doors in that wall, they collected data to support the unavailability of the door -- the doors in that wall. And that's what would drive the failure probability for the normal operating state.

CHAIRMAN SIEBER: Does that mean the door is sometimes left open, or blocked, or does it mean the door is really a three-hour barrier.

MR. HYSLOP: It means that if the door is left open or blocked.

CHAIRMAN SIEBER: All right.

MR. HYSLOP: That was -- that's my understanding. Let me tell you that there wasn't a lot of documentation in the new regs on these. And I

told you that we we're working with the Office of Research. We've asked the Office of Research if they have any more insight to give us on these failure probabilities in this table, we're very interested.

It's evolving and it's a state-of-the-art process.

CHAIRMAN SIEBER: Now, the plants usually keep track of missing fire barriers and blocked doors and things like that as part of their fire protection monitoring system. So, there's a source of plant-specific data for that that could be used, I guess, if the licensee wanted to contest what you were doing?

MR. HYSLOP: Yes, the -- as Doug said, you know, we have a phase three process. I'm talking about the phase two. The licensee in any -- in any and all of this study has the opportunity to present additional information to refine the results.

Here, we've tried to provide generic data so that we can get through the process.

CHAIRMAN SIEBER: Okay.

MR. HYSLOP: Now, if you go to a three-hour barrier, one that has a high degradation, they are -- the zero means that we're not giving any credit for it. And the plant system documentation would support minimal credit for this particular high-level

degradation of a three-hour barrier.

DR. APOSTOLAKIS: So, the inspector is -- I think Bill asked that question -- is provided with information or guidance, how to declare something as moderate or high?

MR. HYSLOP: Yes.

MR. SALLEY: Yes, if I could jump in, J.S.? We have another example of a case we're working right now. In an area, it was required, for their original Appendix R compliance, to have a three-hour box built around a number of cables that had penetrated into an area.

They didn't need -- they needed to rely on this A-train, we'll call it, inside the box for a fire in the B-train area. So, by regulation, it was always required to have a three-hour enclosure around it.

And the licensee was moving along, thinking it was pretty good. The inspector went out; the inspector was looking at it and said, "That box up there," -- they said "Yeah, three-hour barrier for Appendix R."

He said, "Great, can I see the test reports for it and the design basis?" The said, "Sure." So, they started digging through it. When they got into it deep, they really didn't have a test.

It sounded like a good idea to take these non-combustible boards and assemble them here. And they've existed that way since the mid-80's and have taken the three-hour credit for it.

Now, we got into a discussion with them, and what kind of a credit could we assign to this? Well, we have no testing. We just know that it was a box --

CHAIRMAN SIEBER: It's zero.

MR. SALLEY: Right. Will the bolts fail, and the box fall off, even if it's non-combustible? They've covered it with phlomastic, which is a limited combustible.

So, to enter into this, it entered in as a high degradation, zero. The licensee then, because we got the zero, started working through it, built a mock-up of this at a laboratory and tested it, and found that it got approximately one hour.

So, we, in the analysis, further refining it, went from the high degradation to, here, a moderate because they did have some creditability to that box after having tested it.

Once again, it was a good inspection finding to go and look at that.

CHAIRMAN SIEBER: So, they had to conduct

a special test to even come up with that?

MR. SALLEY: Yes.

CHAIRMAN SIEBER: Okay. Now, let me ask another question. And again, referring to "door" on there, do I interpret that to mean that any three-hour door in the plant that's expected to be open for 30 days a year?

MR. SALLEY: The door thing, I just want to -- I understood a little different J.S., if I could expound upon that. We give you three levels there. We give you a -2, a -2.5 and a -3.

CHAIRMAN SIEBER: Okay.

MR. SALLEY: Not all three-hour fire barriers are the same. For example, if I wanted a perfect fire wall, I'd have 12 inches of concrete poured, solid pour, no penetrations, no doors, no nothing. I'd have a lot of confidence, and history has proven that, that that's a pretty good three-hour fire wall.

However, in a power plant, if I introduce a door, well the door doesn't test the same as a fire wall. The door criteria is much more lax, just by the nature of the door. I mean, you have gaps.

If you have some flaming remote on the other side, it won't perform as good as the wall, but

it's still a recent --

CHAIRMAN SIEBER: It's still a three-hour barrier.

MR. SALLEY: -- it's still a three-hour barrier. You need to have that in there. If this wall had numerous penetrations, I'd need to look at those penetrations? And do I have tests? Do I have designs? Do I have a comfortable feeling with all the penetrations?

So, that -2 to -3 gives the inspector some room to customize it for his application in determining the --

CHAIRMAN SIEBER: It sounds to me a little subjective.

MR. SALLEY: Engineering judgement.

(Laughter.)

CHAIRMAN SIEBER: That's another way to phrase it. Let's move on.

MR. HYSLOP: Okay, so basically, the moderate degradation is a twist of a value between the high and the normal operating state. And we all -- to get to the values, you know, we used, we looked at the one-hour barrier, the fixed suppression system and fire brigade.

The one-hour barrier in the normal

operating state was taken to be approximately equal to a moderate degradation of a three-hour, in that, you know, a moderate degradation of a three-hour is somewhere between two and one hours. And so, that's what we expect for a normal operating state for a one-hour.

And then, the logic is similar for the moderate and high degradations of the one-hour, as was for the three-hour, the basis for the choices.

Now, if we talk about the fixed suppression system, there, the normal operating state of that is also taken from many studies. I know it's in five, and I know it's in the PAR Implementation Guide, the basis for this number.

So, there, that's judged as a normal operating state. And again, for an automatic suppression with -- where we have some degradation which drives us to conclude that there's minimal credit, we give it zero.

Now, the last one we talk about is the fire brigade. And really, it's a manual suppression. That's really what that is, is a manual suppression there. Let's be quite frank, because if you look at the fire brigade, you notice, for a high degradation, we give credit.

And that's because there are fire watches, there are operators going around a plant, and there's data found in the PAR Implementation Guide that supports that these people do put out some fires before they get bad. So, we have some credit there.

The -1 there is -- it's often scenario-important. But for cases where the IPEEEs looked at lots of fire sources creating severe fires, .1 was typically used in those analyses to support that. And that was really the origin of the number here.

Let me see if I have any other comments. So essentially, you know, I guess to sum up, some of these normal operating states are supported by industry, or NRC, or both, and guides. And the other values were kind of deduced from common sense, good judgement. Go ahead.

So, now, I'm going to move into the reactor safety portion of this because we've identified the fire mitigation frequency. This is the -- these are the fires where -- which have the opportunity to get big. Our suppression system hasn't worked, and so we have some elements of our defense in-depth that are going to fail to control this fire.

So, what I'm going to -- let's move to the next slide.

DR. FORD: Excuse me. The only data in this whole page 37 is this Sandia new Reg 1150, the previous one. The only hard data that you have --

MR. HYSLOP: Well, we have --

DR. FORD: -- 10^{-3} is --

MR. HYSLOP: No. Well, that was adopted by industry also. So, that's a number generally accepted in the PAR community. I think that was derived in the 1150 studies. I don't know if industry did any additional work before accepting that.

This is one of the things I've identified to Nathan Siu, of the fire research plan, that we're interested in having additional information on because, you know, we recognize that this is one of the -- one of the area that -- you know, there's a limited information on fire on which to make our judgement.

DR. FORD: But that's my point; the only referenceable data is that 10^{-3}?

MR. HYSLOP: Well, there -- no, there -- no, that's referenceable also in either the five or the PAR Implementation Guide, both of which are industry documents.

DR. FORD: Okay.

CHAIRMAN SIEBER: I would like to suggest

that we're going through the basic principles right now of how this worked, but you do have a specific example.

MR. HYSLOP: Okay.

CHAIRMAN SIEBER: And maybe we can do that after lunch so that we can get through with the general explanation and let us know.

MR. HYSLOP: Actually, we're doing the example, but we're almost finished with it. So, I think --

CHAIRMAN SIEBER: Well, it looks like a lot of sheets.

MR. HYSLOP: Well, that's okay. I can do those in five -- in five minutes, and that's what I intend to do. I'd like to -- if you don't -- whatever you want to do.

(Laughter.)

CHAIRMAN SIEBER: I think this is a good place, then, to stop before we get into all this detail here.

MR. HYSLOP: Okay.

CHAIRMAN SIEBER: And even though it's extremely interesting --

MR. HYSLOP: Okay.

CHAIRMAN SIEBER: And why don't we recess

for lunch and come back at one o'clock? And we'll finish this up then.

(Whereupon, the proceedings went off the record at 12:08 p.m. and resumed at 1:02 p.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:02 p.m.)

CHAIRMAN SIEBER: We'll come back to order and continue with Fire Protection SDP.

MR. HYSLOP: What we've done, just to remind you, was to calculate a fire mitigation frequency which was the frequency of the fires for concern were those that aren't extinguished or controlled by suppression and those which challenge our barrier.

What I'm going to do is move on to an evaluation which involves the reactor safety worksheets. Doug Coe, in his presentation, talked to you about an application of those sheets and I'm going to talk to you about a different one.

Let's move to the next slide.

[Slide change.]

MR. HYSLOP: The next slide is the worksheet for a small LOCA and the reason we're using the small LOCA is because it's fire induced. As you recall, we lost all the electrical trains. Losing those electrical safety trains means that we lose our component cooling water and our charging system and losing both of those induces a small LOCA or RCP-Seal LOCA. And this is consistent with the assumptions

used in the reactor safety process.

So now we have to say how significant is that fire induced small LOCA? And if you look at the sequences which are here on the left most column, you'll see that first of all one sequence which leads to core damage is a small LOCA and the loss of all high pressure injection. In this scenario, we're looking at the charging pumps and I think the SI trains injected a slightly lower pressure, but you could have some depressurization, therefore some mitigating capability if they were available.

But upon losing all these electrical trains and mechanical trains you, in essence, lose your high pressure capability. So the reason I said we could get through this quickly is because we really give no credit for the mitigating capability in this particular scenario. So our fire mitigation frequency which had no reduction because of the length of time that these degradations existed, essentially serve to characterize the increase in core damage frequency fully. And for this example, we get a white and you would go through the same tables as Doug did. I've just short-cutted it.

[Slide change.]

MR. HYSLOP: So if you go back to that

earlier slide it says that the resulting evaluation is white.

Now what would happen if we had felt that that fixed suppression system wasn't worthy of any credit at all? If you remember, it was immoderate, based on the observations that the inspectors made. Then it would be in a yellow territory. As you've talked before, the yellow provides a different response than the action matrix as does the white. So we would have geared up a little more for this one.

If we repaired the fire barrier, for instance, then we would have been pretty much at a green/white threshold in that case and depending on exactly where we were, we would have gone -- we may have gone with a white for that because this is a conservative approach and then allowed the licensee to come in with a refine analysis to support his work.

So that's it for my presentation and Mark's presentation.

MR. COE: If I may add one thing, it's important to make the point that the SDP process has not removed the requirement for the staff to make judgment and as you've seen here with the fire protection as well as the earlier presentation that I did, the judgments are now more rigorous, more

disciplined by this framework that we've chosen to use, but in essence, there are still judgments and they occur at the assumption level or at the basic input level for these SDPs and the logic that then processes those assumptions to a final result is clear and is apparent to all of our stakeholders and is then the subject of dialogue and discussion. So I do want to make the point that we have not extracted judgment from this process.

MR. SHACK: What's the feedback you get from the inspection people about whether they feel they can make these judgments?

MR. SALLEY: Can I take that one? In the fire sense, let me pick that up and explain one other thing that's kind of important if we go back to our example. Now remember, this process is new. It's evolving. J.S. told you that. We're getting better. We're refining, we're doing, we're learning. If you think back to your question in this case here with judgment and such, there's one question that we just kind of glossed over and it was done this way in the actual example because it was so early on and it was looked at and that is what's the fire potential, okay? If I could argue from a licensee's standpoint and say well, okay, yeah, it's a 10 minute fire barrier, but

when I go through the dynamics of combustion here, I get a 6 minute fire, worse case. So that gives us room to argue and move around within the evaluation.

One of the things that we're currently moving on and this is the way we're seeing them now is what's the realistic fire threat. As the newer SDPs are coming in the findings, that seems to be one of the up front questions. Could I have had, do I have the chemistry there to give me the credible fire to challenge these degraded barriers' suppression systems. And that's where we're moving with the effort now. With the inspectors, one of the things that is -- if I for example say a gallon of combustible liquid, in each one of our minds we picture the fire that could be. It could be in a kerosene lamp and you've got a hurricane lamp or you could spill it all at once and get a big burn. How do we make those judgments and that's what we're working on. We have a quarterly workshop with the inspectors to review the cases and J.S. goes through the cases that we've been through in the last quarter and we're starting to introduce some of these new tools and methods on how to do the fire scenario development. That's what the process is currently today. That's what we're working on and going through the

development methods is where we start all getting the same judgment and the same experiences, learning from the different ones.

CHAIRMAN SIEBER: Now that may change the significance of a given set of circumstances. It doesn't change the fact that you would still be in violation of Appendix R which is deterministic to the violation whether it's cited or noncited or whatever color it is, it still exists.

MR. HYSLOP: And as we've said, any and all of those still go into the corrective action program. They need to be fixed.

CHAIRMAN SIEBER: On the other hand, it seems to me that the development of risk-based fire analysis is not too far along. If I look at NFPA 805, it discusses that to a great extent, but it seems to me that that is in addition to the deterministic requirements of Appendix R or branch technical position 9.5.1 or the guidelines or whatever class of plant that you're into. And until such time as you risk-inform Appendix R, if you ever do it, where it tells you, you don't need a one hour, three hour fire barrier, you need a 20 minute or a 60 minute or a 90 minute fire barrier based on fire scenarios and risk probabilities, it sort of puts us into an enforcement

juxtaposition into what the regulations tell us to do, it seems to me.

Can you comment on that at all?

MR. SALLEY: The risk-informed performance based approach, I see the SDP portion of this is moving in the right direction and being fairly valuable. For example, in the past, if you were to just find the CO_2 system, didn't meet its design concentrations and the fire barriers didn't either --

CHAIRMAN SIEBER: It would be a Level 4.

MR. SALLEY: Right. At some point in there someone would say well, how bad was it and some engineer would walk out there and say well, you know, we've got this switch gear and from what I've seen a switch gear fire -- and it would be an opinion. A pure opinion. It's going to be real bad or it's not.

Here, we at least are starting to framework and say okay, from a risk standpoint. How bad would it have been? What would the possible outcomes be and we have a nice structured framework to make a better determination. So I see it as a real improvement there.

CHAIRMAN SIEBER: Now the example you describe here is a Phase 2 analysis under the SDP. What circumstances would cause you to do a more

rigorous analysis and if so, how would you do it?

There's a step beyond this, right, as far as the degree or rigor?

MR. SALLEY: Right. And I guess we haven't seen a whole bunch of Phase 3s, but one of the areas that I've seen them go to is we go into the fire dynamics.

CHAIRMAN SIEBER: Using what tools?

MR. SALLEY: That depends. You know, C-FAST is a common piece of software put out that people like to use and make approximations with. So you would start seeing the fire modeling come into more -- but also you would see in a Phase 3 from my experience J.S., and please correct me, but the issue of fire frequency, okay, people wouldn't want to say what's the fire frequency of the room or what's the fire frequency of that specific piece of --

CHAIRMAN SIEBER: Equipment.

MR. SALLEY: Equipment. And you'll see that things -- the fire frequency can change orders of magnitude, you can change colors. I like the colors like -- you guys want to keep them green. I want lime green and dark British racing green.

CHAIRMAN SIEBER: If you change by a factor of 10, you change colors all together. You go

from a green to a white to a yellow to a red, right?

MR. SALLEY: You'd see more rigorous fire dynamics development. You'd see more rigorous on the fire frequency of the specific component rather than average or an area and I think between a Phase 2 and a 3 you would see things like the licensee taking it serious and going to perform a test to see what grading does that barrier really have. The NRC has given us zero and we can't argue with their zero. So they'd go out and try to get some hard number for it.

MR. HANNON: This is John Hannon. I'd also add that there's an effort, we have underway now at the NRR staff to look at the fire events database to update that and that might provide more current information. Think of using the SDP as far as fire event frequencies, initiation frequencies.

CHAIRMAN SIEBER: Yes. Now is the methodology you would use to do a Phase 3 analysis in a fire protection area proceduralized or documented or is this whatever you decide you want to do kind of thing?

MR. HYSLOP: I haven't done any Phase 3s associated with this. I've looked at a couple of utility ones. We currently need better Phase 3 guidance and that's one of the things that we've asked

the Office of Research to provide us as a result of this program.

In general, your technique is the same, given the things that you're considering: frequency, defense in depth and mitigating systems. I suppose if someone could develop distributions they could think of something other than the mean and incorporate that. I don't know of anyone who has done that.

So I really don't have a very good answer to your questions.

MR. COE: When you're talking about Phase 3 guidance, you're talking really about what kind of standards exist in the general field or practice of probabilistic risk assessment.

CHAIRMAN SIEBER: That's true.

MR. COE: And you may be aware that ASME is working on some standards that the NRC is participating on that committee with and they should be coming out with a set pretty soon.

CHAIRMAN SIEBER: Well, they actually have published a standard, but that's for regular PRAs, you know, the very comprehensive ones. And it doesn't seem to me, as I recall that standards that it tells you specifically what models to use, what assumptions to make, where you get your data from, how you derive

all these quantities that go in there. The fact that it doesn't even describe initiation frequency, defense in depth, mitigating systems or any of that. It's sort of in the eye of the beholder at this point, right?

MR. COE: Exactly, and I think that the process that we've devised here is one that helps the decision makers of this Agency that are about to make a risk informed decision, better understand the assumptions that went into it. And I don't know that that would change necessarily whether you're doing a Phase 2 analysis or a Phase 3.

A decision made on the basis of a Phase 3 analysis should be just as understood in terms of the influential assumptions that were used as a Phase 2.

CHAIRMAN SIEBER: I would think one reason why you would go to a Phase 3 is because your Phase 2 analysis was challenged and that being the case, then why not challenge the Phase 3 analysis?

MR. COE: In any case, what this does is foster better discussion and a more focused discussion between the staff and the licensee, typically. I've seen this play out because anytime an issue is characterized as greater than green, it comes to a panel at headquarters. And the panel, subject to the

panel, is whether or not we are applying the SDP process consistently and inevitably the discussion gets down to the level of confidence that the staff has and the assumptions that are most influential to the result. And then when we discuss this with a licensee, again, it focuses our discuss on those assumptions which are most influential to the result. And I think it's a more efficient way of processing, of communicating with, both internal to the staff as well as external.

MR. JOHNSON: But we do hear your question and it's a good question.

CHAIRMAN SIEBER: Yes. I guess the other thing that I'm thinking of is there really aren't a lot of fires in power plants if we ignore waste basket fires in some outbuilding some place. On the other hand, there is talking about mining for noncompliance, there's a lot of opportunities just due to the complexity of the regulations to find design deficiencies and testing deficiencies and so forth. I mean you could really make a living doing that.

So I see the potential for enforcement actions, noncompliances, noncited violations, what have you, being always there.

MR. COE: We hope our inspectors are

sensitive to and looking for the most significant of those because I think anybody could agree that as large and complex a facility as these are, there will definitely be some level of deficiencies that exist all the time and the licensee should be identifying and correcting those and our interest would be in identifying those that are of greatest significance to the public health and safety.

CHAIRMAN SIEBER: And that's what this process is intended to do.

MR. COE: Is to focus our efforts as regulators, yes.

CHAIRMAN SIEBER: Okay. I think that clarifies that for me. Why don't we move on.

MR. JOHNSON: Okay. All right, Don will you come up?

We're continuing through the presentation. If you look in your packages, we're going to shift gears now and talk about performance indicators and Don is here and we hope to be joined by Garrett Perry shortly to talk about a number of issues with respect to performance indicators.

The first topic that I wanted to cover was to talk about thresholds in a very general sense, just to refresh your memory with respect to what we

intended to do with thresholds, not just performance indicator thresholds, but thresholds in the ROP. We're then going to talk about the process for developing thresholds and I think there was some interest in having us look at mitigating system, an example of how we set those thresholds, so we're going to do that, right, Don?

MR. HICKMAN: Yes.

MR. JOHNSON: And then last, but not least, we're going to talk about PI reporting so you understand a little bit of the mechanics of how we get this PI data to the Agency.

Just by way of providing some explanation or some reminder, if you will, about what we were trying to achieve with thresholds in the ROP, again and I made this point earlier, when we set out to do the ROP we had the notion, in fact, industry very much wanted us to recognize that there needed to be some licensee response band. We weren't going to be able to achieve zero defect. That was an unreasonable expectation. There, in fact, needed to be some area with which the licensees could operate their plants and have problems, but that wouldn't warrant necessarily an increase response on the part of the regulator beyond what we do with respect to doing sort

of a baseline level of inspection at all plants to make sure we have the necessary information along with performance indicator information to begin to get an indication about the performance of plants.

So there was this notion of a licensee response band. Well, in order to make that work we set up a series of thresholds and those thresholds really serve as trigger points, if you will, for us to take increased regulatory response.

Again, the greater the degradation, the more thresholds, the more significant the threshold trip, the greater the regulatory response and we'll talk about the regulatory response when we talk about the action matrix in July.

I do want to make the point that the thresholds aren't intended to be predictive. And in fact, we don't even like to use words like leading. And in earlier presentations for the ACRS and in multiple presentations, earlier presentations throughout the development of the ROP, we have typically gotten the question, are the thresholds leading, are performance indicators leading and every time we try to come back with a response that goes very much like we don't guarantee, we don't believe that it's appropriate for us to say that we can

predict or present an occurrence of an event. We can't predict necessarily that at Plant A, whose performance is at X level today is going to be at Y level in a year from now. That's not what we set out to do when we set the thresholds.

What we set out to do when we set the thresholds was be able to trigger ourselves early enough in a way that would enable us to take timely action because what we don't want to have happen, we don't have to have plants go into that unacceptable column of th action matrix. We're talking about that far right column of the action matrix where we've lost confidence in their ability to maintain the design of the plant. And we've got some words, some high levels words that were taken from the order, from things like -- like words we wrote in the Millstone order, for example, where the Agency has lost confidence in the ability of the plant to -- the licensee to operate that plant safely. And so the thresholds are intended to allow us to trigger, to respond in time to interact before a plant would go into that column.

So we talk about timely, we talk about thresholds as enabling us to take timely action where we see these performance declines happening. And thus, that's what we were trying to do with respect to

the thresholds.

I guess I just wanted to pause for a second and let us talk about thresholds before we go further because I know there was and has been, continue to be questions about what we were intended to do with respect to the thresholds.

Wonderful.

MR. BONACA: I don't want to belabor it, but it's hard to believe that you can take timely action if you don't have some leading indications that you can work on. That's my comment.

You're saying on the one hand you don't intend to have leading indicators. I can accept that. Then on the other hand you say you want to be able to have indicators that will give you the opportunity to have timely action which means take action before things happen. So that in and of itself implies you expect them to be leading. So I don't know where you're going with the two statements.

MR. JOHNSON: And it's sort of timely -- that's a fair comment. It's sort of -- is it timely or is it leading to what and this is kind of the discussion that we have.

One of the difficulties with the current thresholds in some people's minds is that with respect

to the low level issues that they see at a plant, you can get into -- some people firmly believe that they can in terms of thing that you begin to see indications, low level indications of human performance, low level indications with respect to the way licensees find problems or treat those problems, that those provide an early indication, if you will and if the licensee doesn't fix those, they're going to end up with a problem.

And I guess I'm trying for a shift in mindset. The old process used to have us look at those issues and react to those issues. We often drew conclusions based on a predominance of those kinds of things, extrapolated them to say hey, if you don't fix these things, licensee, you're going to end up on the last list and the problem with that is that we predicted about twice the number of plants that actually ended up on the last list based on an approach like that because what actually happens is that at a very low level, unless you actually see thresholds, unless you actually get to a point where thresholds are being crossed, much of what you see to cause you alarm because you never know whether what you're seeing is a tip of the iceberg or it is, in fact, what it is and there's not much beyond it.

And so again, the rigor of the thresholds is to try to say if there are performance problems, we want to have the threshold set low enough so that we can trigger response as those performance problems begin to occur, but again, if you have problems that don't even reach that threshold, we're going to -- those fall in the licensee response band.

That's the balance I'm trying to strike when I draw the line between what is timely. The notion of being predictive, I mean we've had, you'll remember maybe a couple years ago or three years ago or so in response to a direction that we got from the Commission, then I think the EOD looked at financial indicators and the notion at that time was that financial indicators would be an example of something, a type of indicator that would be predictive. And that the ACRS, at the strong urging of the ACRS, among other stakeholders, we backed away from that approach because again, what you would seize upon in terms of being predictive could give you bad results, you could end up seizing on something and thinking that you were getting a valid prediction and in fact, you weren't getting a valid prediction at all.

So again, the emphasis on the thresholds was to allow us to recognize performance problems and

begin to interact the action matrix providers with greater responses early on because again what we don't want to happen is we don't want to have a plant where tomorrow we decide for ourselves that that plant is unsafe. We want to have had an opportunity to engage and we think that engagement has to happen though through results, performance issues that reflect themselves and especially as they cross thresholds to the SDP or performance indicator issues that cross thresholds that we've set up.

MR. HICKMAN: If I could add to that just a bit. The old AEOD performance indicators were sometimes criticized and we ourselves also wanted to try to make them predictive, leading. I know, criticized for the fact that they were. That is very difficult to do because you have to look at programs that will ultimately reflect in performance at the plant.

What those programs operate through people and you never can predict how people will react to programmatic weaknesses. Instead of trying to make them predictive, what we always said we were trying to do was to try to make them as responsive as possible, as quick reacting to changes in performance at the plant so that we could identify that as early as

possible.

In fact, we did some comparisons of the trends of PIs against Agency actions, senior management, meeting actions and things like that. Putting on the watch list and those kinds of things. And that was kind of rather informative.

But we want to be as reactive as possible, particularly for this program because one of the premises of the program is that if there's a risk significant problem at a plant it will eventually turn up in performance at the plant. If it doesn't do that, then we say it's not particularly risk important, if it doesn't reflect in some kind of a performance at the plant. So we're looking for those kind of performance problems to show up and we want to identify them as soon as possible so we can step in after crossing the first threshold into the white band and try to take some action to prevent them going further. That's the whole premise of the program.

MR. KRESS: Since George is not here, I'll try to articulate a couple of questions that I anticipate he might have asked about this slide. One of them would be looking at the second bullet and the third, delta CDF due to some change in these performance indicators are likely to be plant

specific. How do you know that these are the numbers that would be generic? How do you arrive at a generic number for what is like to be plant specific? That's one question.

The other question is what's the rationale for choosing the 95 percentile for the first threshold? Why is that a good number to use?

MR. JOHNSON: Okay, I'm sorry, was there a third question?

MR. KRESS: Those two right now.

MR. JOHNSON: We actually were going to get to those. Don was going to talk through the actual process for developing thresholds and when we get joined by Garrett Perry and I know Don's been anxiously watching the door for Garrett to come in, Garrett was involved in the original setting of the thresholds. We'll talk about those issues.

MR. HICKMAN: Yes, we'll get into both of those. We'll start with the first bullet.

The green-white threshold, the concept was to identify plants with performance as an outlier to the industry. We didn't go into this development with the concept in mind of 95 percent or two standard deviations or anything like that. When I show you this slide, I think you'll see that it's very obvious

where the thresholds should be set and maybe I guess we should go into that one right now.

[Slide change.]

MR. HICKMAN: This is an example of what we did. This happens to be the safety system unavailability of the aux. feedwater system. Remember, now that we did this in the fall of 1998 and so we took the most current full three years of data that we had, that was 95 to 97 and this was -- we did all this in concurrence with -- in agreement with the industry, represented by NEI. We said that we would take those three years and make them our baseline. So we collected this data over that period for the best data we could get for each of these PIs.

In this case, for our safety system unavailability indicator we used the same definitions that WANO had been using for many years. So they had been collecting this data on a quarter by quarter basis, taking 12 quarters and summing them up, calculating the indicator.

We had three years worth of that. We had 12 quarters worth of that data. We took every plant, in this case all of the PWRs, there's 71 on here. We took the highest value during those three years and we plotted it and that's what you see. It's the worse

case value, the highest unavailability of that system for each of those plants.

MR. KRESS: Now, if I were going to draw a line as a threshold through that, I would have dropped down to the next level, instead of the one you have because there's, to me, it looks like two modes, two mode distribution. I would make the line right in between the two modes. I don't see a real rationale for the line you have up there.

MR. HICKMAN: That's set at 2 percent which is the current threshold. If we had dropped it down to the next line, that's 1.5 percent. I guess you could argue about that. We looked also at the number of plants, two things we looked at. One was that there was a clean break. You didn't want to have a plant, two plants slightly, very small difference apart, but on opposite sides of the threshold.

So we looked for a gap. And as you point out, it could have gone either place.

MR. KRESS: Yes.

MR. HICKMAN: We then also looked at the number of plants. And this is not a hard and fast rule. It wasn't like 95 percent was a hard and fast number. It was of that order. And so we captured five plants setting it at 2 percent, out of 71 in a

three-year time period. If we had dropped it down we would have gotten 13 plants.

MR. KRESS: I don't understand why you didn't, frankly.

MR. HICKMAN: This one is probably a little more controversial than some of the others. Most of them were very clear where the threshold ought to be. This one we could argue about whether it's 1.5 percent or 2 percent. You're right.

We felt that 5 plants was better perhaps than the 13.

MR. UHRIG: You say this is just PWRs? There's a hundred and some odd plants there, unless I'm not reading it --

MR. HICKMAN: Well, the numbering system is kind of strange. These are the graphs that we got from NEI. They provided this data. And the numbering isn't quite right. But if you count the bars, it's actually 71.

(Laughter.)

MR. UHRIG: Okay.

MR. HICKMAN: If all the plants are there, then there would be that number, but they're not all there. It's confusing.

MR. BONACA: Again, this is not plant

specific at all. What I mean is that it doesn't recognize the --

MR. KRESS: That was the other thing --

MR. BONACA: -- importance, the importance of the unavailability to the specific plant.

MR. KRESS: Right.

MR. HICKMAN: That's correct.

MR. BONACA: Okay, so it doesn't recognize that.

MR. KRESS: It may be that that plant that shoots up there has always been there and it didn't matter.

MR. BONACA: Maybe there is another system behind it.

CHAIRMAN SIEBER: It might have five pumps.

MR. HICKMAN: We recognize that. We have had many discussions about this. There's actually four indicators per plant on the safety system unavailability and we're undertaking a major effort to kind of overhaul this. And of course, as George keeps reminding us, we're aiming towards the plant specific PIs, the plant specific thresholds. That's the goal.

MR. BONACA: This is a good effort there.

MR. HICKMAN: It's going to go from the

beginning.

[Slide change.]

MR. HICKMAN: Let me go back to this slide again. Now Garrett can talk better about this because he did this and I'm not a PRA person, but basically what he did was to take some generic vendor models that we had. He used the old SPAR models, not the new rev. 3 models, but the old one. And there were just a limited set of those, I think about a dozen or so and those were essentially vendor types of models for the various configurations of the vendors for Westinghouse two loops, three loops, four loops, etcetera.

He then ran this parameter, varied the parameter that we were monitoring to get a change in CDF of 10^{-5} for the white/yellow threshold. And he did that for each of the models and if you look in Appendix H of attachment 2 to SECY 99007, that's Garrett's appendix where he describes how he set these thresholds and there are tables in there and it will show for various plants representative of each of these models what the numbers were. And essentially what he did was to take the most conservative number, the smallest number.

MR. KRESS: That's how he got around the

plant specific part of that.

MR. HICKMAN: Right. So to make sure that essentially every plant was covered. If you read it carefully, you'll see there's a few holes in there and there's still work to be done on the thresholds, but that was the basic approach.

The same thing was done for the yellow/red threshold, but adjusting the parameter to get a delta CDF of 10^{-4}.

MR. KRESS: That's using the old SPAR models?

MR. HICKMAN: Yes. Right. Right now we have --

MR. KRESS: It's kind of group plants by vendor type?

MR. HICKMAN: They're just vendor models.

MR. KRESS: There's one that's treated as one type of plant?

MR. HICKMAN: Right, they're pretty generic vendor models, but there's a particular plant, I guess that it gets modeled after and they're listed in the tables in Appendix H.

MR. KRESS: That represents these plants?

MR. HICKMAN: Yes.

CHAIRMAN SIEBER: I take it you couldn't

do that, use that technique for the green-white threshold because almost all plants would be white then, right?

MR. HICKMAN: With green-white it would be more difficult.

CHAIRMAN SIEBER: You would have -- all you'd have to do is have one failure and you would be white, a CDF at 10^{-6}, right?

MR. HICKMAN: But as Garrett points out in Appendix H, this method worked well because you'll see that there is still quite a gap between the green-white threshold and the white-yellow threshold. So by going by outliers from industry norm, we think we have a pretty good threshold. It gives us a decent green band for the licensees to operate in and it gives us a white band for us to react and to try to prevent further degradation of performance. So it did work out pretty well.

MR. KRESS: This is a one time fixed event, threshold and it won't be adjusted later?

MR. HICKMAN: We set the thresholds this way prior to the pilot program. At the completion of the pilot program we looked again and we did make some adjustments. Actually, it wasn't based on the pilot data because we only had 13 plants, but when we got

the initial input from the entire industry, giving their historical data, that's what we looked at and we did make some adjustments based on that.

In some of the safety system unavailability indicators, in the security equipment performance index indicator an din the occupational radiation exposure indicators. Also, in safety system functional failures and scrams of loss of normal heat.

MR. SHACK: I also suspect that the finer you make that delta CDF the more the plant specificity makes a real importance, that is, if you did that at 1 times 10^{-6}, you really would almost have to do it on a plant specific basis. By the time you get to 10^{-4}, you're probably not terribly sensitive to --

MR. KRESS: I think you're exactly right.

MR. SHACK: Minor variations. So there's a certain rationale to doing it that way.

MR. COE: That's a good point. I would also point out that some licensees, because these thresholds or these thresholds for unavailability in this case are generic, may find that their own maintenance rule, performance criteria for the same piece of equipment allows much greater unavailability for certain components that are being monitored by these PIs and this is a source of concern to them,

that they're being held to this generic standard whereas their own plant design, their unique features of their plant design would allow a more unavailability to accrue for that particular component before they got to that risk threshold.

MR. JOHNSON: Yes, if you remember where we were, as Don points out in 1998, we really were trying to make progress, given the tools that we could seize upon quickly, given the PIs that we could seize upon quickly. We did create some new PIs and in fact, we did end up trying to set thresholds for those and then trying to benchmark those thresholds and make adjustments to those thresholds in the pilot program. And we recognize, as we go forward, that we'll need to continue to work on and to refine the performance indicators and the performance indicator thresholds. We have a process that -- and we talked about this a little bit at the last briefing, that as a formal change process for changing PIs or changing thresholds and it's a deliberate process that has us look and pilot and benchmark before we make decisions about changes. But again, I think we agree with the ACRS that our thrust for the major improvement with respect to PIs is in trying to, to the extent that we're able to, do something with respect to being more plant

specific.

CHAIRMAN SIEBER: There's some slight difference in the wording of the second and third bullet. Is that just editorial or is there some meaning you're trying to convey there that I'm missing?

MR. HICKMAN: Garrett wrote that. I really don't know.

MR. SHACK: The rule about parallel construction.

(Laughter.)

CHAIRMAN SIEBER: Come to the right place, right.

MR. HICKMAN: If there are no more questions on that, there was apparently a desire to see how the process works, how we collect the PIs and report them.

CHAIRMAN SIEBER: Okay.

MR. HICKMAN: I don't appear to have a transparency for that. You will have it in your handout.

CHAIRMAN SIEBER: 43. PI Reporting.

MR. HICKMAN: Yes, PI Reporting. I used here an example, again, from the safety system unavailability indicator. The PI is defined in the

guidance document, NEI 99-02. And I've shown that definition here.

It's the sum of the unavailable hours to plan the unplanned and the fault exposure hours.

MR. UHRIG: What do you mean by fault exposure hours?

MR. HICKMAN: Fault exposure hours are the hours that a train was in a failed state, but was undetected.

MR. UHRIG: Before you caught it?

MR. HICKMAN: He didn't know it was failed until some time later.

MR. UHRIG: How do you know when that is?

MR. HICKMAN: Well, if -- let's say you ran a surveillance test and it failed, but you could trace that back to some maintenance that was done some time prior to that test and if you could show that that's what caused a failure then you would count that amount of time.

MR. UHRIG: Okay, what about where there are two surveillances, one, it passed, one, it failed?

MR. HICKMAN: If you had no way of knowing when the failure occurred --

MR. UHRIG: Then you've gone all the way back to the other one?

MR. HICKMAN: What you do is you use half the integral.

MR. UHRIG: Half the integral.

MR. HICKMAN: The standard statistical technique, assume it's a uniform probability of failure, divide by 2. It's good for large sample sizes which we don't really have, but that's the way it's typically done.

MR. UHRIG: All right.

MR. HICKMAN: And that's an issue that's been a problem in this program for quite a while. There's a lot of serious discussion about the use of T/2. We have had a number, about three failures of 18 month surveillance tests, which meant licensees had to count 9 months of unavailable hours which is -- and then that sticks with you for three years, basically.

CHAIRMAN SIEBER: But that's been the fact for a long time, you know. I remember that from 20 or 30 years ago.

MR. HICKMAN: That's pretty standard, pretty standard technique.

So we do that. That is how we calculate a train unavailability, per train.

MR. KRESS: The hours train is required, is that to differentiate shut down conditions when you

don't need it?

MR. HICKMAN: Well, ideally it should. What we're doing right now and what WANO does is to simply lump them together. Ideally we would have separate indicates for power operation and shut down conditions, but right now we just lump them together.

MR. KRESS: This is just the number of hours over which you determine the unavailability then?

MR. HICKMAN: Yes.

MR. KRESS: So it's the code of thermal errors.

MR. HICKMAN: And what's used there is the hours that the train is required per tech specs which means if you're shut down and tech specs only require one EDG, you can take the others out and do whatever you want to with them and not have to count the hours.

Now the other thing that INPO did, INPO actually developed the indicators in the late 1990s and WANO started using them in 1995. INPO developed them in the early 1990s. They did some tests collecting actual data and then looking at easier ways to calculate unavailability that would be less of a burden on licensees with regard to the data they have to submit. And they found that by taking these -- the

train unavailabilities of a system and averaging them together, they came up with a system unavailability that tracked pretty well with the real thing. The numbers weren't the same, but they tended to go in the same directions. So this is what they used and it's what we are now using. It's not right. Ideally, you would want to know when both trains were out at the same time. You'd have to have the timing information, but rather than collect all of that, they said this is close enough and it suits our purposes and that's what they were using and so that's what we're using. We recognize the weaknesses.

MR. KRESS: But that other information is probably available, just harder -- more work to get it.

MR. HICKMAN: Yes. And as you know, the Office of Research is developing the risk-based indicators and they're trying to get information like that into the EPIX system so they can calculate unavailability.

What the licensee actually submits to us then is four numbers for each train, the planned unavailability, the unplanned unavailability, the fault exposure hours and the hours the train is required.

They send that to us in an e-mail with an attached file that is actually a delimited text file. That comes into our system here and it's automatically dumped into a spreadsheet and each of those numbers is put in the right bin. It's all automated. That spreadsheet then calculates the values. That's been thoroughly checked. All through the pilot program we checked that to make sure it works properly.

So really the processing is hands off. We do nothing with it until it's all in this spreadsheet. We then take that spreadsheet. We send the data back, first of all. We send the delimited text files back to the licensee to say this is what we got. Is this what you sent? That's the confirmation process that takes about a week.

Then once they've confirmed that the data we've received is accurate, then we review it. We give the regions a chance to look at it and within a week then we put it out on the external web.

Actually, at the end of the first week you put it on the internal web for the regions to see and a week later then we put it out on the external web.

And that's really all there is to the data processing.

Are there any questions?

CHAIRMAN SIEBER: So basically, the way you're using performance indicators differs from the way plants use it. Plants use it as a predictive measure and they collect sometimes as many as 250 different performance indicators saying that if you have backlogs building up and so forth, that that's an indication that your maintenance program, your corrective action program or what have you is declining and so they use that to redirect resources. What you're doing is calculating and reporting changes in risk, in effect, which is more or less real time. If unavailability goes up, then the risk changes for a given plant. And if reactor trips go up, the risk from ATLAS is changed and so on down the line. So there is a different concept between the way utilities use performance indicators and the way you folks are. And I think you have to do it your way so that it matches the regulatory system. You don't want to be in the business of managing the plant the way a plant manager would do it.

So I think that's appropriate, what you're doing.

MR. HICKMAN: That's exactly true. There are a number of good indicators that will work if people don't know you're tracking them and that's good

for plant managers to be looking at those kinds of things like backlog. For us to take them and put them on the web would not be good.

CHAIRMAN SIEBER: Well, you don't have regulations that speak to backlogs.

MR. HICKMAN: Right. In fact, the backlog will go away instantly if we start --

CHAIRMAN SIEBER: All you have to do is sit down and do some homework.

MR. HICKMAN: That's right.

MR. JOHNSON: This whole shift in the process with respect to our use of performance indicators was really dramatic from what we had done prior to the oversight process and to be quite honest, we were a little bit surprised at the industry's willingness to go forward with some of the performance indicators. By that, what I mean is we've got thresholds on scrams for 7,000 critical hours and there's no regulatory requirement that says that a plant shouldn't have four scrams per 7,000 critical hours --

CHAIRMAN SIEBER: Or 10.

MR. JOHNSON: Or 10.

CHAIRMAN SIEBER: Except it does change the risk.

MR. JOHNSON: So what we did, what we set out to do and what we were able to accomplish is that we chose a set of indicators that we believe is indicative, now they're not perfect, they're not as risk-informed in some cases we would like them to be, but they give us insights along with inspections into issues that begin to emerge at a plant at a level where we as a regulator ought to engage as opposed to where licensee management ought to be doing its business.

CHAIRMAN SIEBER: Okay.

MR. LEITCH: Has this definition been the one you've used here in this whole one year, initial one year period?

MR. HICKMAN: Yes.

MR. LEITCH: Have any of the other definitions changed during the one year period like scrams and if so, how did they change?

CHAIRMAN SIEBER: Yes, they did.

MR. HICKMAN: You may be aware that we just finished a pilot program for replacement scram indicator. Are you aware of that?

There were a few people in the industry who were concerned about unintended consequences, unintended influences on operators from counting

manual scrams, so the industry -- industry representatives working within NEI developed an alternate indicator to replace that one and we just finished a pilot program. The intention is to count exactly the same thing and that was automatic and manual scrams, but without ever using the word scram in the definition, so it's kind of a funny thing. But we are looking at that now. We have criteria to evaluate that against and we'll use that to serve as a replacement.

MR. LEITCH: That's one thing that confused me. In the pilot program you counted both manual and automatic scrams, just like the initial one year program, it's just the matter that they didn't call them scrams?

MR. HICKMAN: Right, that was the intent. Whether we did that or not is still yet to be determined. We're looking at the data now. We just got it in, final, couple weeks ago.

CHAIRMAN SIEBER: Well, that particular argument goes back about 10 years because the industry made the same arguments to INPO that says you're going to inhibit the operator from manually tripping the reactor and the INPO philosophy is to trip it manually before some automatic system takes you out which

lessons the transient on the plant in a lot of cases and so I guess I wonder whether counting manual scrams is really the right thing to do, even though from the standpoint to causing an initiating event by the twist of a wrist does change the risk of the plant because it causes a lot of other things to happen.

Is there something on either side of that question as to whether you count it or you don't count it?

MR. HICKMAN: As you know, the AEOD PIs agreed to use the same definition as INPO.

CHAIRMAN SIEBER: Right.

MR. HICKMAN: When they started those in 1985.

CHAIRMAN SIEBER: Right.

MR. HICKMAN: And we only counted automatic scrams while critical for that reason. But there were people here who were concerned that operators might try to beat the PI by manually scramming it, so we monitored that we never really saw any signs of that. Manual scrams have remained relatively constant around 40 per year, up until the last couple of years. Some as high as maybe 55, some down to about 29 or so, but roughly averaging around 40. They're down a little bit now, down into the low

30 range, but of course, the automatic scrams have come way down from several hundred, down to about 50.

CHAIRMAN SIEBER: Right.

MR. HICKMAN: But from the very beginning and working with NEI on this, we never really doubted whether we needed to count manual scrams because the conditions in the plant that require a scram are the same and whether the operator manually scrams it or it takes an automatic scram, whatever has gone wrong with the plant that required that scram is what we want to count.

CHAIRMAN SIEBER: Yes, but the technical challenge to the plant is typically less because you haven't reached the set point or the limiting safety settings.

MR. HICKMAN: That's true. As the operator scrams it, he may prevent other automatic actions by not reaching --

CHAIRMAN SIEBER: And less than the excursions that the plant goes through during a shutdown.

MR. LEITCH: But this new definition, revised definition, not using the word scram is separate pilot program. That is, the initial one year period, nothing has changed during that period?

MR. HICKMAN: No. We're still using the same indicator that we started with in the pilot program and it says the indicator counts all automatic and manual scrams while critical.

MR. LEITCH: Was there a change or is there a change being contemplated with regard to unplanned power changes?

MR. HICKMAN: Yes. We're getting ready to try a pilot program on a replacement for that. Actually, there are two proposals, one from the NRC and one from NEI that we'll pilot. The concern there is that we had a 72-hour rule, basically it said if the time between the identification of a problem and beginning to insert negative reactivity is greater than 72 hours, then it doesn't count. This was something that was of concern to NEI and the industry that we shouldn't count power reductions that are planned. It was never the staff's intention. We never worried about whether it was planned or not. We used a definition that's in the monthly operating report and there, the distinction was not planned versus unplanned. It was forced versus schedule which is not exactly the same thing.

CHAIRMAN SIEBER: That's right.

MR. HICKMAN: And what we captured in the

monthly operating report was whether they had to come down at the first available opportunity to fix it, or whether they could ride through that and continue on.

At that time, when the monthly operating report was put into place, the first available opportunity was considered to be the next week. So that was the criterion. But what's happened is with the 72-hour rule, that provides an incentive for licensees to --

CHAIRMAN SIEBER: Struggle along.

MR. HICKMAN: And ride it out. And in fact, we had a licensee who was very forward with us and he told us, I can't afford another power change. I'm going to ride it out and he did that a couple of times.

In defense of the licensee, he didn't do it when he thought it was a safety problem, so even though it was going to cause him a problem, he did shut down and he did count it, but when he thought he could get away with it, he didn't do it.

CHAIRMAN SIEBER: Well, that's one of the problems with performance indicators across the board. People know what the thresholds are and what the goals are and they will manage the plant to meet those expectations. And that's not always in the plant's

best interest.

MR. JOHNSON: That's right.

CHAIRMAN SIEBER: And so that should be an important factor when you folks are divining what kind of performance measures you're going to use, because you might as well face it, people do manage to those indicators.

MR. JOHNSON: Absolutely.

MR. HICKMAN: That's true and this is a particular problem in the initiating events cornerstone and the mitigating systems cornerstone.

CHAIRMAN SIEBER: That's right.

MR. HICKMAN: We've had a number of successes in the program in the emergency preparedness cornerstone and in the physical protection cornerstone. If we could make all of the indicators like those in the EP cornerstone, they provide the incentive for the licensee to do the right thing, that is, we've got a drill exercise performance indicator and a drill participation indicator. And if he's having problems with either one of those, the answer is to run more drills and get more people in the drills. And we've had great success. We've had people who were not paying attention to whether there were people who were actually getting trained or not

on a regular basis and when we started the PI, they realized that and they responded and they brought their PIs down to within the green band. And that's good, if everybody stayed within their green band, that would be good.

The same thing happened in the security equipment performance index. We had a couple of licensees who had very bad problems with their security equipment and had just never gotten management attention and as soon as the PI came out and the manager looked at that, he said what's this all about and he immediately fixed the problem.

CHAIRMAN SIEBER: Yes, but there was a practice among licensees in security to say that if I put a watchman in place or a response officer in place of the defective piece of security equipment, that compensating measure was equivalent to having that piece of equipment in the service, so they would sit down and calculate it's going to cost me $25,000 to fix a TV camera, how long can I keep a watchman there to watch that zone? And will I, in effect, make out economically by doing that? Okay, so what you've done there is change the economic balance of supply/demand situation for the management.

MR. HICKMAN: Sooner or later though

they'd have to fix it, but I mean at some point the cost of the guard is going to exceed the cost to fix it.

CHAIRMAN SIEBER: That's true. It all depends on whether you have capital money or operating money to spend.

MR. HICKMAN: That's true.

CHAIRMAN SIEBER: Some day I'll have a meeting to explain the power plant economics, but some plants don't have capital money. You know, they just don't have a rate base, so they don't want to spend it.

MR. SHACK: Has anybody objected to any of these PIs as a backfit?

MR. JOHNSON: Not to my knowledge, no.

MR. COE: There has been some discussion at high levels regarding the earlier question, the earlier point that was made is that these aren't based on regulatory requirements and therefore there's a question out there about de facto regulation. But I think that those haven't been, there hasn't been a unified chorus of individuals out there that are complaining about that. I'm speculating, but I think it's primarily because they see greater net benefit, you know, the disadvantages as they perceive them are

offset by the benefits of the program. So they're willing to work with us and continue to evolve the program to what they hope would be better in the future.

MR. JOHNSON: I actually think we could be more positive. There was concern early on about whether we needed a regulatory requirement to collect these, regulation to collect these performance indicators and NEI said God forbid, don't do that. And we said okay, we'll have this voluntary PI program and if you guys don't give us PIs, we'll go do baseline inspection to get the insights. Well, we've not had licensees not give us performance indicators because they don't buy the program.

Now having said that, we work very closely with the industry and other stakeholders and the public meeting to refine the reporting criteria, to make sure they're reasonable and understood. So it's been a lot of work for us to be able to implement this voluntary aspect of the ROP. But there's not a course there.

MR. SHACK: I hear that plants collect 200 PIs and whenever the risk-based PIs are mentioned, oh my God, the burden is incredible, can't believe it and it just somehow seems like a mismatch here. Again,

maybe there's a difference between collecting the data for your own purposes and swearing to the NRC that this data is accurate and I'm ready to go to jail if it's wrong.

MR. JOHNSON: Yes and those are some of the issues. In fact, the last time I sat in on the risk-based performance indicator talk that you all were given by Research and that is what licensees tell us. I think what we heard from licensees of late is we've got this new oversight process. We've got PIs associated with that process. Why don't we live with that for awhile and why don't we consider very carefully adding additional performance indicators that could result in additional burden. So there is definitely that theme that we're getting.

And again, when we go to collect performance indicators, I sort of am remembering now how that last risk-based performance indicator briefing went and some of the issues that came up that were discussed and I think we have an IOU, as a matter of fact, to the ACRS that came out of that briefing, but again, remember, the performance indicators provide a valuable piece of information. Now the performance indicator program is a voluntary program. It turns out there are OMB clearance requirements,

requirements with respect to collecting data from more than nine licensees. So if we go to do that, we've got to make the case about burden and about benefit. And so we're -- we think we are appropriately cautious with respect to adding new PIs to make sure that they give us the benefit that we need, but at a cost that is appropriate.

That was some of the sense that we discussed last time. You're right. You do hear the industry say hey, don't give us a whole bunch more of performance indicators when what we have is okay for now.

CHAIRMAN SIEBER: I think the other problem that comes up sometimes is the fact that if NRC comes out and says I want this performance indicator and I'd like you to send it to me, but my definition is different than WANO's, then the licensee sees that as a whole new indicator because they have to engage somebody to produce it every month for you. I think on the other hand, the industry appears to prefer risk informed and performance based regulation to deterministic regulation and if it adopts that kind of preference, they have to cooperate and I think that's what you're seeing.

MR. HICKMAN: And you hit on one of their

big concerns and that is if they have to calculate unavailability one way for WANO and another way for the maintenance rule and another way for us --

CHAIRMAN SIEBER: That's right.

MR. HICKMAN: That's a burden.

CHAIRMAN SIEBER: It's confusing too, because it's usually the same person who's doing all the calculations and to keep all that stuff straight for a whole bunch of different indicators is troublesome.

MR. HICKMAN: Especially if you're going to be held to 50.9 requirements for sending it to us.

CHAIRMAN SIEBER: That's right.

MR. HICKMAN: The other aspect of that -- I just lost it. Oh, the other aspect to the more indicators is in their view it's just more ways to go white and why do we need more ways to go white if we've got 18 already that work.

MR. JOHNSON: Okay, that captures the discussion we plan to have on performance indicators although I do note that Garrett is in the room.

CHAIRMAN SIEBER: Too late. Unless one of the Members has a question that they would like to direct to Garrett.

[Slide change.]

MR. JOHNSON: Okay, the last section that we want to cover and we've just got a couple of slides is there were some selected issues. Two of the SECY issues I think we've already talked about, and that is we talked about thresholds and the threshold for green to some extent. Hopefully, you're satisfied and we don't need to talk about fire protection any more, because the fire protection people are no longer in the room and I can't even spell fire protection.

CHAIRMAN SIEBER: Well, I'm the chairman, but the one who asked the question isn't here. So I'll take it upon myself the duty to go over it with him.

MR. JOHNSON: Okay, the last topic that we wanted to talk about was the topic of cross-cutting issues because we know there has been some interest with respect to this topic and for that Jeff Jacobsen is going to talk very briefly about cross-cutting issues.

[Slide change.]

MR. JACOBSEN: Okay. I guess where we left this, just a little brief history as cross-cutting issues is something that has come up throughout our engagement with the public and internal stakeholders with regard to how cross-cutting issues

are treated in the new oversight process. And cross-cutting issues we defined originally as three issues: human performance, safety conscious work environment and problem identification and resolution. So when we talk about cross-cutting issues, those are the three things we're talking about.

The fundamental assumption when we designed the framework for the revised oversight process was that these cross-cutting issues would show up either in the performance indicators or in the baseline inspections, in a sufficient time frame to allow us to engage before a real safety issue arose.

We consciously did not design a program to specifically go after human performance, for instance, because we thought that if human performance was weak, it would show up in one of the performance indicators, reactor trips or unavailability if it was maintenance related to human performance, etcetera.

With regard to safety conscious work environment, a similar analogy was thought that weaknesses in that area where people are afraid to bring problems up or there's retribution, our experience has been that those facilities performance has suffered as a result of that and we would see it.

CHAIRMAN SIEBER: You would also see that

as allegations, would you not?

MR. JACOBSEN: Right, which we also monitor kind of outside of the performance indicators and baseline inspection, but it is part of our overall process.

We do, however, have a significant portion of our inspection program that's directed at problem identification and resolution because we believe that is a very important part of the process, so we look at that. We were looking at it annually. We recently made a decision to change that to a once every two year inspection. So we do look at that.

CHAIRMAN SIEBER: How do you determine whether the licensee for any given plant has set a low enough threshold for formally identifying problems?

MR. JACOBSEN: Our experience has been that each licensee's program is somewhat unique.

CHAIRMAN SIEBER: That's right.

MR. JACOBSEN: We don't have a go-no go, per se, for what's a low enough threshold. What we would use would be if we, for instance, in our other inspections identify problems that we think are significant, that the licensee didn't get into their corrective action program for whatever reason, we would infer that they do not -- they either don't have

a low enough threshold or they aren't looking in the right direction.

If we're finding stuff or other external organizations are finding issues, and the licensee isn't finding them, then that's either a threshold question or a question that they just aren't looking in the right areas.

CHAIRMAN SIEBER: Well, how do you weave that into the regulatory system? I mean you could determine that through observation and inspection, but how do you bring that --

MR. JACOBSEN: How do we act on it?

CHAIRMAN SIEBER: Well, how do you relate that to the requirements of the regulations?

MR. JACOBSEN: Well, Appendix B has -- is really the appropriate regulation.

CHAIRMAN SIEBER: You can cite anybody for anything through Appendix B.

MR. JACOBSEN: Right, well, most things. There are some areas that Appendix B isn't applicable and that has actually come up in this process, emergency preparedness, for instance.

CHAIRMAN SIEBER: Right.

MR. JACOBSEN: Appendix B is not applicable.

The way we deal with it is if we were to have an inspection finding that turned out to be a significant finding and if we found out the root cause of that finding was related to threshold issue or improper evaluation of a previous issue, we would deal with that in that manner.

CHAIRMAN SIEBER: Okay.

MR. JACOBSEN: It would be on a for-cause basis for the most part.

MR. LEITCH: What's the basis for moving that inspection module from annually to semi-annually?

MR. JACOBSEN: That was a very general statement of what we're doing. In addition to changing the frequency, we've done some other things. We've beefed it up a little bit so although we're going to do it less frequently, we're going to add some resources to it because we think that the look every two years in a deeper way is more effective than doing it annually in not as deep a way.

The basis for it in our experience, licensees' programs such as this will not change significantly on a one year basis. We've seen declines in corrective action programs, trends, but we believe that a frequency of every two years will be sufficient to pick that up and if we went and did an

inspection at a facility and found they had a good, corrective action program one year, it would be highly unlikely, in our opinion, that it would decline significantly in one year. It's more of a cultural -- it's almost analogous to plant culture. And that's something that you know takes a long time to turn around. It also pretty much takes some time to go down. So that's -- we're also adding some additional requirements where we're going to instead of doing a team inspection, we're going to look at some limited samples throughout the two years on a per inspector basis. So every so often, one of the inspectors is going to pick something in the corrective action program and do an in-depth inspection of that one item. And then every two years the thought would be that you would integrate all those insights that you got throughout the year, as well as the insights you got while you're doing the team inspection into a more broad assessment of the corrective program.

MR. LEITCH: Okay.

MR. JACOBSEN: And the last thing we're going to is an we'll talk about this a little more when we get to the action matrix discussion next time, in July, the other element that we're adding is is we're beefing up the role of this PI&R inspection or

I guess I should say if a plant would end up in the action matrix in the degraded cornerstone column, we would, in fact, consider -- the regions would consider doing a problem identification and resolution inspection. We think that provides a better opportunity for licensees, for the NRC to look at the performance of the licensee and the performance of the PI&R program in a specific event where they've crossed some thresholds. So we think, in balance, even though we say we're going from a single year to a biennial frequency, we've done some other things of PI&R that we really believe make it more, a much more effective inspection.

MR. FORD: Just for information, what does move out of the licensee response band, they don't correspond with it? What does it mean?

MR. JACOBSEN: The second item?

MR. FORD: Yes.

MR. JACOBSEN: Okay, I'll go into that. Our experience with the first year of implementation of the revised oversight process has pretty much supported the first assumption and what we mean by that is plants that we've looked at and we have concerns about in the cross-cutting areas and primarily they've been in the problem identification

and resolution area. For instance, if we did our annual team inspection and we had a lot of green findings, we haven't had any white findings or greater as a result of the corrective action inspections. We've had very few white inspection findings overall. But in the PI&R area we haven't had any. But we've had a lot of green ones and if you look at the plants where there's been a lot of green findings and where the inspection team came away with concerns about the adequacy of the program, in all cases those plants have moved out of the first column, that licensee response column of the action matrix, either to a degraded cornerstone column or a regulatory response column which has allowed us to engage further and to look in a more programmatic sense at the corrective action program.

A good example of that is Kewaunee where we had concerns with their performance during our problem identification and resolution inspection. They had a yellow performance indicator and when we went out and did that, we identified broader concerns with the corrective action program as well. As a result, they totally revamped their corrective action program.

So these four facilities are examples of

facilities where we had concerns after doing the baseline inspection and they also -- we had opportunities to look further as a result of our supplemental inspections.

The contrary to that is we have not identified any plants where we have significant concerns in the cross-cutting areas that have not moved out of the licensee response. So it's been a very close tie between the performance and actually crossing the thresholds that allow us to engage further.

The third bullet, no significant precursors caused by cross-cutting issues, well, in fact, the definition of significant precursors, I believe, is an event that's defined as having a 1 in 1,000th greater chance of leading to a reactor accident. There haven't been any of those period.

Really, if you were to look at the fundamental assumption and the basis of the ROP is we would be concerned if we had, for instance, one of these significant precursors and found out they were caused by a cross-cutting issue and we didn't have an opportunity to go after it and prevent it. That hasn't occurred.

The way we're going to deal with that is

kind of on the next page. We're going to look at things at a threshold actually lower than significant precursors. We're going to look at ASP events and inspection findings that come out yellow and red and we're going to look and see in those instances whether cross-cutting issues were one of the root causes that caused the event or the inspection finding to occur. And if so, would our program have at least given us the opportunity to identify those type of issues.

So I guess the bottom line is we believe our fundamental premise of the ROP with regard to cross-cutting issues still appears to be true. However, we still have some on-going actions to continually challenge that and ensure that, in fact, we are focusing our resources in the right direction, as we do with all areas. It's not limited to cross-cutting issues.

That's pretty much all I wanted to go into.

MR. JOHNSON: Very good.

CHAIRMAN SIEBER: Thank you very much, appreciate it.

I'd like to take a few minutes to ask if any Members have any comments that they'd like to make based on what we've heard today?

MR. UHRIG: I just have a question. This was handed out. I don't know if you handed it out or this came from somebody else.

MS. WESTON: I passed it out and my only question is what are the titles of the codes.

MR. UHRIG: Among other things.

(Laughter.)

CHAIRMAN SIEBER: Okay, there are the seven cornerstones.

MR. UHRIG: The other question had to do with there's a number after, for instance, white 3. Does that mean three findings?

MS. WESTON: That's the inspection summary findings for the first quarter.

MR. UHRIG: That would be third quarter, 3 would mean third quarter?

MS. WESTON: That's what he's looking at. This is the first quarter. This is all the first quarter. These are cornerstones.

MR. UHRIG: What does the 3 mean?

MS. WESTON: I don't know.

CHAIRMAN SIEBER: Since we're still on the record, maybe we could have people speak into the microphone.

MR. JOHNSON: What you're looking at is

one of the web page printouts and we've got a number of these employees to summarize the results for all of the plants, in addition to be able to pull up any individual plants, these are the performance indicators and the inspection results. So Don is going to try to answer the question.

MR. HICKMAN: What you see here is for each plant and each cornerstone, you see the inspection finding results. What they show there, the ones with the numbers, the color is the color of the highest, the most significant one and the number is the total number. It doesn't necessarily mean there are three whites in that block, but it means there are three and the highest one is a white.

MR. UHRIG: Okay. So I take it where there's no number, there's only one finding?

MR. HICKMAN: Yes.

MR. UHRIG: For example, most of the greens are that way?

MR. HICKMAN: Yes.

MR. UHRIG: Okay.

CHAIRMAN SIEBER: The other question was there are a large number of no findings. That means simply that this is the first quarter and during that first quarter there was no evaluation?

MR. UHRIG: No.

MR. HICKMAN: They had -- they conducted inspections and had no findings.

CHAIRMAN SIEBER: None at all.

MR. JACOBSEN: They may or may not have done an inspection in that area. In either case, there were no findings.

MR. BONACA: And green means simply --

CHAIRMAN SIEBER: That there was a finding.

MR. BONACA: Yes, but for example, the initiators, the first category, a green would mean simply that it was --

CHAIRMAN SIEBER: Well, it means there was a finding which means there's a deficiency, but it's within the licensee's prerogative and control to fix it.

MR. JOHNSON: Exactly.

CHAIRMAN SIEBER: Without additional enforcement emphasis.

MR. UHRIG: Notice in some cases, sister plants for instance here, Peachbottom 2 and 3 had whites both -- is that a common failure? Is it a site failure? Is it just the individual plants happen to come out that way?

MR. HICKMAN: It depends.

MR. UHRIG: Same with quad cities.

MR. JOHNSON: Every unit has -- the ROP is specific for the unit with respect to the performance indicators and the inspection findings. And so it's entirely possible.

MR. UHRIG: Is that cornerstone emergency preparedness?

MS. WESTON: Occupational radiation safety. It's the sixth column.

MR. UHRIG: Internal rad.

MR. JACOBSEN: And in some cases the finding can affect both units. In other cases, it may be two separate independent white findings of a unit.

MR. HICKMAN: For the cornerstones and site white programs like EP and occupational radiation safety and security, they both get account.

MR. BONACA: The question I have is you pointed out that there is a correlation between plants that has a problem and the effectiveness of the corrective action program and I always believed that. But a question I have do you have any specific set of indicators on the corrective action program being used or is it so, is it again considered subjective by a licensee, a judgment he may express on that?

I'm going to the fact that more and more we are speaking about objective evidence and when I look at this data, I mean I can interpret it and it tells me something. But I still believe that the corrective action program tells me much more than anyone of these boxes. That's my personal belief, if I could get into it. And so the question I have is when you do the inspection, since there is no quantitative assessment that is translated into a caller, do you use some specific indicators and are they agreed to by the licensees?

MR. JACOBSEN: I'll answer it a couple of ways. First of all, we have some indicator and that is if we have findings we do run those findings through the SDP so we have either so many green issues or so many white issues. That's a very crude indication.

MR. BONACA: Okay.

MR. JACOBSEN: The second, I guess, answer to that is every licensee has their own set of indicators that they're using to measure their programs. The problem is that eery one of these programs is different and every licensee has a different set of indicators with different thresholds.

The third answer is we understand it would

be a big improvement if we could develop some more objective ways of assessing these corrective action programs. Because our assessment right now is largely qualitative and not quantitative. So we do have a task group that we're working towards and it may not be performance indicators as we think of them today, but we are looking at developing a more objective way of assessing the corrective action programs. And if we were to come up with indicators, we would have to get industry to buy in. It gets back to the question that we raised, how much burden do we want to add for what gain? We might have to develop site-specific thresholds, for instance, and then you have to validate the indicators.

MR. BONACA: But typically, you do have some -- like threshold level, is it low or high? And you have some way of -- agreed to by the industry. I mean I've seen, I can go from one site to the next and I've been there looking at corrective action programs and I can see they all speak the same language, pretty much, because there is a lot of shared information today. The other one is categorization. Okay, what do you lump into category 1, 2, 3? Do you have the right percents distributed there? What is the time of response? I'm just pointing out that maybe, by now,

there is more consistency among the programs than not.

MR. JACOBSEN: Well, they're becoming more consistent and we're -- and the industry has done some work in this area and INPO has some inspections that they do. Nobody has been able to come up with any joint performance indicators.

MR. BONACA: True.

MR. JACOBSEN: But we're looking and we're going to continue to look at that and the types of things you mentioned are good. WE do have our procedure broken down into areas that we look at. We look at threshold and we look at prioritization and we specifically have attributes that we look at in each of those areas, but to take those and quantify them is a whole -- I know two plants, one that has 10,000 items they put in their corrective action program a year, and one that has 1,000 and they both may work real well. It's just how those two programs are managed. It's very hard to say to somebody you need to have so many thousand items in your corrective action program or your threshold is not low enough. You don't want to do that. You have to be real careful.

MR. JOHNSON: John, did you have anything you wanted to add? I know you like to talk on this

topic.

MR. COE: Only that your comment is a very good one and it's been one that I know that I've been thinking about a lot for several years, because the process of these inspections is as Jeff indicated, very qualitative. At one point, as -- in my previous existence as an analyst, I actually went out and tried to do some more quantitative look at corrective action programs by taking the current open issues and gauging them according to their functional impact and then also gauging them in accordance with their risk importance, and then essentially combining those two elements for that each item to come up with kind of a composite list of those issues which were both functionally, had functional impact associated with it and had risk significance. And that might be one way of assessing whether or not the licensee is applying the correct priorities, okay, and investing the right level of resources, if they're grading their resources in a manner which makes sense from a risk standpoint.

In addition, there's a question out there that could be asked about what about the accumulation of lower level issues that in the risk kind of sense combined together, synergistically, to provide a greater risk impact than each one looked at

individually. So these are the kinds of issues and the kinds of questions you're raising are very good ones and they're ones we've been thinking about.

MR. BONACA: Well, the reason why I raise this is also some, for example, some licensees are more aggressive because they have been having problems and they tend to do more cause analysis. Others, who believe they are very good or they believe that, they tend to say we do too much and so they go now to apparent cause in many more cases because there is some kind of complacent setting. You'd be surprised how the first type of individual finds more things. Therefore, you tend to say he has more problems. And the other one doesn't find that much because he does all the apparent causes and very few causal evaluations and on the surface he has less problems. And so you tend to think the other guy is better off. I've seen these cases and compared them and you are surprised on how you can get truly the wrong conclusion. And so that is the point I was making. Maybe there are some indicators that can be determined to help in that process because I think it's such an important area.

MR. JOHNSON: Very good. I think it's a good point. The last thing I would point out with

respect to that is that we raised this issue with the industry, continue to raise this issue with the industry and the last time we raised it with the industry, you might appreciate that the industry doesn't feel like we need to do more with respect to performance indicators particularly in this area.

MR. BONACA: Somehow I'm not surprised.

(Laughter.)

But they don't mind that you are looking into it, right?

They can't do anything about it. That's the fundamental area of inspection.

MR. JOHNSON: That's right.

CHAIRMAN SIEBER: I guess I'd like to ask if any other Members have questions or comments that they would like to make at this time?

MR. SHACK: I guess just the one I'd make is it seems to me like such a fundamental area, that is one you wouldn't want to back off on the inspections and that's always the price that industry is looking for. Yeah, we'll give you a PI if you back up. But this certainly seems like about the last inspection you want to back off on.

MR. JOHNSON: Yes, absolutely, and that's why I was careful to say we don't believe that we're

backing off on PI&R. We think that what we're putting in place is a more effective PI&R and that's really the focus of our changes in that particular area, although I think there is a net decrease of 25 hours a year or something.

MR. JACOBSEN: Yes, it about 5 or 6 percent. That's on paper anyway. What actually gets implemented is --

CHAIRMAN SIEBER: Actually, it seems to me that the number of modules in their rigor has increased under this new program from what it was before which has pluses and minuses and the pluses, of course is more directed inspection and the minuses, that there's less abilities for the region and individual site inspectors to use their discretion to respond to special situations in the plant. And I guess that as you gain more experience in the inspection process, you'll be able to judge whether the balance that you now have is appropriate compared to something more akin to the past practice which seemed to have more flexibility in it than the current system.

MR. JACOBSEN: Actually, the change we're making in PI&R responds to that very comment, that one of the regions felt strongly about having this part of

the program where we could look at things in a more real time basis than they thought. So rather than doing it as a team once a year, we're going to pick these things throughout the year. So that actually responds to that flexibility question. So we are looking at that and making changes as appropriate.

CHAIRMAN SIEBER: Right. Okay. Any other questions or comments?

MR. LEITCH: I'm still just perhaps a little confused about the expectations for the predictive nature of this reactor oversight program.

If you had a hypothetical plant that was running along with basically green performance indicators and no color inspection findings, and then it's had a track record of that for several months, a year and then you come through some self-reviewing event, you find that the plant has a lot of problems and winds up in a regulatory shutdown, would you be disappointed with the reactor oversight program or would you say well, this is not a predictive program, we had no way of knowing that?

I'm still groping for what the expectation is there.

MR. JOHNSON: Yes. If we saw a plant -- we as an Agency, we constantly look at these

situations and we do a lot of hand wringing and soul searching and we try to make decisions about whether the process, the performance that results is a process failure. And if I saw a plant that was in the licensee response band that ended up in the degraded cornerstone corner, that doesn't mean that we've had a programmatic failure.

Now in our self-assessment matrix we look, we will look, we continue to look at jumps in plant performance across multiple columns of the action matrix to see if there was something that should have been in the process that was not in the process. But the process hasn't failed because again, we haven't built a process that we guarantee predicts that kind of thing.

If you tell me, if you're painting a picture of a plant that was in the licensee response band today, that tomorrow we have to issue an order to remain shut down, that is their performance is unacceptable, then yeah, I think we have to really step up to the plate and talk about whether we need to do something drastic with respect to the program.

MR. LEITCH: I mean admittedly, I have not seen such a thing. I'm not saying such a thing exists. I just don't understand your expectations.

Thank you.

CHAIRMAN SIEBER: Any other questions? Since there are none I would like to comment to you, Mike, and to all the speakers today that I think you have been very responsive to the questions that we asked. I thought your presentations were well prepared. And I think that you're on the right track, but you've only been in this business for a short time and I'm sure you're still in the learning process and as time goes on you, for sure, will make some adjustments in what you're doing today, but it just seems to me this is a step forward and I want to thank you for putting in the time and effort to give us good presentations and well thought out responses.

So with that I think we can conclude, unless anyone else any comments or statements to make. We can conclude with today's meeting and again, thank you very much.

MR. JOHNSON: Thank you very much.

(Whereupon, at 2:40 p.m., the meeting was concluded.)